ANALIZA STRUKTURNOG KAPITALA KAO KOMPONENTE INTELEKTUALNOG KAPITALA U IKT PREDUZEĆIMA

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Rezime

Uspešnost i konkurentnost savremenih kompanija zavisi od njihovog intelektualnog kapitala. Intelektualni kapital predstavlja nematerijalnu imovinu koja se može sagledati kroz tri osnovna podnivoa: ljudski, strukturni i relacioni kapital. Cilj ovog rada je istraživanje strukturnog kapitala i njegovih osnovnih komponenti: sistemi i programi, istraživanje i razvoj i pravo intelektualne svojine. Pilot istraživanje u ovoj oblasti sprovedeno je u periodu jun-avgust 2020. godine. Istraživanje je sprovedeno anonimnim upitnikom na uzorku od 102 ispitanika zaposlenih u kompanijama IKT sektora Republike Srbije. Rezultati su pokazali da su zaposleni u ovom sektoru ocenili sisteme i programe kao najvažniji faktor strukturnog kapitala. Ovi rezultati treba da posluže kao putokaz u upravljanju strukturnim kapitalom u kompanijama IKT sektora kako bi se kreiralo radno okruženje koje doprinosi ukupnom rastu i razvoju kompanije, kako u nacionalnom, tako i međunarodnom okruženju.

Ključne reči: *intelektualni kapital, strukturni kapital, IKT sektor.*

JEL: J24, O34.

Uvod

U savremenim uslovima poslovanja na izuzetno zahtevnom tržištu preduzeća u sektoru informaciono-komunikacionih tehnologija (IKT) dobijaju sve značajniju ulogu. Poslovne aktivnosti preduzeća sve više su usmerene na mogućnosti razvoja i implementacije IKT u poslovni proces, kroz primenu tzv. „pametnih rešenja" koje

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IKT preduzeća pružaju preduzećima drugih industrijskih grana (https://www.srbija.gov.rs/dokument/45678/strategije-programi-planovi-.php). Na taj način ovaj sektor postaje jedan od nosećih stubova društvenog rasta i razvoja. Uporedna analiza zaposlenosti u računarskom programiranju, savetovanju i povezanim aktivnostima ukazuje da je u periodu od 2010. do 2020. godine Republika Srbija zabeležila najveći rast zaposlenosti (14,21%) u IKT sektoru u poređenju na odabrane zemlje Dunavskog regiona (Kleibrink et al., 2018). Prema podacima Narodne banke Srbije (2020) u poslednjih pet godina izvoz IKT usluga beleži permanentan rast od preko 20% godišnje. Ako posmatramo indeks profitabilnosti on je u IKT sektoru šest puta veći u odnosu na prosečan indeks profitabilnosti za celu ekonomiju (Matijević, Šolaja, 2020). Sve veća inostrana tražnja za radnom snagom utiče na povećanje zaposlenih u ovom sektoru. U 2018. godini u Republici Srbiji poslovalo je 2.349 informatičkih preduzeća sa pojedinačnim godišnjim prihodom od preko milion dinara. U odnosu na delatnost najviše je bilo programerskih preduzeća (1.483) što čini 63% ukupnog broja. Ako posmatramo po veličini programerska preduzeća, u ukupnom broju IKT preduzeća dominiraju mikro firme (manje od 10 zaposlenih) kojih je bilo 1.086 (73,2%), malih preduzeća je bilo 322 (21.7%), srednjih 68 (4,6%), a u samo 7 velikih preduzeća (0,5%) bilo je više od 250 zaposlenih (Matijević, Šolaja, 2020). S obzirom da mala i srednja preduzeća predstavljaju pokretačku snagu IKT sektora trebalo bi ići na povećanje njihovog broja. U prvih osam meseci 2019. godine osnovano je 229 programerskih preduzeća, a da bi mikro firme prerasle u velika preduzeća najuspešnijim domaćim firmama potrebno je u proseku više od 10 godine (Matijević, 2019). Osnovni nosioci rasta domaćeg IKT sektora su izvoznici softvera. Analiza srpskog izvoza kompjuterskih usluga u periodu od 2007. do 2018. godine pokazuje da je izvozna osnovica u 2007. godini bila niska (62 miliona evra), dok je u 2018. godini izvoz premašio milijardu evra (1.016 miliona evra), što rezultira prosečnim godišnjim rastom od 30%.

Uporedo sa jačanjem trendova globalizacije i značaja IKT-a povezan je pojam nove ekonomije u kojoj znanje postaje „najvažnija sirovina, najvažniji izvor nove vrednosti, najvažniji proizvod i ključ upravljanja poslovanjem" (Stewart, 1998). Učenje i znanje su direktno povezani – proces učenja rezultira znanjem. Učenje se može definisati kao „proces unapređenja delovanja zahvaljujući boljem znanju i razumevanju relevantnih pojava" (Đuričin et al., 2018). Pod znanjem se podrazumeva „sistematizovano, logičko i organizovano, provereno i prerađeno iskustvo, u čiju smo ispravnost opravdano uvereni" (Trebješanin, 2008). Učenje je kontinuiran proces, pri čemu se od zaposlenih zahtevaju brojne promene koje su determinisane zahtevom za uvećanjem fonda znanja. Organizacija koja uči može se definisati kao „organizacija u kojoj ljudi neprestano proširuju svoje sposobnosti kako bi ostvarili rezultate koje zaista žele, u kojoj se neguje novi i prošireni model mišljenja, u kojoj je oslobođena kolektivna težnja i u kojoj ljudi neprestano uče kako

da rade zajedno" (Sengi, 2003). Ove organizacije sposobne su da stvaraju i obezbeđuju nova znanja i nove koncepte. Na taj način postaju fleksibilnije što im omogućava da mogu pravovremeno da reaguju na zahteve poslovnog okruženja, kao i da ostvare postavljene organizacione ciljeve. Rezultati pokazuju da su za zaposlene u javnim preduzećima u Srbiji novčana stimulacija i visina zarade nezamenljivi faktori motivacije, što pokazuju i rezultati istraživanja o organizacionoj posvećenosti zaposlenih u poslovnim bankama (Lekić, Vapa-Tankosić, 2018). Rezultati istraživanja (Lekić et al., 2019) o zadovoljstvu poslom zaposlenih u javnom sektoru su pokazali da zarada, saradnja sa najbližim saradnicima, mogućnost napredovanja, politika nagrađivanja, saradnja i dobri odnosi sa nadređenima i priroda posla su direktno povezani sa ukupnim zadovoljstvom poslom. Mogućnost učenja na radnom mestu, kvalitet timskog rada i nadzor rada tima pozitivno utiče na ukupno zadovoljstvo poslom u bankama (Lekić et al., 2020).

Razvojem IKT-a stvorene su brojne baze podataka koje omogućavaju brzinu i jednostavnost u obezbeđenju potrebnih znanja i informacija. Intelektualni kapital u preduzeću predstavlja osnovni pokretač inovacija i konkurentske prednosti u ekonomiji zasnovanoj na znanju kroz primenu sistema upravljanja znanjem, kao i ključni faktor kreiranja strategijske prednosti organizacije. Brojne studije ukazale su na značaj intelektualnog kapitala i njegov uticaj na poslovne performanse preduzeća. Ljudski, strukturni i relacioni kapital su međusobno povezani i ne mogu se izolovano posmatrati. Sprovedena istraživanja pokazuju da se ovim komponetama svuda ne pridaje isti značaj. To je podstaklo potrebu da se u ovom radu analizira strukturni kapital sa aspekta srpskih IKT preduzeća i sagleda međusobni odnos njegovih podkomponenti kako bi se moglo delovati na unapređenje nivoa, kako strukturnog, tako i intelektualnog kapitala.

Koncept intelektualnog kapitala

Intelektualni kapital može se definisati kao „proizvod tokova znanja u preduzeću, odnosno organizacionog učenja koga čine ljudski, strukturni i kapital odnosa sa klijentima i drugim stejkholderima" (Bontis, 1998), odnosno „kao imovina koja uključuje ljudski kapital, informaciono-komunikacione tehnologije, poslovne procedure i nematerijalnu imovinu koja može biti pretvorena u materijalnu i nematerijalnu vrednost" (Lentjušenkova, Inga, 2016).

U poslednje dve decenije razvijeni su brojni modeli intelektualnog kapitala koji određuju njegove osnovne komponente. Najčešće korišćena i citirana je podela intelektualnog kapitala na ljudski, strukturni i relacioni. (Sveiby, 1997; Bontis, 2002) Ljudski kapital odnosi se na „sposobnosti ljudi – profesionalno iskustvo, nivo obrazovanja i veština, metode obuke i obrazovanja menadžera i sposobnosti učenja, što podrazumeva razmenu znanja, sposobnost rešavanja problema, sposobnost upravljanja, grupe za uvežbavanje, preduzetništvo, liderstvo, podatke o razvoju i

usavršavanju" (Petty, Guthrie, 2000). Strukturni kapital nastaje transformacijom ljudskog kapitala obuhvatajući raznovrsne neopipljive elemente kao što su organizaciona struktura, procesi i rutine, običaji, baze podataka, sistemi i intelektualno vlasništvo (Edvinsson, 1997). Relacioni kapital kreira se kroz specifične odnose sa eksternim stejkholderima (investitori, kupci, dobavljači i kreditori). Ispoljava se kroz brend, reputaciju, odnose sa klijentima, saradnju sa partnerima, licence i kanale distribucije. (Janošević, Dženopoljac, 2012)

Zbog izuzetnog značaja za savremene organizacije, intelektualni kapital je bio predmet brojnih istraživačkih studija u različitim zemljama i sektorima poslovanja. U najvećem broju studija, polazna osnova za kreiranje istraživačkog upitnika bio je Bontisov upitnik o intelektualnom kapitalu (1998). Bontisovo prvobitno istraživačko okruženje bila su kanadska preduzeća i to: sedam iz finansijskih usluga, četiri iz hemijske industrije, četiri iz osiguranja, tri iz IKT sektora i dva koja su obavljala kurirske usluge. Cilj studije je bio da utvrdi koje varijable utiču na ljudski, strukturni i relacioni kapital i kak one utiču na poslovne performanse. Rezultati su ukazali da je ljudski kapital beskorisan bez podržavajuće strukture, odnosno strukturnog kapitala koji može da koristi i neguje njegove veštine.

Pomoću upitnika prvobitno primenjenog u Kanadi, Bontis et al. (2000) sproveli su empirijsko istraživanje u dva industrijska sektora u Maleziji ispitujući uticaj ljudskog, strukturnog i relacionog kapitala i njihovu međusobnu povezanost. Glavni zaključci ove studije su: ljudski kapital je značajan bez obzira na granu industrije; ljudski kapital ima veći uticaj na struktuiranje preduzeća u neuslužnoj industriji; relacioni kapital ima značajan uticaj na strukturni kapital bez obzira na industriju; razvoj strukturnog kapitala ima pozitivan uticaj na poslovne performanse preduzeća bez obzira na industriju.

Seleim et al. (2004) svojom studijom prvi istražuju prirodu ljudskog, strukturnog i relacionog kapitala u egipatskim softverskim preduzećima. Cilj ove studije bio je da se sagledaju ključni indikatori intelektualnog kapitala kako bi se dobile smernice za izgradnju jake baze znanja za budući razvoj intelektualnog kapitala. U istoj industriji Seleim et al. nastavili su istraživanje (2007) u pravcu analize odnosa između ljudskog kapitala i poslovnih performansi preduzeća na uzorku od 38 softverskih preduzeća koja su činili 107 članova Komore softverske industije u Egiptu. Korišćenjem odgovarajućih statističkih metoda, rezultatima je dokazano da postoji pozitivna i statistički značajna vezu između pojedinih komponenti ljudskog kapitala i poslovnih performansi preduzeća.

Wang et al. (2005) pomoću regresije metodom delimičnih najmanjih kvadrata (PLS) istraživali su uticaj intelektualnog kapitala na poslovne performanse u IKT industriji na Tajvanu. Dobijeni rezultati pokazali su da elementi intelektualnog kapitala direktno utiču na poslovne performanse preduzeća, osim ljudskog kapitala koji ima indirektan uticaj kroz kapital inovacija, kapital procesa i kapital kupaca. Takođe,

postoji uzročno-posledična veza između četiri elementa intelektualnog kapitala. Ljudski kapital utiče na kapital inovacija i procesni kapital. Inovacioni kapital utiče na procesni, a procesni na kapital kupaca. Kapital kupaca doprinosi boljim poslovnim rezultatima. Ove uzročno-posledične veze između osnovnih komponenti i podkomponenti daju implikacije kreiranje modela za upravljanje intelektualnim kapitalom u preduzećima IKT industrije.

Moslehi et. al. (2006) u svojoj studiji istraživali su komponente intelektualnog kapitala u iranskim osiguravajućim preduzećima u odnosu na 110 indikatora i specifično poslovno okruženje. Anketirani su menadžeri različitih nivoa. Najmanji značaj pridaju strukturnom kapitalu, što negativno utiče na ukupni nivo intelektualnog kapitala. Ignorisanje značaja intelektualnog kapitala može dovesti do monopola javnih preduzeća. Autori daju preporuke za unapređenje upravljanja poslovnim procesima i bolje odnose sa eksternim stejkholderima.

Sharabati et al. (2010) svoju studiju usmerili su na istraživanje odnosa između pojedinih komponenti intelektualnog kapitala i poslovnih performansi u farmeceutskom sektoru Jordana. Uticaj intelektualnog kapitala sagledan je ne samo kroz njegove komponente (ljudski, strukturni i relacioni) već i njihove podkomponente. U istraživanju je anketirano 132 menadžera najvišeg i srednjeg nivoa iz svih 15 članova Udruženja farmaceutskih proizvođača. Sprovedena je korelaciona i regresiona analiza da bi se utvrdila validnost mera i postavljenog modela. Koeficijenti su pokazali da relacioni kapital ima najznačajniju povezanost sa intelektualnim kapitalom.

Dženopoljac et al. (2016) su sproveli istraživanje koje je imalo za cilj da analizira uticaj intelektualnog kapitala i njegovih ključnih komponenti na finansijske performanse izabranih IKT preduzeća kroz povraćaj kapitala, povraćaj imovine, povraćaj uloženog kapitala, profitabilnost i obrt imovine. Istraživanje je sprovedeno u tokom 2009-2013. godine na uzorku od 13.989 srpskih IKT preduzeća. Za merenje intelektualnog kapitala korišćen je koeficijent dodatne vrednosti (VAIC).

Metodološki okvir istraživanja

Predmet istraživanja je strukturni kapital kao jedna od komponenti intelektualnog kapitala u IKT preduzećima Republike Srbije. Cilj rada je da se analizom podkomponenti strukturnog kapitala utvrdi njihov uticaj na strukturni kapital. U istraživanju se polazi od osnovne hipoteze da sistemi i programi, istraživanje i razvoj i pravo intelektualne svojine utiču na ukupni strukturni kapital. Stoga je neophodno detaljnuje analizirati njihove podkomponente. Ovo pilot istraživanje izvršeno je u periodu od juna do avgusta 2020. godine i deo je šireg istraživanja koje se odnosi na uticaj intelektualnog kapitala na poslovne performanse preduzeća. U posmatranom periodu anketirano je 102 ispitanika zaposlenih u srpskim IKT preduzećima u više gradova Republike Srbije (Beograd, Novi Sad, Zrejanin, Niš, Užice).

Prikupljanje podataka izvršeno je anonimnom on-lajn anketom kreiranom prema Bontisovom upitniku (Bontis, 1998), a prilagođenoj specifičnosti IKT sektora Republike Srbije. Merenje strukturnog kapitala izvršeno je primenom modela merenja ukupnog strukturnog kapitala za nivo preduzeća koji se bazira na tri podkomponente strukturnog kapitala: SP – sistemi i programi, IR – istraživanje i razvoj i PIS – pravo intelektualne svojine. Suština je u pronalaženju proseka relativnih ocena koje zaposleni kroz anketu daju o pojedinim dimenzijama ukupnog strukturnog kapitala sagledanih kroz njihove podkomponente. U oceni navedenih parametara u istraživanju je korišćena petostepena Likertova skala (1 – izrazito se ne slažem, 2 – ne slažem se, 3 – neodlučan sam, 4 – slažem se i 5 – izrazito se slažem).

Rezultati i diskusija

Sistemi i programi (SP) kao deo strukturnog kapitala analiziraju se kroz uticaj deset parametara: sp_1 – preduzeće ima programe obuke u cilju obučavanja internih resursa u vidu potencijalnih naslednika za nosioce viših i glavnih pozicija; sp_2 – kultura i atmosfera preduzeća je podsticajna i prijatna; sp_3 – programi regrutovanja zaposlenih preduzeća su usmereni ka zapošljavanju najboljih raspoloživih kandidata; sp_4 – preduzeće ima dobro razvijen sistem nagrađivanja vezan za performanse; sp_5 – preduzeće kontinuirano podržava svoje zaposlene u usavršavanju njihovih veština i obrazovanju kad god je to potrebno; sp_6 – zaposleni ima uticaj na odluke koje donosi preduzeće: sp_7 – preduzeće nije „birokratska noćna mora"; sp_8 – sistemi i programi preduzeća utiču na produktivnost preduzeća; sp_9 – sistemi i programi preduzeća utiču na profitabilnost preduzeća, i sp_{10} – sistemi i programi preduzeća utiču na tržišnu poziciju preduzeća. Rezultati istraživanje u odnosu na parametre sistema i programa prikazani su u *Tabeli 1*.

Tabela 1. Deskriptivni pokazatelji za parametre sistema i programa

SP	N	1	2	3	4	5	Min	Max	Mean	Std.Dev.	Varian.	Coeff. Var.
sp_1	102	3	9	16	35	39	1	5	3,96	1,075	1,155	27,14%
sp_2	102	1	2	6	51	42	1	5	4,28	0,746	0,556	17,41%
sp_3	102	5	4	9	42	42	1	5	4,10	1,043	1,088	25,46%
sp_4	102	5	8	9	45	35	1	5	3,95	1,088	1,184	27,54%
sp_5	102	3	2	12	55	30	1	5	4,05	0,867	0,752	21,42%
sp_6	102	9	7	11	41	34	1	5	3,82	1,216	1,479	31,80%
sp_7	102	2	5	12	42	41	1	5	4,13	0,936	0,876	22,68%
sp_8	102	1	2	9	52	38	1	5	4,22	0,762	0,581	18,08%
sp_9	102	0	3	8	56	35	1	5	4,21	0,705	0,497	16,76%
sp_{10}	102	1	4	8	43	46	1	5	4,26	0,839	0,704	19,68%

Izvor: Istraživanje autora

Na osnovu prikazanih rezultata istraživanja u *Tabeli 1*, uočava se da je najznačajniji parameter sistema i programa podsticajna i prijatna kultura i atmosfera preduzeća (sp_2). Prosečna ocena ovog parametra je najviša i iznosi 4,28 (Std. Dev 0,746), a koeficijent varijacije 17,41%. Uticaj sistema i programa na

Tabela 3. Deskriptivni pokazatelji za parametre prava intelektualne svojine

PIS	N	1	2	3	4	5	Min	Max	Mean	Std.Dev.	Varian.	Coeff. Var.
pis_1	102	5	5	9	46	37	1	5	4,03	1,043	1,087	25,88%
pis_2	102	4	7	15	48	28	1	5	3,87	1,016	1,033	26,24%
pis_3	102	7	5	12	49	29	1	5	3,86	1,094	1,197	28,32%
pis_4	102	5	7	14	48	28	1	5	3,85	1,052	1,106	27,29%
pis_5	102	4	8	11	52	27	1	5	3,88	1,013	1,025	26,08%
pis_6	102	6	6	16	43	31	1	5	3,85	1,097	1,204	28,48%
pis_7	102	7	7	15	48	25	1	5	3,75	1,106	1,224	29,47%
pis_8	102	6	6	14	44	32	1	5	3,88	1,096	1,202	28,24%
pis_9	102	5	5	13	46	33	1	5	3,95	1,042	1,086	26,37%
pis_{10}	102	5	5	13	50	29	1	5	3,91	1,020	1,041	26,09%

Izvor. Istraživanje autora

Pravo intelektualne svojine (PIS) kao deo strukturnog kapitala sagledan je kroz uticaj deset parametara: pis_1 – preduzeće ima jasne strategije i procedure za upravljanje intelektualnim kapitalom; pis_2 – preduzeće prati svoj portfelj PIS-a; pis_3 – preduzeće sprovodi strategiju licenciranja PIS-a, pis_4 – preduzeće aktivno ohrabljuje i nagrađuje stvaranje u cilju maksimiziranja prihoda od PIS-a; pis_5 – PIS predstavlja ključnu intelektualnu imovinu za top menadžment, za koju se smatra da stvara vrednost preduzeća; pis_6 – preduzeće maksimalno koristi PIS; pis_7 – preduzeće ima visok broj PIS-ova godišnje u poređenju sa konkurentima; pis_8 – PIS utiče na produktivnost preduzeća; pis_9 – PIS utiče na profitabilnost preduzeća, i pis_{10} – PIS utiču na tržišnu poziciju preduzeća. Rezultati istraživanja u odnosu na parametre prava intelektualne svojine prikazani su u *Tabeli 3*.

Na osnovu rezultata istraživanja prikazanih u *Tabeli 3*, uočava se da su najznačajniji parameter prava intelektualne svojine jasne strategije i procedure za upravljanje intelektualnim kapitalom (pis_1) sa prosečnom ocenom od 4,03 (Std. Dev 1,043), a koeficijent varijacije 25,88%. Prosečna ocena uticaja PIS-a na profitabilnost preduzeća (pis_9) iznosi 3,95 (Std. Dev. 1,042), a koeficijent varijacije 26,37%, dok je prosečna ocena uticaja PIS-a na tržišnu poziciju preduzeća (pis_{10}) 3,91 (Std. Dev. 1,020), a koeficijent varijacije 26,37%. Preduzeće ima visok broj PIS-ova godišnje u poređenju sa konkurentima (pis_7) je parametar sa najnižom prosečnom ocenom od 3,75 (Std. Dev. 1,142), a koeficijent varijacije 28,62%.

Ako izvršimo rangiranje pojedinih komponenti strukturnog kapitala u odnosu na iznose njihove prosečne vrednosti, na prvom mestu je parametar sistemi i programi (4,10), sledi istraživanje i razvoj (4,09) i pravo intelektualne svojine (3,88). Rezultati analize pojedinih komponenti strukturnog kapitala dobijeni ovim empirijskim istraživanjem pokazuju da anketirani ispitanici zaposleni u IKT preduzećima smatraju da sistemi i programi i istraživanje i razvoj značajno utiču na strukturni kapital, a da pravo intelektualne svojine ima znatno manji uticaj. Strukturni kapital značajno utiče na ukupni intelektualni kapital preduzeća. Prosečna vrednost strukturnog kapital u ovom istraživanju iznosila je 4,02. Istraživanja drugih autora u

ovoj oblasti, sprovedena prema sličnoj metodologiji, pokazuju da je u Kanadi na uzorku od 20 preduzeća različitih sektora strukturni kapital ocenjen sa prosečnom ocenom 4,08 (Bontis, 1998), iranskim osiguravajućim preduzećima prosečnom ocenom 2,23 (Moslehi et al., 2006), jordanskim preduzećima iz farmaceutskog sektora prosečnom ocenom 3,06 (Sharbati et. al, 2010). To pokazuje da se ocena strukturnog kapitala razlikuje u odnosu na posmatrene zemlje i sektore poslovanja.

Zaključak

Rezultati analize komponenti i podkomponenti strukturnog kapitala dobijeni ovim empirijskim istraživanjem pokazuju da zaposleni u IKT preduzećima smatraju da sistemi i programi i istraživanje i razvoj značajno utiču na strukturni kapital, a pravo intelektualne svojine ima znatno manji uticaj. Strukturni kapital je direktno povezan i sa ljudskim i sa relacionim kapitalom. Upravo ovaj zaključak ukazuje na važnost podsticajne i prijatne kulture i atmosfere, fleksibilne organizacione strukture koja može da odgovori na promenljive zahteve tržišta, regrutovanje novozaposlenih na osnovu njihovih znanja, kompetencija i veština, usmeravanje na istraživanje i razvoj poslovnih procesa, primenu najnovijih naučnih i tehničkih dostignuća i sklonost promenama i inovacijama. Jasno definisane strategije i procedure upravljanja intelektualnim kapitalom su performanse koje doprinose višem nivou strukturnog kapitala i koje dalje treba unapređivati.

Posebnu pažnju treba usmeriti na: programe i obuke zaposlenih u cilju njihovog napretka u hijerarhijskoj strukturi organizacije, transparentan sistem nagrađivanja na osnovu ostvarenih performansi, veću participaciju zaposlenih u procesu odlučivanja, što će se pozitivno odraziti i na lidersku poziciju na polju istraživanja i razvoja IKT preduzeća. Analiza komponenti i podkomponenti treba da omogući menadžerima IKT preduzeća da uoče koje to performanse doprinose višem nivou njihovog intelektualnog kapitala jer samo na taj način mogu da obezbede svoj budući rast i razvoj i konkurentsku poziciju na tržištu.

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ANALYSIS OF STRUCTURAL CAPITAL AS A COMPONENT OF INTELLECTUAL CAPITAL IN ICT ENTERPRISES

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Abstract

The success and competitiveness of modern companies depends on their intellectual capital. Intellectual capital is an intangible asset that can be viewed through three basic sub-levels: human, structural and relational capital. The aim of this paper is to research structural capital and its basic components: systems and programs, research and development, and intellectual property law. A pilot study in this area was conducted from June to August 2020. The research was conducted with an anonymous questionnaire on a sample of 102 respondents employed in companies in the ICT sector of the Republic of Serbia. The results showed that employees in this sector rated systems and programs as the most important factor of structural capital. These results should serve as a guide in the management of structural capital in ICT companies in order to create a working environment that contributes to the overall growth and development of the company, both in national and international environment.

Keywords: intellectual capital, structural capital, ICT sector

Introduction

In contemporary business conditions on an exceptionally demanding market, companies in Information-Communication Technology (ICT) sector are gaining an ever-increasing role. Business activities of companies are increasingly directed at a possibility of implementing ICT in the business process through the application of the so called "smart solutions" that ICT companies provide to companies of other industrial branches (https://www.srbija.gov.rs/dokument/45678/strategije-programi-planovi-.php).

In that way, this sector is becoming one of the pillars of social growth and development. Comparative analysis of employment in computer programming,

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consulting and related activities points that the Republic of Serbia recorded the highest employment rate (14.21%) in the ICT sector from 2010 to 2020, compared to selected countries of the Danube region (Kleibrink et al., 2018). According to data from the National Bank of Serbia (2020), in the last five years, export of ICT services noted a permanent growth of around 20% a year. If we observe the profitability index, it's six times bigger in the ICT sector that the average profitability of the economy as a whole (Matijević, Šolaja, 2020). An increasing demand for work force influences an increase in employment in this sector. In 2018, 2349 information companies did business in the Republic of Serbia with an individual yearly revenue of over a million dinars. In relation to the activity, the majority were programming companies (1483) which makes 63% of the total number. If we observe the programming companies by size, the ICT sector is dominated by micro firms (less than 10 employees) which amounted to 1086 (73.2%), 322 (21.7%) small companies, 68 (4.6%) medium companies and only 7 (0.5%) large companies with more than 250 employees (Matijević, Šolaja, 2020). Considering that small and medium companies represent the driving force of the ICT sector, their number should be increased. In first eight months of 2019, 229 programming companies were founded and the time necessary for micro companies to grow into large ones is on average more than 10 years (Matijević, 2019). Basic growth carriers of the domestic ICT sector are software exporters. Analysis of Serbian computer services export in 2007 was low (62 million euros), while the export in 2018 surpassed a billion euros (1,016 million euros), which results in an average yearly growth of 30%.

Along with strengthening globalization trends and significance of the ICT, the notion of new economy in which knowledge becomes „the most important raw material, most important source of new value, most important product and key of business management" is connected (Stewart, 1998). Learning and knowledge are directly connected – learning process results in knowledge. Learning can be defined as „performance improvement process with the help of better knowledge and understanding of relevant occurrences" (Đuričin et al., 2018). As knowledge „a systematic, logical and organized, proven and reworked experience, in whose correctness we are justifiably convinced" is implied (Trebješanin, 2008). Studying is a continuous process, where it is expected from the employees to make numerous changes which are determined by the request to increase the knowledge base. Organization that teaches can be defined as „an organization in which people constantly expand their capabilities in order to achieve results that they really want, in which a new and expanded way of thinking was nurtured, in which there is a liberated collective aspiration, in which people constantly learn how to work together" (Sengi, 2003). These organizations are capable of creating and providing new knowledge and new concepts. In this way they become more flexible, which enables them to be able to react timely to demands in the business environment, as

well as achieve organizational results. Results point out that in public companies in Serbia, money stimulation and earning amounts are irreplaceable motivation factors for employees, which is shown by research results on organizational commitment of employees in business banks (Lekić, Vapa-Tankosić, 2018). Research results (Lekić et al., 2019) on job satisfaction by public sector employees have shown that earnings, cooperation and good relations with closest associates, opportunity for advancement, reward policy, cooperation and good relations with superiors and nature of the job are directly related with total job satisfaction. Possibility to learn at the workplace, quality of team work and supervision are positive influences on total job satisfaction in banks (Lekić et al., 2020).

Development of ICT caused the creation of numerous databases that enable speed and simplicity in enabling necessary knowledge and information. Intellectual capital in a company represents the basic driver of innovation and competitive advantage in knowledge-based economy through the application of knowledge management system, which is also a key factor in creating strategic advantage of an organization. Numerous studies have pointed to the significance of intellectual capital and its influence on business performance of a company. Human, structural and relational capital are intertwined and can't be observed separately. Conducted research points out that these components aren't given the same significance everywhere. This encouraged the need to analyze structural capital from the aspect of Serbian ICT companies in this paper and see the reciprocal relationship of its subcomponents in order to be able to act on improving the level of structural, as well as intellectual capital.

Concept of intellectual capital

Intellectual capital can be defined as "a product of knowledge flow in a company i.e., organizational learning, made from human, structural and relational capital between clients and other stockholders" (Bontis, 1998), i.e., „as assets that includes human capital, information-telecommunication technologies, business procedures and immaterial assets can be transformed in material and immaterial value" (Lentjušenkova, Inga, 2016).

In the last two decades, numerous models of intellectual capital that determine its basic components, were developed. The one that is used and quoted most often is division of intellectual capital to human, structural and relational (Sveiby, 1997; Bontis, 2002). Human capital relates to the "capability of people – professional experience, level of education and skills, methods of education and training of managers and capability to learn, which implies knowledge transfer, capability to solve problems, management capabilities, training groups, entrepreneurship, leadership, data on development and specialization" (Petty, Guthrie, 2000). Structural capital arises by transforming human capital, by encompassing a variety of

intangible elements, such as organizational structure, processes and routines, customs, databases, systems and intellectual property (Edvinsson, 1997). Relational capital is created through specific relations with external stockholders (investors, buyers, suppliers and creditors). It manifests through brand, reputation, client relations, partner cooperation, licenses and distribution channels (Janošević, Dženopoljac, 2012).

Due to exceptional significance for contemporary organizations, intellectual capital was the subject of numerous research studies in different countries and business sectors. In most studies, the starting point for creating a research questionnaire was the Bontis questionnaire on intellectual capital (1998). Bontis' original research environment were Canadian companies, as follows: seven from financial services, four from the chemical industry, four from insurance, three from the ICT sector and two that performed courier services. The goal of the study was to determine which variables affect the human, relational and structural capital and how they influence business performance. Results have pointed out that human capital is useless without supporting structures i.e., structural capital that can use and nurture its skills.

Through a questionnaire that was initially used in Canada, Bontis et al. (2000) conducted an empirical research in two industrial sectors in Malaysia researching the influence of human, structural and relational capital and their mutual connection. Main conclusions of this study were: human capital is significant, regardless of the industrial branch; human capital has an increasing influence on structuring a company in non-service industry; relational capital has a significant influence on structural capital regardless of the industry; development of structural capital has a positive influence on business performance of a company, regardless of the industry.

Seleim et al. (2004) have been the first to research the nature of human, structural and relational capital in Egyptian software companies through their study. The aim of this study was to review the key indicators of intellectual capital in order to gain guidelines for developing a strong knowledge base for future development of intellectual capital. Seleim et al. have continued this research in the same industry (2007) in the direction of analyzing the relation between human capital and companies' business performance on a sample of 38 software companies, that had 107 members in the Egyptian Chamber of Software Industry. Using the appropriate statistical methods, research has proven that there is a positive and statistically significant relation between certain components of human capital and business performances of a company.

Wang et al. (2005) have used Partial Least Squares regression (PLS) method in order to research the influence of intellectual capital on business performance in the ICT industry in Taiwan. The obtained results have shown that the intellectual capital elements directly influence business performance of companies, other than human capital which has an indirect influence through innovation capital, process capital

and buyer capital. Also, there is a cause-effect relation between the four elements of intellectual capital. Human capital influences innovation capital and process capital. Innovation capital influences process capital and process capital influences buyer capital. Buyer capital contributes to better business results. These cause-and-effect relations between basic components and subcomponents give implications of creating a model for management of intellectual capital in companies from ICT industry.

Moslehi et. al. (2006) researched in their study the components of intellectual capital in Iranian insurance companies in regard to 110 indicators and specific business environment. Different level managers were interviewed. They gave the lest significance to structural capital, which negatively influenced the total level of intellectual capital. Ignoring the significance of intellectual capital can lead to public company monopoly. Authors gave recommendations to promote management of business processes and better relations with external stockholders.

Sharabati et al. (2010) have directed their study on researching the relations between certain components of intellectual capital business performances in the pharmaceutical sector of Jordan. The influence of intellectual capital isn't only perceived through its components (human, structural and relational) but their subcomponents as well. 132 high and medium-level managers from all 15 members of Pharmaceutical producer's association were interviewed in the research. A correlation and regression analysis were conducted in order to determine the validity of measures and the established model. The coefficients have shown that relational capital has the most significant relationship with intellectual capital.

Dženopoljac et al. (2016) conducted a research which had the goal to analyze the influence of intellectual capital and its key components on financial performances of the chosen ICT companies through return on capital, return on assets, return on invested capital, profitability and property turnover. Research was conducted in the time period from 2009 to 2013, on a sample of 13,989 Serbian ICT companies. Value Added Intellectual Coefficient (VAIC) was used in order to measure the intellectual capital.

Methodological research framework

Research subject is structural capital as one of the components of intellectual capital in Serbian ICT companies. The aim of the paper is to determine the influence of subcomponents of structural capital on the structural capital. Research starts from a basic hypothesis that systems and programs, research and development and intellectual property right influences and total structural capital. Therefore, it's necessary to analyze their subcomponents in more detail. This pilot research was conducted in the timeframe from June to August 2020 and as a part of wider research that is related to the influence of intellectual capital on business performances of a

company. 102 respondents were interviewed in the observed period in Serbian ICT companies in multiple cities (Belgrade, Novi Sad, Zrenjanin, Niš, Užice).

Data was collected through an anonymous online survey created according to Bontis' questionnaire (Bontis, 1998) and adjusted to the specificity of Serbian ICT sector. Measuring structural capital was performed by applying the model of measuring total structural capital at the company level which is based on three subcomponents of structural capital: SP – systems and programs, IR – research and development and PIS – intellectual property rights. The essence in finding the average of relative grades that the employees gave through their survey on certain dimensions of total structural capital seen through their subcomponents. In grading the stated parameters in the research, a five-point Likert scale was used (1 – I strongly disagree, 2 – I don't agree, 3 – I am indecisive, 4 – I agree, 5 – I strongly agree).

Results and discussion

Systems and programs (SP) are analyzed through the influence of ten parameters as a part of structural capital: sp1 – company has training programs with the aim of internal resource training in the form of potential successors for holders of higher and main positions; sp2 – culture and atmosphere of a company is stimulating and pleasant; sp3 – employee recruitment programs are directed at employing best available candidates; sp4 – company has well developed reward system tied to performances; sp5 – company continuously supports its employees in perfecting their skills and education whenever it's necessary; sp6 – employee has an influence on decisions the company makes; sp7 – company isn't a "bureaucratic nightmare"; sp8 – company's systems and programs influence the company's productivity; sp9 – company's systems and programs influence the company's profitability and sp10 – company's systems and programs have an influence on the company's market position. Research results are shown in relation to system and program parameters in *Table 1*.

Table 1. Descriptive indicators of system and program parameters

SP	N	1	2	3	4	5	Min	Max	Mean	Std.Dev.	Varian.	Coeff. Var.
sp_1	102	3	9	16	35	39	1	5	3,96	1.075	1.155	27.14%
sp_2	102	1	2	6	51	42	1	5	4,28	0.746	0.556	17.41%
sp_3	102	5	4	9	42	42	1	5	4,10	1.043	1.088	25.46%
sp_4	102	5	8	9	45	35	1	5	3,95	1.088	1.184	27.54%
sp_5	102	3	2	12	55	30	1	5	4,05	0.867	0.752	21.42%
sp_6	102	9	7	11	41	34	1	5	3,82	1.216	1.479	31.80%
sp_7	102	2	5	12	42	41	1	5	4,13	0.936	0.876	22.68%
sp_8	102	1	2	9	52	38	1	5	4,22	0.762	0.581	18.08%
sp_9	102	0	3	8	56	35	1	5	4,21	0.705	0.497	16.76%
sp_{10}	102	1	4	8	43	46	1	5	4,26	0.839	0.704	19.68%

Source: Authors' research

Based on shown research results in *Table 1*, it can be noted that the most significant parameter of systems and programs is stimulating and pleasant culture and

atmosphere in the company (sp2). Average grade of this parameter is the highest, amounting to 4.28 (Std. Dev 0.746) and the variation coefficient is 17.41%. The influence of systems and programs on the company's market position (sp10) was graded at an average of 4.26 (Std. Dev. 0.839) and the variation coefficient is 19.68, while the average grade of influence on company productivity (sp8) is 4.22 (Std. Dev. 0.762) and the variation coefficient is 18.08%. The influence of employees on company decisions (sp6) is the parameter with the lowest average grade of 3.82 (Std. Dev. 1.216) and the variation coefficient is 31.80%.

Table 2. Descriptive indicators of research and development parameters

IR	N	1	2	3	4	5	Min	Max	Mean	Std.Dev.	Varian.	Coeff. Var.
ir_1	102	4	9	16	28	45	1	5	3,99	1,142	1,304	28,62%
ir_2	102	2	7	6	52	35	1	5	4,09	0,919	0,845	22,49%
ir_3	102	3	4	16	44	35	1	5	4,02	0,960	0,921	23,88%
ir_4	102	3	0	11	51	37	1	5	4,17	0,841	0,708	20,19%
ir_5	102	2	2	13	46	39	1	5	4,16	0,860	0,740	20,70%
ir_6	102	3	4	16	44	35	1	5	4,02	0,960	0,921	23,88%
ir_7	102	4	7	12	39	40	1	5	4,02	1,066	1,137	26,53%
ir_8	102	3	4	12	40	43	1	5	4,14	0,971	0,942	23,46%
ir_9	102	2	5	11	40	44	1	5	4,17	0,940	0,884	22,56%
ir_{10}	102	2	6	14	36	44	1	5	4,12	0,983	0,967	23,88%

Source: Authors' research

Research and development (IR) as a part of structural capital are observed through the influence of ten parameters: ir1 – company is observed on the research field; ir2 – company continuously develops work processes; ir3 – company is continuously developing and reorganizing based on research and development results; ir4 – the company monitors and adopts the newest scientific and technical achievements around the world; ir5 – company's systems and procedures support innovations; ir6 – company establishes an appropriate and adequate budget for research and development activities; ir7 – company's top management support and significantly leans on research and development department; ir8 – company's research and development influences company's productivity; ir9 – company's research and development affects company's profitability and ir10 – company's research and development influences company's market position. Research results related to research and development parameters and shown in *Table 2*.

Research results analysis from *Table 2*, reveal that the most significant research and development parameter is stimulating and pleasant culture and atmosphere (ir4). The average grade of this parameter is highest for the assertion that the company follows and adopts newest scientific and technical achievements around the world (ir4) and amounts to 4.17 (Std. Dev. 0.841) and the variation coefficient is 20.19%. The influence of research and development on company profitability (ir9) is graded with the same average mark (Std. Dev. 0.940) with the variation coefficient of 22.56%, while the average grade that systems and procedures support innovations (ir4) amount to 4.16 (Std. Dev. 0.860), while the variation coefficient is 20.07%. A

company is considered a leader in the research field (ir1) is a parameter with the lowest average grade of 3.99 (Std. Dev. 1.142) and the variation coefficient of 28.62%.

Table 3. Descriptive indicators for intellectual property rights

PIS	N	1	2	3	4	5	Min	Max	Mean	Std.Dev.	Varian.	Coeff. Var.
pis_1	102	5	5	9	46	37	1	5	4,03	1,043	1,087	25,88%
pis_2	102	4	7	15	48	28	1	5	3,87	1,016	1,033	26,24%
pis_3	102	7	5	12	49	29	1	5	3,86	1,094	1,197	28,32%
pis_4	102	5	7	14	48	28	1	5	3,85	1,052	1,106	27,29%
pis_5	102	4	8	11	52	27	1	5	3,88	1,013	1,025	26,08%
pis_6	102	6	6	16	43	31	1	5	3,85	1,097	1,204	28,48%
pis_7	102	7	7	15	48	25	1	5	3,75	1,106	1,224	29,47%
pis_8	102	6	6	14	44	32	1	5	3,88	1,096	1,202	28,24%
pis_9	102	5	5	13	46	33	1	5	3,95	1,042	1,086	26,37%
pis_{10}	102	5	5	13	50	29	1	5	3,91	1,020	1,041	26,09%

Source: Authors' research

Intellectual property rights (PIS) as a part of structural capital was looked at through the influence of ten parameters: pis1 – company has clear strategies and procedures for managing intellectual capital; pis2 – the company monitors its PIS portfolio; pis3 – the company conducts its PIS licensing strategy; pis4 – the company actively encourages and rewards creation with the aim of maximizing PIS revenue; pis5 – PIS represent the key intellectual property for top management, which is considered to create company value; pis6 – company maximally uses PIS; pis7 – the company has a high number of PIS's annually compared to its competitors; pis8 – PIS influences company productivity; pis9 – PIS influences company profitability and pis10 – PIS influences company's market position. Research results compared to intellectual property right parameters are shown in *Table 3*.

Based on research results shown in *Table 3*, it can be pointed out that the most significant parameters of intellectual property rights are clear strategies and procedures for intellectual capital management (pis1) with an average grade of 4.03 (Std. Dev. 1.043) and the variation coefficient of 25.88%. The average grade on influence of PIS on company profitability (pis9) amounts to 3.95 (Std. Dev. 1.042) and the variation coefficient is 26.37% while the average grade of PIS's influence on company's market position (pis10) is 3.91 (Std. Dev. 1.020) and the variation coefficient is 20.37%. The parameter where a company has a high number of PIS's yearly related to competitors (pis7) has the lowest average grade of 3.75 (Std. Dev. 1.142) and the variation coefficient is 28.62%.

If we perform ranking of certain components of structural capital related to their average value, the systems and programs parameter is in the first place (4.10), followed by research and development (4.09) and intellectual property rights (3.88). Analysis results of certain structural capital components obtained by this empirical research show that surveyed respondents employed in ICT companies consider that systems

and programs and research and development significantly influence structural capital, and intellectual property rights has a significantly smaller influence. Structural capital significantly influences total intellectual capital of a company. Average value of structural capital in this research amounted to 4.02. Other authors' researches in this area conducted by the similar methodology show that, out of 20 companies from different sectors in Canada, structural capital was graded with an average of 4.08 (Bontis, 1998), Iranian insurance companies with an average of 2.23 (Moslehi et al., 2006), Jordanian companies from the pharmaceutical sector with an average of 3.06 (Sharbati et al, 2010). This points out that the grade of structural capital is different in relation to the observed companies and business sectors.

Conclusion

Structural capital component and subcomponent research results obtained by this empirical research show that employees in ICT companies consider that systems and programs and research and development significantly influence structural capital, but intellectual property rights have a significantly smaller influence. Structural capital is directly connected with human and relational capital. It is exactly this conclusion that points to the significance of stimulating and pleasant culture and atmosphere, flexible organizational structure which can respond to changeable market demands, recruitment of new employees based on their knowledge, competence and skills, directing to research and development of business processes, application of newest scientific and technical achievements and inclination to changes and innovations. Clearly defined strategies and procedures of managing intellectual capital are performances that contribute to higher level of structural capital which should be promoted further.

Special attention should be pointed at: programs and employee training with the goal of their advancement in the hierarchical structure of the organization, transparent rewarding system based on achieved performances and bigger employee participation in the decision-making process, which will positively reflect on the leadership position for research and development field of ICT companies. Component and subcomponent analysis should enable ICT companies' managers to notice which performances contribute to the highest level of their intellectual capital because only in that way can they secure their future growth and development and competitive position on the market.

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