

## NOVE TEHNOLOGIJE, DIZAJN I INOVACIJE U FUNKCIJI REINDUSTRIJALIZACIJE

### NEW TECHNOLOGIES, INNOVATION AND DESIGN IN FUNCTION OF REINDUSTRIALIZATION

Valentina Vukmirović, dipl. ing.

Prof. dr Nikola Vukmirović

Univerzitet u Banjoj Luci, Ekonomski fakultet u Banjoj Luci

University of Banja Luka, Faculty of Economics Banja Luka

Pregledni članak

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Review paper

#### REZIME

*Velika industrijska preduzeća treba da se restrukturiraju, uvedu nove tehnologije i redizajniraju organizacionu i proizvodnu strukturu da bi bila samoodrživa i konkurentna. Metodologija koja je za to najpogodnija je sistem inovativnih grupa i preduzetničkih timova za uvođenje u proces proizvodnje novih sirovina, tehnologija, grafičkog inženjeringa i dizajna za proizvode i ambalažu kao i drugih oblika nematerijalne imovine. Prioritet primjene reinženjeringa i restrukturiranja imaju preduzeća za razvoj kooperacije sa velikim brojem malih radnointenzivnih preduzeća čija se proizvodnja zasniva na novim znanjima. Mala i srednja preduzeća koja su dominantna u veličinskoj strukturi privrede zapošljavaju novu obrazovanu, kreativnu radnu snagu i najviše doprinose sprečavanju "odliva mozгова", povećanju izvoza i razvoju manje razvijenih područja. Informatičke tehnologije imaju ključni značaj za unapređenje proizvodnih procesa, a grafičke tehnologije za dizajn i vizuelni identitet proizvoda. U radu su dati konkretni rezultati istraživanja iz ova dva sektora. Iz sektora informatičkih tehnologija istraživanja su vezana za Telekom Srpske, a iz grafičkih tehnologija istraživanja su vezana za Grafotisak.*

**Ključne riječi:** reindustrijalizacija, informatička tehnologija, 3D dizajn, grafički inženjering, životni ciklus, tehnološke inovacije, poslovne komunikacije.

#### SUMMARY

*Large industrial companies need to be restructured, new technologies need to be introduced and organizational and production structure needs to be redesigned, in order to be sustainable and competitive. The priority of implementing reengineering and restructuring have cooperation development companies with large number of small work-intensive companies which base their production on new technologies. Small and medium enterprises that are dominant in size structure of the economy, employ new educated, creative work force and contribute the most in preventing "brain drain", export increase and development of less developed areas. Information technologies are crucial for the improvement of production processes, and on the other hand, graphic technologies are crucial for design and visual identity of the product. This paper will provide specific results from two sectors. In the sector of information technology research is related to Telekom Srpske, and in the sector of graphics technology the research is related to Grafotisak.*

**Key words:** reindustrialization, information technology, 3D design, graphic engineering, life cycle, technological innovation, business communication.

## UVOD

Kriza koja je 2008. godine globalno zahvatila cijeli svijet, prisilila je preduzeća i cijele ekonomije da traže inovativna rješenja za nastale ekonomske, tehnološke, organizacione i druge probleme. Razvijene zemlje su počele da pronalaze izlaz iz krize i našle su ga u uvođenju inovacija, novih tehnologija i novih znanja u cilju restrukturiranja i revitalizacije velikih i srednjih preduzeća. Ova preduzeća su strateški nosioci razvoja malih preduzeća kroz sistem kooperacije, odnosno autsorsinga. Stoga su razvijene države dale podsticaje i pokrenule proces reindustrijalizacije preko preduzeća koja su dobijene podsticaje uložila u istraživanja, nove tehnologije, inovacije, kvalitet, softverske programe, dizajn i vizuelni identitet proizvoda, kao i druge procese i aktivnosti koje pripadaju sferi nematerijalne imovine. Tako su nastale i neke potpuno nove tehnologije i proizvodne aktivnosti kao što je 3D dizajniranje, koje su unijele pravu revoluciju u industrijsku proizvodnju.

Potrebna je najprije revitalizacija preduzeća koja još uvijek imaju proizvodnju i slične proizvodne sadržaje, zatim obnova „posustalih“ preduzeća kroz „braunfield“ investicije. To se opet prioritetno odnosi na one prerađivačke kapacitete koji imaju izobilje domaćih sirovina (poljoprivredni proizvodi, voda, drvo), a čiji se proizvodi danas u najvećoj mjeri uvoze.

Finansijska sredstva za obnovu, restrukturiranje i revitalizaciju postojećih industrijskih kapaciteta, kao i podizanje novih mogu se pribaviti uslovljavanjem da strani investitori koji ulažu gotovo isključivo u trgovinu budu obavezni da proporcionalni iznos ulažu u domaću proizvodnju i u svojim prodajnim kapacitetima prodaju pretežno domaće proizvode.

Dakle, podsticajima treba dovesti investitore prvenstveno u proizvodnju (primjer Fiata u Republici Srbiji) i u podsticanju investicija saradivati sa lokalnim samoupravama. Za to treba osposobiti mlade preduzetne kadrove putem posebnih specijalističkih studija i neformalnih oblika edukacije za preduzetničko-menadžerske vještine.

## INTRODUCTION

The 2008 crisis, which has seized the whole world globally, forced companies and entire economies to look for innovative solutions for arising economic, technological, organizational and other problems. Developed countries have begun to seek for the way out of crisis and they found it in implementing innovation, new technologies and new knowledge with the aim of restructuring and revitalization of small and medium enterprises. These enterprises are strategic holders of small enterprises development through the system of cooperation, i.e. outsourcing. Therefore, developed countries gave incentives and initiated the process of reindustrialization through the enterprises which invested gained incentives in research, new technologies, innovation, quality, software, design and visual identity of the product, as well as other processes and activities which belong to the sphere of non-material assets. That is the manner in which some completely new technologies appeared, such as 3D technology, which brought complete revolution in the industrial production.

Primarily, revitalization of the companies which still have certain production, i.e. production contents is needed, and afterwards renewal of companies which have fallen behind, through „brownfield“ investments. The priority are those processing programs that have an abundance of local raw materials (agricultural products, water, wood) and which products are largely imported now.

Financial means for reconstruction, restructuring and revitalization of existing industrial capacities, as well as establishment of new ones, can be obtained by conditioning foreign investors who invest almost exclusively in retail, to invest certain percentage in domestic production and sell in their retail capacities proportional part of domestic products.

Therefore, incentives should attract investors primarily to invest in production (the example of Fiat in Serbia) and to collaborate with local government in forming investment funds. Young entrepreneurial cadres should be empowered to perform these activities through specialist studies and informal ways of education for entrepreneurial and managerial skills.

Transfer znanja i poslovnih vještina treba obezbijediti uz uključivanje u proces edukacije iskusnih preduzetnika koji su pokazali liderske sposobnosti i poslovne vještine kako na domaćem tako i na spoljnom globalnom tržištu (Petković, 2006, str. 222).

Jasno je da nije moguće oživjeti mnoga propala velika industrijska preduzeća, ali je, uz nove tehnologije, inovativne proizvodne procese, unapređenje dizajna, brendiranje, primjenu promotivnih strategija, podsticanje i zaštitu intelektualne svojine, uvođenje savremene multimedijalne komunikacije sa kupcima i potrošačima, moguće obnoviti, restrukturirati i revitalizovati postojeće industrije i pokrenuti neke nove zasnovane na novim znanjima i informatičkim tehnologijama kao što su industrije 3D dizajna i slično (Amor, 2002, str. 121).

### KONCEPTUALNI OKVIR REINDUSTRIJALIZACIJE ZASNOVAN NA TEORIJI ŽIVOTNOG CIKLUSA PREDUZEĆA

Savremena analiza upravljanja razvojem preduzeća prema I. Adizes-u, (Adizes, 2002, str. 192-197), zasniva se na deset faza životnog ciklusa u kojima se nalaze organizacije u svom razvoju.

Među tim fazama, kao predmet našeg istraživanja, posebnu važnost imaju faze u kojima je potrebno obavljati restrukturiranja i revitalizaciju uvođenjem inovacija i preduzetničkog inteligentnog. Ove faze se mogu grafički prezentovati na način kako je to dato u tabeli 1. (Adizes, 2002, str. 192-197).

Uvođenje novih tehnologija, inovacija i ulaganje u ostale oblike nematerijalne imovine koji najviše doprinose revitalizaciji i jačanju konkurentne sposobnosti preduzeća, najefikasnije je u top fazi životnog ciklusa preduzeća.

To u pravilu rade konkurentski najposposobnija preduzeća kada povećavaju svoje učešće na globalnom tržištu. Međutim, moguće je i u ostale dvije faze pokrenuti proces revitalizacije mjerama koje su prethodno opisane, ali je potrebno uložiti

Transfer of knowledge should be provided with the involvement of experienced entrepreneurs who have demonstrated leadership skills and business skills at the local, domestic and foreign, global market (Petković, 2006, p. 222).

It is obvious that it is not possible to revitalize numerous ruined industrial enterprises, but with new technologies, innovative production processes, improvement of design, branding, implementation promotional strategies, promotion and protection of intellectual property, the introduction of modern multimedia communications with customers and consumers, it is possible to renew, restructure and revitalize existing and start up of a new industrial capacity. Especially with new entrepreneurial ventures that are encouraged, the attention should be paid on: new knowledge, young educated people and the latest technology (especially new information technologies such as 3D printing etc.) (Amor, 2002, p.121).

### CONCEPTUAL FRAMEWORK OF REINDUSTRIALIZATION BASED ON THEORY OF LIFE CYCLE OF THE COMPANY

Analysing the model of contemporary management development of companies, according to I. Adizes (Adizes, 2002, p. 192-197), there are ten phases of organisation's development life cycle.

Among those phases, special importance have phases in which is necessary to perform the activities of restructuring and revitalization implementing innovation and entrepreneurial intelligence. These phases can be presented graphically (see Table 1) (Adizes 2002, p. 192-197).

Implementing new technologies, innovation and investing in other forms of non-material assets which contribute the most to the revitalization and strengthening of competitive advantage of a company, are the most efficient in top phases of life cycle.

In general it is done by the most capable enterprises in the global market. Although, it is possible to start the process during the other two phases by implementing means which are already described, but it is necessary to invest much more effort with

mnogo više napora i troškova, a ostvareni rezultati će biti mnogo skromniji u odnosu na top fazu.

Sam proces uvođenja novih tehnologija i inovacija ne može se odvijati stihijski, već treba primijeniti u literaturi poznate modele preduzetničkog inteligentnosti i IGPT sistema (inovativne grupe i preduzetnički timovi). Posebno je važna uloga leaderskog i kreativnog kadra u takvim organizacijama, što je pokazalo i naše istraživanje analizom slučaja dva preduzeća iz BiH („Telekom Srpske“ i „Grafotisak“).

bigger expenses and achieved results will be much more modest when compared to the Top phase.

The process of implementing new technologies itself, can not be performed spontaneously, but with applying one of the familiar models of entrepreneurial intelligence and IGPT system (innovative groups and entrepreneurial teams). The role of leadership and creative cadre in that kind of organization, as shown in this paper by the case study of two enterprises from Bosnia and Herzegovina (Telekom Srpske and Grafotisak), is especially important.

Tabela 1  
Ključne faze životnog ciklusa preduzeća

Table 1  
Key phases of enterprise life cycle

<b>Faze životnog ciklusa iskazane simbolima</b> <b>P, A E, I</b> <b>[Phases of life cycle expressed with symbols</b> <b>P, A, E, I]</b>	<b>Karakteristike</b> <b>[Characteristics]</b>
<b>Top forma (Premier) PAEI</b> <b>[Top form (Premier) PAEI]</b>	Optimalno stanje organizacije; odlikuje se fleksibilnošću, upravljanju promjenama i predviđanju rezultata; pozitivan rezultat je postignut integracijom ključnih razvojnih faktora. [Optimal condition of the organization; characterized by flexibility, change management and forecasting results; positive result is achieved by integrating the key development factor.]
<b>Stabilnost (Stable) PaeI</b> <b>[Stability (Stable) PaeI]</b>	Organizacija nedovoljno misli na budućnost; osnivači osjećaju da su otkrili trajni uspjeh; ljudi se osjećaju dominantno. [Organization does not pay enough attention on the future; founders feel that they have achieved permanent success; people feel dominant.]
<b>Aristokratia (Aristocracy) pAeI</b> <b>[Aristocracy pAeI]</b>	Postoje samo pravila, procedure i sačuvani kadrovi; nema novih ideja niti osoba koje bi ih sprovodile; postoji kodeks ponašanja i dobra integracija između zaposlenih. There are only rules, procedures and personnel preserved; no new ideas or people who get them implemented; here is a code of conduct and good integration between employees.

A - administracija; P - proizvodnja, E - preduzetništvo; I - integracija

A - administration; P - production, E - entrepreneurship; I - integration

## ULOGA NOVIH ZNANJA U RESTRUKTURIRANJU POSTOJEĆIH I FORMIRANJU NOVIH PREDUZEĆA

U proteklim decenijama glavni pokretači razvoja u tradicionalnoj industriji bile su velike korporacije i masovna proizvodnja proizvoda koji nisu imali problema u pronalaznji kupaca, a osnovni poslovni cilj im je bio povećanje opsega proizvodnje (Audretsch & Theurik, 2004, str. 143-166). U današnjim uslovima koje karakteriše višak ponude u odnosu na potražnju, povećanje proizvodnje usmjereno je na povećanje količina informacija i znanja, sa zadatkom povećanja efikasnosti te izrade finalnog proizvoda sa većom dodatnom vrijednošću. Najviše dodatne vrijednosti u današnjoj proizvodnji proizlaze upravo iz znanja, a ne iz materijala.

Globalna ekonomija sve više poprima odlike informacione ekonomije znanja, napuštajući obrasce industrijske ekonomije dominantne posljednjih decenija, a „kao suprotnost materijalnoj imovini, usluge i povezana nematerijalna imovina sada čine najveći dio BDP-a u većini ekonomija, a usluge se više temelje na znanju nego na materijalnome“ (Fleisher & Bensoussan, 2003, str. 7). Često postoji veliki jaz između informacija koje su potrebne menadžmentu za donošenje odluka i bezbroj podataka koji se svakodnevno prikupljaju u preduzeću. Radi premoštavanja tog jaza, kompanije obavezno treba da investiraju u razvoj sistema poslovne inteligencije kako bi podatke i informacije pretvorile u korisno znanje, te na taj način povećale konkurentsku prednost (Vukmirović, 2012, str. 241). U cilju što uspješnijeg korišćenja znanja u praksi, potrebno je skrenuti pažnju na neke ključne odrednice za podjelu znanja s obzirom na njegov izvor, načine primjene i izlazne rezultate. Najčešće se i u literaturi i u praksi koriste: (1) eksplicitno znanje (explicit knowledge); (2) implicitno znanje (implicit knowledge) i (3) poslovna inteligencija (business intelligence). Ova podjela posebno dolazi do izražaja u primjeni metodologije preduzetničkog inteligentizma (entrepreneurial intelligence) za analiziranje poslovnih događaja

## THE ROLE OF NEW KNOWLEDGE IN RESTRUCTURING EXISTING AND FORMING NEW ENTERPRISES

In past decades main development drivers in the industrial economy were large corporations and mass production of products which had no difficulties in finding customers, and their basic aim was to increase the production volume (Audretsch & Theurik, 2004, p. 143-166). In today's conditions, which are characterized by the excess supply relative to demand, the increase in production is aimed at increasing the amount of information and knowledge, with a mission to increase efficiency and production of the final products with higher added value. Most added value in production today originates just from knowledge, not from the material.

Global economy is increasingly taking on the characteristics of the information economy of knowledge, abandoning the dominant forms of industrial economies in recent decades, and “as opposed to tangible property, services and related intangible assets now make up the largest part of GDP in most economies, while services are mostly based on knowledge, rather than material“ (Fleisher & Bensoussan, 2003, p. 7). There is often a big gap between the information which are necessary for management in decision-making and numerous information which are collected in the company on a daily basis. In order to overcome that gap, companies must invest in development of business intelligence system in order to turn unprocessed data in useful knowledge and maintain competitive advantage (Vukmirović, 2012, p. 241). In order to ensure successful use of knowledge in practice, it is necessary to draw attention to some of the key determinants for knowledge classification, with regard to its source, method of administration and outputs. Most frequently, both in literature and in practice are: (1) explicit knowledge; (2) implicit knowledge and (3) business intelligence. This classification is particularly evident in the implementation of the methodology of entrepreneurial intelligence for analyzing business events in previous period and the

u prethodnom periodu i planiranje očekivanih kretanja i rezultata u narednom periodu (Dedijer, 1991, str. 102). Analitičko-planska funkcija izuzetno je važna za efikasno korišćenje novih tehnologija, inovacija, 3D dizajniranja i drugih oblika nematerijalne imovine u proizvodnji. Posebno postaje važno 3D dizajniranje koje predstavlja proces kreiranja objekata koristeći mašine koje slažu materijal sloj po sloj u tri dimenzije dok se ne dobije željeni predmet koji je prethodno kreiran na računaru. Riječ je o revolucionarnom dizajniranju trodimenzionalnih objekata prilagođavanjem i unapređivanjem inženjerskog koncepta čiji je tvorac Čarls Hal, kasniji osnivač kompanije 3d Systems koji je uveo u praksu stereolitografiju, kao jedan od načina pravljenja 3D modela iz slike na kompjuteru. Od tada pa do danas 3D dizajn nalazi primjenu u različitim granama industrije poput automobilske, avijacije, mašinske, medicinske, industrije nakita i za vlastite potrebe ljudi. Zanimljivo je spomenuti da je 1999. godine proizveden prvi ljudski organ, mokraćna bešika, pomoću 3D dizajniranja, a 2002. i prvi bubreg. Ovakvi organi se prave trodimenzionalnom štampom i potom se ugrađuju u čovjeka. Zatim 2008. godine je proizveden prvi 3D printer koji je u stanju da sam reprodukuje većinu svojih dijelova. Do danas su ostali još samo neki elektronski dijelovi da se posebno dodaju, ali će, vjerovatno, i taj problem biti uskoro riješen i 3D printer će moći sam sebe da proizvede (Vukmirović, 2012, str. 211).

expected developments and results in the future (Dedijer, 1991, p. 102). Analysis and planning function, which is performed according to the methodology of entrepreneurial intelligence, is very important for efficient usage of new technologies, such as the technology of 3D printing. 3D design technology is the process of creating objects using machines which arrange material layer by layer in three dimensions until desired item, previously created on the computer, is not done. It is a revolutionary technology of producing three dimensional objects by adjusting and improving inkjet concept, created by Charles Hall, founder of 3D Systems company, who introduced stereolithography in practice, as one of the manners of creating 3D model from a computer picture. From then on, 3D design has found its use in different branches of industry such as automotive industry, aviation, mechanical engineering, medical industry, jewelry manufacture, as well as people's personal needs. It is interesting to mention that in 1999., using 3D design, the first human organ, the bladder, was produced, and in 2002. the first kidney. These organs are made with three-dimensional printing, and then incorporated into a human's body. In 2008 the first 3D printer with the capability of reproducing most of its parts was produced. Up until now, only few electronic components need be added separately, but the problem will probably be resolved soon and the 3D printer will be able to produce itself (Vukmirović, 2012, p. 211).

## STUDIJA SLUČAJA

### Studija slučaja „Telekom Srpske“

Telekom Srpske a.d. Banja Luka, osnovan je 1996. godine, djelatnost komunikacijske usluge, sa osnovnim proizvodima: fiksna telefonija, mobilna telefonija, broadband, internet usluge i T/Network usluge. Telekom Srpske od decembra 2006. godine je u većinskom vlasništvu Telekoma Srbije (65 odsto dionica). Telekom Srpske spada u velika preduzeća po broju zaposlenih, vrijednosti aktive i ostvarenom prihodu. Godine

## CASE STUDIES

### „Telekom Srpske“ case study

Telekom Srpske, stock company from Banja Luka, was founded in 1996, as a company that provides communication services with basic products such as: landline network, mobile telephony, broadband, internet services and T/Network services. Telekom Srpske belongs to the range of large companies, bearing in mind the number of employees, the value of assets and generated revenue. In 2008, accomplished busi-

2008. ostvareni poslovni prihodi iznosili su 468,3 miliona KM, a 2012. godine 470,8 miliona KM. Broj zaposlenih je 2008. godine iznosio 2.525, a 2012. godine 2.195. Iz ovih podataka je vidljivo da je preduzeće uspjelo da od početka krize zadrži svoj tržišni udio i čak poveća poslovne prihode zahvaljujući uvođenju novih tehnologija, inovacija i novog dizajna proizvoda. U periodu 1996. do 2012. godine preduzeće je provelo veći broj aktivnosti na uvođenju novih proizvoda, unapređenju dizajna i drugih karakteristika proizvoda/usluga. Samo u 2011. godini uvedeno je šest paketa novih usluga od kojih posebno treba spomenuti: online kupovinu, web portal, web shop, mobilna plaćanja računa i drugo (Republički zavod za statistiku, 2013). U cilju prevazilaženja krize i održivog razvoja posebna pažnja posvećena je službama i sektorima preduzeća koji se bave istraživanjem, razvojem tehnologije, dizajniranjem proizvoda i marketingom.

Za pružanje usluga mobilne telefonije u Republici Srpskoj na nivou preduzeća je specijalizovana radna jedinica za mobilnu telefoniju M:tel, a za internet servise specijalizovana je radna jedinica TEOL.

Telekomunikacioni sistemi se danas suočavaju sa velikom konkurencijom, zahtjevima koje postavlja internet, mogućnostima širokopojasnih servisa (telekonferencije, videokonferencije, video po zahtjevu, itd.) i stalno rastućim zahtjevima korisnika. Telekomunikacioni operatori moraju da prilagode svoje poslovne modele prema tim trendovima održavajući istovremeno standarde kvaliteta, pouzdanosti i operativne uspješnosti kojiim omogućavaju da se takmiče sa konkurencijom na globalnom tržištu.

Praćenjem evolucije telekomunikacione industrije, sve više se uočava da se mnoge telekomunikacione kompanije udaljavaju od poslovnog modela zasnovanog na strategiji razvoja infrastrukture (proizvoda) usluga i prihvataju poslovni model zasnovan na strategiji usmjerenoj na korisničke usluge. Telekomunikacione kompanije koje su iz-

ness income was 468,3 million KM, and in 2012 470,8 million KM. The number of employees in 2008. was 2.525 and in 2012, 2.195. These data implies that the company managed that, from the beginning of the crisis maintains its market share and even increase business revenue due to the introduction of new technology, innovation and new product design. In the period between 1996 and 2012, the company has conducted numerous activities on introducing new products, improvement of design and other characteristics/products. In 2011 only, six packages of new services have been introduced of which special mention should be made about online shopping, web portal, web shop, bill payment via mobile phones etc (Republic institute for statistics, 2013). In order to overcome the crisis and achieve sustainable development, special attention was paid to the offices and sectors, which are engaged in the research, development and marketing.

Mobile telephony services in Republic of Srpska are provided by specialized work unit for mobile telephony M:tel, while internet services are provided by specialized work unit TEOL.

Telecommunication systems today face a tough competition, the requirements of the internet, the possibilities of broadband services (teleconferencing, videoconferencing, video on demand, etc.) and constantly growing demands of users. Telecommunication operators have to adjust their business models to these trends, while maintaining standards of quality, reliability and operational performance that enable them to keep pace with the competition in the global market.

By tracking the evolution of the telecommunication industry, it is evident that many telecommunication companies are moving away from a business model based on the strategy of infrastructure development of services and accepted business model which is based on a strategy aimed at customer service. Telecommunication

gubile povlašćeni monopolski status i ušle u novu eru takmičenja sa konkurencijom, uvidjele su da je upravljanje odnosima sa kupcima (CRM) ključni faktor koji diferencira najbolje u odnosu na ostale. Izbor strategije koja je usmjerena ka korisniku usluga zavisi od raspoloživih savremenih tehnologija koje omogućavaju brzo i efikasno razumijevanje njegovih potreba i ponašanja, što omogućava konkurentnost kompanije. Da bi se što potpunije upoznali korisnici, u Telekomu Srpske prikupljaju dvojake informacije: o njihovom ponašanju i o njihovim prilikama. Svaki kontakt sa korisnikom treba da bude iskorišćen za prikupljanje informacija. Razvojem korisnički orijentisanog poslovanja i potpuno razumijevanje korisnika je jedini put opstanka na tržištu. Postoji mnogo problema sa kojima se susreću telekomunikacione kompanije. Odlazak, odnosno zadržavanje postojećih klijenata je najveći problem u poslovanju telekomunikacionih kompanija.

U uslovima kada je penetracija u ukupnom stanovništvu dostigla svoj maksimum, mobilni operateri mogu povećati profit (ili ga zadržati) samo zadržavanjem profitabilnih korisnika, ponudom novih usluga postojećim korisnicima, pronalaženjem pojedinih grupa unutar ciljane populacije itd. Prema našim istraživanjima, telekomunikacione kompanije ulažu veliki novac za dobijanje novih korisnika. Međutim, to može koštati do deset puta više nego zadržavanje postojećih, čemu se ne pridaje velik značaj. Telekom Srpske ima značajnu neiskorištenost kapaciteta tokom pojedinih dijelova dana, sedmice i mjeseca, dok, s druge strane, mora imati dovoljne kapacitete da opslužuje sate najvećeg opterećenja. Razumijevanje korisničkog ponašanja i neiskorišćenog mrežnog kapaciteta omogućava Telekomu Srpske da ponudi servise koji bi apsorbirali neiskorišćene mrežne kapacitete. Da bi mogli vršiti kvalitetnu analizu, neophodno je uvođenje tzv. Sistema za podršku odlučivanju (decision support system - DSS). DSS sistem omogućava dubinske analize velikih

companies that have lost a privileged monopoly status and entered into a new era of competition with other companies, realized that the customer relationship management (CRM) key factors which differentiate the best when compared to the others. The strategy, which is focused on the customer depends on the availability of new technologies that enable fast and efficient understanding of their needs and behaviors, allowing the company's competitiveness. To be fully informed about their users, in Telekom Srpske they collect information twofold: on their behavior and their circumstances. Every contact with the customer has to be used for gathering information. Developing user oriented management and fully understanding customers is the only way of existence on the market. Telecommunication companies are facing many problems. The retain of customers is the biggest problem in telecommunication.

In circumstances where the penetration of the total population reached its peak, mobile operators can increase their profit (or keep it) just by retention of profitable customers, by offering new services to existing customers and detecting certain groups within the target population, etc. According to our researches, telecommunication companies invest a lot of money for obtaining new customers. However, it can cost up to ten times more than retaining existing ones, which is often a neglected fact. Telekom Srpske has an insufficient exploitation of capacities in certain parts of the day, week and month, while, on the other hand, it must have sufficient capacity to handle the highest rush hours. Understanding the customer's behavior and unused network capacity, enables Telekom Srpske to offer services that would absorb unused network capacity. In order to perform qualitative analysis, it is necessary to introduce the so-called (decision support systems DSS). DSS system provides in-depth analysis of large amounts of data, providing the ability to observe in-

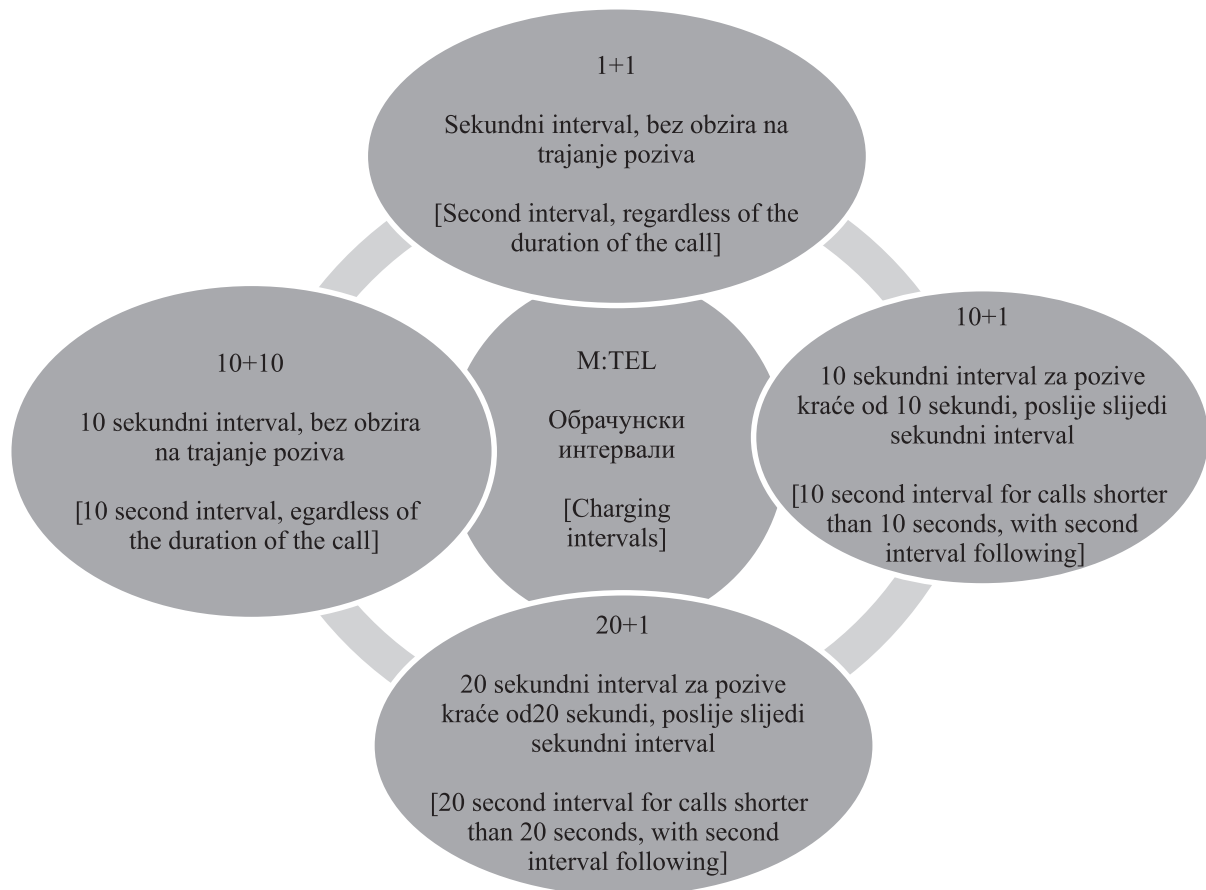


količina podataka, dajući mogućnost pogleda na informacije iz više uglova. Prilikom kreiranja DSS-a u mobilnoj telefoniji, jedan od zahtjeva je i da se analiza vrši na više i sa više nivoa, omogućavajući krajnjim korisnicima mogućnost postavljanja raznih pitanja na koja treba da se dobije jasan i precizan odgovor. Arhitekturu sistema za podršku odlučivanju čine tri komponente: izvorni sistemi; skladište podataka i platforma poslovne inteligencije. Prethodno razmotreni problemi i relacije u poslovanju najbolje se mogu ilustrovati praktičnim primjerom, a koji izražava specifičnost djelatnosti koju obavlja Telekom Srpske i način mjerenje rezultata njegove poslovne efikasnosti.

U studiji slučaja obrađen je problem prelaska sa minutnog na sekundno obračunavanje cijene impulsa, tj. promjenu obračunskog tarifnog intervala „60+1“ sekundi u „10+1“ sekundi. Cilj je bio dobiti potpuni uvid u rješenje problema prelaska sa minutnog na sekundno obračunavanje cijene impulsa, uočiti područja definisana problemom, odrediti parametre koji definišu ta područja, uočiti eventualna pravila, uzorke ili interesantne pojave. U praktičnom primjeru su obuhvaćene sve faze analize: faza razumijevanja problema, faza čišćenja i pripremanja podataka, izbor odgovarajućeg modela (algoritma), faza modeliranja, te evaluacija rezultata modeliranja. Analiza je obavljena korišćenjem vizuelizacijskih tehnika i metoda (algoritama) pretraživanja podataka. Od puštanja u komercijalni rad, Mobilna telefonija Srpske (m:tel), kada govorimo o obračunskim intervalima, imala je „60+1“ sekundni interval. Zbog konkurencije na tržištu BiH, m:tel je bio primoran da razmatra mogućnost promjene obračunskog intervala. U analizi su razmatrane četiri varijante obračunskih intervala koje su potencijalno mogle da zadovolje korisnike i menadžment preduzeća – jer uvođenje novog obračunskog intervala dovodi do gubitka prihoda m:tel-a.

formation from different angles. While creating DSS in mobile telephony, one of the requests is to provide the analysis on more levels in order to provide the users with the ability to ask various questions that should provide a clear and precise answer. The architecture of decision support system consists of three components: the source systems, data warehouse and business intelligence platform. Previously discussed problems and relationships in business can be best illustrated through a practical example, which expresses the specific activities carried out by the Telekom Srpske and a way of measuring the results of its operating efficiency.

In case study the problem of transfer from minute to second calculation of impulse prize: i.e. the shift of calculation of tariff interval „60+1“ seconds to „10+1“ seconds. The aim was to obtain a complete insight in the solution of the problem of transfer from minute to second calculation of impulse prize, spot the areas defined with the problem, set the parameters which define those areas, observe possible rules, patterns or interesting phenomena. In practical example all phases in the analysis are covered: the phase of understanding the problem, the phase of cleaning and preparation information, choosing the right model (algorithm), phase of molding and evaluation of molding results. The analysis is performed by using visualization techniques and methods (algorithms) of data research. Since the beginning of the commercial operation, mobile operator of Republic of Srpska (m:tel), when speaking about charging interval, used the „60+1“ seconds interval. Due to the competition in the market of Bosnia and Herzegovina, m:tel was forced to consider the possibility of changing the charging interval. The analysis considered four variants of billing intervals that are potentially able to satisfy customers and company management - since the introduction of the new accounting interval leads to loss of income for m:tel.



Slika 1. Varijante obračunskih intervala

Picture 1. Versions of charging intervals

Obrada podataka korišćenjem alata poslovne inteligencije pokazala je da će interval "10+1" biti atraktivan kada se posmatra sa korisničke tačke gledišta. Za "10+1" interval nije potreban novi sistem naplate.

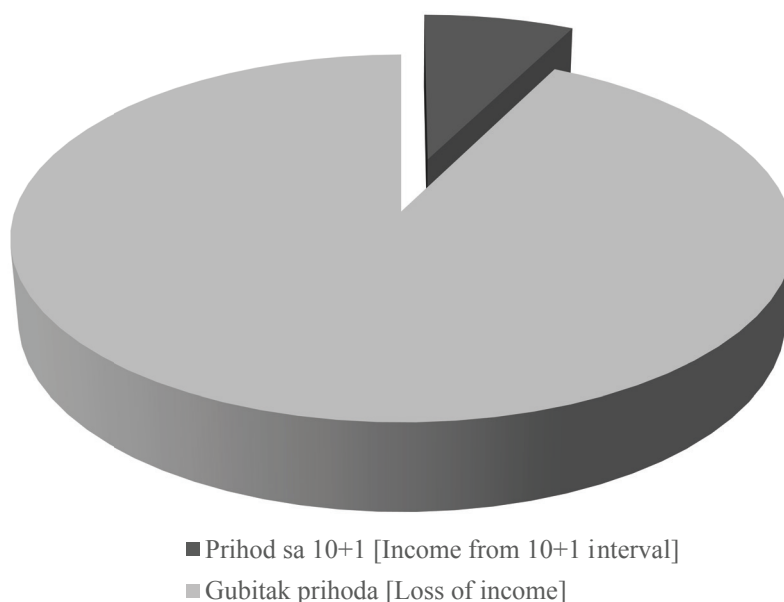
Razmatran je i sekundni interval, ali zbog prostora za buduće ustupke prema korisnicima i razlike u gubicima prihoda, smatralo se da je "10+1" interval u tom trenutku bio najadekvatniji.

Planirano je da se novi obračunski interval implementira isključivo na novim tarifnim modelima u postpaid-u i na prepaid-u. Gubitak prihoda je 7,3770% bez porasta saobraćaja (Grafikon 1). Treba napomenuti da je analiza rađena kao „najgori scenario“ (bez porasta saobraćaja kome doprinose novi korisnici i bez povećanja prosječne potrošnje korisnika).

Data analysis using business intelligence tools showed that the interval "10+1" will be active, when observed from the consumers point of view. For "10+1" interval, new system of charging is not necessary.

The second-interval was also considered, but the scope for future concessions to the users and the differences in revenue losses, it was thought that the "10 +1" interval at the time was the most appropriate.

It is planned to implement a new charging interval exclusively in accordance with the new tariff models in the postpaid and prepaid. Income loss is 7,3770% with no increase in traffic (Graph 1). It should be mentioned that the analysis was done as the „worst scenario“ (with no increase in traffic which is contributed by new customers without the increase of average consumer spending).



*Grafikon 2.* Gubitak prihoda sa prelaskom na 10 sekundni interval

*Graph 2.* The loss of revenue in transition to the 10 second interval

Očekivane prednosti novog tarifnog modela Telekoma Srpske trebalo bi da dovedu do porasta saobraćaja koji je marketinški prikladan za komunikaciju sa korisnicima, migracije sa prepaid-a na postpaid, smanjenja odlazaka korisnika, pozitivnog mišljenja medija u okruženju, zadovoljstva korisnika, poboljšanja imidža kompanije.

U cilju unapređenja poslovanja, Telekom Srpske, uvođenjem alata poslovne inteligencije, odnosno, preduzetničkog intelidžensa, sprovodi pretraživanje podataka o različitim aktivnostima unutar sistema, što obuhvata: informacije o telefonskim pozivima, informacije o radu sistema, informacije o smetnjama i kvarovima u mreži, informacije o korisnicima usluga, informacije potrebne za naplatu korišćenih usluga itd. Na taj način omogućava se da informacije skrivene u tim podacima ne budu izgubljene, već da budu iskorišćene za poboljšanje kvaliteta usluge, planiranje i uvođenje novih usluga, zadržavanje profitabilnih klijenata i sprečavanje njihovog odlaska konkurenciji, pronalaženje načina za izbjegavanje zagušenja u mreži itd.

U praktičnom primjeru su obuhvaćene sve faze preduzetničkog intelidžensa, posmatrano

Expected benefits of the new tariff model of Telekom Srpske should lead to: an increase in traffic which is, from the marketing point of view, suitable for communications with customers; migration from prepaid to postpaid; decreased loss of users; positive reviews of media in the environment; customer satisfaction; improvement of company image.

In order to improve the business through the introduction of business intelligence tools, ie, entrepreneurship intelligence, Telekom Srpske conducts data research on variety of activities within the system, which includes: information about phone calls, information about the operation of the system, information about the disturbances and failures in the network, information about users services, the information necessary for charging used services, etc. These activities are allowing that information hidden in these data are not lost, but used to improve the quality of services, planning and introduction of new services, retaining profitable customers and preventing them to use competition's services, finding ways to avoid congestion in the network, etc.

The example from practice covers all phases of entrepreneurship intelligence, from the

iz ugla upravljanja: brzo prikupljanje podataka, kratka analiza (primjena alata poslovne inteligencije), originalno istraživanje (korišćenje tarifnih paketa različitog trajanja), ciljno posmatranje (cilj istraživanja je da se pronađe tarifni paket koji će biti dovoljno dobar za korisnike sa minimalnim gubicima za kompaniju, sa perspektivom povećanja prihoda usljed povećanja broja korisnika), inteligentni sistemi (efikasnija upotreba ljudskog kapitala), inteligentna komunikacija (manifestuju se putem prezentacije, informacione tehnologije, informacione psihologije, informacione politike i dr. (Kalakota & Robinson, 2002, str. 36).

viewpoint of management: rapid data collection; brief analysis (application tools business intelligence) original research (using tariff packages of varying length) target observation (research goal is to find a tariff plan that will be good enough for users with minimal loss for the company, with the perspective of increasing revenue due to an increase in the number of users); intelligence systems (efficient use of human capital); intelligence communication (manifested through the presentation, information technology, information psychology, information policy, etc.) (Kalakota & Robinson, 2002, p. 36).

### Studija slučaja "Grafotisak"

### Case study „Grafotisak“

Grafotisak s distribucijom školskog i kancelarijskog materijala, te grafičkih repromaterijala počeo je da radi 1990. godine. Od tada uspješno plasira brendove svojih dobavljača i vlastite proizvode na tržište BiH, ali i na tržište u regije.

Grafotisak started distributing school, office and graphic supplies in 1990. Since then, this company successfully distributes brands of its suppliers and their own products on the market of Bosnia and Herzegovina and on the regional market.

Tržište je prepoznalo Grafotisak kao sigurnog partnera, te je to preduzeće dugi niz godina tržišni lider. Trajnim reinvestiranjem dobiti u nove tehnologije i u distribuciju neprekidno poboljšava uslove poslovanja. Kako bi u svakom trenutku mogao udovoljiti potrebama kupaca, Grafotisak posjeduje skladišne prostore u Grudama, Sarajevu, Banja Luci i Tuzli, u kojima je smješten kompletan asortiman artikala koje svakodnevno proširuje i izvozi u preko 10 zemalja u okruženju. Grafotisak je 2008. godine postao vlasnik 50% poduzeća Fokus d.o.o., tržišnog lidera u distribuciji kancelarijskog i školskog materijala, te konfekcioniranog papira u Republici Hrvatskoj. Grafotisak iz Gruda, BiH, osnovan je 1983. godine kao manje proizvodno preduzeće grafičkih proizvoda. Od tada dinamično raste i uspješno plasira brendove svojih dobavljača i vlastitih proizvoda, ali i na tržištu zemalja Zapadnog Balkana.

The market recognized Grafotisak as a secure partner, which makes this company a long-time market leader. Permanent reinvesting of profit in new technologies and distribution, continuously improves business conditions. In order to please the needs of customers in every moment, Grafotisak possess storage spaces in Grude, Sarajevo, Banja Luka and Tuzla, in which complete range of products, which is expanded and exported in over ten countries in region on a daily bases, is situated. In 2008, Grafotisak became the owner of 50% of Fokus enterprise, market leader in distribution of office and school supplies in Republic of Croatia. Grafotisak company, based in Grude, Bosnia and Herzegovina was founded in 1983. as a smaller enterprise for production of graphic products. Since then it grows dynamically and successfully distributes the brands of their suppliers and their own products on the market of the countries from the Western Balkans.

Grafotisak koristi preduzetničku strategiju "tržišne niše" i uvlačenja kupaca u poslovni proces, te stalno inoviranje proizvodnog programa, što mu omogućuje povećanje učešća

Grafotisak uses the entrepreneurial strategy of „market niche“ and indentation of customers in the business process and continuous innovation of production programme which allows it to increase

na tržištu. Grafotisak kao tržišni lider regije u proizvodnji i prometu grafičkih proizvoda izradio je vlastiti razvojni model – trajno reinvestiranje dobiti u nove tehnologije i inovacije u grafičkom inženjerstvu. Rezultat takvog modela razvoja je višestruko povećanje obima poslovanja. Broj zaposlenih je porastao sa desetak zaposlenih prilikom osnivanja na preko 350 zaposlenih u tri države (BiH, Hrvatska, Srbija) u 2013. godini. Ključnu ulogu u dizajniranju modela razvoja Grafotiska ima razvojna služba koja stipendira, zapošljava i motiviše talentovane mlade stručnjake za inovativna rješenja u grafičkom inženjerstvu i dizajnu.

Planovi razvoja proizvodnog programa se kreiraju po savremenim metodama poslovnog predviđanja i preduzetničkog inteligentnosti. Zahvaljujući razvoju zasnovanom na novim znanjima, primjeni novih tehnologija i privlačenju mladih, talentovanih kadrova i posebnom pristupu kupcima (uvođenje kupca u sistem proizvodnje i njegovo pretvaranje iz konsumenta u prosumenta) ovo preduzeće je uspjelo ne samo da izbjegne smanjenje obima poslovanja poslije “izbijanja” krize, nego je uspjelo i povećati obim proizvodnje i plasmana na domaćem i stranom tržištu za 43% u periodu od 2009. do 2012. godine.

## ZAKLJUČAK

Mnoga preduzeća iz industrijskog sektora razvijenih zemalja, a posebno zemalja u tranziciji (kao što je BiH) loše su pozicionirani u svjetskoj ekonomiji u vrijeme globalne ekonomske krize. Globalizacija i kriza predstavljaju najveće probleme za zrele industrije i preduzeća ukoliko nedovoljno ulažu u nove proizvode, nove tehnologije, dizajn i kadrove koji imaju nove poslovne ideje. Stoga je neophodna revitalizacija zrelih preduzeća i industrijskih sektora i pokretanje razvoja novih preduzeća i nove industrije zasnovane na novim znanjima, novim tehnologijama i sistemskim inovacijama (Antončić, 2002, str. 4).

Sistematičnom analizom se može uočiti da su značajan broj preduzetnika i preduzeća

the participation in the market. Grafotisak, as a regional market leader in producing and distribution of graphic products, has built their own development model – permanent reinvestment of income in new technologies and innovation in graphic engineering. The result of that kind of development model is multiple increase of business volume. The number of employees has increased from about ten to over 350 employees in three countries (Bosnia and Herzegovina, Croatia, Serbia) in 2013. The key role in designing the model of development of Grafotiska has the development department which provide scholarships, hires and motivates talented young experts for innovative solutions in graphic engineering and design.

Development plans are created in accordance with contemporary methods of business forecasting and entrepreneurial intelligence. Due to development based on new knowledge, implementing new technologies, attracting young, talented personnel and special approach to customers (introducing the customer in the system of production and its turn from consumer to prosument) this company managed to, not only avoid the decrease of business volume in the period of crisis, but to increase the volume of production and distribution on domestic and foreign market for 43% in the period of 2009 to 2012.

## CONCLUSION

Many enterprises from the industrial sector of developed countries, especially countries in transition (such as Bosnia and Herzegovina) are poorly positioned in world economy in the period of global economic crisis. Globalization and crisis present the biggest problems for mature industries and enterprises if they do not invest enough in new products, new technologies, design and cadres that provide new business ideas. Therefore, revitalization of mature enterprises and industrial sectors and initiation of development of new enterprises and new industry based on new knowledge, new technologies and system innovation (Antončić, 2002, p. 4).

Systematic analysis shows that significant number of entrepreneurs and enterprises recorded rapid

zabilježili brzi rast prihoda, izvoza i zaposlenosti, kao i povećanje kapitala baš u vrijeme krize. To ukazuje na to da su ova preduzeća i preduzetnici sa izraženim preduzetničkim duhom iskoristili krizu kao nepriliku za kreiranje vlastite prilike za razvoj. Na te pojave u ranijim krizama ukazao je G. Gilder u svojim istraživanjima koje je provodio dugi niz godina u SAD-u. Njegova istraživanja su ukazala na to da preduzetnički duh u kompanijama doprinosi ne samo optimalnom kombinovanju postojećih resursa, nego i kreiranju novih resursa. Naša istraživanja su pokazala (posebno dvije analize slučaja) da u vrijeme krize treba povećati ulaganja u istraživanje i razvoj, a ne smanjivati ta ulaganja u cilju štednje koja je u ovom slučaju kontraproduktivna. Navedena istraživanja su pokazala da primjena koncepta inovativnog dizajna i preduzetničkog marketinga u preduzećima omogućava formiranje uslova za uspješniji tržišni nastup i za postizanje konkurentne sposobnosti preduzeća.

U praksi se pokazalo da nema ozbiljnijeg razvoja malog, eksternog preduzetništva bez razvoja internog preduzetništva u velikim korporacijama oko kojih se kao sazviježde razvija mnoštvo malih kooperantskih preduzeća. Osnovni pokretač svih aktivnosti su bila nova znanja, nove tehnologije, inovacije i kreativni kadrovi. Sa odvijanjem procesa tranzicije, znanje će sve više biti faktor od opredjeljujućeg značaja za novi razvoj industrije i pratećih korporativnih djelatnosti u obliku malih i srednjih preduzeća.

Kao jedna od ključnih aktivnosti unapređenja industrijskog preduzetništva javlja se kreiranje procesa obrazovanja iz oblasti preduzetništva (kreiranje poslovnih ideja, dizajniranje i brendiranje proizvoda, proizvodnja softvera i drugih oblika nematerijalne imovine).

growth of revenue, exports and employment, as well as an increase in equity in the period of crisis. This points to the fact that these companies and entrepreneurs with strong entrepreneurial spirit use the crisis as a trouble to create their own opportunities for development. G. Gilder pointed out at the occurrence of the earlier crisis in his research which was conducted in the United States. His research indicated that the entrepreneurial spirit in companies, does not only contribute to the optimal combining of existing resources, but also the creation of new resources. Our researches showed that in the period of economic crises the investments in research and development should be increased, not decreased, as a measure of savings, which is in this case counterproductive. Stated researches showed that implementation of innovative design concept and entrepreneurial marketing in companies provide creating conditions for more successful market appearance and achieving competitive ability. Implementation of the corporate entrepreneurship concept allows forming conditions for more successful market performance and achieving competitive ability of the company.

In fact, the practice has shown that there is no serious development of small, external enterprise, without the development of internal entrepreneurship in large corporations, around which many small cooperative companies develop as a constellation. The main driving force of all activities were new knowledge, new technologies, innovations and innovative cadres. With the progress of the transition process, the knowledge will increasingly be a factor of decisive importance for the development of entrepreneurship in transition economies.

As one of the key activities of improving industrial entrepreneurship, the creation of the educational process in the field of entrepreneurship can be emphasized (creating business ideas, design and branding, production software and other forms of intangible property).

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