

## Quality Measurement of Innovative Efficiency of a Company

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## Merenje kvaliteta inovativne efikasnosti preduzeća

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**Abstract:** *From the holistic point of view, a business model is a reference framework used to identify the ways in which a company creates, offers and gains profit from innovations. The measuring of the innovative efficiency helps the top management of a company in two ways: (1) to make decisions based on good information bearing in mind the long-term nature and risk in the realisation of the innovative projects and (2) to distribute goals and efforts comparing to the short term and long-term innovations. The aim of the paper is the analysis of the indexes of innovation and efficiency, as well as the application of the balanced records of innovation with the particular attention on the status and perspectives of the companies in The Republic of Serbia.*

**Key words:** *business model, innovation, efficiency, top management*

**Rezime:** *Poslovni model posmatran holistički predstavlja referentni okvir za identifikovanje načina na koji preduzeće stvara, pruža i izvlači vrednost od inovacija. Merenje inovativne efikasnosti pomaže top menadžmentu preduzeća dvojako i to: a) da donose odluke na osnovu dobre informisanosti imajući u vidu dugoročnu prirodu i rizik u realizaciji inovativnih projekata i b) pomažu im da rasporede ciljeve i napore u poređenju sa kratkoročnim i dugoročnim inovacijama. Cilj rada je analiza merila inovativnosti i efikasnosti, kao i primena izbalansiranog zapisnika inovativnosti sa posebnim osvrtom na stanje i perspektive preduzeća u Republici Srbiji.*

**Ključne reči:** *poslovni model, inovacija, efikasnost, top menadžment.*

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### I. Introduction

In order to be competitive and keep their present position in modern economy many companies must find new ways to grow and develop.

### I. Uvod

U savremenoj privredi mnoge kompanije da bi bile konkurentne ili da bi zadržale postojeću poziciju moraju da nađu nove puteve za rast i razvoj.

Innovations are one of the primary means corporations are using to grow and strengthen their strategic position. Innovation implies the use of new knowledge with the aim to transform organisational processes and business models or design new products and provide specific services, which are attractive and commercially profitable (Vucenov et al., 2010).

Innovation is characterised by design of values for customers, which he recognises as an important and distinctive advantage over the competitive products. The approach to the design of values becomes continuously innovative. Innovations present a new approach to problem solving, which involves incremental, revolutionary changes in the way of thinking, products, processes, and organisations (Pesalj, B., 2006).

In order to be effective, innovation should be simple. Innovation is a unique mental attitude that focuses a company on the future.

The aim of this paper is to point out the promotion possibilities of competitiveness of Serbian companies by increasing their innovativeness, that is, development and application of new ideas and skills for the purpose of commercialisation of new or promoted existing products and services. Besides, the critical condition of innovative efficiency in Serbia, the level of application of integral models of innovations measurement, the level of investments in research and development and analysis of a Serbian company are pointed out.

## **II. The results of innovative efficiency in Serbia**

Not only is the market in Serbia small, but it is also isolated. Thus, the practice of using models for measuring innovative efficiency is at a very low level. There are several reasons for this, among which is the process of transition we are presently experiencing, economic and political instability, global economic crisis, etc.

On the other hand, people in Serbia are strongly oriented towards joining the European Union

Inovacije su jedno od primarnih sredstava pomoću kojih korporacije rastu i jačaju svoju strategijsku poziciju. Inovacija podrazumeva upotrebu novog znanja sa ciljem transformisanja organizacionih procesa i poslovnih modela ili stvaranja novih proizvoda i pružanja specifičnih usluga koje su primamljive i komercijalno isplative (Vučenov et al., 2010).

Inovaciju karakteriše kreiranje vrednosti za kupca koju on prepoznaje kao značajnu i distinktivnu prednost u odnosu na konkurentske proizvode. Sam pristup kreiranju vrednosti postaje kontinuirano inovativan. Inovacije predstavljaju novi pristup rešavanju problema, koji često podrazumeva korenite, revolucionarne promene u načinu razmišljanja, proizvodima, procesima ili organizacijama (Pešalj, B., 2006).

Da bi bila efektivna, inovacija treba da bude jednostavna. Inovativnost je svojevrsni mentalni stav koji fokusira preduzeće da vidi ispred sadašnjosti, u budućnost.

Cilj rada je da ukaže na mogućnosti pospešivanja konkurentnosti srpskih preduzeća povećanjem njihove inovativnosti, odnosno, razvoj i primenu novih ideja i veština u svrhu komercijalizacije novih ili unapređenih postojećih proizvoda i usluga.

Dakle, da se ukaže na kritično stanje inovativne efikasnosti u Srbiji, stepen primene integralnih modela merenja inovativnosti, nivo ulaganja u istraživanje i razvoj i analiziranje samog stanja u preduzećima u Srbiji.

## **II. Rezultati inovativne efikasnosti u Srbiji**

Tržište Srbije nije samo malo već i izolovano, pa je praksa korišćenja modela merenja inovativne efikasnosti na niskom nivou. Postoji nekoliko razloga za to, a među njima su tranzicioni proces u kome se nalazimo, ekonomska i politička nestabilnost, globalna ekonomska kriza, itd.

Sa druge strane, narod u Srbiji pokazuje snažnu orijentaciju u pravcu pridruživanja Evropskoj uniji,

and business activity on the community market considers complete application of modern technology at all levels of economy.

By using models to measure innovation efficiency, the company involves all interested individuals, and enables solving the problems of an economic entity within a short time period (Krstić & Vukadinović, 2008).

Thus, it opens possibilities, which are in accordance with basic economic principles.

Results of the first research on the innovation potential of Serbia have shown that Serbian economy invests in research and development 10 times less with respect to the average of the European Union, although at the same time it exceeds the European average regarding the public funds for those areas.

The program for development of companies and entrepreneurship (EDEP) (Skarazinski & Gipson, 2009) through innovative efficiency has comprised 600 companies and 50 institutions. The results have shown that in 68% of the cases, Serbian businessmen see as the main obstacle for greater innovation in their companies the lack of financial resources; in 33% of the cases – the lack of market analysis services and in 23% of the cases they have listed the lack of good marketing support to new products. The research has shown that companies in Serbia innovate only in certain areas, and the most common type of innovation for the time being is procurement of new mechanisation, equipment and software, and personnel training.

The most innovative Serbian companies mostly operate in the domestic market with minor export and the low level of patent applications by the domestic companies (2% on the average) is also a problem for further development.

One of the key potentials in Serbia is the number of highly educated people, which is close to the European average, but education analysis has shown that, compared to the EU, the number of engineers and experts in the field of natural sciences who contribute most to innovative development is twice as small. A dominant problem in this area is the lack of sustainable system relations, i.e.

a poslovanje na tržištu zajednice podrazumeva potpunu primenu savremene tehnologije na svim nivoima privređivanja.

Korišćenjem modela merenja inovativne efikasnosti na jednostavan način kompanija uključuje sve zainteresovane kreativne pojedince, omogućava da se konkretan problem privrednog subjekta u kratkom roku uspešno reši (Krstić & Vukadinović, 2008).

Na ovaj način se otvaraju mogućnosti koje su u skladu sa osnovnim ekonomskim principima.

Srpska privreda investira u istraživanje i razvoj 10 puta manje u odnosu na prosek Evropske unije, iako istovremeno prelazi evropski prosek po nivou javnih izdvajanja za te oblasti, pokazali su podaci prvog istraživanja o inovativnom potencijalu Srbije.

Program za razvoj preduzeća i preduzetništva (EDEP) (Skarazinski & Gipson, 2009) koji finansira EU je u toku istraživanja inovativne efikasnosti obuhvatilo 600 preduzeća i 50 institucija, pri čemu su rezultati pokazali da privrednici Srbije kao glavnu prepreku za veću inovativnost u svojim kompanijama u 68% slučajeva navode nedostatak finansijskih sredstava, u 33% slučajeva nedostatak usluga analize tržišta, a 23% navodi nepostojanje dobre marketinške podrške novim proizvodima.

Istraživanje je pokazalo da preduzeća u Srbiji inoviraju samo u pojedinim oblastima, a da je najrasprostranjeniji vid inovacije za sada nabavka mehanizacije, opreme i softvera, te obuka kadrova.

Najinovativnija srpska preduzeća uglavnom rade na domaćem tržištu, bez velikog izvoza, a problem za dalji razvoj predstavlja i veoma nizak nivo patentnih prijavi domaćih preduzeća koji u proseku iznosi samo 2%.

Jedan od ključnih potencijala Srbije je broj visokoobrazovanog stanovništva koji je blizu evropskog proseka, ali je analizom obrazovanja uočeno da, u odnosu na EU, u proseku ima dvostruko manje inženjera i stručnjaka prirodnih nauka koji i najviše doprinose inovativnom razvoju.

Dominantan problem u ovoj oblasti nedostatak održivih sistemskih veza, odnosno

“the fundamental need to facilitate the relation between institutions for research and development, universities, institutions for protection of intellectual property, the government’s procurement mechanisms and infrastructure support to the companies” (Jaksic, 2008).

„fundamentalna potreba da se olakša povezanost između institucija za istraživanje i razvoj, univerziteta, institucija za zaštitu intelektualne svojine, vladinih mehanizama nabavke i infrastrukturne podrške preduzećima” (Jakšić, 2008).

Table 1. The strategy of innovations (SORS, 2008)  
Tabela 1. Strategija inovacija (SORS, 2008)

Size Veličina	Number of companies Broj preduzeća	Number of innovations introduced (products and processes),% Broj uvedenih inovacija (proizvoda i procesa) %	Process innovations,% Inovacije procesa %	Innovations in company organisation,% Inovacije u organizaciji preduzeća %	Innovations in marketing, % Inovacije u marketingu %
Small Mala	41	31.97	34.01	49.66	23.81
Medium Srednja	37	58.96	56.72	65.67	29.85
Large Velika	22	55.00	53.75	57.50	36.25
<b>Total</b> Ukupno	<b>100</b>	<b>47.09</b>	<b>46.81</b>	<b>57.34</b>	<b>28.81</b>

■ Products ■ Processes  
□ In organization □ In marketing

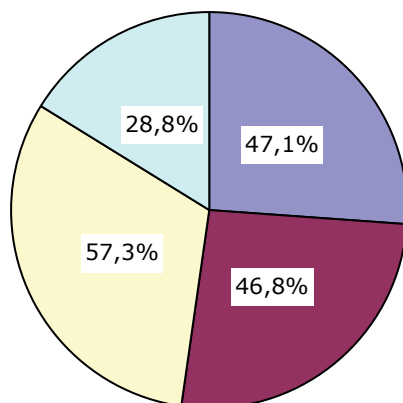


Figure 1. Innovations in products, processes, organisation and marketing and innovations

Slika 1. Inovacije proizvoda, procesa, organizacije i marketinga

■ Large ■ Medium □ Small

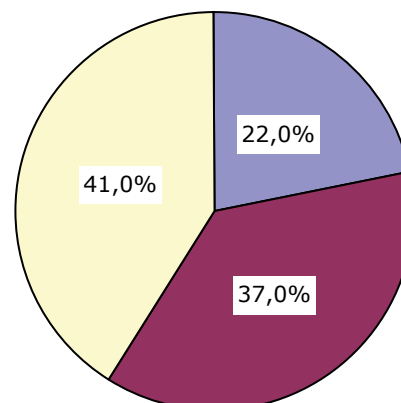


Figure 2. The size of a company

Slika 2. Veličina preduzeća i inovacije

This is why it is important to compensate the lack of “technology brokers” - organisations that deal with the transfer of knowledge and technology from science institutions to economy, as well as with the stimulation of cooperation with international institutions and the market.

In the paper are presented results of the research comprising 100 production companies selected according to the data

Zato je veoma važno da se što pre nadomesti nedostatak “tehnoloških brokera” - organizacija koje se bave transferom znanja i tehnologija iz naučnih institucija u privredu i podsticanjem saradnje sa međunarodnim institucijama i tržištem.

U radu su prikazani rezultati istraživanja koje je obuhvatilo 100 proizvodnih preduzeća izabranih na osnovu podataka

from The Economist Magazine on the 300 most successful companies in Serbia. The participants were top managers and managers responsible for research and development. The research was conducted in 2008, and the results refer to the innovation activities of the companies for the period from 2005 to 2007 (SORS, 2008).

The analysis of answers to the question if they had had any product and process innovations over the past few years showed that in 100 companies that had introduced new products and processes, 31,97% were small, 58,96% were medium and 55,00% were large companies (Table 1, Figures 1 and 2).

The research covered innovative activity of the companies according to the economy branches (Table 2), where the number of implemented innovations in companies was analysed, i.e. the number of applied projects.

Table 2. The number of companies that have implemented innovations according to economy branches (SORS, 2008)

Tabela 2. Broj preduzeća koja su implementirala inovacije prema privrednim granama (SORS, 2008)

Industrial sectors Sektor industrije	The number of introduced innovations, % Broj uvedenih inovacija, %	Process innovations, % Inovacije procesa, %	Innovations in company organization, % Inovacije u organizaciji preduzeća %	Innovations in marketing, % Inovacije u marketing, %
Agriculture, ore and stone mining Poljoprivreda, vađenje ruda i kamena	26.92	38.46	50.00	15.38
Production Proizvodnja	57.14	55.64	62.41	39.85
Production of electric energy, gas and water Proizvodnja električne energije, gasa i vode	45.45	45.45	72.73	9.09
Construction Građevinarstvo	20.00	28.00	56.00	4.00
Services Usluge	45.26	44.53	58.39	29.20
State management, health institutions and education Državna uprava, zdravstvo i obrazovanje	56.00	48.00	36.00	20.00
<b>Total Ukupno</b>	<b>49.09</b>	<b>46.81</b>	<b>57.34</b>	<b>28.81</b>

It can be concluded that the level of innovation activities considerably differs depending on the affiliation to the certain sector.

iz Ekonomist magazina o 300 najuspešnijih preduzeća u Srbiji.

Ispitanici su bili top menadžeri i menadžeri zaduženi za istraživanje i razvoj. Istraživanje je sprovedeno tokom 2008. godine, a rezultati se odnose na inovativne aktivnosti preduzeća u periodu od 2005 do 2007. godine (SORS, 2008).

Analizom odgovora na pitanje da li su uvodili inovacije proizvoda i procesa prethodnih godina utvrđeno je da od 100 preduzeća modifikovalo je ili uvelo nove proizvode i procese 31,97% malih, 58,96% srednjih, a 55,00% velikih preduzeća (Tabela 1, Slike 1 i 2).

Istraživanjem je obuhvaćena inovativna aktivnost preduzeća prema privrednim granama (Tabela 2), pri čemu je analiziran broj implementiranih inovacija u preduzećima, odnosno broj idejnih projekata koji se primenjuju u praksi.

Može se zaključiti da se nivo inovativnih aktivnosti značajno razlikuje s obzirom na pripadnost određenom sektoru.

The results are in accordance with most of the empiric research, showing that economy branches considerably influence the selection of innovation strategy. The analysis also comprised the innovation effects in an organisation, as presented in Table 3 (SORS, 2008).

Rezultati su u skladu sa većinom empirijskih istraživanja koja su pokazala da privredna grana značajno utiče na izbor strategije inovacija. Analiza je obuhvatila i efekte inovacija u organizaciji što je prikazano u tabeli 3 (SORS, 2008).

Table 3. The effects of innovations in an organisation  
Tabela 3. Efekti inovacija u organizaciji

The effects of innovations in an organization Efekti inovacija u organizaciji	Small Companies Mala preduzeća	Medium Companies Srednja preduzeća	Large Companies Velika preduzeća	Total Ukupno
Short period necessary for the reaction to the customers' needs Skraćeno vreme potrebno za reakciju na potrebe kupaca	17.01	22.39	17.50	19.11
Increased quality of products and services Povećan kvalitet proizvoda i usluga	25.85	29.10	31.25	28.25
Cost reduction on the unit of product Smanjenje troškova po jedinici proizvoda	11.56	11.19	13.75	11.91
Increased satisfaction of the employees Povećano zadovoljstvo zaposlenih	15.65	8.96	11.25	12.19

The research covers the relation between the source of knowledge and the strategy of innovations. The low scope of cooperation with education and research institutions shows that the knowledge exchange between the economy and the university is at a very low level. Science research does not follow the needs of the economy and is not applied in practice.

Moreover, the equipment in companies is more than 10 years old (Table 4). At the beginning of the 1990s, most public-owned companies in Serbia were very respectable systems, whereas today they are mostly companies with great losses operating with outdated equipment, surplus employees and with prices that do not cover the expenses of business operations. The biggest problems our public companies are faced with are outdated equipment, surplus manpower, inefficiency, political management. The argument in favour of establishing public companies in private ownership is inadequate efficiency of the market mechanism in providing public goods.

Private initiative is low in this area. Substantial initial investments are necessary, particularly when it comes to infrastructure activities.

Istraživanjem je obuhvaćen odnos između izvora znanja i strategije inovacija. Nizak obim saradnje sa obrazovnim i naučno-istraživačkim organizacijama pokazuje da je razmena znanja između privrede i univerziteta na veoma niskom nivou. Konkretnije, da naučna istraživanja ne prate potrebe privrede kao i da ne dožive praktičnu primenu.

Pored toga, oprema u preduzećima je starija od 10 godina (tabela 4). Većina javnih preduzeća u Srbiji su početkom 1990. godine bili veoma respektabilni sistemi, dok su u 2010. god. uglavnom poslovali sa gubitkom i zastarelom opremom, viškom zaposlenih i sa cenama koje ne pokrivaju ni troškove poslovanja. Najveći problemi sa kojima se susreću naša javna preduzeća su zastarelost opreme, višak zaposlenih, neefikasnost, partijsko upravljanje.

Argument u prilog osnivanju javnih preduzeća u javnom vlasništvu je nedovoljna efikasnost tržišnog mehanizma u obezbeđivanju javnih dobara.

Privatna inicijativa se slabo ispoljava u ovom području delatnosti. Potrebna su značajna inicijalna ulaganja, posebno kada je reč o infrastrukturnim delatnostima.



Table 4. The age of equipment in companies (SORS, 2008)  
 Tabela 4. Starost opreme u preduzećima (SORS, 2008)

<b>Innovation potential – the age of equipment in companies</b> <b>Inovacioni potencijal-starost opreme u preduzećima</b>	<b>Small companies</b> <b>Mala preduzeća</b>	<b>Medium companies</b> <b>Srednja preduzeća</b>	<b>Large companies</b> <b>Velika preduzeća</b>	<b>Total</b> <b>Ukupno</b>
Older than 10 years Starija od 10 godina	17.66	36.50	48.36	31.12
Between 5 and 10 years old Između 5 i 10 godina	20.10	17.22	14.56	17.87
Between 3 and 5 years old Između 3 i 5 godina	26.28	17.93	16.54	21.11
Between 1 and 3 years old Između 1 i 3 godine	28.46	20.52	13.98	22.47
Not older than 1 year Nije starija od 1 godine	7.50	7.83	6.56	6.56

The common characteristic of these activities is the necessity of big investments and state ownership, and they are often called companies without owners (Cantino, 2009).

In these companies innovative activity is present only in those who are financially the strongest, because they have their own research centers (Levi-Jaksic, 2005).

### III. Conclusion

In order for the company to be able to survive and develop in conditions of crisis and destabilisation, it must be innovative. The futuristic vision of the top management must be based on the measuring of the innovation efficiency with the aim to determine the present state and position, as well as the possibility of further development.

The lack of measures of innovation and imbalance in the relation of innovation and efficiency are the main obstructions in the future development of the companies in Serbia.

Research shows that the state of measuring innovation efficiency in Serbia is critical and rarely present.

The main deficiencies are in the lack of connection and cooperation between the institute and university research centres and the economy, as well as the inadequate structure of the highly educated personnel.

Public companies today are mostly companies with great losses operating with equipment older than 10 years, surplus manpower,

Zajedničko svojstvo ovih delatnosti je neophodnost velikih ulaganja i državno vlasništvo, zato se često nazivaju preduzećima bez vlasnika (Cantino, 2009).

U ovim preduzećima inovativna aktivnost je zastupljena samo u finansijski najjačim, jer oni imaju svoje istraživačke centre (Levi-Jakšić, 2005).

### III. Zaključak

Da bi preduzeće u uslovima krize i destabilizacije moglo da opstane i da se razvija mora da bude inovativno. Futuristički pogled top menadžmenta mora da je baziran na merenju inovativne efikasnosti sa ciljem da se utvrdi postojeće stanje i položaj kao i mogućnosti za dalji razvoj.

Nedostatak merila inovativnosti i uravnoteženosti u odnosu inovacije i efikasnosti glavne su kočnice u budućem razvoju preduzeća u Srbiji.

Istraživanja pokazuju da je u Srbiji stanje po pitanju merenja inovativne efikasnosti kritično i malo zastupljeno.

Glavni propusti su u nepostojanju sprege i saradnje između instituta i istraživačkih centara univerziteta i privrede, kao neadekvatna struktura visokoobrazovanog kadra.

Kada su u pitanju javna preduzeća, to su danas uglavnom preduzeća koja posluju sa gubitkom i opremom starijom od deset godina,

with inadequate qualification structure and companies with inefficient management structure. Bearing in mind their importance for the economy and the State, their serious restructuring is necessary.

viškom zaposlenih radnika neodgovarajuće kvalifikacione strukture i preduzeća sa neefikasnom menadžerskom strukturom. Imajući u vidu da su od opšteg značaja za privredu i državu neophodno je njihovo ozbiljno restrukturiranje.

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