

BENCHMARKING AND LOGISTICS

BENČMARKING I LOGISTIKA

Gordana RADIVOJEVIĆ¹, Momčilo MILJUŠ¹

¹ Faculty of Transport and Traffic Engineering, Belgrade, V. Stepe 305, Belgrade

Abstract: In order to assess their position in the market companies have always felt a need to compare with other companies. Benchmarking is a contemporary method of comparing the best practices standards with the company's performance in order to achieve optimum results.

Benchmarking is a process which incorporates the components of modern management practice as part of total quality management (TQM - Total Quality Management). It is a new conception in strategic management whose implementation is aimed at the enhancement of performances of economic entities. Benchmarking may be defined as a learning process which ensues from the study and analysis of the positive experiences of others where such experiences - along with the necessary adjustments - would be applied with a view of promoting one's own performance. From the standpoint of applicability benchmarking is a tool which enables the monitoring and improvement of performance, based on the knowledge acquired from the best-practice examples and understanding of the processes underlying the attainment of such successful results.

This paper is dedicated to the description of the benchmarking process and the possibility of its implementation in logistic systems. In part II of this paper the place and role of benchmarking have been described, as well as its history, the various types of bench-marking research projects and implementation stages. Part III deals with the logistics performances and the performance metrics determination. In part IV some examples have been given of benchmark research on logistics along with the identification of possible problems that may be encountered during the conduct of research. Part V contains conclusive deliberations.

Key words: benchmarking, logistic, logistics performances

Apstrakt: Kompanije, u cilju sagledavanja svoje tržišne pozicije, uvek imaju potrebu za poređenjem sa drugim kompanijama. Jedan od savremenih postupaka poređenja pokazatelja i unapređenja poslovanja kompanije je benčmarking.

Benčmarking je proces, koji obuhvata komponente moderne upravljačke prakse kao dela sveukupnog kvaliteta upravljačke operacije (TQM - Total Quality Management). To je novi koncept strategijskog menadžmenta, koji se primenjuje u cilju unapređenja poslovanja ekonomskih subjekata. Benčmarking se može opisati kao proces učenja, koji proizilazi iz posmatranja i analiziranja pozitivnih iskustava drugih, kako bi se data iskustva, uz neophodna prilagođavanja, primenila u cilju unapređenja sopstvenog poslovanja. Sa aspekta primene, benčmarking je alat za praćenje i poboljšanje performansi, učenjem iz najboljih primera u praksi i razumevanjem procesa pomoću kojih su ti primeri postignuti.

U ovom radu je opisan proces benčmarkinga i mogućnost njegove primene u logističkim sistemima. U drugom delu rada opisano je mesto i uloga benčmarkinga, istorijat, vrste benčmarking istraživanja i faze primene. U trećem delu rada opisane su logističke performanse i izmeritelji za njihovo oređivanje. U četvrtom delu su prikazani neki primeri primene benčmarking istraživanja u logistici, sa ukazivanjem na moguće probleme u realizaciji. Peti deo rada je su zaključna razmatranja.

Ključne reči: benčmarking, logistika, logističke performanse

1 INTRODUCTION

In the market economy the growth of competitiveness is inevitable. The users' major concerns are no more confined to the quality and price of products; the service parameter (accuracy, reliability, efficiency of realization of their requirements etc.) is playing an equally important role. On the other hand companies rendering quality services may quote higher prices for their products which, in some way, should be regarded as justifiable since the quality of service is assessed by the amount of money the user is prepared to pay. The two crucial facts that must be recognized in order to satisfy the user's requirements are: what is it the user wants and when does he want it? For these reason the company should define its objectives so as to comply with the users' requirements and in doing so it has to monitor its own performance and compare it to other companies' performances in order to assess its position and its advantages and shortfalls versus the competition's.

In order to assess their position in the market companies have always felt a need to compare with other companies. The standard methods of comparing are based on the company's making a comparison with a group of indicators, the comparing of its own products to competitive products and on the identification of "weak" points within the company itself. Benchmarking is a contemporary method of comparing the best practices standards with the company's performance in order to achieve optimum results.

Benchmarking is a process which incorporates the components of modern management practice as part of total quality management (TQM - Total Quality Management). It is a new conception in strategic management whose implementation is aimed at the enhancement of performances of economic entities. Benchmarking may be defined as a learning process which ensues from the study and analysis of the positive experiences of others where such experiences - along with the necessary adjustments - would be applied with a view of promoting one's own performance. From the standpoint of applicability benchmarking is a tool which enables the monitoring and improvement of performance, based on the knowledge acquired from the best-practice examples and understanding of the processes underlying the attainment of such successful results.

1 UVOD

U tržišnoj privredi porast konkurentnosti predstavlja neminovnost. Za korisnike nisu više presudni samo kvalitet i cena proizvoda, već i parametri usluge (pravovremenost, pouzdanost, efikasnost realizacije njihovih zahteva i dr.). Sa druge strane, kompanije sa kvalitetnom uslugom mogu zahtevati veće cene za svoje proizvode, što je na neki način i opravdano, jer usluga je onoliko kvalitetna, koliko je korisnik spreman da plati. Ključna činjenica u zadovoljenju zahteva korisnika leži u shvatanju i razumevanju dve stvari: šta korisnik želi i kada to želi. Iz tih razloga, kompanija mora svoje ciljeve da definiše u skladu sa zahtevima korisnika i zbog toga mora da prati svoje performanse, da ih upoređuje sa drugim kompanijama, kako bi sagledala svoj položaj i prednosti i nedostatke u odnosu na konkurenciju.

Kompanije, u cilju sagledavanja svoje tržišne pozicije, uvek imaju potrebu za poređenjem sa drugim kompanijama. Uobičajeni postupci za poređenje se zasnivaju na poređenju skupa pokazatelja, poređenju konkurentskih proizvoda sa svojim i identifikovanju "slabih" mesta u kompaniji. Jedan od savremenih postupaka poređenja pokazatelja i unapređenja poslovanja kompanije je *benčmarking*.

Benčmarking je proces, koji obuhvata komponente moderne upravljačke prakse kao dela sveukupnog kvaliteta upravljačke operacije (TQM - Total Quality Management). To je novi koncept strateškog menadžmenta, koji se primenjuje u cilju unapređenja poslovanja ekonomskih subjekata. Benčmarking se može opisati kao proces učenja, koji proizilazi iz posmatranja i analiziranja pozitivnih iskustava drugih, kako bi se data iskustva, uz neophodna prilagođavanja, primenila u cilju unapređenja sopstvenog poslovanja. Sa aspekta primene, benčmarking je alat za praćenje i poboljšanje performansi, učenjem iz najboljih primera u praksi i razumevanjem procesa pomoću kojih su ti primeri postignuti.

This paper is dedicated to the description of the benchmarking process and the possibility of its implementation in logistic systems. In part II of this paper the place and role of benchmarking have been described, as well as its history, the various types of bench-marking research projects and implementation stages. Part III deals with the logistics performances and the performance metrics determination. In part IV some examples have been given of benchmark research on logistics along with the identification of possible problems that may be encountered during the conduct of research. Part V contains conclusive deliberations.

2 PLACE AND ROLE OF BENCHMARKING

Benchmarking is a new conception in strategic management which is implemented in order to improve the performance of one's own company.

It can be described as a process of continuous evaluation, the comparing of one's own parameters with the external and internal performance parameters of established leaders in the best practices the aim of which is to gain knowledge and generate conditions for self-improvement. Furthermore, it is a learning process that is based on the close monitoring and study of other companies' positive experiences which can subsequently be used to implement improvements in one's own company.

The popularization of benchmarking process was initiated by a number of major world companies (Xerox, Gillete, Exel Logistics and other) in the second half of the 20th century.

The Gillete Company has got a network of production and distribution centers in eight countries in South America. Every year a "contest" is organized among those countries by comparing 12 parameters of logistics performances determined at the company's level. Thus organized "contest" is a form of loyal competition at the company's level. The "winners" in each of the twelve categories of logistics performances are logistics managers who transfer their experiences to their associates whereby the overall operations of the Company are improved in all the countries.

U ovom radu je opisan proces benčmarkinga i mogućnost njegove primene u logističkim sistemima. U drugom delu rada opisano je mesto i uloga benčmarkinga, istorijat, vrste benčmarking istraživanja i faze primene. U trećem delu rada opisane su logističke performanse i izmeritelji za njihovo oređivanje. U četvrtom delu su prikazani neki primeri primene benčmarking istraživanja u logistici, sa ukazivanjem na moguće probleme u realizaciji. Peti deo rada jesu zaključna razmatranja.

2 MESTO I ULOGA BENČMARKINGA

Benčmarking predstavlja novi koncept strategijskog upravljanja, koji se primenjuje u cilju unapređenja poslovanja.

Benčmarking se može opisati kao proces neprekidnog merenja, unutrašnjeg i spoljašnjeg upoređivanja, u odnosu na ustanovljene lidere u najboljoj praksi, kako bi se steklo znanje i stvorili uslovi za poboljšanje sopstvenih performansi. To je i proces učenja iz posmatranja i analiziranja pozitivnog iskustva drugih, da bi se ta iskustva uz neophodne promene primenila u sopstvenom poslovanju.

Proces benčmarkinga je popularisan od strane velikih svetskih kompanija (Xerox, Gillete, Exel Logistics, i dr) u drugoj polovini XX veka.

Kompanija Gillete ima svoje proizvodne i distributivne centre u osam zemalja Južne Amerike. Svake godine se između njih organizuje "takmičenje", poređenjem 12 izmeritelja logističkih performansi, određenih na nivou kompanije. Ovako organizovano "takmičenje" predstavlja jedan oblik kolegijalne konkurencije na nivou kompanije. "Pobednici" u svakoj od 12 kategorija logističkih performansi, su logistički menadžeri, koji prenose svoja iskustva kolegama i time unapređuju ukupno poslovanje kompanije, u svim zemljama.

In recent years the Xerox Company has introduced some changes in its distributive network. Those changes relate to the number, location and structure of all distribution facilities, final products and serviceable (spare) parts. In order to develop as successful a conception of distributive centers as possible Xerox organized visits to the various distributive centers in different industry fields. Engineers from Xerox selected a of logistics performances that were relatively easy to assess and on the basis of those parameters evaluated each distributive center. On every visit information were exchanged with hosts and particularly with those whose performances were rated highly. The exchange of information and experiences was quite open since the participating companies were not confronted as competitors. Having done so Xerox benefited from other companies' experiences which were incorporated in its distributive center project design. Benchmarking process in Xerox has been functioning till the present day where the company has attained world-class rating.

SBC ranks as one of major national suppliers in America in the field of telecommunications. The management set up a task to cut the logistics costs by 20% provided that the quality of services rendered to its users be maintained at the same level or improved. The Company's director invited other companies which recorded superior performances in the field of warehousing and distribution. The companies which were open for a cooperation and willing to furnish relevant information, responded affirmatively to this invitation Three companies were selected from among the invited ones: John Deere, United Stationers and Exel Logistics which entered into a successful partnership with SBC. As a first step of this joint effort a questionnaire was drafted on the basis of which a comparative analysis of the companies' performances was to be carried out. Each company furnished 12 questions of its own so the final version of the questionnaire contained 48 questions related to the respective company's performance. During the next stage each company filled out the questionnaire and having analyzed the obtained answers SBC made out a report. It took three months before a working meeting was organized where each benchmarking partner was given a specific topic on which it was to educate the other partners. The educators were selected on the basis of assessed results from the questionnaire. Another meeting followed after three months. The process that lasted one year resulted in improved performance at each of the companies.

Kompanija Xerox je poslednjih godina uvela izmene u svoju distributivnu mrežu. Promene se odnose na broj, lokaciju i konstrukciju svih objekata distribucije gotovih proizvoda i delova za servis. U nameri da razvije što produktivniji koncept distributivnih centara, Xerox je organizovao obilazak različitih distributivnih centara, koji pripadaju različitim privrednim oblastima. Inženjeri iz Xerox-a su izabrali skup logističkih performansi, koje su relativno lako izmerljive, i na osnovu njih su procenjivali svaki distributivni centar. Pri svakoj poseti, razmenjivane su informacije i iskustva sa domaćinima, a posebno sa onima koji su po performansama visoko procenjeni. Razmena informacija i iskustava je bila veoma otvorena jer se radi o nekonkurentskim kompanijama. Na ovaj način, Xerox je sebi obezbedio dobra praktična iskustva drugih, koja je uključio u svoje projektno rešenje distributivnog objekta. Proces benčmarking u Xerox-u funkcioniše i danas, kada je kompanija postala "svetska klasa" (world-class rating).

SBC je jedan od najvećih nacionalnih snabdevača u oblasti telekomunikacija u Americi. Menadžment je postavio zadatak smanjenja logističkih troškova za 20% uz održavanje ili unapređenje nivoa usluge korisnika. Direktor kompanije je uputio poziv drugim kompanijama, koje su imale superiorne performanse u oblasti skladištenja i distribucije. Kompanije koje su pozitivno odgovorile na poziv, bile su otvorene za davanje informacija i saradnju. Izabrane su tri kompanije (John Deere, United Stationers i Exel Logistics), koje su sa SBC formirale uspešno benčmarking partnerstvo. U prvom zajedničkom koraku, formiran je upitnik na osnovu koga će se porediti kompanije. Svaka kompanija je dostavila svojih 12 pitanja, tako da je upitnik imao 48 pitanja o poslovanju kompanije. U sledećem koraku, svaka kompanija je popunila upitnik i SBC je uradio analizu dobijenih odgovora, i na osnovu toga formirao izveštaj. Posle tri meseca benčmarking partneri su organizovali radni sastanak, na kome je svako dobio temu o kojoj će edukovati ostale. Edukatori su izabrani na osnovu izmerenih rezultata iz upitnika. Posle tri meseca organizovan je sledeći sastanak. Proces koji je trajao tokom godine je doneo unapređene performansi za svaku kompaniju.

The European association EFQM (European Foundation Quality Management) with a business seat in Brussels covers some 30 member states. Within the EFQM a Benchmarking Group was set up in order to carry out research work and exchange experiences in all fields of activities. The members of the Benchmarking Group are renown European specialist in related spheres. The Group se engages in the organization of seminars, training and education of managers, linking of benchmarking partners, consulting, the making of various studies and pilot projects.

APQC (American Productivity and Quality Center) is an American Association which, among other activities, also engages in benchmarking. Its members are the leading companies and specialists in different professional fields. The Association has its own database containing information on the companies and indicators of their performances on the basis of which a list of leaders is generated for each activity segment. The Association engages in rendering services to other parties in the benchmarking process, the organization of working conferences and linking of benchmarking partners.

The above examples of the world companies and associations suggest that a properly organized benchmarking research will almost certainly lead to the company's successful performance. In order that benchmarking research be adequately conducted the following requirements should be met:

- proper understanding of processes within one's own company,
- adequate choice of the benchmark object,
- adequate choice of benchmark companies,
- familiarization with benchmark methodology.

To understand one's own processes means to be familiar with all subsystems within the company, the levels of their hierarchy and the operating processes and functions that are accomplished within those subsystems. The results of an analysis of the operations, process and function indicators within the company will be used to set up guidelines for such changes whose implementation should lead to improved performance.

U Evropi postoji udruženje EFQM (European Foundation Quality Management) sa sedištem u Briselu, koje obuhvata oko 30 država članica. U okviru EFQM postoji Benchmarking Group, koja se bavi istraživanjem i razmenom iskustava u svim oblastima rada. Članovi Benchmarking Group su istaknuti stručnjaci iz Evrope, koji pripadaju različitim oblastima. Grupa se bavi: organizovanjem seminara, obučavanjem i edukacijom menadžera, povezivanjem benčmarking partnera, poslovima konsaltinga, izradom različitih studija i pilot projekata.

APQC (American Productivity & Quality Center) je američka asocijacija, koja se u jednom segmentu svog rada bavi benčmarkingom. Članovi su vodeće kompanije i eksperti različitih oblasti. Asocijacija ima svoju bazu podataka o kompanijama i njihovim pokazateljima rada, na osnovu koje formira listu lidera u svakoj oblasti. Asocijacija se bavi pružanjem usluga u procesu benčmarkinga, organizovanjem radnih skupova i povezivanjem benčmarking partnera.

Navedeni primeri svetskih kompanija i udruženja, ukazuju da dobro realizovano benčmarking istraživanje skoro sigurno donosi uspeh kompaniji. Dobra realizacija benčmarking istraživanja podrazumeva:

- razumevanje procesa u sopstvenoj kompaniji,
- dobar izbor benčmark objekta,
- dobar izbor benčmark kompanije i
- poznavanje benčmarking postupka.

Razumevanje sopstvenih procesa podrazumeva poznavanje svih podsistema kompanije, njihovih hijerarhijskih nivoa i poslovnih procesa i funkcija koji se u njima realizuju. Analiza pokazatelja rada procesa i funkcija u kompaniji ukazuje na promene, koje treba da unaprede poslovanje kompanije.

The benchmark object can be the company itself, or some of its subsystems or a process on which benchmark research is being conducted. The company's management makes a decision on the scope and level of changes to be implemented (individual operating processes or functions, one of the company's subsystems or changes at the level of the whole company) i.e. it defines the benchmark object.

Benchmark is the chosen leader, the best practice to which the company is compared. Properly selected benchmark is a prerequisite to successful benchmark research. Foreign experiences show that the best company should be chosen as benchmark, a leader in the respective field in order to attain expected objectives. If a company chooses an average competitor as its leader, it will also end up as an average performer after research has been completed.

Benchmark methodology is a continuous process of determining where a company stands in relation to the chosen leader in a specific field of business. The first stage of the process is benchmark research where a parallel is drawn between the company's performance and that of the leader and measures are taken in order to overcome initial differences. At the end of research the company's performance is improved, the company gets abreast with its chosen leader, but the benchmark process still goes on as an iterative process incorporating the company's continuous evaluation of performance, comparing itself to even better a performer and further pursuing of new objectives.

2.1 THE HISTORY OF BENCHMARKING

The term benchmarking is derived from the word benchmark which has a number of meanings: standard for competitive assessment, a fixed point of reference, a marked point of elevation, a mark used in land surveys, a model etc. In the broadest sense it is the original, starting point from which measurements can be made or a standard in relation to which measurements are being made.

Toward the middle of the 20th century Japanese specialists started visiting the most prominent companies in America and Europe to acquire knowledge and get ideas related to a successful conduct of business. The Japanese have improved

Benčmark objekat je cela kompanija, ili neki njen podsistem ili proces na koje se primenjuje benčmarking istraživanje. Menadžment kompanije donosi odluku o obimu i nivou realizacije promena (pojedini poslovni procesi ili funkcije, jedan od podsistema kompanije ili promene na nivou cele kompanije), odnosno definiše benčmark objekat.

Benčmark je izabrani lider, najbolja praksa sa kojom se kompanija poredi. Dobar izbor benčmarka je preduslov za uspeh benčmarking istraživanja. Strana iskustva ukazuju na to da za benčmark treba birati najbolju kompaniju, lidera u oblasti, da bi se ostvarili očekivani ciljevi. Kada se za benčmark izabere prosečna kompanija, na kraju istraživanja i sopstvena kompanija će biti samo jedna od prosečnih.

Postupak benčmarkinga je kontinualni proces poređenja kompanije sa izabranim liderom u nekoj oblasti. Prvi deo ovog procesa je benčmarking istraživanje, kada se porede performanse kompanije i lidera i preduzimaju akcije u cilju prevazilaženja početnih razlika. Na kraju istraživanja, kompanija ima poboljšane performanse, dostiže izabranog lidera, ali se proces benčmarkinga nastavlja i dalje, kao iterativni proces stalnog merenja performansi, poređenja sa boljim od sebe i dostizanja novih ciljeva.

2.1 ISTORIJAT BENČMARKINGA

Osnovu benčmarkinga predstavlja termin **benčmark**, koji ima više značenja: standard za poređenje, reper (fiksna, referentna tačka), oznaka visine, oznaka za nivelaciju pri merenju zemljišta, model. U najopštijem smislu benčmark je prvobitna izvorna tačka sa koje mogu biti izvršena merenja ili standard u odnosu na koji se rade merenja.

Polovinom XX veka Japanci su počeli da posećuju najbolje kompanije Amerike i Evrope, u nameri da prikupe znanja i ideje o uspešnom poslovanju. Primenom i modifikacijom prikupljenih saznanja, Japanci su u značajnoj

their performance to a considerable extent by modifying and implementing the collected expertise thanks to which their companies have become competitive and are now holding leading positions in the world market. The idea of benchmarking is summed up in the Japanese expression "dantos" which means to try to be the very best.

The modern conception of benchmarking was developed in America during the 60s of the last century. It was originally developed by the companies which functioned in industrial environment. Today benchmarking is applied to all forms of economic and non-economic entities (production systems, educational institutions, governmental bodies, non-governmental associations etc.) Since the end of the 20th and the beginning of 21st century benchmarking has been used as a method of strategic management.

2.2 TYPES OF BENCHMARKING

Benchmarking is a continued process of identification, understanding and adjustment of products, services, equipment and procedures within the companies with best practice, with the view of improving its own business. The target of benchmarking research is a part of the company to which the process of benchmarking is being applied, aiming to improve its business performance. The targets of research can be different: products, methods, services, performances or operating processes. The aim of comparing is setting the best practice and example, which would be transferred into the company. The complexity of research depends upon the object of research, and as a rule, the simplest researches are for products, while the most complex ones are for business operations. Benchmarking is a chosen example, the best practice the objective is compared with. There are different divisions of it in the world literature. Generally speaking, benchmarking can be divided into:

- internal and
- external.

Internal benchmarking includes a comparison of the organizational units within one company, while the external benchmarking is a comparison between the companies. These types of benchmarking will be explained in the following section.

meri unapredili svoje poslovanje i japanske kompanije su postale konkurentne i vodeće na svetskom tržištu. Ideja benčmarkinga sažeta je u japanskom terminu "dantos", što znači pokušaj da se bude najbolji među najboljima.

Današnji koncept benčmarkinga je razvijen u Americi 60-tih godina XX veka. Originalno su ga razvile kompanije koje funkcionišu u industrijskom okruženju. Danas se benčmarking primenjuje na sve oblike privrednih i neprivrednih subjekata (proizvodni sistemi, obrazovne ustanove, državni organi, nevladine asocijacije.). Uspesne kompanije na kraju XX veka i početkom XXI veka koriste benčmarking kao tehniku strategijskog upravljanja.

2.2 VRSTE BENČMARKINGA

Benčmarking je kontinuirani proces identifikacije, razumevanja i prilagođavanja proizvoda, usluga, opreme i postupaka kompanija s najboljom praksom u cilju poboljšanja sopstvenog poslovanja. Objekat benčmarking istraživanja je deo kompanije na koji se primenjuje proces benčmarkinga, sa ciljem poboljšanja. Objekti istraživanja mogu biti različiti: proizvodi, metode, usluge, performanse ili poslovni procesi. Cilj poređenja je određivanje najbolje prakse i primera, koji bi se preneli u kompaniju. Kompleksnost istraživanja zavisi od objekta istraživanja, a po pravilu, najjednostavnija istraživanja su za proizvode, a najkompleksnija za poslovne procese. Benčmark je izabrani primer, najbolja praksa sa kojom se poredi objekat. U svetskoj literaturi postoje različite podele benčmarkinga. U najopštijem smislu, benčmarking se može podeliti na:

- interni i
- eksterni.

Interni benčmarking podrazumeva poređenje organizacionih celina u okviru jedne kompanije, a eksterni benčmarking je poređenje između kompanija. U nastavku rada biće dato objašnjenje za navedene vrste benčmarkinga.

Internal benchmarking

Internal benchmarking covers research within the own company, with a purpose of comparing business operations of different organizational units. This is applicable in large companies, with several organizational units, clearly defined organizational structure and hierarchy, and with a system of dislocated affiliates. Internal benchmarking is based on a hypothesis that the operating process in one part of the company is more successful when compared with its other parts.

Internal benchmarking includes the comparing of operational functions within different parts of the same company. The object of comparing are different organizational units having the same operational functions. The aim of monitoring and analyzing performance is to improve business operations, reduce costs, improve the quality of services and operating process, etc.

The advantages of internal benchmarking are comparatively low research costs and accessibility to all the necessary data concerning the assessment of performances in question. Internal research provides the standardization of the quality of business operating of all the organizational units within the company and represents good basis for external benchmarking.

The disadvantages of internal benchmarking are that it is closed within the boundaries of its own system, which fails to reach the best results, as it is possible by making comparisons at the external level. If organizational units in a company operate in different conditions of economic, political and cultural environment, there will be no real basis for their mutual comparing.

External benchmarking

According to the type of benchmarking, external benchmarking can be divided into:

- Competitive
- Functional
- Generic

Competitive benchmarking

Competitive benchmarking represents researches between competitive companies, engaging in the same business activity within the same or

Interni benčmarking

Interni benčmarking podrazumeva istraživanje u sopstvenoj kompaniji, u cilju poređenja poslovnih procesa različitih organizacionih celina. Ovo je moguće u velikim kompanijama, koje imaju više organizacionih celina, jasno definisanu organizacionu strukturu i hijerarhiju rada, i mrežu dislociranih filijala. Interni benčmarking polazi od pretpostavke da je poslovni proces u jednom delu kompanije uspešniji u odnosu na druge delove.

Interni benčmarking podrazumeva poređenje poslovnih funkcija u različitim delovima iste kompanije. Upoređuju se različite organizacione celine, koje imaju iste poslovne funkcije. Cilj je da se posmatranjem i analizom rada unapredi poslovanje objekta benčmarkinga, preko sniženja troškova, poboljšanja kvaliteta usluga i procesa i dr.

Prednosti internog benčmarkinga su relativno niski troškovi istraživanja i dostupnost svim potrebnim podacima o merama performansi koje se porede. Interno istraživanje obezbeđuje ujednačavanje kvaliteta poslovanja svih organizacionih celina u kompaniji i predstavlja dobru osnovu za eksterni benčamarking.

Nedostaci internog benčmarkinga su zatvorenost u sopstveni sistem, što ne dovodi do najboljih rezultata do kojih bi se moglo doći poređenjem na eksternom nivou. Kada organizacione celine kompanije funkcionišu u različitim uslovima okruženja (ekonomskim, kulturnim, političkim) nema realnih uslova za njihovo poređenje.

Eksterni benčmarking

Prema vrsti benčmarka, eksterni benčmarking se dalje može podeliti na:

- konkurentski,
- funkcionalni i
- generički.

Konkurentski benčmarking

Konkurentski benčmarking predstavlja istraživanja između konkurentskih kompanija, koje se bave istom delatnosti na istim ili različitim tržištima. Istraživanja obuhvataju

different markets. Administrative, production or service processes can be the subject of research. In order to realize competitive benchmarking, a realistic basis for comparison is necessary. Each company must be fully aware of both its own and the competitor's advantages and superiorities within specific segments. Comparative advantages of the company can be a starting point for creating a strategic plan to be used in benchmarking research.

A type of competitive benchmarking is the forming of a partnership between companies, with the mutual aim of developing the respective businesses. Forming a partnership is possible when companies have both the same and different markets. It is possible to apply competitive benchmarking and create a partnership in many areas, especially in the car industry. Each of the companies can benefit through carefully defined partnership relations, without jeopardizing the previously gained markets.

Gathering information can be a major problem in these researches, for they concern competitive companies, and information are part of business secret of each company. The problem is often resolved by engaging a third party. Most commonly these are consulting companies, institutes or benchmarking centers, which exist in developed countries. The weak point of competitive benchmarking is that it engages a great number of collaborators on the standardization and exchange of facts coming from different companies.

Functional benchmarking

Functional benchmarking comprises a comparison of the same business functions in the companies having different activities. Research work covers the same business functions of different origins. Those functions can be associated with production, financial, tertiary, etc. By comparing such business functions with other functions from different fields, a company gathers new and original ideas which can help it promote the entire quality of business. The advantage of functional benchmarking is an easier access to the information and experience of other companies covering different areas. Gathering the necessary information is a simple task, since there is no competition between the companies subjected to comparing. The knowledge on non-typical examples is stimulating for implementation in the own company.

administrativne, proizvodne ili uslužne procese. Za realizaciju konkurentskog benčmarkinga neophodno je da postoji realna osnova za poređenje kompanija. Svaka kompanija mora dobro da poznaje svoje i konkurentske prednosti i superiornosti u određenim segmentima. Komparativne prednosti kompanije mogu biti polazna osnova za donošenje strateškog plana za benčmarking istraživanje.

Jedan oblik konkurentskog benčmarkinga je formiranje partnerstva između kompanija, sa zajedničkim ciljem unapređenja poslovanja. Formiranje partnerstva je moguće kada kompanije imaju i ista i različita tržišta. Primena konkurentskog benčmarkinga i formiranje partnerstva je prisutna u mnogim oblastima, a posebno u automobilske industriji. Dobro definisan partnerski odnos može da donese prednosti svakoj kompaniji, bez ugrožavanja ranije osvojenih tržišta.

Veliki problem u ovim istraživanjima predstavlja prikupljanje informacija, jer se radi o konkurentskim kompanijama, a informacije su deo poslovne tajne svake kompanije. U praksi se ovaj problem prevazilazi angažovanjem trećih lica. To su najčešće konsalting firme, instituti ili benčmarking centri, koji postoje u razvijenim zemljama. Nedostatak konkurentskog benčmarkinga je angažovanje velikog broja saradnika na standardizaciji i razmeni podataka, koji potiču iz različitih kompanija.

Funkcionalni benčmarking

Funkcionalni benčmarking obuhvata poređenje istih poslovnih funkcija u kompanijama, koje imaju različitu delatnost. Istraživanje se odnosi na iste poslovne funkcije različitog porekla. Te funkcije mogu biti proizvodne, finansijske, uslužne i dr. Kompanija poređenjem poslovnih funkcija sa kompanijama iz drugih oblasti dobija nove i originalne ideje, kojima unapređuje ukupni kvalitet poslovanja. Prednost funkcionalnog benčmarkinga je u lakšem pristupu podacima i bogatstvu iskustva drugih kompanija iz različitih oblasti. Prikupljanje neophodnih informacija je jednostavno, jer ne postoji konkurencija između kompanija, koje se porede. Saznanja o netipičnim primerima imaju podsticajni i inovativni karakter za primenu u sopstvenoj kompaniji.

Generic benchmarking

Generic benchmarking comprises a comparison with the best companies. The aim of it is to compare the functions and the processes with the best companies, regardless of the activities they engage in.

Generic benchmarking is a procedure of finding the best new solution which could be applied in one's own company. This research is applied to multifunctional business processes and is characterized by a wide range of approaches in comprehending and application. Most frequently cited benchmarks in literature are the best companies in the world (Coca-Cola, Xerox etc.). An average company should choose a benchmark from the middle-class companies, to make the comparison as realistic as possible. Generic benchmarking is an extremely complex research project, which demands the recruitment of a large number of collaborators having extensive experience in benchmarking.

This type of benchmarking is widely applied in air traffic, in solving the problems of delayed flights on line services, but primarily in finding solutions for reducing the time necessary to handle aircraft and passengers at airports.

2.3 BENCHMARKING PROCESS

IBC (International Benchmarking Clearinghouse) has been studying various benchmarking models, realized in different business companies. Each of the models consists of almost the same units. In international literature a great number of authors have been dealing with the problem of benchmark research. Some of them were Camp (1989), Braithwaite (1992), Coopers & Lybrand (1993), Royston & Harland (1993), James-Moore & Keeble (1994) and other. The papers contain descriptions of various work methodologies that have the same essence but differ in some steps depending on actual circumstances where they have been applied.

In the largest number of published papers a benchmarking process is represented on both the global and detailed levels. On the global level, the realization of benchmarking may be described through several phases, while on detailed level, individual steps of realization are described.

Generički benčmarking

Generički benčmarking podrazumeva poređenje sa najboljim kompanijama. Cilj je da se porede funkcije i procesi sa kompanijama koje su u tome najbolje, bez obzira na to kojom delatnošću se bave.

Generički benčmarking je postupak pronalaženja najboljeg novog rešenja, koje bi moglo da se primeni u sopstvenoj kompaniji. Ovo istraživanje se primenjuje za multifunkcionalne poslovne procese i karakteriše ga velika širina u shvatanju i primeni. Kao benčmarkovi u literaturi se najčešće navode najbolje svetske kompanije (Coca-Cola, Xerox i dr.). Prosečna kompanija treba da izabere benčmark iz srednje klase kompanija, da bi poređenje bilo što realnije. Generički benčmarking je izuzetno kompleksno istraživanje, koje zahteva angažovanje velikog broja saradnika sa velikim benčmarking iskustvom.

Ova vrsta benčmarkinga našla je najširu primenu u vazдушnom saobraćaju pri rešavanju problema zadržavanja vazduhoplova u linijskom saobraćaju, pre svega, u pronalaženju ideja za skraćivanje vremena opsluge aviona i putnika na aerodromima.

2.3 PROCES BENČMARKINGA

IBC (International Benchmarking Clearinghouse) je proučavao različite modele benčmarkinga, realizovane u različitim kompanijama. Svaki od modela se sastoji od gotovo istih celina. U svetskoj literaturi veliki broj autora se bavio problemom benčmarking istraživanja. Neki od njih su Camp (1989), Braithwaite (1992), Coopers & Lybrand (1993), Royston & Harland (1993), James-Moore & Keeble (1994), i drugi. U radovima su prikazane različite metodologije rada, koje imaju istu suštinu, ali se razlikuju u pojedinim koracima zavisno od konkretnih uslova gde su primenjene.

U najvećem broju objavljenih radova proces benčmarkinga se prikazuje na globalnom i/ili detaljnom nivou. Na globalnom nivou realizacija benčmarkinga se može prikazati kroz nekoliko faza, a na detaljnom nivou se opisuju pojedinačni koraci realizacije.

The basic phases of the benchmarking process (Figure 1) that exist in APQC, EFQM and other companies are:

- I Planning,
- II Data collection
- III Analysis and
- IV Application

Osnovne faze benčmarking procesa (slika 1), koje postoje kod APQC-a, EFQM-a i drugih kompanija, su:

- I planiranje,
- II prikupljanje informacija,
- III pnaliza i
- IV primena.

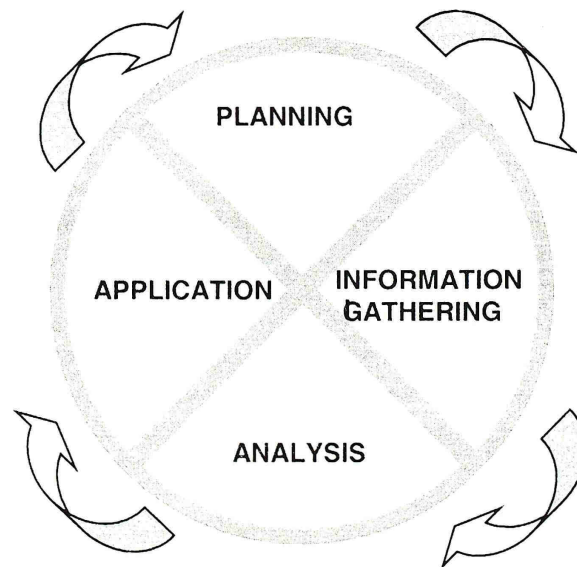


Figure 1 Phases of Benchmarking process
slika 1 Faze Benčmarking procesa

I Planning

At the beginning of research it is necessary to analyze the business of the whole company in order to determine the units where benchmark will be applied. A preliminary appraisal of competitiveness includes internal and external analyses, which will point to the own advantages and shortcomings and depending on that, to the comprehensiveness of benchmarking research.

A long-term benchmarking research requires a well- defined realization plan of individual activities that may be foreseen in this phase. The realization plan should include deadlines for each of these particular activities. A benchmarking team includes experts from the company that are well acquainted with the company's business. Experts from other institutions will be hired, if needed, that could realize the defined plan with a backup from the senior levels of management.

A selection of the best business companies is carried out in this phase, which could be a

I Planiranje

Na početku istraživanja potrebno je uraditi analizu rada cele kompanije, kako bi se odredile celine gde će se primeniti benčmark. Preliminarna ocena konkurentnosti obuhvata interne i eksterne analize, koje će ukazati na sopstvene prednosti i nedostatke i u zavisnosti od toga na obuhvatnost benčmarking istraživanja.

Za dugoročno benčmarking istraživanje neophodno je definisati plan realizacije pojedinačnih aktivnosti, koje se mogu predvideti u ovoj fazi. Plan realizacije treba da sadrži vremenske rokove za svaku od aktivnosti. Benčmarking tim obuhvata stručnjake iz kompanije, koji dobro poznaju rad kompanije, i po potrebi stručnjake iz drugih institucija, koji bi uz podršku viših nivoa menadžmenta obezbedili realizaciju definisanog plana.

U ovoj fazi se radi izbor najboljih kompanija, koje mogu biti benčmark. Izbor zavisi od

benchmark. A selection depends on the characteristics of the own company, environment and goals that are to be achieved. Some of the criteria for the selection of the benchmark company could be: the company size, its relative position on the market, degree of confidence in the company etc.

II Data collection

In this phase, data collection (information gathering) is performed on all business companies that have been selected in the previous phase. The information may be gathered by conducting a poll, direct communication with the company or by hiring third persons. The type of information that is being gathered largely depends of the benchmarking type that is researched (product benchmarking, functional benchmarking, strategic benchmarking).

III Analysis

A company benchmarking team processes all compiled data and on the basis of such information makes its final report. A report contains business performance indicators of all processed companies. This report represents a basis for the final selection of the benchmark, i.e. of the benchmark partner. On the other hand, data from the report make possible quantitative comparison of own business operations with that of other business companies, as well as the defining of ultimate goals of benchmarking researches, i.e. performance level to be attained.

IV Application

In this phase, a company commences the realization of changes, which are the end result of benchmarking research. Collected information and knowledge are applied in business operations and follow-up of the realization of set goals commences.

The described phases are present in each benchmarking research. APQC points to the importance of these phases and quotes American experiences in relation to time needed for their realization. If the first three phases are observed, their share in time is as follows: planning 30%, collecting of information 50% and data analyzing 20%. The fourth phase is practically of infinite duration since it constitutes the beginning of a

karakteristika sopstvene kompanije, okruženja i ciljeva koji se žele postići. Neki od kriterijuma za izbor benčmark kompanije mogu biti: veličina kompanije, relativna pozicija na tržištu, stepen poverenja prema kompaniji i dr.

II Prikupljanje informacija

U ovoj fazi se radi prikupljanje podataka o svim kompanijama izabranim u prethodnoj fazi. Prikupljanje podataka se može obaviti anketiranjem, direktnom razmenom sa kompanijom ili angažovanjem trećih lica. Vrsta informacija, koje se prikupljaju u najvećoj meri zavise od tipa benčmarkinga, koji se istražuje (benčmarking proizvoda, funkcionalni benčmarking, strateški benčmarking).

III Analiza

Benčmarking tim u kompaniji obrađuje sve prikupljene podatke i na osnovu njih formira finalni izveštaj. Izveštaj sadrži pokazatelje rada svih obrađenih kompanija. Ovaj izveštaj predstavlja osnovu za konačan izbor benčmarka, odnosno, benčmark partnera. Sa druge strane, podaci iz izveštaja omogućavaju kvantitativno poređenje sopstvenog poslovanja sa drugim kompanijama, i definisanje konačnih ciljeva benčmarking istraživanja, odnosno, nivoa performansi koje se žele dostići.

IV Primena

U ovoj fazi kompanija počinje sa realizacijom promena, koje su rezultat benčmarking istraživanja. Prikupljene informacije i saznanja se primenjuju u poslovanju i počinje da se prati ostvarivanje postavljenih ciljeva.

Opisane faze su prisutne u svakom benčmarking istraživanju. APQC ukazuje na značaj ovih faza i navodi američka iskustva u pogledu vremena potrebnog za njihovu realizaciju. Ako se posmatraju prve tri faze njihovo učešće u vremenu je: planiranje 30%, prikupljanje informacija 50% i analiza podataka 20%. Četvrta faza je praktično neograničenog trajanja, jer predstavlja

new method of company's living cycle, where benchmarking is a part of business strategy.

An important part in the realization of benchmarking research is the determining of own and benchmark measurements of performance. Measurements of performances are the business performance indicators that may be quantitative or qualitative. In the first phase of research the measurements of performances in the company are determined, and in the analysis phase they are determined at the benchmark (the best point of reference). On the basis of their comparison one arrives at the difference ("gap") that exists at the onset of research. In figure 2 a graphic representation of the company's development trend is given before and after benchmarking research.

početak novog načina života kompanije, gde je benčmarking deo poslovne strategije.

Važan deo u realizaciji benčmarking istraživanja je određivanje sopstvenih i benčmarkovih mera performansi. Mere performanse predstavljaju pokazatelje rada, koji mogu biti kvantitativni i kvalitativni. U prvoj fazi istraživanja se određuju mere performanse u kompaniji, a u fazi analize kod benčmarka (najboljeg repera). Na osnovu njihovog poređenja dolazi se do razlike («praznine» - gap), koja postoji na početku istraživanja. Na slici 2 je dat grafički prikaz trenda razvoja kompanije pre i posle benčmarking istraživanja.

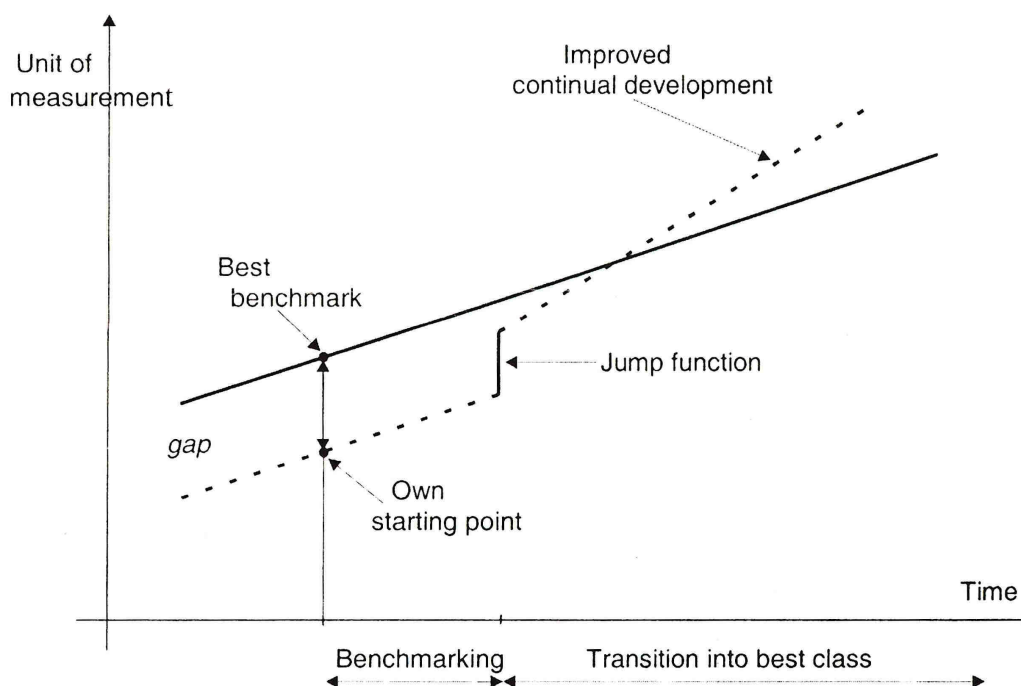


Figure 2 Company and benchmark development trend
slika 2 Trend razvoja kompanija prei posle benčmark istraživanja

2.4 BENCHMARKING ADVANTAGES AND DISADVANTAGES

Benchmarking process has great advantages in comparison to classic methods of improving the company's business operations. Classic approach means identifying problems within the company, their solving by applying specific methods and obtaining a new state of business operation, with large time, material and human resources. The outcome of such problem solving is most often

2.4 PREDNOSTI I NEDOSTACI BENČMARKINGA

Benčmarking proces ima velike prednosti u odnosu na klasične metode poboljšanja poslovanja kompanije. Klasični pristupi podrazumevaju identifikovanje problema u kompaniji, njihovo rešavanje primenom određenih metoda i dobijanje novog stanja poslovanja, uz izuzetno velike vremenske, materijalne i ljudske resurse. Ishod ovakvog

uncertain. Benchmarking points to the use of experience of other, better companies, which have already successfully resolved the problems.

The basic benchmarking advantages are:

- continual improvement of business operations,
- increased competitiveness on the market,
- overcoming of poor performances,
- savings in the costs of improvement,
- increase in profits,
- better understanding of the competition and
- setting of new business goal.

With all above advantages, benchmarking has its own shortcomings which primarily relate to the misunderstanding of the essence and technique of research. A failure in the benchmarking process could be the consequence of the following factors:

- lack of understanding of benchmarking process,
- inadequate selection of benchmark objects i.e. the activities to which benchmarking will be applied,
- selection of a benchmarking company with which a comparison is made,
- selection and possibility of comparison of performance indicators,
- inadequately planned costs and time of research and
- insufficient support of the whole company to benchmarking

3 LOGISTIC SYSTEMS PERFORMANCES

Demands of the customers in the contemporary transportation and logistics services market require changes at the level of rendered services. Improvement of the quality of services relates to an increase in the speed of transport, shortening of delivery time, increase in punctuality of delivery, increase in safety of merchandise etc., with minimization of logistic costs and expenses.

These market trends have brought about extensive structural changes in the concept of realization of logistic activities. The basic areas of these changes are:

rešavanja problema je najčešće veoma neizvestan. Benčmarking ukazuje na korišćenje iskustava drugih, boljih kompanija, koje su iste probleme uspešno rešile.

Osnovne prednosti benčmarkinga su:

- kontinualno poboljšanje poslovanja,
- povećana konkurentnost na tržištu,
- prevazilaženje loših performansi,
- uštede u troškovima poboljšanja,
- porast profita,
- bolje razumevanje konkurencije i
- postavljanje novih poslovnih ciljeva.

Uz sve navedene prednosti, benčmarking ima i svoje nedostatke, koji se, pre svega odnose na nerazumevanje suštine i tehnike istraživanja. Neuspeh benčmarking procesa može biti posledica sledećih faktora:

- nerazumevanja procesa benčmarkinga,
- loš izbor benčmark objekata tj. aktivnosti na koje će se primeniti benčmarking,
- izbor benčmarka – kompanije sa kojom se radi poređenje,
- izbor i mogućnost poređenja izmeritelja performansi,
- adekvatno planirani troškovi i vreme istraživanja i
- podrška cele kompanije benčmarkingu

3 PERFORMANSE LOGISTIČKIH SISTEMA

Zahtevi korisnika na savremenom transportnom i tržištu logističkih usluga zahtevaju promene u nivou kvaliteta pruženih usluga. Poboljšanje nivoa kvaliteta usluga odnosi se na povećanje brzine transporta, skraćanja vremena isporuke, povećanje tačnosti isporuke, povećanja sigurnosti robe, i dr. uz minimizaciju logističkih troškova.

Ovakve tržišne tendencije dovele su do krupnih strukturnih promena u konceptu realizacije logističkih aktivnosti. Osnovne oblasti ovih promena su:

- Locating, the concept, organization method, categorization and functions of logistic centers.
 - Technologies of realization of logistic processes (transportation, reloading and warehousing).
 - Information technologies that secure the functioning of logistic systems.
 - Methods and procedures of strategic, tactical and operational planning and logistic processes control.
 - Methods and procedures of follow-up, measuring and analysis of performances of logistic systems.
- lociranje, koncept, način organizacije, kategorizacija i funkcije logističkih centara,
 - tehnologije realizacije logističkih procesa (transportnih, pretovarnih i skladišnih),
 - informacione tehnologije koje obezbeđuju funkcionisanje logističkih sistema,
 - metode i postupci strateškog, taktičkog i operativnog planiranja i upravljanja logističkih procesa i
 - metode i postupci praćenja, merenja i analize performansi logističkih sistema.

These changes have imposed certain requirements in the logistics field upon each system which participates in the realization of flow of trade. These requirements are stated by sets of values of corresponding indicators – *requested logistic performances*. Logistic performances are various parameters, measurers, coefficients and indicators in logistics. In a wider sense of meaning, logistic performances may be seen as a subset of all characteristics (business and organizational performances) of the company's operations. Logistic performances are the result of business strategy, organization of work and applied level of technique, technology and information systems in a company.

From the aspect of grouping of logistic performances, there are "hard" and "soft" measurers. The "hard" measurers include: the costs, profit, economic and financial indicators. The "soft" indicators are: degree (level) of customer satisfaction, service level, delay in delivery etc. The "hard" indicators can relatively easily be quantified, while the "soft" indicators most often represent the customer's perception on realized service.

From the system theory aspect, logistic performances can be divided into internal and external ones. Internal performances are the "inner" characteristics of logistic subsystems (transportation, reloading, warehousing, information subsystem...) and are related to technical-technological, organizational, economic and other relevant characteristics of these systems. External performances represent the "result" of functioning of logistic systems and are an expression of the degree of quality and economical realization of the logistic processes, i.e. they are a reflection of the logistic system and

Ove promene nametnule su u oblasti logistike određene zahteve svakom od sistema koji učestvuju u realizaciji robnih tokova. Ti zahtevi se iskazuju skupom vrednosti odgovarajućih pokazatelja – *zahtevanih logističkih performansi*. Logističke performanse su različiti parametri, izmeritelji, koeficijenti i pokazatelji u logistici. U širem smislu, logističke performanse se mogu posmatrati kao podskup svih karakteristika (poslovnih ili organizacionih performansi) rada kompanije. Logističke performanse su rezultat strategije poslovanja, organizacije rada, i primenjenog nivoa tehnike, tehnologije i informatike u kompaniji.

Sa aspekta grupisanja logističkih performansi, postoje "tvrđi" i "meki" izmeritelji. U grupu "tvrđih" izmeritelja spadaju: troškovi, profit, ekonomski i finansijski pokazatelji. "Meki" pokazatelji su: nivo zadovoljenja korisnika, servis stepen, kašnjenje isporuke i drugi. "Tvrđi" pokazatelji se relativno jednostavno mogu kvantifikovati, a "meki" pokazatelji najčešće predstavljaju percepciju korisnika o realizovanoj usluzi.

Sa aspekta teorije sistema, logističke performanse se mogu podeliti na interne i eksterne. Interne performanse su "unutrašnje" karakteristike logističkih podsistema (transportnog, pretovarnog, skladišnog, informacionog...) i odnose se na tehničko-tehnološke, organizacione, ekonomske i druge relevantne karakteristike ovih sistema. Eksterne performanse predstavljaju "rezultat" funkcionisanja logističkog sistema i odraz nivoa kvaliteta i ekonomičnosti realizacije logističkih procesa, odnosno, one su odraz logističkog sistema i načina njegovog

its method of functioning in a given environment. At the same time, external performances are complex multifaceted functions of internal performances.

In view of the nature of logistic processes and requirements they fulfill, logistic performances may be divided into four categories.

- Logistic costs,
- Service degree - level of quality of logistic service,
- Logistic productivity – efficiency of resources,
- Safety of logistic processes and impact to environment (ecological system).

The division of these logistic performances into internal and external is only a conditional one, since the logistic subsystems are the links of one single logistic chain. The said performances may be looked upon from the aspect of one subsystem or from the aspect of the system as a whole, so that in relation to the level of observation, the same performance in one instance may be internal and in other an external value.

An analysis of logistic performances, their structuring, measurement and appraisal of effects by change of their values can be an extremely complex job, depending on the structure and hierarchical level of the company.

With this said, there are two problems in analyzing the logistic performances. One problem is how changes in individual company units bring about a change in logistic performances. Both problems point to the need of deeper analysis of interdependence of logistic performances and organization of work in the company (technical, technological, information system etc.) Due to this reason, in the remaining part of this paper a short summary will be given of the said basic logistic performances.

3.1 LOGISTIC COSTS

Logistic costs include costs of all activities that are realized for the purpose of forming, designing, directing, controlling and regulating the flow of trade, energy and information and represent an economic measure of a successful functioning of logistic systems.

funkcionisanja u okruženju. Istovremeno, eksterne performanse su kompleksne višeatributne funkcije internih performansi.

Imajući u vidu prirodu logističkih procesa i zahteve koje oni realizuju, logističke performanse se mogu podeliti u četiri kategorije:

- logistički troškovi,
- servis stepen – nivo kvaliteta logističke usluge,
- logistička produktivnost – efikasnost resursa i
- bezbednost logističkih procesa i uticaj na eko sistem u okruženju.

Podela ovih logističkih performansi na interne i eksterne je uslovna, jer su logistički podsistemi karike jednog istog logističkog lanca. Navedene performanse se mogu posmatrati sa aspekta jednog podsistema ili sa aspekta sistema kao celine, tako da u odnosu na nivo posmatranja, ista performansa u jednom slučaju može biti interna, a u drugom eksterna veličina.

Analiza logističkih performansi, njihovo struktuiranje, merenje i ocena efekata promenom njihovih vrednosti može bit izuzetno kompleksan posao, zavisno od strukture i hijerarhijskog nivoa kompanije.

Pri tome, kod analize logističkih performansi postoje dva problema. Jedan problem je kako definisati organizaciju rada u kompaniji, da bi se dostigle željene vrednosti performansi. Drugi problem je kako promene u pojedinim delovima kompanije utiču na promenu vrednosti logističkih performansi. Oba problema ukazuju na potrebu dublje analize međuzavisnosti logističkih performansi i organizacije rada kompanije (tehničke, tehnološke, informacione i dr.). Iz tog razloga, u nastavku rada će biti dat kraći prikaz navedenih osnovnih logističkih performansi.

3.1 LOGISTIČKI TROŠKOVI

Logistički troškovi obuhvataju troškove svih aktivnosti koje se realizuju u cilju oblikovanja, projektovanja, usmeravanja, vođenja i regulisanja protoka roba, energije i informacija i predstavljaju ekonomsku meru uspešnosti funkcionisanja logističkih sistema.

As it has already been said, determining the logistic costs depends on a large number of factors and is a very complex and extensive task. In order to calculate and follow up the logistic costs it is necessary to make their breakdown, i.e. to determine the phases and elements of the process that generate these costs. It is a tall order, since logistics is a service function, present in most of the subsystems.

The structure of costs, applied level of detail quantity and calculation method depend on the set goal, technology applied and relevant characteristics of the logistic process that is being considered.

3.2 SERVICE DEGREE

Service Degree is the level of quality of services provided to the customers, degree of the customer's satisfaction with the provided service. Service degree can hardly be quantified, since it represents a customer's opinion and his preference for provided services. Each customer has his own subjective value system and in conformity with it, it can be concluded that some service is "poor", "good" or "excellent". On the basis of the opinion formed on the service degree, a customer will form his judgment of a business company as a whole and as a rule, without delving into internal organization and subsystems.

Service degree represents a very complex performance of logistic systems. Defining a structure of service degree is most often based on polling the customers and statistical determining of important factors. The most frequent measurers of service degree are: time cycle of executing the customer's order, reliability and punctuality of delivery. Determining the service degree measurers can be done for each logistic subsystem or at the company level as a whole.

Maintaining an adequate level of service degree is directly connected with an increase in logistic costs and both performances are in mutual conflict since they impact the company's profit in different ways.

Kao što je već rečeno, utvrđivanje logističkih troškova zavisi od velikog broja faktora i predstavlja veoma obiman i kompleksan zadatak. Da bi se logistički troškovi mogli proračunavati i pratiti potrebno je izvršiti njihovo raščlanjavanje, odnosno, utvrđivanje faza i elemenata procesa koji generišu te troškove. To je veoma teško uraditi, jer je logistika uslužna funkcija, koja je prisutna u većini podsistema.

Struktura troškova, primenjeni nivo detaljnosti i metod proračuna zavise od postavljenog cilja, primenjene tehnologije i relevantnih karakteristika logističkog procesa koji se razmatra.

3.2 SERVIS STEPEN

Servis stepen je nivo kvaliteta usluge korisnika, mera korisnikovog zadovoljenja pruženom uslugom. Servis stepen se teško može kvantitativno izraziti, jer predstavlja osećaj, preferenciju korisnika o dobijenoj usluzi. Svaki korisnik ima svoj subjektivni sistem vrednosti i u skladu sa tim zaključuje da je neka usluga "loša", "dobra" ili "odlična". Na osnovu suda o servis stepenu, korisnik formira mišljenje o kompaniji kao celini, po pravilu ne ulazeći u unutrašnju organizaciju i podsisteme.

Servis stepen predstavlja veoma kompleksu performansu logističkih sistema. Definisane strukture servis stepena najčešće se bazira na anketiranju korisnika i statističkom utvrđivanju značajnih faktora. Kao najčešći izmeritelji servis stepena navode se: vreme realizacije ciklusa kupčeve porudžbine i pouzdanost i tačnost isporuke. Određivanje izmeritelja servis stepena može se raditi za svaki logistički podsistem ili na nivou kompanije kao celine.

Obezbeđenje odgovarajućeg nivoa servis stepena direktno je povezano sa porastom logističkih troškova, a obe performanse su međusobno konfliktne jer na različite načine utiču na profit kompanije.

3.3 LOGISTIC PRODUCTIVITY

Logistic productivity comprises various technical and exploitation indicators of logistic systems. The measurers of logistic productivity can be subdivided into three groups:

- technical-exploitation characteristics for quantifying the logistic costs,
- technical--exploitation characteristics that describe a degree of exploitation of resources and
- characteristics that determine a service degree by the customer.

The measurers of logistic productivity are calculated at lower levels of logistic system control and they provide conditions for an adequate interconnection of subsystems. Pursuant to this, logistic costs and service degree are determined, which are the basis for passing decisions at higher hierarchical levels.

The structure of measurers of logistic productivity can be subdivided into basic logistic subsystems so that one can speak of productivity of the fleet of trucks (motor pool), degree of utilization of reloading mechanization, warehouses etc. Logistic productivity can be observed on the subsystem level but also on the level of individual means or activity (e.g. technical-exploitation characteristics of forklift or time factors of order processing).

3.4 SAFETY OF LOGISTIC PROCESSES

Safety of logistic processes includes: workplace safety, industrial safety and fire protection. In regard to safety of logistic processes there are several approaches, while at this point only two are mentioned. One is founded on monetary appraisal of safety of these processes based on direct and indirect costs, while the other is based on determining the probability of occurrence of injury and possible damage. The impact of logistic processes to environment is expressed as a degree of environmental pollution. An analysis of safety of logistic processes can be seen on strategic level (through solving of the problem of location of logistical systems) and on operational level (through determining the values of the said measurers).

3.3 LOGISTIČKA PRODUKTIVNOST

Logistička produktivnost obuhvata različite tehničke i eksploatacione pokazatelje logističkih sistema. Izmeritelji logističke produktivnosti mogu se podeliti u tri grupe:

- tehno-eksploatacione karakteristike za kvantifikovanje logističkih troškova,
- tehno-eksploatacione karakteristike koje opisuju iskorišćenje resursa i
- karakteristike kojima se određuje servis stepen korisnika.

Izmeritelji logističke produktivnosti se izračunavaju na nižim nivoima upravljanja logističkog sistema i preko njih se obezbeđuju pretpostavke za adekvatno povezivanje podsistema. Na osnovu njih se određuju logistički troškovi i servis stepen, koji predstavljaju osnovu za donošenje odluka na višim hijerarhijskim nivoima.

Struktura izmeritelja logističke produktivnosti može se raščlaniti na osnovne logističke podsisteme, pa se može govoriti o produktivnosti voznog parka, stepenu iskorišćenja pretovarne mehanizacije, skladišnog prostora i dr. Logistička produktivnost se može posmatrati na nivou podsistema, ali i na nivou pojedinačnog sredstva ili aktivnosti (npr. tehno-eksploatacione karakteristike viljuškara ili vremenske karakteristike obrade porudžbine).

3.4 BEZBEDNOST LOGISTIČKIH PROCESA

Bezbednost logističkih procesa obuhvata: bezbednost rada, bezbednost radne sredine i požarnu bezbednost. U pogledu izmeritelja bezbednosti logističkih procesa postoji više pristupa, a ovde se navode dva. Jedan se zasniva na novčanoj proceni bezbednosti ovih procesa na osnovu direktnih i indirektnih troškova, a drugi na određivanju verovatnoće nastanka povrede i eventualno nastale štete. Uticaj logističkih procesa na ekologiju okruženja se izražava stepenom zagađenja okoline. Analiza bezbednosti logističkih procesa se može posmatrati na strateškom nivou (kroz rešavanje problema lokacije logističkih sistema) i operativnom nivou (kroz određivanje vrednosti pomenutih izmeritelja).

4 BENCHMARKING AND LOGISTICS

In contemporary business, logistic systems function under conditions of very tough market competition. Every company's goal is to provide top quality services to customers with minimum own costs, which is a typical example of conflict of goals. Upgrading of company's business today, more than ever, can be realized through various methods. Some of them are: implementation of information and communication technologies, application of new organizational work concepts, upgrading of manufacturing plants, modernized technological solutions etc. Each of these changes requires, in the first place, large financial investments that are justified as a rule, but do not guarantee the attainment of leader's position on the market.

If two companies are taken into consideration, that have an approximately equalized level of technological and technical equipment, they could have significantly different market position. Differences in their market position can be a consequence of various factors:

- poor organization of work in the company and its subsystems,
- inadequate application of technique and technology,
- inadequate utilization of production, warehousing, reloading and transportation facilities,
- poor organizational interconnection between subsystems etc.

Application of any new solutions in a company, without taking into consideration the environment and market, can only produce temporary minor improvements, which certainly is not the strategic goal. When a business company wants to improve its operations at a strategic level, the right question is: *how are the better companies performing?* On the same occasion, it is stressed that in present-day conditions the market competition depends to a considerable extent on logistics, i.e. solutions applied in this field for the actual company.

Application of benchmarking research, due to complexity of logistic systems and processes within them, has a wide application in logistics.

4 BENČMARKING I LOGISTIKA

U savremenom poslovanju logistički sistemi funkcionišu u uslovima veoma oštre konkurencije na tržištu. Cilj svake kompanije je da obezbedi što kvalitetniju uslugu klijentima, uz što manje sopstvene troškove, što je tipičan primer konflikta ciljeva. Unapređenje poslovanja kompanija danas, više nego ikada pre, može da se ostvari na različite načine. Neki od njih su: primena informacionih i komunikacionih tehnologija, primena novih organizacionih koncepcija u radu, unapređenje proizvodnih kapaciteta, savremenija tehnološka rešenja i dr. Svaka od ovih promena zahteva, pre svega, velika finansijska ulaganja, koja su po pravilu opravdana, ali ne garantuju dostizanje leaderske pozicije na tržištu.

Ako se posmatraju dve kompanije, koje imaju približno ujednačen nivo tehničke i tehnološke opremljenosti, one mogu imati značajno različitu poziciju na tržištu. Razlike u njihovoj poziciji na tržištu mogu biti posledica različitih faktora:

- loša organizacija rada u kompaniji i njenim podsystemima,
- neadekvatna primena tehnike i tehnologije,
- nedovoljna iskorišćenost proizvodnih, skladišnih, pretovarnih i prevoznih kapaciteta i
- loša organizaciona povezanost između podsystema i dr.

Primena bilo kakvih novih rešenja u kompaniji, bez posmatranja okruženja i tržišta, može da dovede do trenutnih minimalnih poboljšanja, što svakako nije strateški cilj. Kada kompanija želi da poboljša svoje poslovanje na strateškom nivou, pravo pitanje je: *Kako to rade oni koji su bolji?* Pri tome se naglašava da u današnjim uslovima konkurentnost na tržištu u sve većoj meri zavisi od logistike, odnosno rešenja koja se primenjuju u toj oblasti za konkretnu kompaniju.

Primena benčmarking istraživanja, zbog kompleksnosti logističkih sistema i procesa u okviru njih, ima veliku primenu u logistici.

In this way, it is possible to solve various logistic problems and to pass adequate decisions related to: optimal location of logistic centers and/or warehouses, automatization of logistic processes, time period for execution of order, improvement of basic business functions, improvement in quality of customer services etc. This is corroborated by a large number of practical examples.

The Gillette Company has improved business operations of its manufacturing and distributive centers in South America, when it has applied internal benchmarking research. Twelve (12) logistical performances have been used for comparison of business performance of these centers, some of them being: punctuality in delivery, accuracy of inventory, turnover of inventory (stocks), intensity of replenishment, productivity, density of replenishment of warehouse, time cycle of placing orders, percentage of punctuality in realizing purchase orders.

Xerox has applied external benchmarking research for preliminary projecting of its distribution network. L.L. Bean has been chosen as benchmark. The comparison has been made according to the following performances: annual volume of delivery of merchandise from the facility and working hours spent in the facility. The research effect is that the Xerox distributive center in Chicago was the winner of the annual productivity award.

The use of good practice and transfer of Know How in benchmarking research in the field of logistics are making possible the creation of new organizational concepts that are becoming models for the following applications. Frazelle quotes how some of the existing conceptual models present in logistics have originated. ECR (Efficient Customer Response) in retail sale has originated from CFR (Continuous Flow Replenishment) from the domain of electronics industry. CFR has originated from QR (Quick Response) from textile industry, while the QR originated from JIT (Just-In-Time) from the Japanese car-manufacturing industry.

Basic problems in applying benchmarking research in logistic systems, due to their complexity are:

Na ovaj način moguće je rešavati različite logističke probleme odnosno donositi odgovarajuće odluke vezane za: optimalnu lokaciju logističkih centara i/ili skladišta, automatizaciju logističkih procesa, vreme realizacije porudžbine, unapređenja osnovnih poslovnih funkcija, poboljšanje kvaliteta opsluge korisnika i dr. Ovo potvrđuje niz primera iz prakse.

Kompanija Gillete je unapredila poslovanje svojih proizvodnih i distributivnih centara u Južnoj Americi, kada je primenila interno benčmarking istraživanje. Za poređenje poslovanja ovih centara korišćeno je 12 logističkih performansi, od kojih su neke: tačnost otpreme, tačnost zaliha, obrt zaliha, intenzitet popunjavanja, produktivnost, gustina popunjenosti skladišta, vreme ciklusa naručivanja i procenat tačnosti realizacije naručivanja.

Xerox je primenio eksterno benčmarking istraživanje za preprojektovanje svoje distributivne mreže. Za benčmark je izabran L.L.Bean. Poređenje je urađeno po sledećim performansama: godišnji obim otpreme robe iz objekta i utrošeni radni sati u objektu. Efekat istraživanja je da je Xerox-ov distributivni centar u Čikagu bio dobitnik godišnje nagrade za produktivnost.

Korišćenje dobre prakse i transfer znanja i iskustva u benčmarking istraživanju u oblasti logistike, omogućavaju stvaranje novih organizacionih koncepcija, koje postaju modeli za sledeće primene. Frazelle navodi kako su nastali neki od postojećih modela koncepcija prisutnih u logistici. ECR (Eficient Customer Response) u maloprodaji je nastao od CFR (Continuous Flow Replenishment) iz domena elektronske industrije, CFR je nastao od QR (Quick Response) iz tekstilne industrije, a QR je nastao od JIT (Just-In-Time) iz japanske automobilske industrije.

Osnovni problemi primene benčmarking istraživanja i u logističkim sistemima, zbog njihove složenosti, su:

- determining performances measures and
- comparison of performances measures.
- određivanje mera performansi i
- poređenje mera performansi.

Performances measures of logistic systems are very complex values, which could be defined at various hierarchical levels of the company. Depending on the level at which they are defined, their description is becoming more complex. Some logistic performances (service degree, safety of logistic systems) can hardly be quantified and in practice they are usually represented indirectly through adequate measurers (reliability and punctuality of delivery, probability of occurrence of damage).

Comparison of logistic performances is the second practical problem in the realization of research. If a benchmark object and the benchmark are not comparable for their basic characteristics (e.g. surface area of warehouse, volume of work in warehouse, turnover etc.), then the measurers of performances have to be reduced to the unit value so that a comparison can be made possible. Qualitative measures of performances (e.g. quality of customer services) are most often descriptive and are obtained by polling the customers (e.g. excellent service, good, satisfactory, poor delivery). The comparison of these performances requires their "standardization" in some value system.

This paper suggests an introduction of *fuzzy* theory into determining the performances measures and comparison of measures in various business companies. Fuzzy theory enables the showing of vagueness and ambiguity and can be used here to describe qualitative measures of performances. For example, service degree can be described by fuzzy numbers: excellent service, good or poor service. By fuzzy technique services different performances can be compared that can hardly be quantified numerically.

In benchmarking research, a comparison between benchmark objects and benchmark is most often done for more performances. Frazelle gives an example of warehousing system benchmarking. Warehousing system performances which are used: productivity, density of storage, accuracy of delivery, DST, time cycle of purchase orders and safety. Figure 3 shows a graphic illustration of performance measures for benchmark object and benchmark. This illustration clearly points to discrepancies that exist in performances of analyzed warehouse that have to be overcome.

Mere performansi logističkih sistema su veoma kompleksne veličine, koje se mogu definisati na različitim hijerarhijskim nivoima kompanije. U zavisnosti od nivoa na kome se definišu usložnjava se i njihov opis. Neke logističke performanse (servis stepen, bezbednost logističkih sistema) se teško mogu kvantitativno prikazati, i u praksi se najčešće predstavljaju posredno preko odgovarajućih izmeritelja (pouzdanost i tačnost isporuke, verovatnoća nastanka štete).

Poređenje logističkih performansi je drugi praktični problem u realizaciji istraživanja. Ukoliko benchmark objekat i benchmark nisu uporedivi po svojim osnovnim karakteristikama (npr. površina skladišta, obim rada u skladištu, obrt i dr.), tada se izmeritelji performansi moraju svesti na jediničnu vrednost kako bi poređenje bilo moguće. Kvalitativne mere performansi (npr. kvalitet usluge korisnika) su najčešće opisne i dobijaju se anketiranjem korisnika (npr. odlična usluga, dobra, zadovoljavajuća, loša isporuka). Poređenje ovih performansi zahteva njihovu "standardizaciju" u nekom vrednosnom sistemu.

U ovom radu se predlaže uvođenje *fuzzy* teorije u određivanje mera performansi i poređenje performansi u različitim kompanijama. Fuzzy teorija omogućava prikazivanje neodređenosti i višeznačnosti, i ovde se može iskoristiti za opisivanje kvalitativnih mera performansi. Na primer, servis stepen se može opisati fuzzy brojevima: odlična usluga, dobra usluga ili loša usluga. Tehnikama fuzzy teorije mogu se porediti različite performanse, koje se teško mogu numerički kvantifikovati.

U benchmarking istraživanju poređenje benchmark objekta i benchmarka se najčešće radi po više različitih performansi. Frazelle navodi primer benchmarkinga skladišnog sistema. Performanse skladišnog sistema, koje se koriste su: proizvodnost, gustina skladištenja, tačnost zaliha, tačnost otpreme, DST, vreme ciklusa narudžbine i bezbednost. Na slici 3 je prikazana grafička ilustracija mera performansi za benchmark objekat i benchmark. Ovakva ilustracija jasno ukazuje na razlike, koje postoje u performansama analiziranog skladišta, a koje je potrebno prevazići.

Besides the above given examples, some of the possibilities for application of benchmarking research in logistic systems could be:

- defining the number and distribution of logistic centers,
- better quality connection of all participants in logistic chain,
- better quality connection of company's subsystems,
- improvement of information flows,
- improvement of business functions etc.

Osim opisanih primera, neke od mogućnosti primene benčmarking istraživanja u logističkim sistemima mogu biti:

- definisanje broja i rasporeda logističkih centara,
- kvalitetnije povezivanje svih učesnika u logističkom lancu,
- kvalitetnije povezivanje podsistema u kompaniji,
- poboljšanje informacionih tokova,
- unapređenje poslovnih funkcija i druge.

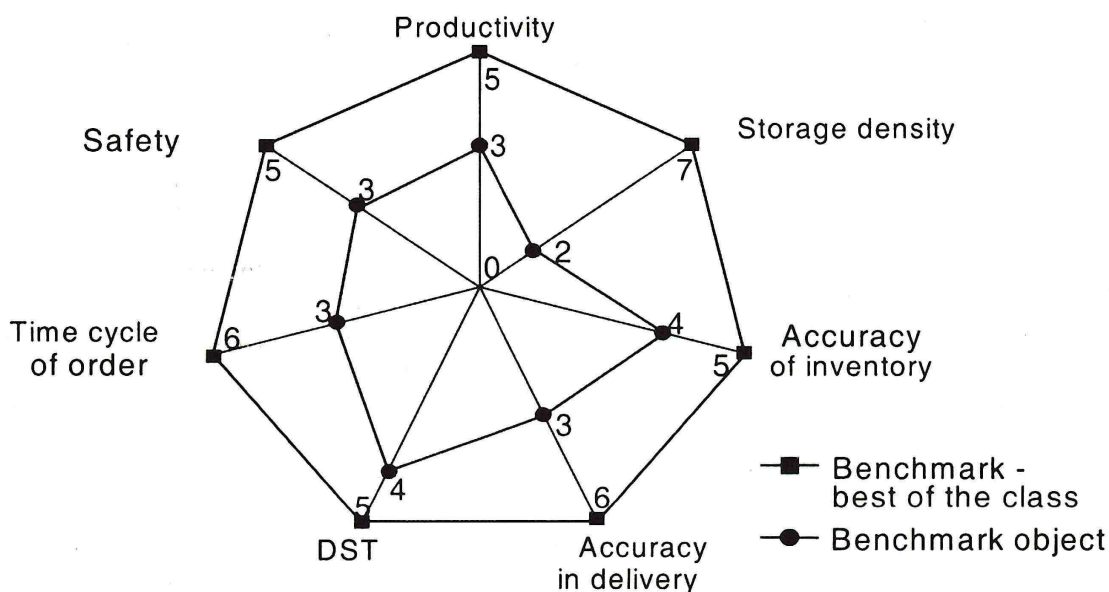


Figure 3 Performances of storage system of benchmark objects and benchmark
slika 3 Performance sistema benčmark objekata i benčmarka

5 CONCLUSION

Nowadays, logistics with its instruments makes possible competitiveness on the market and due to its complexity and potential rationalization is a permanent area for research work. A company, in order to be able to understand its status in that field usually strives to be compared with its business competition. However, due to complexity of logistics, it is not a simple task. Benchmarking is one of the approaches to its solving. By its methodology it makes it possible in an efficient way to compare own performances with leaders in respective fields and the formation of a basis to bring strategic decisions. These decisions make it possible to overcome the differences as determined in this manner, attainment of the performance levels of market leaders and the taking over of the leader's position.

5 ZAKLJUČAK

Logistika, koja svojim instrumentima danas omogućava konkurentnost na tržištu, zbog svoje složenosti i potencijalnih racionalizacija, je permanentno mesto istraživanja. Kompanija, da bi bila u mogućnosti da spozna svoj status u tom domenu obično teži poređenju sa konkurencijom. Međutim, zbog kompleksnosti logistike, to nije jednostavan zadatak. Jedan od pristupa njegovom rešavanju je benchmarking. Svojom metodologijom on na efikasan način omogućava poređenje sopstvenih performansi sa liderima u odgovarajućoj oblasti i formiranje osnove za donošenje strateških odluka. Te odluke omogućavaju prevazilaženje, na ovaj način utvrđenih razlika, dostizanje nivoa performansi lidera i preuzimanje leaderske pozicije.

Benchmarking research is a continuous process, which from the moment of implementation of new solutions becomes an integral part of business policy and strategy of the company that wants to remain in the market and survive competition.

Benčmarking istraživanje je kontinualan proces, koji od trenutka implementacije novih rešenja postaje sastavni deo poslovne politike i strategije kompanije, koja želi da ostane i opstane u tržišnoj konkurenciji.

REFERENCES / LITERATURA

- [1] Camp R., "Benchmarking: The Search for Industry Best Practices That Lead to Superior Performance", ASQC Quality Press, Milwaukee, 1989.
- [2] Camp R., "Business Benchmarking" ASQC Quality Press, Milwaukee, 1995.
- [3] Frazelle E., *World-Class Warehousing and Material Handling*, McGraw-Hill, N.Y., 2001.
- [4] Gillen D., "Benchmarking and Performance Measurement: The Role in Quality Management", *Handbook of Logistics and Supply-chain Management*, New York, pp. 324-350, 2001.
- [5] Kotler, P., *Marketing Management—Analysis, Planning, Implementation and Control*, New York, 1997.
- [6] Miller, J., "Benchmarking Global Manufacturing", Homewood, 1997.
- [7] Novack R., "Quality and Control in Logistics: A Process Model", *International Journal of Physical Distribution and Materials Management*, Vol 19, 1989.
- [8] O'Reagan S., Keegan R., "Benchmarking Explained", *Benchmarking in Europe – Working together to Build Competitiveness*, EU, 2000.
- [9] Vidović, M., «Possibilities For Improvement in Performance of Logistics Systems By Optimization of Operational Planning of some Classes of Reloading Processing», PhD, Faculty of Transport & Traffic Engineering, Belgrade, 1997.
- [10] <http://www.benchmarkingnetwork.com>
- [11] <http://www.benchmarking.gov.uk>
- [12] <http://www.benchdb.com>
- [13] <http://www.benchmarkingnetwork.com>
- [14] <http://www.benchmarking-in-europe.com>
- [15] <http://www.efqm.org>
- [16] <http://www.apqc.org>

Reviewal / Recenzija: prof. dr Božo Kolonja