

OPERATIONAL AND EMPLOYEES PERFORMANCE OF SERBIAN INDUSTRIAL COMPANIES WITH ISO 9001 CERTIFICATE

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Original Scientific Paper

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Business performance is manifested through key performance indicators, which show the actual state in business enterprises and possible deviations from the business objectives that have been set. Due to new practices in transitional economies it is necessary to track business performance measures on company level. The most frequently studied types of performance in the available literature are quality, operational, market and financial, employee performance, innovation, project, aggregate firm performances, and customer satisfaction. This study empirically examines operational and employees performance on a sample of 113 Serbian industrial companies. After data collection through questionnaire usage, descriptive statistics, factor and reliability analysis were used to check if description of examined performances could be done using dimensions proposed according to results of the previous research in a statistically significant way. Examined operational and employees performances provided, have proved valid and reliable dimensions of Serbian industrial companies as a construct. The obtained results comply with previous research done in other countries and contexts. Future research could consist of a longitudinal study but as an examination of operational and employees` performance measures in other Serbian industrial sectors, too. Also, the relationship between operational and employees performance measures could be explored.

Keywords: Operational performance, Employee performance, Companies, Serbia.

INTRODUCTION

The transition processes are characteristic for a large part of the world economy, including the countries of the former USSR, Bulgaria, Romania, Hungary, and also the countries of former Yugoslavia. Serbia's transition process has taken place about a quarter of a century. The liberalization of trade relations and capital balance has enabled the integration of the economic system of Serbia in international financial and commodity flows. As a consequence of those integrations, companies in Serbia are in the phase of introducing new trade procedures and new legislatives, with wide foreign investments in domestic companies. It results in high demand for radical organizational changes due to new business

ambience (Dondur, Pokrajac, Spasojević-Brkić, & Grbić, 2011; Živković, Mihajlović, & Prvulović, 2009). Survival on the market and a good business performance are the main aims of contemporary companies that are not easily reached together with necessary organizational and structural changes.

Due to implementation of new practices it is necessary to track performance measures at company level. The most frequently studied types of performance in available scientific references are: quality performance, operational performance, market and financial performance, employee performance, customer satisfaction, innovation performance, project performance and aggregate firm performance, (Sadikoglu & Zehir 2010).

Operational performance of the company is one of very important types of firm's performance that measures results of the company according to standard or prescribed indicators of effectiveness, and efficiency such as cycle time, productivity, quality, waste reduction and regulatory compliance.

Employees performance is also a very important measure since it was noticed a long time ago that motivation, attitude and perception of employees influenced organizations' functioning (Khandwalla, 1977). It is also known that structural changes significantly influence employees performance results (Argyris, 1993).

Since Serbian industrial context emphasizes structural changes, it is very important to analyze companies' operational performance. Empirical study on the sample of 113 Serbian industrial companies is the main aim of this survey in order to determine evidences that come about companies operational and employees' performance.

This survey consists of the following parts. After literature review, operational and employees performance constructs are described with certain dimensions. After data collection on the sample of Serbian industrial companies, the data are undergone to multivariate statistics, factor and reliability analysis. Finally, the results will show if the proposed dimensions belong to constructs operational and employees' performance.

PREVIOUS RESEARCH

Business performance is manifested through key performance indicators, which show the actual state in business enterprises and possible deviations from the business objectives that have been set.

Review of business performance has been tracked from available literature sources in different ways, as can be seen in Table 1. It can be noticed that operational and employees' performance is a very important performance measure. There are also other important measures such as financial, market, social and other measures.

Table 1: Business performances in previous researches

AUTHOR	PERFORMANCE MEASURES
Fuentes-Fuentes, Albacete-Sáez and Lloréns-Montes (2004)	<ul style="list-style-type: none"> – financial (total revenue, profitability) – operational (defective products, rework, customer satisfaction) – employee performance (employee satisfaction, absence from work)
Demirbag, Lenny Koh, Tatoglu and Zaim (2006)	<ul style="list-style-type: none"> – financial (total revenue, net profit, profit/expense ratio) – non-financial (investment in research and development, extension in capacities, new product development, larger market share, expansion on new markets)
Lai (2003)	<ul style="list-style-type: none"> – motivational (employee earnings and benefits, employee trainings, employee satisfaction, job security, work safety) – market (development and innovation of new and existing products, competitive product price, customer complains) – productivity (efficiency in material, work force, capacities usage) – societal (benefits for society and community)
Samson and Terziovski (1999)	<ul style="list-style-type: none"> – market (customer expectations fulfillment) – employee contentment (employees' moral and satisfaction) – operational (share of defective products, costs in the warranty period, quality costs, share of timely deliveries)
Everett et al. (1997)	<ul style="list-style-type: none"> – financial – operational – employees performance
Tari and Sabater (2004)	<ul style="list-style-type: none"> – customer satisfaction – employees satisfaction – societal benefits – operational performances

In the context of operational measures, certain previous works should be mentioned. Hendricks and Singhal (1997) have explored the impact of effective Total Quality Management - TQM implementation on operational performance which resulted in the conclusion that firms winning quality awards outperformed those in a matched control sample without such awards. Sharma (2005), Samson and Terziovski (1999), and Lemak, Reed and Satish (1997) have concluded that quality improvement practices improve business performance, too. They also presented significant proofs for financial and operational performance improvement. Spasojević Brkić, Djurdjević, Dondur, Klarin and Tomić (2013), Spasojević Brkić, Klarin, Brkić, Lučanin and Milanović (2011), Sadikoglu and Zehir (2010) and Samson and Terziovski (1999) for measuring operational performance determined the following five crucial dimensions:

- Customer satisfaction
- The share of defective products in relation to the volume of production
- The cost of the warranty period as compared to total sales
- Quality costs in relation to total revenue and
- Proportion of timely deliveries in total deliveries.

It is very important to design jobs so that employees stress factors can be reduced in aim to enhance their motivation, improve their satisfaction and performance (Garg & Rastogi, 2006, Tomić, Spasojević-Brkić, & Klarin, 2012, Terziovski & Samson, 1999). It further leads to effective competition potential of the company in the global marketplace (Garg & Rastogi, 2006). According to Bass, Avolio and Atwater (1996), employees perform tasks through identification with a leader or with their organization. It means that they make basic agreement with the norms to which they are required to perform (Bass et al., 1996). Vroom (1964) points out that better performance can be achieved when a reasonable level of expectation-fit exists and when the social exchange between managers and employees is fair and equal. Andrews and Kacmar (2001) highlight that employees tend to achieve self-interests, advantages, and benefits at the expense of others and sometimes contrary to the interests of the entire company. Employees even tend to promote their interests more aggressively in an environment that works with limited resources (Vigoda-Gadot, 2007). Love and Edwards (2005) in their study

have proved that perceived work demands, job control and social support through job design leads to higher productivity results.

Literature sources such as Sadikoglu and Zehir (2010), Spasojević Brkić et al. (2013), Skerlavaj, Štemberger and Dimovski (2007) and Spasojević Brkić et al. (2011) propose the following common dimensions for employees' performance description:

- Employees moral
- Employees productivity
- Employees absenteeism rates and
- Wages and other employees' benefits.

METHODOLOGY AND RESULTS ON OPERATIONAL AND EMPLOYEES PERFORMANCE

Data for study of industrial enterprises in Serbia were collected using a questionnaire formed for this purpose. Respondents were required to mark the value of operational and employees' performance dimensions rating at a Likert scale from 1 to 5. Performance concepts and dimensions are consistent with and discussed in detail in Spasojević Brkić et al. (2011), while the performance measurements are consistent with previous research (Nair, 2006).

The survey population consists of 969 ISO 9001 certified industrial companies. Based on the experience of other researchers, in order to represent population in good manner, 250 industrial companies were chosen for the survey, including 40 large, 80 medium-sized and 130 small companies.

Distribution of the survey was conducted via e-mail. Responses were received from 119 industrial companies certified according to ISO 9001 management standard, which comprise more than 10% of the Serbian industrial company population with that characteristic. There was a 47.6% response rate. The response was worst in small enterprises, as shown in Figures 1 and 2. The average number of employees in the sample was 370.91, with a standard deviation of 267.98. Our sample proves the fact that almost a third of employees work in large enterprises in Serbia. The answers have been obtained from the persons employed in domestic industrial companies with an average of 16.98 years work experience. The 41% of the employees were quality department

directors, 32% were directors of other technical departments, 22% employees work in quality departments or quality representatives and 5% in other managerial positions. Since this survey is a part of the larger survey, it is important to note that data about operational and employees performance is obtained from 113 companies (at maximum), due to missing data. Distribution of size of the ISO 9000 certified companies in Serbia is presented in

Figure 1., while the same distribution for the sample is presented in Figure 2.

Table 2 presents the descriptive statistics for operational business performance collected data.

Table 3 presents the descriptive statistics for employees` business performance collected data.

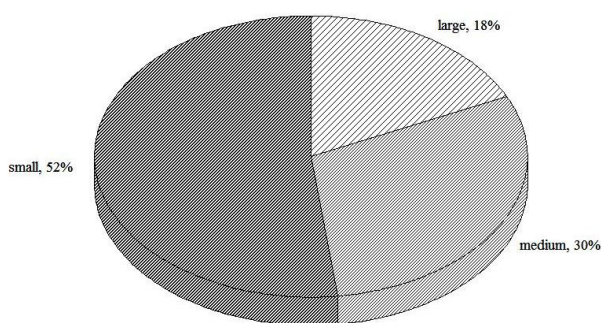


Figure 1: Distribution of certified Serbian industrial companies according to size in population

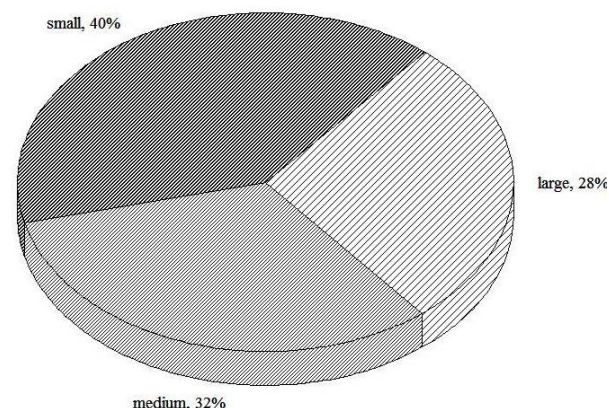


Figure 2: Distribution of certified Serbian companies according to size in the sample

Table 2: Descriptive statistics for operational business performance in Serbian industrial companies

Operational performance dimensions	N	Min.	Max.	Mean	Stand. dev.
Customer satisfaction	113	1	5	3.71	0.873
The share of defective products in relation to the volume of production	104	1	5	3.73	1.201
The cost of the warranty period as compared to total sales	101	1	5	3.64	1.339
Quality costs in relation to total revenue	97	1	5	3.91	1.071
Proportion of timely deliveries in total deliveries	103	1	5	3.77	1.156

Table 3: Descriptive statistics for employees` business performance in Serbian industrial companies

Employees performance dimensions	N	Min.	Max.	Mean	Stand. Dev.
Employees moral	111	1	5	3.50	1.026
Employees productivity	111	1	5	3.35	0.891
Employees absenteeism	109	1	5	3.13	0.747
Wages and other employees benefits	111	1	5	3.72	0.974

After descriptive statistics, data are undergone to explorative factor and reliability analysis to check if they are useful in operational performance description in statistically significant way.

Reliability is the degree to which the observed variable measures the "true" value and is "error free" (Hair, Anderson, Tatham, & Black, 1998). For this study, reliability was estimated through Cronbach α coefficient as an indicator of the amount of present random error in the scale used

for measurement (Kaynak & Hartley, 2006). The value 0.60 has been adopted for the lower level of Cronbach α acceptability. Nunnally (Spasojević Brkić, 2009) suggests the value 0.70 for the lower level, with a large number of researchers adopt this value (Spasojević Brkić, 2009; Handfield, Jayaram, & Ghosh, 1999). However, values lower than 0.70 can also be seen in numerous studies (Spasojević Brkić V. 2009; Singh, 2008; Conca, Llopis, & Tari, 2004; Tari & Sabater, 2004; Lai, 2003). A coefficient value of 1 means perfect

reliability (Hair et al., 1998). Cronbach α coefficient is calculated according to the following formula (Cronbach & Shavelson 2004):

$$\alpha = \left(\frac{k}{k-1} \right) \cdot \left[1 - \frac{\sum S_i^2}{S_{sum}^2} \right] \quad (1)$$

where, k - the number of conditions contributing to a total score, S_i^2 - variance for k individual measurement, and S_{sum}^2 - variance for the sum of all measurements.

Explorative factor analysis is a statistical method used to uncover the underlying structure of a certain set of variables. It is used herein with the aim to reduce a larger number of variables to a much smaller set, retaining as much as possible of the variation. Explorative factor analysis is conducted using principal components with Varimax rotation and Kaiser normalization on the obtained data. It means that given factor matrix with arbitrary reference for n test and r factors, Varimax criterion requires orthogonal rotations on this matrix in order to obtain a maximum (Kaiser, 1959):

$$\sum_s \left\{ n \cdot \sum_i (\alpha_{is}^2 / h_i^2)^2 - \left[\sum_i (\alpha_{is}^2 / h_i^2) \right]^2 \right\} \quad (2)$$

where: $j=1,2, \dots, s=1,2, \dots$, while n represents tests, r represents factors, α_{i_s} is the loading for j -th test on s -th factor and h_j^2 is communality of the j -th test.

Only those factors that accounted for variances greater than one, i.e. with eigenvalues > 1 , were extracted. Also, for interpreting the factors relating to sample size, only those items which had factor loadings greater than 0.5 were included (Hair et al., 1998). As can be seen in Figure 3 two factors which accounted for 72.08% of the total variation in the observed variables were extracted.

In this survey all 5 examined operational performance dimensions are above or very close (0.595) to value of 0.6 of Cronbach α , according to results given in Table 5. All factors have loading above 0.5, as can be seen in Table 4.

Explorative factor analysis and reliability analysis for all operational performance dimensions are presented in Tables 4 and 5, respectively.

For the conducted explorative factor analysis for operational performance dimensions, Eigen values for factors and values of explained variance and their cumulative values are presented are shown at Figure 3.

Table 4: Explorative factor analysis for operational performance dimensions

Operational performance dimensions	Factors	
	Factor 1	Factor 2
Customer satisfaction	0.641	0.437
The share of defective products in relation to the volume of production	0.897	0.012
The cost of the warranty period as compared to total sales	0.779	-0.337
Quality costs in relation to total revenue	0.526	-0.692

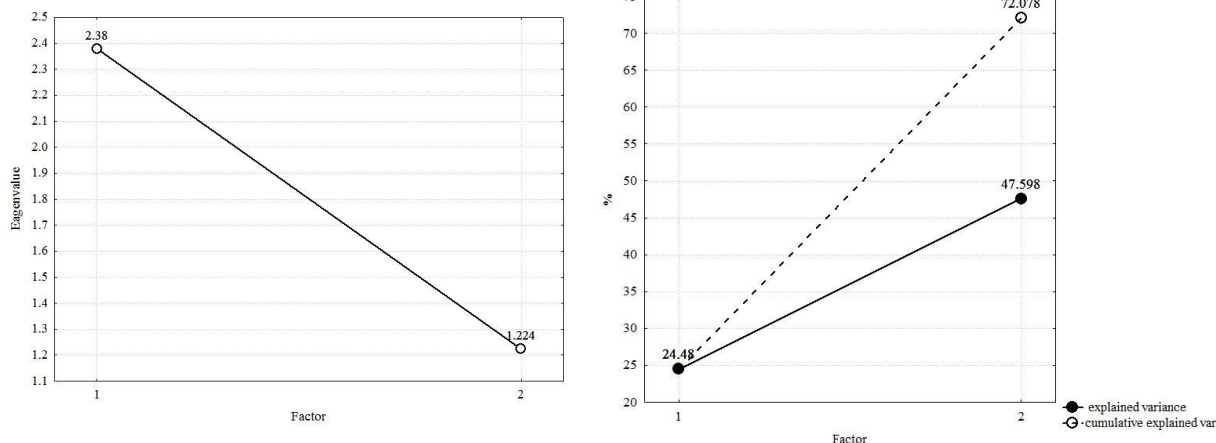


Figure 3: Eigen values, explained and cumulative variance for factors of operational performance

Table 5: Reliability analysis of operational performance dimensions

Factor with "items"	Corrected item - total correlation	Cronbach alpha coefficient if item is deleted
Customer satisfaction	0.421	0.796
The share of defective products in relation to the volume of production	0.733	0.421
The cost of the warranty period as compared to total sales	0.595	0.638
Quality costs in relation to total revenue	0.623	0.378
Proportion of timely deliveries in total deliveries	0.715	0.407

Table 6: Explorative factor analysis for employees' performance dimensions

Employees performance dimensions	Factors	
	Factor 1	Factor 2
Employees moral	0.889	-0.196
Employees productivity	0.701	0.387
Employees absenteeism	0.651	-0.679
Wages and other employees benefits	0.577	0.613

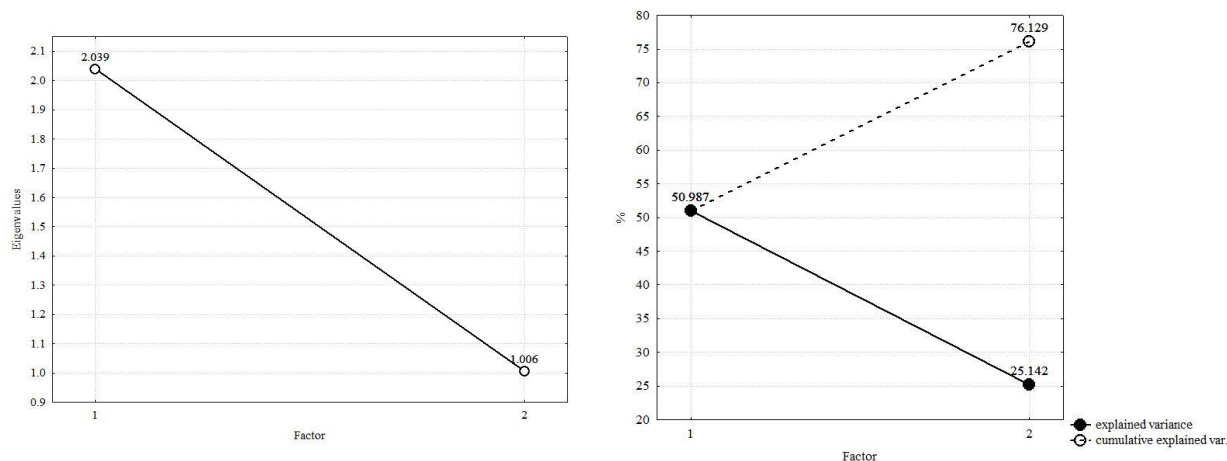


Figure 4: Eigen values, explained and cumulative variance for factors of employees' performance

Table 7: Reliability analysis of employees' performance dimensions

Factor with "items"	Corrected item - total correlation	Cronbach alpha coefficient if item is deleted
Employees moral	0.613	0.416
Employees productivity	0.611	0.418
Employees absenteeism	0.690	0.638
Wages and other employees benefits	0.733	0.421

Explorative factor analysis and reliability analysis for all employees' performance dimensions are presented in Tables 6 and 7, respectively.

Figure 4 represents Eigen values and percentage of explained variances for explorative factor analysis of employees' performance dimensions.

Regarding employees performance, from Tables 6 and 7, can be noticed that all employees' performance dimensions have adequate values both in reliability and factor analysis.

CONCLUSIONS

This survey comes to the conclusion that it is possible to classify and track operational and employees performance of Serbian companies into pattern as described in this paper using multivariate statistics - factor and reliability analysis. Tracking the operational and employees performance of Serbian companies in the proposed simple manner enables the improving rates of survival on the market and good business performance of domestic companies.

Accordingly, customer satisfaction, the share of defective products in relation to the volume of production, the cost of the warranty period as compared to total sales, quality costs in relation to total revenue and proportion of timely deliveries in total deliveries have been proved as well as valid and reliable dimensions of operational performance of Serbian industrial companies as a construct.

Also, employees' moral, productivity and absenteeism rates and their wages and other benefits have been proved and as well as valid and reliable dimensions of employees' performance of Serbian industrial companies as a construct.

Our results comply with those within the framework proposed in previous research done in other countries and contexts. In some further studies, dimension cost reliability of the warranty period as compared to total sales as a part of construct operational performance should be checked.

The limitation of this study lies in the fact that this research is a cross sectional study.

Future research could consist of a longitudinal study. A suggestion for future studies would be an examination of operational and employees' performance measures in other Serbian industrial sectors, too. Also, the relationship between operational and employees performance measures could be explored.

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OPERATIVNE PERFORMANSE I PERFORMANSE ZAPOSLENIH U SRPSKIM INDUSTRIJSKIM PREDUZEĆIMA SERTIFIKOVANIM PREMA ISO 9001

Poslovne performanse se mere putem ključnih pokazatelja, koji opisuju stanje u preduzeću i devijacije od postavljenih ciljeva. U preduzećima ekonomija u tranziciji neophodno je obratiti posebnu pažnju praćenju mera poslovnih performansi. Najčešće razmatrani tipovi poslovnih performansi u literaturi su performance kvaliteta, operativne performanse, tržišne performanse, inovacione performance, performance projekata i zadovoljstva kupaca. U ovom radu razmatrane su performanse zaposlenih i operativne performanse na uzorku 113 srpskih industrijskih preduzeća. Nakon prikupljanja podataka putem upitnika, primenjene su deskriptivna statistika, faktorska i analiza pouzdanosti u cilju provere statistički značajnih dimenzija konstrukata performansi prema prethodnim istraživanjima. Pretpostavljene dimenzije su potvrđene kao statistički značajne u opisivanju konstrukata, tako da su dobijeni rezultati su u skladu sa prethodnim istraživanjima sprovedenim u drugačijim kontekstima. Kao predlog daljih istraživanja daje se longitudinalna studija, kao i uključivanje drugih industrijskih sektora u analizu. Takodje je korisno istražiti i vezu između operativnih i performansi zaposlenih.

Ključne reči: Operativne performanse, Performanse zaposlenih, Preduzeća, Srbija.