

PERFORMANCE EFFECTS OF THE BUSINESS PROCESS CHANGE IN LARGE ENTERPRISES: THE CASE OF CROATIA

Ivan Peronja *

Received: 17. 10. 2014
Accepted: 16. 2. 2015

Original scientific paper
UDC 005.71-022.56(497.5)

The main aim of this paper is forming the model of impact that business process change management has on organizational performance of large companies. Critical Success Factors – CSFs are closely observed in such a model. It was proved that the business process changes, observed through critical success factors, affect organizational performance that are observed through customer satisfaction and financial performance of the company. The direct relationship among the proposed variables, as well as the proposed conceptual research model, are empirically validated.

1. THE EVOLUTION AND DEVELOPMENT OF BUSINESS PROCESS MANAGEMENT (BPM)

In an attempt to consolidate the needs of business organizations with the tradition of simplifying operations the concepts leading up to BPM were (re)defined many times. The proponent of such a thinking was Taylor (as quoted in Buble, 2006), who revolutionized management with his book *The principles of scientific management*. Harmon (2007) outlined a brief history review of different concepts that preceded the BPM. It can be stated that the nucleus of BPM is *Taylorism*, which strongly advocates simplifying the work, seeking the best solutions, and introducing a system to control the final product. The characteristics of the first phase were implicit and non-automated processes. In the 1970s, Total Quality Management (TQM) as well as quality control methodology were introduced. The Six Sigma concept, which combines process analysis and statistical quality with the reward system within the organization, was developed in the 1980s. The concept was expanded to include Lean technologies developed in Japan by Shingo and Ohno (Harmon, 2007).

* Ivan Peronja, PhD, University of Split, Department of Professional Studies, Kopilica 5, 21000 Split, Croatia, E-mail: iperonja@oss.unist.hr

Each employee is responsible for the process by using a variety of techniques such as Just-In-Time or seven types of waste. The following table compares some of the fundamental characteristics in the historical development of theoretical approaches that focus on business processes.

Table 1. A comparison of the characteristics of BPR, TQM and Six Sigma

	Radical BPR	Revisionist BPR	TQM	Six Sigma
Level of changes	Radical	Little progress	Incremental	Incremental
Scope	Organization	Processes	Processes	Process
Focus	Start from scratch	Redesign of current processes	Redesign of current processes	Improvement of current processes
Participation	Top-down	Top-down/Bottom-up	Bottom-up	Bottom-up
The role of IT	Key	Basic	Key	Key
Other possibilities	Process ownership	Process ownership	Statistic tools	Statistic tools
Risk	High	Moderate	Moderate	Moderate
Goals	Cost reduction	Cost reduction	Quality improvement	Quality improvement

Source: Valentine & Knights (1998); Chang (2006).

Summing up the concepts illustrated in the historical evolution of BPM, and going through the stages of its development, from the Porter's value chain (Buble, 2006), through the Rummler-Brach methodology, Material Requirements Planning (MRP) I and II, as well as Total Quality Management (TQM), workflow management systems, as well as various other initiatives, reengineering of business processes had been developed (Geršak, 2005; Bosilj Vukšić et al., 2008).

During the second stage of BPM development, the processes were changed in a radical way. Hammer and Champy (2004) describe business transformation as an example of a new beginning in their book *Reengineering the Corporation: A Manifesto for Business Revolution*. In the reengineering context, organizations start perceiving a significant need to redesign their business processes, in order to achieve substantial improvements in operations. The definitions and main characteristics of previously discussed and similar approaches are presented in the table below.

Table 2. Process-focused organizational development

TQM	“A process which ensures maximum effectiveness and efficiency within a business and secures commercial leadership by putting in place processes and system which will promote excellence, prevent errors and ensure that every aspect of business is aligned to customer needs and advancement of business goals without duplication or waste of effort.” (Pike & Barnes, 1993)
BPR	“A fundamental rethinking and radical design of business processes to achieve improvements in critical, contemporary measures of performance, such as cost, quality, service and speed.” (Hammer & Champy, 1993)
Supply chain management	“An integrated philosophy to manage the total flow in a supply chain from supplier to end customer.” (Paulson et al., 2000)
Learning organization	“An organization skilled at creating, acquiring and transferring knowledge and at modifying its behavior to reflect new knowledge and insights.” (Garvin, 1993)
Lean production	”Lean thinking enables companies to find the best way to specify value for the customer, to identify the value stream for each product, to cause the product to flow smoothly from concept to customer, to permit customer to pull value as needed from the producer and to make a lean leap toward perfection.” (Womack & Jones, 1996)

Source: Lindfors, C. & Leiringer, R. (2002), Pike, J. & Barnes, R. (1994), Hammer, M. & Champy, J. (1993), Garvin, D. (1993), Womack & Jones (1996), as quoted by Hernaus (2006, 48).

Business Process Management (BPM) is a systematic way to manage and improve business activities by concentrating on business processes (from their design to optimization), as to meet the business objectives (Davis & Brabander, 2007). Since BPM is focused on processes, it can be used along various process approaches and management practices, such as TQM and BPR. BPM is a way of improving the process in the organization and represents a permanent effort within the organization (Škrinjar & Trkman, 2013). By using BPM, companies implement business processes, organizational changes and apply information technology (Škrinjar & Trkman, 2013). According to Hammer (as quoted by Vom Brocke & Rosemann, 2010), BPM considered to be the *hyper-concept*. Harmon (as quoted by Vom Brocke & Rosemann, 2010), argues that BPM is actually the culmination of a range of various concepts (in the fields of quality management, business management and IT), following a common process orientation. Ohtonen and Lainema (2010) believe that BPM essentially creates value for the end user through activities in an organization and by fulfilling other strategies like generating returns on invested capital. BPM is mainly focused on management processes and increasing process capacities, which benefit the customers.

2. ORGANIZATIONAL PERFORMANCE

Organizational performance is, according to Enos (2007), related to defining and achieving specific goals, although different definitions can be found in literature (see following table).

Table 3. Definitions of organizational performance

Author	Definition	Contribution
Enos (2007)	Organization performance are indicators and progressive achievement of tangible, specific, measurable, worthwhile and personally meaningful goals.	Definition and selection of quantitative indicators.
Parmenter (2010)	The organizational performance is marked and classified by success indicators, performance indicators and key performance indicators as key success indicators. The fundamental success factors are the list of problems or aspects of organizational performance that indicate the vitality of the organization, its state and success.	Key indicators of organizational performance
Franceschini, Galetto and Maisano (2007)	Measuring organizational performance reports on the long-term process of continuous monitoring and reporting on achievements, especially of the pre-defined aims. The measures of organizational performance can be related to the type or level of process, direct output results.	Observation of everything that the measures of organizational performance can relate to.
Buble (2006)	Taking into consideration the effects of performance represents the beginning of the business process transformation. One of the aims of improving business processes is to determine economic sense that the changes will bring, which is not possible without measuring performance.	Quantifying the economic sense of changes.
Jeston and Nelis (2008)	If business performance is not measured, you cannot manage your business. To measure performance means to know and to be able to make a decision in certain circumstances.	The importance of measuring performance in the context of making good business decisions.
Davenport (1993)	Actions are important, but they will not be taken unless everything is directed towards improving the process.	Discusses performance problems.

Source: Author.

When measuring organizational performance, indicators are chosen by the management for the purpose of reporting and performance improvements (Parmenter, 2010). Those performance measures, oriented to aspects of organizational performance that are most critical to current and future success of the organization, are classified as key performance indicators (KPIs). They can be classified as (Parmenter, op. cit.):

- key result indicators (KRI) tell *how* a certain task was performed taking into consideration key success factors;
- result indicators (RIs) tell *what was done*;
- performance indicators (PIs) tell *what they did*;
- key performance indicators (KPIs) *what to do in order to increase performance*.

KPIs clearly indicate what actions should be taken by employees and what kind of responsibility should be assigned to teams. They also have a significant impact on other success factors and encourage necessary business actions. Successful development and use of KPIs is determined by:

- partnership with employees, unions, suppliers, and key customers
- transfer of power to employees
- measuring and reporting on what is important
- linkage of performance measures and strategy through KPIs.

Critical success factors (CSFs) are a series of measures or aspects of organizational performance that determine the “health” and success of an organization. There are usually five to eight CSFs within an organization. The purpose of critical success factors and performance measures they contain is to align daily activities to an organization’s strategies. Although most organizations know what their success factors are, few organizations have clearly described and duly selected critical success factors.

To conclude, without a clear definition and knowledge of CSFs, performance management cannot function. Benefits that knowledge of CSFs brings are evident in the selection of winning KPIs and the elimination of measures, which are not based on CSFs. Employees then know their priorities and effectively participate in daily activities connected to organizational strategy, reducing the number of unnecessary reports included. Critical success factors are focused on very specific areas, and are precisely defined, in contrast to the strategic objectives, which can be more general.

3. FINANCIAL AND NON-FINANCIAL ORGANIZATIONAL PERFORMANCE

Process performance management is of great importance for organizations, since it helps to control, assess, and enhance processes and organizations. It potentially leads to significant financial and non-financial improvements (e.g. increase in revenue, cost reductions, improvement of cycle time, a higher customer satisfaction, adds value, employee satisfaction, better cooperation). Although the nature of the relationship between process performance measurement and organizational performance is unclear (González et al., 2010), and is still being explored, there are some indications of a positive relationship. It might be argued that a positive relationship will occur, if process performance measurement is systematically supported by top management and is harmonized with the strategic goals of the organization.

Performance measures are traditionally strongly influenced by financial reporting, which resulted in the development of numerous financial measures. Mostly used financial measures are return on assets (ROA), return on equity (ROE), return on investment (ROI), profit margin, earnings per share, and the value per employee. These traditional financial indicators are no longer perceived as appropriate means of exercising control management (Neely, 2007). A change in the perspective occurred in the mid-1980s. Performance measures were no longer strictly focused on finance. Organizations began to increasingly implement non-financial performance measures, such as customer retention, customer satisfaction, employee turnover, and the development of new products.

However, it should be emphasized that applying a strategy on specific goals that lead operational actions requires both financial and non-financial measures, which should be seen as complementary. This has been confirmed by Hoque and James (2000), who studied the use of non-financial measures, proposed by various frameworks for performance measurement, and confirmed a strong positive correlation between these measures and financial performance.

Their results imply the possibility of certain time intervals in performance results. Empirical analyses by Škrinjar et al (2007, 2008) obtained similar results: orientation towards business processes has a strong, indirect impact on financial performance through non-financial aspects of operations (non-financial performance). *This study will also assume that the measured process performance has a positive impact both on financial and non-financial performance.*

Therefore, it can be assumed that companies with a strategic approach to business process management will produce process improvement (process performance). Based on this achievement, they might also enjoy both the directly increased financial performance, as well as increase non-financial performance, which should be converted into financial effects in a longer term. This paper will empirically test both the financial and some of the non-financial performance consequences, but it does not address the dynamics of the performance effects, which needs to be explored by a new study.

4. PREVIOUS STUDIES OF THE RELATIONSHIP BETWEEN BUSINESS PROCESS CHANGE AND ORGANIZATIONAL PERFORMANCE

McCormack and Johnson (2001) have conducted one of the most influential studies in this field and found a correlation between process orientation and business performance improvement, as well as a surprisingly strong relationship between process-oriented companies and the overall performance. Following the previously cited study, Škrinjar et al. (2008) analyzed and empirically tested the impact of business process orientation on the overall organizational performance. Their empirical research was conducted in 2005 on a sample of 203 companies in Slovenia and 202 companies in Croatia, each with more than 50 employees. Before testing the whole model, the exploratory factor analysis confirmed the impact of business processes on the financial and non-financial performance. The financial performance construct was measured by using ROA and added value per employee, while the non-financial performance construct was measured by indicators grouped into four scales. The authors statistically confirmed a strong and significant impact of business processes and process organization on financial and non-financial performance. A significant indirect impact of process organization on financial performance through non-financial performance was proved, as well.

Results of a study, conducted by Hernaus et al. (2008) show the importance of choosing the optimal strategy for achieving organizational goals. The strategy should be tightly integrated with business processes (Spanyi, 2003, 2005; Ndede-Amadi, 2004, Brocke & Rosemann, 2010, Kohlbacher & Gruenwald, 2011). Strategic goals are achieved by business processes, which create a new value for the company with their feedback. The mere implementation and operational execution of the strategy inevitably depend on the processes and their interactions with other organization elements.

Hernaes et al. (2012) conducted empirical verification of a model with four hypotheses. The first hypothesis argued that the strategic approach towards business process management positively affects implementation of the process performance measurement. The second one analyzes the impact of business performance measures on non-financial performance and the third - impact of business process measures on financial performance. The fourth hypothesis explored association between the non-financial and financial performance. Analyzing the research results and observing the path model, the authors concluded there was a significant statistical correlation and influence of all specified constructs, apart from the influence of process performance measures on financial performance. Statistics also confirmed the impact of business process management, human resources management and management of external stakeholders on non-financial performance.

Pavlov and Bourne (2011) studied impact assessment of implementation of performance measures. It revealed that the problem of measuring organizational effectiveness through the dynamics of organizational processes was poorly understood among managers. This is also supported by the research, conducted by Lynch and Cross (1995), who found poor integration of efficiency measures and business process measures.

Taticchi et al. (2010) proposed a modification of performance measures and a model of business process management, as to enable organizations to identify the process influence within the relationship among core business processes that.

These studies confirm the specificity in selecting critical success factors for the organization, as key factors for achieving direct non-financial and indirect financial benefits for the organization in relation to its competitors. The impact on improving the financial results is indirectly realized through non-financial operations, which indicates that business organizations should periodically review the selected critical success factors. Almost all empirical studies, mostly support the hypothesis that the process-oriented organizations achieve better non-financial performance, and, potentially, through an indirect influence, better financial results, as well.

5. MODEL OF THE IMPACT OF BUSINESS PROCESS CHANGE ON ORGANIZATIONAL PERFORMANCE

The starting point for developing a model of the impact of business process changes on organizational performance can be found in the results of previous

theoretical and empirical research. When developing the model, the author's idea was based on connecting indicators of critical success factors of business process changes with the business process performance that are expressed by internal and external criteria.

The conceptual model, used in this study, has been created from previously mentioned research and demonstrated by the following figure.

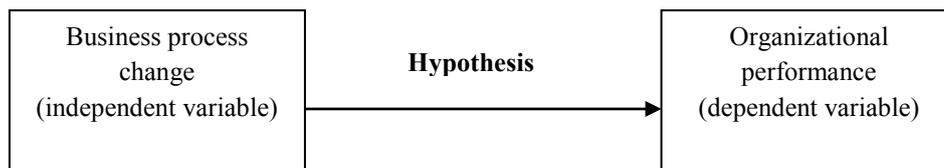


Figure 1. The conceptual model of the impact of business process changes on organizational performance

The hypothesis for this research presupposes the positive relationship between the two variables from the conceptual model and can be stated as follows:

Hypothesis: Business process changes positively affect organizational performance of large companies.

The operationalization of both variables has been influenced by the theoretical reflections and the model proposed by Buble et al. (2010). By operationalizing the first construct in the model (business process change), the indicators selected are the ones considered stable and unique in each business organization¹. The second construct describes the indicators of organizational performance that represent the dependent variable of the proposed models. The second construct includes indicators for measuring customer satisfaction and financial performance, while these indicators are directly influenced by indicators that have been selected as critical success factors of business organizations.

The independent variable has been operationalized on the basis of previously empirically verified critical success factors (CSFs) for business process change (Jeston and Nelis, 2006). These critical success factors, related to managing business process change, include:

¹A conceptualization by Jeston and Nelis (2006) is used.

- change leadership,
- impact of business process managers,
- connection with the organizational strategy,
- process architecture,
- the structural approach to implementing BPM,
- the impact of human factors on change management,
- people and empowerment,
- initiating and finalizing project activities,
- performance sustainability,
- actual value,
- the level of development of information technologies.

The dependent variable is defined by indicators of organizational performance. Indicators of financial performance are consulted from publicly available data on large companies' performance. The fundamental choice of revenue as the indicator of financial performance can be justified by the research context. Namely, empirical research was conducted during the economic crisis, which greatly affected the financial performance of companies and their stability, and in particular the reported profits (or losses). In such an economic environment, revenue was considered to be the most stable measure of financial performance, while other indicators are, to a greater extent, subject to fluctuations and activities of financial decisions and accounting policies.

At the other hand, the customer satisfaction was considered to be the fundamental nonfinancial dimension of performance. It was operationalized using the Szwarc's model (2005).

The model is based on three key elements, taking into consideration the perception of product quality, service, customer satisfaction, and the way customer complaints are managed. Indicators in this construct emphasize managerial perception to get answers about the perception of product quality, service, customer satisfaction and the way customer complaints are managed. The level of customer satisfaction was measured by total customer satisfaction with business companies, how often a promise was fulfilled on time and whether services were provided when the customer first required it, meeting the expectations that customers have of the companies and their business concerning the courtesy, willingness for help, kindness, working as a team, being accessible and trustworthy.

6. RESEARCH RESULTS

Empirical research was carried out on the population of large companies, i.e. those employing more than 250 employees (as prescribed by the simplified European accounting standards). The companies included into the bankruptcy proceedings, bankruptcy or liquidation were not included. There were 359 such companies, identified in the database of the Croatian Chamber of Commerce. Out of those, 150 companies were chosen, by using the Excel-based random choice procedure.

During the first round of the survey, the questionnaires were sent by postal mail to the companies included in the sample. The questionnaires were addressed to the CEOs of the non-responding companies in the second round of research. In addition, the non-respondents were also contacted by phone and asked to fill out an online version of the questionnaire, which was sent by e-mail. At the end of the survey, all 150 planned questionnaires were returned. Data analysis was conducted by SPSS. The value of Cronbach's alpha ranges from 0 to 1. It is generally considered that, if the value of this coefficient is above 0.7, the internal consistency of a set of statements can be considered acceptable. In Table 4, it can be seen that all the statements meet the criteria of internal consistency.

Table 4. Cronbach's alpha values

Item groups	Cronbach's alpha	Number of items
Organizational changes	0.749	14
Business process changes	0.843	13
Business process performance	0.770	5
Customer satisfaction	0.789	3

Source: Research results.

Considering that the analysis resulted in four latent variables (factors) whose structure is identical to the theoretical assumptions, the factor analysis confirmed that the theoretically conducted grouping of variables is empirically acceptable. Below are the results of the analysis, which shows the details of empirical grouping of individual particles of the questionnaire into latent variables (factors). The analysis also points that statistical prerequisites for the exploratory factor analysis are met, since the Kaiser-Meyer-Olkin (KMO) measure of sample adequacy exceeds 0.60 and Bartlett's test of sphericity is statistically significant ($p = 0.000$).

Table 5. KMO and Bartlett's tests for extracted factors

Kaiser-Meyer-Olkin measure of sampling adequacy	0.687	0.804	0,654	0.751
Bartlett's test (χ^2)	952.038	789.389	245.909	67.684
Significance	0.000	0.000	0.000	0.000

The factor structure is identical to the theoretical assumptions, which makes it evident that this the latent variable (factor) synthesizes individual items, referring to general characteristics of organizational changes (see Table 6).

Table 6: Factor loadings (organizational change factor)

The explained variance and factor structure	
Total explained variance	65.7%
Factors structure (variable)	Factor 1
Management successfully plans and leads the changes.	0.709
Managers at lower levels responsible for the implementation and change management in the organization are appointed.	0.597
Individuals and/or teams are formally in charge of implementing change in the organization.	0.755
Such individuals and /or teams have at their disposal authority and resources necessary to implement the required changes	0.660
Assessment of how appropriate is the organizational structure	0.511
Assessment of how appropriate is the technical (manufacturing) process and its management.	0.650
Assessment of how appropriate is the allocation of funds, powers, and responsibilities.	0.490
Assessment of how appropriate is the reward and promotion system.	0.551
Assessment of how appropriate are values, attitudes, beliefs and motivation.	0.560
Frequency of changes in organizational structure	0.728
Frequency of changing the technical (manufacturing) process and its management	0.646
Frequency of changing the allocation of funds, powers, and responsibilities	0.584
Frequency of changing the reward and promotion system	0.652
Frequency of changing the values, attitudes, beliefs and motivation	0.688

Source: Research results.

Empirical analysis confirmed that the extracted latent variable (factor) explains a significant part of the variance of individual (involved) items, which is demonstrated by individual factor loadings, presented in Table 6 (which

typically exceed the experiential limit value of 0.5). The extracted factor explains 65.7% of the total variance, which is considered satisfactory for its values to be used in further statistical analysis.

For the second factor, factor loadings appropriately represent the theoretically ‘logical’ group of items, related to business process changes (see Table 7). The factor explains 65.7% of the total variance, which is a satisfactory result, enabling the use of factor score in further statistical analysis.

Table 7. Factor loadings (business process change factor)

The ratio of explained variance and factor structure	
Total explained variance	67.8%
Factor structure (variable)	Factor 2
Top management support in assessing the existing business processes	0.664
The quantity and quality of information for modeling the new business processes	0.703
The involvement of employees and other stakeholders in assessing existing business processes	0.513
The quantity and quality of knowledge and experience of those conducting the modeling of new business processes	0.680
Quantity and quality of information to assess existing business processes	0.457
Understanding the concept of business process management (BPM) and its potential impact on business results (by employees) is present	0.829
The quantity and quality of knowledge and experience of those conducting the assessment of the existing business processes	0.682
Employees are trained on the implementation of business processes and business process management	0.689
Top management support in modeling new business processes	0.729
Teamwork of employees within the existing business processes	0.628
The involvement of employees and others interested in modeling new business processes	0.617
Present incentive to change the existing or introduce new processes because of customer demands or increase in quality	0.705
Present incentive to change the existing or to introduce new processes because of the need to implement modern information technology	0.653

Source: Research results

The third factor brings into the analysis a special form of performance, which is relate to performance of business processes (according to the theoretical explanation of the items included into the factor). It is notable that the variance of all items is explained to a very large extent by the extracted latent variable (factor), with 72.48% of the total variance, which is very satisfactory.

Table 8. Factor loadings (business process performance factor)

Ratio of the explained variance and factor structure	
Total explained variance	72.48%
Variable	Factor 3
Costs of the existing business processes	0.704
Revenues generated by the existing business processes connected to the market	0.790
The run-time execution of the existing business processes (from the first to the last operation)	0.684
The dynamics of the average number of units flowing through the process in a unit of time (dynamics of the process flow)	0.734
The amount of inventories (materials and parts, semi-products and finished products) in the context of the existing business processes	0.99

Source: Research results.

The fourth extracted factor groups the items, which can be interpreted in terms of customer satisfaction, as the selected indicator of nonfinancial performance. As demonstrated by Table 9, the fourth extracted factor explains 78.69% of the total variance, which is very satisfactory. As in previous cases, the variance explained makes a good case for the further use of factor scores.

Table 9. Factor loadings (customer satisfaction performance factor)

Ratio of the explained variance and factor structure	
Total explained variance	78.69%
Variable	Factor 4
Total customer satisfaction with business (fulfillment of promises on time and providing services when first requested by the customer)	0.728
Meeting the expectations that the customers have of the company and its business, concerning the courtesy, willingness to help, kindness, furnishing and equipment, accessibility and trust	0.792
Not meeting the idea of the ideal company, that would fulfill all customer expectations (even if it were unprofitable, or even realistically possible)	0.808

Source: Research results.

Further analysis will determine whether there is a correlation between the values of factor scores for the previously described four factors (latent variables). It indicates that the theoretically set model is relevant. The result is correlation matrix, shown in Table 10, which demonstrates that all latent variables are mutually correlated, with the Pearson's correlation coefficient statistically significant at the level of 0.001 ($p < 0.001$), which demonstrates the existence of statistically relevant relationships.

Table 10. Linear correlation among extracted factor scores and financial performance

		Org. change factor	Business process change factor	Business process performance factor	Customer satisfaction factor	Financial performance
Organizational change factor	Pearson's coefficient	1	0.6	0.568	0.683	0.585
	Sig.		0.000	0.000	0.000	0.000
	N	150	150	150	150	150
Business process change factor	Pearson's coefficient		1	0.501	0.601	0.625
	Sig.			0.000	0.000	0.000
	N		150	150	150	150
Business process performance factor	Pearson's coefficient			1	0.758	0.758
	Sig.				0.000	0.000
	N			150	150	150
Customer satisfaction factor	Pearson's coefficient				1	0.440
	Sig.					0.000
	N					150

Source: Research results.

It should be noted that the choice of revenue as the indicator of financial performance has been previously discussed.

After the correlation analysis, the regression analysis was conducted. Since the correlation analysis does not determine the direction of the relationship, but only shows its existence, it was useful to make the preliminary test on the direction of the relationship, as to provide a general test of the conceptual model.

Considering that the discussed previous studies did not show a convincing relationship between financial performance and business process management/orientation, customer satisfaction was tested as the selected indicator of non-financial performance. Table 11 shows the results of the analysis, in which extracted factors are predictors of customer satisfaction.

Table 11. Regression of customer satisfaction

R	Coefficient of determination	Adjusted coefficient of determination
0.548	0.300	0.286

Source: Research results.

The results in Table 11 indicate that the predicted model explains quite a tolerable level of variance, which confirms the initial choice of independent and dependent variables. In addition, the regression model is statistically significant (empirical value of F test is 20.8532, with a significance level of less than 1%, i.e. $p = 0.000$, as demonstrated by Table 12).

Table 12. Analysis of variance

Variation source	Sum of squares	Degrees of freedom	Estimation of variance	F	Sig.
Interpreted part	44.694	3	14.898	20.853	0.000
Not-interpreted part	104.306	146	0.714		
Total	149.000	149			

Source: Research results.

In Table 13, it can be noticed that the regression coefficients for the two predicted dependent variables (represented by factor scores, calculated on the basis of the previous factor analysis), are statistically significant (at the level of 1%, i.e. $p < 0.01$). The only predictor that was not confirmed as statistically significant ($p > 0.05$), relates to the business process performance, which might point out to problems in achieving business process performance and the contribution of process to organizational performance.

Any possible multicollinearity (multiple correlation) of dependent variables was examined, as well. Tolerance as a measure of multicollinearity always appeared to be less than 0.20, so it can be concluded that this statistical prerequisite for the implementation of regression analysis was completely met.

Table 13. Regression coefficients test

Independent variables	Non- standardized coefficients		Standardized coefficients	t	Sig.
	Parameter estimation	Standard error	Beta		
Constant	-8.245E-17	0.069		0.000	1.000
Organizational change factor	0.247	0.094	0.247	2.639	0.009
Business process change factor	0.292	0.096	0.292	3.048	0.003
Business process performance factor	0.096	0.082	0.096	1.173	0.243

Source: Research results.

After that, regression analysis with revenue, as a measure of financial performance and as an independent variable, was conducted, but the results were not statistically significant. It was not unusual considering that previous research pointed out to problems of establishing relationships between business process-based constructs and financial performance, but provided very reliable results, related to business process influence on non-financial performance.

Discriminant analysis was used, as to test the strength of the extracted factors, in terms of classifying companies into those with below average or above average revenue (as the indicator of financial performance). Median revenue of all the surveyed companies over three years (2009-2011) was used as an average and the results are shown in Table 14.

Table 14. Results of discriminant analysis

The test of mean difference	Wilks' Lambda	F	df1	df2	Sig.
Organizational change factor	0.970	4.536	1	148	0.035
Business process change factor	0.947	8.206	1	148	0.005
Business process performance factor	0.977	3.531	1	148	0.062

Source: Research results.

For organizational changes and business process changes, discriminant function is significant: at the 5% level ($p = 0.035$) for organizational changes, and at the 1% level ($p = 0.005$) for business process changes. Therefore, the

above mentioned variables are verified as independent variables in the research model. The same cannot be said for the business process performance factor, since it is not statistically significant ($p > 0.05$).

Table 15 shows strong correlations among factor scores for latent variables and the corresponding discriminant functions. Given that the minimum empirical value of this ratio is 0.3, which shows that all variables could be empirically verified as adequate predictors of financial performance, because of their predictive strength, in terms of classifying companies into groups with different levels of financial performance.

Table 15. Structure matrix

Variable	The correlation coefficient with the discriminant function
Organizational change factor	0.977
Business process changes factor	0.726
Business process performance factor	0.641

Source: Research results.

It is obvious that of all the observed factors (as potential predictors/independent variables), the most important one is the business process changes factor. According to the structure matrix in Table 15, business process change factor is the most important criterion in classifying companies into groups with below- and above-average financial performance. It is followed by the organizational changes factor and business process performance factor.

Classification table (Table 16) indicates a high reliability of the analysis. Based on the three extracted factors, 85.3% of companies were correctly classified, which is considered satisfactory. The prediction rate of belonging to a group of companies with below average revenue is 84%, and to those with above average revenue is 86.7%.² It can be concluded that companies with below average revenue and those with above average revenue differ significantly with regard to the extracted factors. The obtained results of statistical analysis prove that the three extracted factors significantly affect the financial performance of the company, as well as the classification of companies into those below the median revenue and those above the median revenue (85.3% of correctly classified companies).

² "0" denotes companies with revenue lower than median, and "1" those higher than median.

Table 16. Results of classification of companies by discriminant analysis

		Three-year revenue	Belonging to a group according to the model		Total
			0	1	
Belonging to a group	N	0	63	12	75
		1	10	65	75
Belonging to a group	%	0	84.0	16.0	100.0
		1	13.3	86.7	100.0

Source: Research results.

7. CONCLUSION AND RESEARCH LIMITATIONS

The presented results of statistical analysis have demonstrated that, on the selected sample of large Croatian companies, *the proposed theoretical model can be verified and the hypothesis on the relationship between business process change and performance should be accepted*. Such a conclusion is based on:

- statistically significant results of the correlation analysis, verifying the existence of relationships among the analyzed variables;
- empirical verification of the proposed independent variables (except for business process performance) in terms of predicting non-financial organizational performance (measured by customer satisfaction);
- empirical verification of the proposed independent variables (except for business process performance) in terms of predicting financial organizational performance (measured by revenue).

The construct of business process performance has been extracted from the survey items by means of exploratory factor analysis, but it has not been empirically validated, as contributing either to financial, or non-financial performance. Nevertheless, it is strongly correlated to all other constructs, which requires that it should be empirically studied in the future. Another limitation of this study is the fact that it was conducted only in Croatia, so a comparative analysis of practices in other countries, on the basis of the selected indicators, needs to be done in the future. Regardless of the constructs of the model and their validity, the objectivity of responses has to be taken into account. Since managers' perceptions were analyzed by the questionnaire, it is possible that the managers' evaluation was subjective. Namely, the survey respondents sometimes perceive the situation in their companies to be better than it usually is. The second reason might be related to inadequate knowledge

and understanding of the items included into the questionnaire. It should be also noted that the period of data collection corresponded to the prolonged economic crisis, which has influenced the company performance.

REFERENCES

1. Bosilj Vukšić, V., Hernaus, T., Kovačić, A. (2008): *Business process management*, Školska knjiga, Zagreb.
2. Buble, M. et al. (2010): *The impact of organizational variables on the success of the program for improving business processes (Empirical research)*, Faculty of Economics Split, Split
3. Buble, M. (2006): *Management*, Faculty of Economics Split, Split
4. Chang, J. F. (2006): *BPM Systems*, Auerbach Publication, New York
5. Davenport, T. H. (1993): *Process innovation: Reengineering work through information technology*, Harvard Business School Press, Boston
6. Davis, R., Brabander, E. (2007): *ARIS Design Platform-Getting Started with BPM*. Springer, Berlin
7. Enos, D. E. (2007): *Performance Improvement, Making it happen*, 2nded. Auerbach Publications, New York
8. Franceschini, F., Galetto, F., Maisano, D. (2007): *Management by Measurement*, Springer, Berlin
9. Garvin, D. (1993): Building a learning organization. *Harvard Business Review*, July-August. Retrieved from: <https://hbr.org/1993/07/building-a-learning-organization> (Accessed 12 March 2014)
10. Geršak, P. (2005): *Management poslovnih procesov*, Ekonomska fakulteta, Univerza v Ljubljani, Ljubljana
11. González, L. S., Rubio, F. G., González, F. R., Velthuis, M. P. (2010) Measurement in business processes: a systematic review, *Business Process Management Journal*, 16 (1), pp.114 - 134
12. Hammer, M., Champy, J. (2004). *Reengineering the Corporation: A Manifesto for Business Revolution*, Harper Collins Publishers, New York
13. Harmon, P. (2007): *Business Process Change*, 2nd ed., Elsevier, Oxford
14. Hernaus, T. (2006): *Transformacija klasične organizacije u organizaciju orijentiranu na poslovne procese*, Master's thesis, Faculty of Economics Zagreb, Zagreb
15. Hernaus, T., Pejić Bach, M., Bosilj Vukšić, V. (2012). Influence of strategic approach to BPM on financial and non-financial performance, *Baltic Journal of Management*, 7 (4), pp. 376 – 396.
16. Hoque, Z., James, W. (2000): Linking Balanced Scorecard Measures to Size and Market Factors: Impact on Organizational Performance, *Journal of Management Accounting Research*, 12 (1), pp. 1-17.

17. Jeston, J., Nelis, J. (2006): *Business Process Management*, Elsevier, Oxford
18. Kohlbacher, M., Gruenwald, S. (2011): Process orientation: conceptualization and measurement, *Business Process Management Journal*, 17 (2), pp. 267-283.
19. Lindfors, C., Leiringer, R. (2002). Creating Lean Enterprises Through Process Orientation, Miami, *Proceedings of the First International Conference on Construction in the 21 st Century (CITC2002): Challenges and Opportunities in Management and Technology*, 25-26 April, Miami (FL)
20. Lynch, R. L., Cross, K. F. (1995): *Measure Up! – Yardsticks for Continuous Improvement*, Blackwell Business, Cambridge
21. McCormack, K.P., Johnson, W.C. (2001): *Business Process Orientation-Gaining the E-Business Competitive Advantage*, St. Lucie Press/CRC Press, Boca Raton (FL)
22. Ndede-Amadi, A.A. (2004). What strategic alignment, process redesign, enterprise resource planning, and e-commerce have in common: enterprise-wide computing, *Business Process Management Journal*, 10 (2), pp 184-199.
23. Neely, A. (Ed.) (2004): *Business performance measurement: Theory and practice*, Cambridge University Press, Cambridge.
24. Ohtonen, J., & Lainema, T. (2011): *Critical Success Factors in Business Process Management*, Turku School of Economics. Retrieved from: http://janne.ohtonen.fi/uploads/file/iris2011_submission_9.pdf (Accessed 12 March 2014)
25. Parmenter, D. (2010): *Key Performance Indicators-Developing, implementing and Using Winning KPIs*, John Wiley & Sons Inc., New Jersey
26. Pavlov, A., Bourne, M. (2011): Explaining the effects of performance measurement on performance: an organizational routines perspective. *International Journal of Operations & Production Management*, 31 (1), pp. 101–122.
27. Pike, J., & Barnes, R. (1994): *TQM in Action*. Chapman & Hall, London & New York
28. Spanyol, A. (2005): Strategy and BPM in Towers, S., Fingar, P, (Eds), In Search of BPM Excellence, Meghan-Kiffer Press, Tampa
29. Szwarc, P. (2005): *Researching Customer Satisfaction and Loyalty*. MRS, London
30. Škrinjar, R., Indihar Štemberger, M., Hernaus, T. (2007): The Impact of Business Process Orientation on Organizational Performance, *Proceedings of the 2007 Informing Science and IT Education Joint Conference*,

- Retrieved from: <http://proceedings.informingscience.org/InSITE2007/InSITE07p171-185Skri357.pdf> (Accessed February 5, 2015)
31. Škrinjar, R., Bosilj Vukšić, V., Indihar Štemberger, M. (2008): The impact of business process orientation on financial and non-financial performance, *Business Process Management Journal*, 14 (5), pp. 738-754.
 32. Škrinjar, R., Trkman, P., (2013), Increasing process orientation with BPM: Critical practice, *International Journal of Information Management*, 33, pp. 48-60.
 33. Škrinjar, R., Bosilj Vukšić, V., & Indihar Štemberger, M. (2008): The impact of business process orientation on financial and non-financial performance. *Business Process Management Journal*, 14 (5), pp. 738-754.
 34. Taticchi, P., Tonelli, P., & Cagnazzo, L. (2010): Performance measurement and management: a literature review and a research agenda. *Measuring Business Excellence*, 14 (1), pp. 4-18.
 35. Valentine, R., & Knights D. (1998); TQM and BPR — can you spot the difference? *Personnel Review*, 27 (1), pp. 78–85.
 36. Vom Brocke, J. & Rosemann, M. (Ed) (2010): *Handbook on Business Process Management 2: Strategic Alignment, Governance, People and Culture*, Springer, Berlin
 37. Womack, J. P., Jones, J., T. (1996): *Lean Thinking: Banish Waste and Create Wealth in Your Corporation*, Simon & Schuster, New York

DJELOVANJE PROMJENA POSLOVNIH PROCESA NA REZULTATE POSLOVANJA U VELIKIM PODUZEĆIMA: HRVATSKI SLUČAJ

Sažetak

Cilj ovog rada je formiranje modela djelovanja poslovnih procesa na organizacijske performanse velikih poduzeća. U modelu se u obzir posebno uzima djelovanje kritičnih čimbenika uspjeha. Pokazano je da se promjene poslovnih procesa, mjerene pomoću kritičnih čimbenika uspjeha, djeluju na organizacijske performanse, iskazane kroz zadovoljstvo kupaca i financijske performanse poduzeća. Empirijski je validirana veza između prethodnih varijabli, kao i predloženi istraživački model.