

Indexing on:  
INDEX COPERNICUS  
INTERNATIONAL

Vol. 22, No. 2

**2017**

ISSN 2334-6191 (Online)

UDC 005.21

University of Novi Sad  
Faculty of Economics in Subotica

# Strategic management

International Journal of  
Strategic Management and  
Decision Support Systems  
in Strategic Management

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International Journal of Strategic Management and  
Decision Support Systems in Strategic Management

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<b>Publisher</b>	University of Novi Sad, Faculty of Economics in Subotica Segedinski put 9-11, 24000 Subotica, Serbia Tel: +381 24 628 000 Fax: +381 546 486 <a href="http://www.ef.uns.ac.rs">http://www.ef.uns.ac.rs</a>
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<b>Proofreading</b>	Institut za strane jezike ad Beograd
<b>Prepress</b>	Milivoje Grahovac
<b>Print</b>	Pressia d.o.o., Belgrade, Serbia
<b>Circulation</b>	200  The Journal is published quarterly.

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International Journal of Strategic Management and  
Decision Support Systems in Strategic Management

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ISSN 1821-3448, UDC 005.21

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# Strategic Management

International Journal of Strategic Management and  
Decision Support Systems in Strategic Management

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[www.ef.uns.ac.rs/sm](http://www.ef.uns.ac.rs/sm)

ISSN 1821-3448  
UDC 005.21  
2017, Vol. 22, No. 2

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# Changing Work Engagement: The Longitudinal Effect of a Job Redesign Intervention Among Public Sector Employees

**Tomislav Hernaus**

Faculty of Economics and Business, University of Zagreb, Croatia

**Maja Tadić Vujčić**

Ivo Pilar Institute of Social Sciences, Zagreb, Croatia

**Ana Aleksić**

Faculty of Economics and Business, University of Zagreb, Croatia

## Abstract

Work or employee engagement might be increased through job re-design interventions such as top-down managerial interventions, bottom-up job crafting or bipolar ideals. However, there is a lack of specific understanding how public-sector employees react on specific top-down interventions aimed for increasing their vigor, dedication and absorption. In order to gain more insight into how a top-down (managerial) job re-design intervention could foster work engagement, we conducted a four-wave longitudinal diary study on the sample of white-collar employees and their respective supervisors from two public-sector organizations. Specifically, we explored the effect of the managerial job redesign intervention on public-sector employee work engagement between baseline (T1) and post-intervention (T4). We tested a multiple mediator-single outcome model in which a job design intervention influences work engagement by changing multiple job characteristics. Finally, we also checked for the extent to which change in work engagement can be explained by specific changes in certain job characteristics. Our results showed that work engagement of public-sector employees may also be enhanced by redesigning their jobs through a managerial job re-design intervention. Additional insights regarding work engagement and job re-design of public sector employees are given.

## Keywords

Work engagement, job design, job interventions, public-sector employees.

## Introduction

Work or employee engagement is a desired, fulfilling affective-cognitive state of mind that is closely associated with employee well-being and performance (e.g. Christian, Garza, & Slaughter, 2011). According to the job demands-resources (JD-R) model (e.g. Demerouti, Bakker, Nachreiner, & Schaufeli, 2001), work engagement is driven by the motivating potential of jobs (Schaufeli, Salanova, González-Romá, & Bakker, 2002) and might be increased through job re-design interventions such as top-down managerial interventions, bottom-up job crafting or bipolar

ideals. These planned change initiatives aim to change job characteristics as a means of enhancing employee outcomes (Parker & Wall, 1998). While proactive and employee-led approaches to changing jobs are currently under the spotlight, we have somewhat neglected the original, top-down (managerial) perspective of job design in organizations through which supervisors formally shape work environment for their subordinates by setting targets, describing job tasks, and providing resources (e.g. Bakker & Demerouti, 2016).

Organizations still predominantly empower supervisors (managers) to plan, organize and control the work of their direct reports (employees).

This might be particularly true for public-sector organizations which use less advanced human resource management (HRM) practices than private companies (e.g. Vanhala & Stavrou, 2013). While we have certain knowledge about managerial job/task design change efforts (e.g. Griffin, 1991; Hackman, Pearce, & Wolfe, 1978; Morgeson & Campion, 2002; Nielsen, 2013), there is a lack of specific understanding how public sector employees – who possess a greater desire for intrinsic nonmonetary opportunities than their private counterparts (Giaque, Anderfuhren-Biget, & Varone, 2013) – react to specific top-down interventions aimed for increasing their vigor, dedication and absorption.

The recent, pioneering meta-analysis of the effectiveness of work engagement interventions (Knight, Patterson, & Dawson, 2016) witnessed the steady emergence of this research stream and revealed a small, positive, but reliable effect of work engagement interventions on work engagement. However, the sustainability of these effects is unclear, sample size was low, and different intervention types were examined together thus not allowing making conclusions about type-specific effects. Nevertheless, their meta-analytical review highlighted the need for conducting and examining more work engagement interventions. What we currently need is a broader array of both theoretically- and empirically-driven research into how to better engage public sector employees by making necessary job-related changes. Moreover, the possibility that employees change their behavior in response to the content and demands of their jobs, suggests the need for dynamic versus static models of job design (e.g. Clegg & Spencer, 2007).

## 1. Theoretical framework and hypothesis development

Managerial job re-design is a strategy that managers might use on a regular basis making adjustments and alterations to jobs to fit business requirements with employees' needs and skills (Oldham & Fried, 2016). An implementation of a job re-design intervention in public sector organizations could positively affect job characteristics and employees' work engagement. Bearing in mind that higher levels of work engagement can be positively associated with work performance (e.g. Bakker & Bal, 2010), putting effort into evaluating, fostering, and sustaining work engagement should be of special interest to public sector organizations.

In order to gain more insight into how a top-down (managerial) job re-design intervention could foster work engagement, we conducted a four-wave longitudinal diary study on the sample of white-collar employees and their respective supervisors from two public-sector organizations. Specifically, we explored the effect of the managerial job re-design intervention on public sector employee work engagement between baseline (T1) and post-intervention (T4). In addition, we tested a multiple mediator-single outcome model in which a job design intervention influences one type of employee outcome (i.e. work engagement) by changing multiple job characteristics (see Holman, Axtell, Sprigg, Totterdell, & Wall, 2010). Finally, we also checked for the extent to which change in work engagement can be explained by specific changes in certain (enacted) job characteristics.

The managerial job re-design intervention was implemented as combination of a job resource building and leadership training interventions (Knight et al., 2016). It aimed to enable managers to transfer specific knowledge and skills to their employees, and to foster job and personal resources building among them. In this way, this intervention assisted and empowered managers and employees to modify a particular set of job characteristics (dominantly the enacted ones) and better align them with their job requirements, interests, and skills. Stated in a more formal way, we formulate our first hypothesis:

*H1: Managerial job re-design intervention modifies (enacted) job characteristics of public sector employees.*

Furthermore, previous studies revealed that managerial job re-design interventions can foster work engagement, particularly in group settings (Knight et al., 2016). When employees in public sector organizations experience appropriate support and acknowledgement from their managers, this can not only modify some of their job characteristics, but also positively affect the levels of their work engagement (Giaque et al., 2013). Specifically, managerial job re-design activities can modify job characteristics (Schaufeli & Bakker, 2004) to better suit their employees' capabilities and aspirations, which, in turn, can stimulate and energize employees and make their work more meaningful. We present these notions in our second and third hypothesis:

*H2: Managerial job re-design intervention increases public sector employee work engagement*

*H3: Change in job characteristics is positively associated with change in public-sector employee work engagement.*

## 2. Methodology

### 2.1. Research design

We conducted a non-participative managerial job re-design intervention in which changes are imposed on the job holder by their supervisors. Survey data were collected in four time points across six months starting from the pre-intervention measurement (T1), and followed by three post-intervention measurements (T2, T3 and T4). Pre-intervention measurement was aimed at recognizing the current state of the public-sector job design. Employees were asked to complete the on-line questionnaire and provide perceptual values of their job characteristics. Two months later, the managerial job re-design intervention started with training workshops organized for 20 direct supervisors. In-house workshops introduced the research topic to participants and briefed them about the pre-intervention measurement results. In addition, job re-design intervention opportunities have been explained and necessary instructions were given to conduct one. For this purpose, we slightly adapted the original Job Crafting Exercise (Berg, Dutton, & Wrzesniewski, 2008) by taking a managerial perspective to job-design changes.

After completing the workshop, managers had a one-month time period for reflection and to think about potential job re-design intervention actions for each of their subordinates. Supervisors were given responsibility to actually design and implement job re-design changes in the following two months. Four weeks after supervisors started to introduce employees' job-related changes, an on-line post-intervention measurement with two follow-ups were administered. Employees completed the same job-design questionnaire throughout three consecutive weeks thus enabling us to study step-wise effects of the planned intervention on job characteristics and work engagement within the public-sector workforce.

Research design is graphically presented in Figure 1.

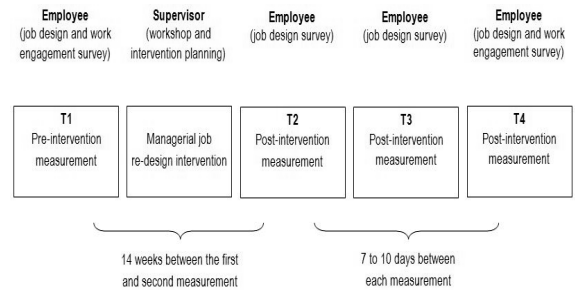


Figure 1 Research design

### 2.2. Organizational context and participants

The study initially encompassed 65 white-collar employees and 20 supervisors from two Croatian public sector organizations providing administrative and professional services. Employees who had more than six months of job tenure received an e-mail invitation via SurveyMonkey to participate in the survey. From a total number of 65 full-time employees, we received all responses at T1, giving a 100% response rate. However, repeated questionnaire rounds resulted in sample size decrease (T2 – 83.1%; T3 – 80.0%) so that at T4 there were 50 participants (the final response rate of 76.9%). Our sample was strongly gender-biased (92% of women), representing a highly educated workforce (88.0%) that was on average younger than 40 years old ( $M = 37.06$ ;  $SD = 7.28$ ). All supervisors participated in the workshop and promised to implement necessary job-related changes that could boost their employees' work engagement.

### 2.3. Measures

The employee-reported measures of chosen job characteristics were taken from the Work Design Questionnaire (WDQ), a comprehensive instrument and a general measure of job design originally developed and validated by Morgeson and Humphrey (2006). Employees were asked to indicate the extent to which they agreed or disagreed with statements (5-point Likert-type scale) related to the nature of their jobs. We gathered their self-perceptions because there is strong evidence that employee self-ratings are congruent with objective job features (Fried & Ferris, 1987). Although we used previously validated measures, a translation/back translation procedure was applied. In addition, the questionnaires were pre-tested for reliability and the Cronbach's alpha values at each point of measurement (see Table 1) were clearly above the acceptable level of .60 (Kline, 2000).

Work engagement was measured with the Utrecht Work Engagement Scale (UWES) developed by Schaufeli et al. (2002). We also controlled for employee gender, employee age, supervisor gender, and supervisor age. All dependent and independent measures were based on employee self-perceptions.

### 3. Results

Table 1 shows descriptive results (means and standard deviations) for perceived job characteristics at four different time points (T1-T4), and for work engagement as a dependent variable at the starting and ending point. In addition, the statistically significant results of the paired sample t-tests (T1-T2, T1-T3 and T1-T4) are marked with asterisk(s). Whereas the majority of job characteristics examined had a negative or constant time trend (except of work autonomy), findings reflected no significant mean change in job complexity, information processing, role ambiguity and task variety, thus confirming their stability.

On the other hand, the largest absolute mean change ( $M_{T1} - M_{T4}$ ) was -.25 for both task identity and supervisor support. Other significant mean changes from T1 to T4 were -.20 for task significance and workload, and -.18 for task interdependence. Obviously, employees have acknowledged the job re-design intervention delivered by their supervisors, which eventually led to certain changes in one's perception of their job characteristics. These changes were step-wise in nature and did not happen simultaneously for different (enacted) job characteristics. Specifically, in step 1 (T1 → T2) significant downward change was reported for task interdependence and workload; step 2 (T2 → T3) was labeled with considerable decrease in task identity; and step 3 (T3 → T4) was completed by noticeable decline in task significance and supervisor support. These episodic findings confirmed our first hypothesis that a managerial job re-design leads to significant changes in employee (enacted) job characteristics.

**Table 1** Descriptive statistics and scale reliability measures at each time point (T1-T4)

Study variables	Pre-intervention measurement			Post-intervention measurement									Period of change
	T1			T2			T3			T4			
	M	(SD)	α	M	(SD)	α	M	(SD)	α	M	(SD)	α	
Task interdependence	3.76	(.87)	.944	3.49**	(.74)	.900	3.54**	(.72)	.904	3.58*	(.79)	.910	T1 → T4
Job complexity	3.54	(.80)	.807	3.60	(.72)	.789	3.51	(.66)	.747	3.46	(.78)	.825	stable
<b>Job demands</b>													
Information processing	4.41	(.59)	.771	4.33	(.50)	.811	4.31	(.51)	.781	4.32	(.52)	.820	stable
Role ambiguity	3.71	(.70)	.891	3.78	(.61)	.846	3.78	(.62)	.866	3.71	(.63)	.614	stable
Workload	3.36	(.73)	.670	3.19**	(.64)	.717	3.18*	(.59)	.623	3.16**	(.58)	.877	T1 → T4
Work autonomy	3.57	(.79)	.846	3.77**	(.73)	.874	3.77*	(.62)	.835	3.68	(.55)	.733	T1 → T3
Task variety	4.42	(.64)	.941	4.30	(.64)	.883	4.37	(.60)	.953	4.38	(.50)	.962	stable
<b>Job resources</b>													
Task identity	3.94	(.64)	.868	3.85	(.72)	.898	3.66***	(.70)	.931	3.69***	(.55)	.850	T2 → T4
Task significance	3.59	(.90)	.937	3.49	(.76)	.902	3.46	(.82)	.953	3.39*	(.79)	.968	T3 → T4
Supervisor support	4.17	(.75)	.870	4.09	(.84)	.885	4.04	(.81)	.883	3.92**	(.78)	.885	T3 → T4
<b>Work engagement</b>	3.47	(.74)	.923	-	-	-	-	-	-	3.65**	(.61)	.912	T1 → T4
<b>F-test value</b>	1.667			-			-			2.314			-
<b>Adj R<sup>2</sup></b>	.122			-			-			.215**			-

**Note:** Statistically significant results of the paired samples t-test are shown with the following asterisk(s): \* p < .10 ; \*\* p < .05 ; \*\*\* p < .01

Next, we conducted hierarchical linear regression analyses (see Table 2) to determine whether a managerial job re-design intervention increases work engagement of public-sector employees. At T1 neither overall multiple regression model (Model 1) or some regression coefficients were

significant at 5% level. However, after the managerial job re-design intervention was completed, at T4, the overall regression model (Model 2) became significant at 1% level and explained 15.4% of variance in work engagement, although only supervisor support was a significant job-design



predictor ( $\beta = .467, p < .01$ ). Nevertheless, we may accept our second hypothesis about the positive influence of managerial job re-design on public-sector employee work engagement.

**Table 2** Hierarchical linear regression analyses results for work engagement as a dependent variable

Measure	Work engagement					
	Model 1 (T1)		Model 2 (T4)		Model 3 (T1 – T4) <sup>2</sup>	
	B	SE	B	SE	B	SE
Intercept	2.382	1.433	2.092*	1.018	.025	.678
Employee gender	-.205	.400	-.111	.304	.221	.359
Employee age	-.005	.017	.010	.012	-.016	.014
Task interdependence	.119	.131	-.048	.122	.120	.149
Workload	-.154	.158	-.129	.148	.334*	.148
Task identity	.072	.193	-.059	.160	.037	.170
Task significance	.074	.132	.189	.116	.283*	.139
Supervisor support	.238	.160	.368**	.129	.357**	.115
F-test value	1.089		8.757		3.557	
Adj R <sup>2</sup>	.013		.154*		.272**	

**Notes:** The table presents unstandardized regression coefficients (B) and standard errors (SE) for each measure.

\* $p < .05$ ; \*\* $p < .01$

Finally, we calculated a squared difference score  $(T1 - T4)^2$  for each of five enacted job characteristics, as well as for public sector employee work engagement. These difference scores were entered into the regression equation to determine to what extent perceived changes in enacted job characteristics predict change in work engagement. The overall regression model (Model 3) was significant at 1% level and explained 27.2% of variance in the outcome variable (change in work engagement). In addition, three out of five squared difference scores were recognized as significant job-design predictors –  $\Delta$  workload ( $\beta = .288, p < .05$ ),  $\Delta$  task significance ( $\beta = .264, p < .05$ ), and  $\Delta$  supervisor support ( $\beta = .387, p < .01$ ). Thus, we were able to confirm our third hypothesis that a positive relationship exists between changes made in job characteristics and the subsequent change in work engagement.

## Conclusion

Our study offers several contributions. Specifically, we showed that work engagement of public-sector employees may also be enhanced by redesigning their jobs through a managerial job re-

design intervention, not only through participative interventions such as job crafting or ideals. Additionally, a clear distinction has been made between typical (chronic) and enacted (flexible) levels of job characteristics, thus contributing to recent discussions on static versus dynamic job design (Daniels, 2006). Job characteristics that were perceived to change from T1 to T4 were task interdependence, workload, task identity, task significance and supervisor support. Interestingly, values for these enacted job attributes unexpectedly decreased favoring Aristotle's idea of a 'too much of a good thing' (Grant & Schwartz, 2011). Finally, change in multiple enacted job characteristics were reported to be positively associated with change in work engagement. In other words, by identifying whether the change in work engagement is caused by a change in one or more job characteristics (Holman et al., 2010), we clearly explained the mechanism how managerial job re-design interventions might lead to successful employee outcomes. **SM**

## ACKNOWLEDGMENTS

This work has been supported in part by the Croatian Science Foundation under the project number [UIP-2014-09-3909]. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of Croatian Science Foundation.

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#### ✉ Correspondence

##### Tomislav Hernaus

Faculty of Economics and Business  
Trg J. F. Kennedyja 6, 10000, Zagreb, Croatia  
E-mail: [thernaus@efzg.hr](mailto:thernaus@efzg.hr)

# Internal Training of Personnel in Russia and Belarus: The Content and Effectiveness<sup>1</sup>

**Tatiana Stuken**

Dostoevsky Omsk State University, Omsk, Russia

**Olga Burtseva**

Dostoevsky Omsk State University, Omsk, Russia

## Abstract

The report presents the results of internal training analysis, conducted in 2015 and based on materials of the survey of executives and employees of industrial enterprises in Russian Federation and the Republic of Belarus. The main results of the study:

1. The characteristics of the internal training organization on the contents of the formed skills and the degree of their specificity for different groups of employees were obtained. In both countries the training programs are primarily focused on the formation of professional skills. Much less attention is paid to development of cognitive and social competencies, which are relevant for executives and specialists. Most of the formed skills are universal. The degree of specificity of skills is maximum for workers and minimal for executives, while the prevalence of specific programs in Belarus is generally higher.
2. The motives for participation of personnel in internal training were identified. The main motives of Russian workers are increase of competitiveness and development, while Belarusian workers are more focused on continued employment. Continued employment is more typical for employees receiving specific training. The prevalence of the motive of increasing the competitiveness in the labor market increases considerably with the growth of universality of the obtained competences.
3. The effectiveness of internal training through the use of subjective evaluations of employees and employers was evaluated. The efficiency of competences formation depends on the size of the organization, its stage of life cycle, focusing on the achievement of strategic goals in the learning process and the decision makers about the employee training.
4. Belarusian employers more often note the non-obvious effect of training and dismissal of the trained employees as a risk of investments in human capital.

## Keywords

Human capital, Internal training of personnel.

<sup>1</sup> The research is carried out with the financial support of Russian Foundation for Humanities, №14-22-01008

## Introduction

The scale and speed of changes in modern economy place high demands on internal training, the content and the impact of which largely affects the success of the organization. In this case, internal training of personnel in different countries has a distinctive national identity.

The focus of the present study is a comparative analysis of the characteristics of internal training in two countries – Russia and Belarus. They have

common historical and cultural roots, but they use different principles and approaches in economic and social policy over the past two decades. Obviously, this situation should be reflected in policy of additional training, because the differences in state regulation of the economy and in the educational sphere form the different structure of the demand of employers for personnel competences and methods of their formation.

The relevance of the study on the example of Russian and Belarusian companies is due to the

fact that most often this problem is deeply investigated at the level of one of these countries. The comparison will allow not only to assess the overall condition and dynamics of changes in the processes of internal training, but also to understand which characteristics of training are specific to post-Soviet economies, and which characteristics are the reflections of differences in public policy.

In addition, in both countries, the volume of internal training is at a relatively low level. For example, according to the BEEPS survey, the share of small and medium enterprises, training staff in Russia varies from 4.8% (unskilled workers) to 15.7% (non-production staff) and 25.0% (skilled workers). Similar estimates for Belarus are slightly higher: employers provide training to 9.2% of unskilled workers, 11.7% of non-productive staff and 41.2% of skilled workers (Gimpelson & Kapelyushnikov, 2011). This is comparable with rates in the countries of Eastern Europe, but it is much lower than in developed countries.

The aim of this work is the comparative evaluation of internal training of personnel in Russia and Belarus from the standpoint of the content of generated knowledge and skills, as well as the effectiveness of programs.

## 1. Literature review

Problems of internal training recently attracted the attention of researchers in various fields of scientific knowledge: economists, sociologists, management professionals. Considering the analysis of studies on internal training of personnel, we can distinguish two independent directions of research.

The first of them, quality direction, is devoted to the study of the functioning of systems of internal training in organizations and their impact on the quality of the workforce of the organization. Here the focus is placed on the analysis of the structures involved in the internal training, techniques and technologies to determine the need for training, its organization, providing feedback during and after the training. Often such research focuses on the search for effective methods of functioning of the internal training systems and development of guidance for companies to organize personnel training. Approaches to assessing the impact of learning generally rely on the assessment of the degree of achievement of goals and use simplified performance evaluation of teaching, which, however, are quite intuitive and

easy to use, although they do not always allow to obtain the accurate and correct assessment of the economic result.

The second direction of research examines the quantitative aspects of the effectiveness of internal training. The basis for these is the human capital theory of G. Becker. Such studies are based on econometric methods and are aimed at assessing the impact of training (usually on the basis of the equation of wages of J. Mincer), as well as the evaluation of the probability of promotion of an employee, dismissal, etc. The use of modern econometric methods allows obtaining a more accurate assessment of the impact of learning, but it does not always involve developing a detailed practical recommendations.

Analyzing the existing literature on the effectiveness of internal training in Russia and in Belarus, it should be noted that most of the publications are focused in the plane of analysis of the qualitative characteristics of education and a substantially smaller part is devoted to quantitative assessments of the impact of training. Quantitative calculations were performed exclusively on the Russian data. This article discusses the main findings obtained by the researchers according to the analysis of internal training of personnel and its impact in Russia and in Belarus.

Researchers from both countries recorded a number of problems associated with the shortage of workers with the skills demanded by employers. According to cross-country studies, in Belarus among the main obstacles to doing business in the country personnel qualification was put in the second place (and for firms employing from 20 to 99 people – the first place) (The World Bank, 2014a), while Russian employers put this issue to the sixth place (businesses with more than 20 people – the third place) (The World Bank, 2014b).

The authors of the report “Developing skills for innovative growth in the Russian Federation” mention the existence of imbalance between the skills generated by the national education system and skills required in the labor market. Employers attribute the shortage not only with the quality of the actual personnel training, but also with cognitive and social skills. For employees in managerial positions such skills are the ability to make decisions (including nonstandard decisions), leadership, ability to work with people, knowledge of foreign languages, openness to new ideas. For specialists such skills are the ability to make decisions, the ability to work both independently and

in a team. The lack of skills among workers is related to professional skills, lack of good faith, the ability to solve problems (Vasiliev, et al., 2013). It is important that the deficit of skills observed by employers, is not related to the unfavorable financial situation of the organizations and, consequently, uncompetitive wages.

The researchers of the Belarusian labor market also suggest a shortage of workers with the required competencies. According to the survey of employers in the private sector of the country, one in two believes that his subordinates are lacking of professional skills, every third captures the lack of self-organization, and every fourth notes that his subordinates have the problems of communication (Soroka, 2004).

Thus, both the Russian and Belarusian employers noted the need for the formation not only professional competences, but also the need for general skills.

A number of studies have undertaken an analysis of the demand of the Russian and Belarusian organizations on the content of internal training. Most employers train their employees on general programs that are also in demand at other enterprises. Only a quarter of employers form specific human capital in internal training programs (Lazareva, Denisova, & Tsukhlo, 2006). There are two groups of problems in the analysis of the content of the training.

Firstly, despite the declared deficit of cognitive and social competencies, employers prefer to train personnel on the programs of professional skills development. The authors of the previously mentioned report noted: "the training is focused mainly on the development of specific professional (technical) skills". This task is devoted to more than 60% of the programs for specialists and workers. Much less attention is paid to training aimed at developing behavioral and social skills. Thus, less than 20% of the programs for managers and less than 30% of the programs for specialists are dedicated to the development of communication skills (ability to work with people). Even less attention is paid to the development of cognitive skills of a high order for managers and specialists. Meanwhile, less than 25% of training programs are aimed at the development of scarce skill for specialists – ability to solve problems (Vasiliev, et al., 2013). According to Soroka (2004), Belarusian employers also train mostly professional competencies. More than a half (58%) of business leaders in the private sector believe that the training should be focused on a particular practical

tasks in the specialty and a quarter of them think that highly specialized training in the workplace is the most effective.

Secondly, there is the issue of cooperation with educational organizations that are not interested in providing training programs adapted to specific organizations. Often attempts to interact with educational institutions on this subject do not lead to success. This fact forces the actively developing organization to solve the problem of the maintenance of internal training on their own, as well as to create their own training centers, corporate universities and other structures (Vasiliev, et al., 2013). When answering the question about the effectiveness of different forms of employee training, employers give obvious preference to the learning in the workplace (mentoring), and courses organized at the enterprise (Lazareva, Denisova, & Tsukhlo, 2006).

According to Russian authors, despite the development of internal training, the gap between the supply of skills and the required skills for middle career workers is even higher than for workers at the beginning of their career, which indicates low effectiveness of continuing education programs and internal development of personnel (Vasiliev, et al., 2013).

A number of studies in Russia provide a quantitative assessment of the effectiveness of training programs. Acting rationally, the employer will invest in internal training of personnel, providing that the benefits from training will be higher than the cost of it. Higher productivity of the worker after training can be the basis for salary increase and career advancement. However, the economic impact of investments in internal training of personnel is not so clear. The training aimed at the formation of general skills increases the competitiveness of the employee and makes his transition to another organization more likely. On the other hand, the acquisition (as the result of learning) of specific skills that are in demand only for that employer restricts wage growth and inter-firm mobility of trained workers.

Most works on the measurement of the training effectiveness analyze the impact of learning through the increase of the employee's salary on the basis of the equation of J. Mincer. Significant differentiation of estimates for Russia is not only due to different time periods and samples, but it is also due to differences in the specifications of econometric models (Berger, Earle, & Sabirianova, 2001; Lazareva O., 2006; Tan, Savchenko, Gimpelson, Kapelyushnikov, &

Lukyanova, 2007). One of the most accurate assessments of the impact of internal training in Russia was presented by Travkin (2014), who estimates that wages of the Russian worker after training increase by 8.3%.

In the work of Alexandrova (2014) an attempt was made to evaluate the impact of internal training on the basis of one of Russian industrial enterprises. Having high precision data on training, wages, characteristics of workers, the author was able to compare the impact of different types of training – apprenticeship, courses, advanced training and professional retraining.

The effects of internal training from the viewpoint of the mobility of personnel were identified by Berger, Earl and Sabirianova (2001).

Despite the attention paid to the analysis of internal training of personnel and its effectiveness in both countries, a number of important issues require further study. In addition, the analysis shows that the most part of research into the effectiveness of internal training was performed on Russian data, while the assessment of effectiveness of internal training in Belarus requires further study.

## 2. Research methodology

The empirical base of the research was the survey materials of the Russian and Belarusian experts. From the Belarusian side the team of Mogilev State A. Kuleshov University under the guidance of Professor N. Makovskaya participated in the expert survey.

The experts were the heads of departments of personnel management and experts whose functional responsibilities include organization of internal training. The authors surveyed 159 experts representing Russian and Belarusian industrial enterprises, located in fourteen regions (Moscow, St. Petersburg, Krasnoyarsk and Altai territory, Ivanovo, Kaluga, Kemerovo, Omsk, Sverdlovsk, Tomsk, Tyumen, Chelyabinsk, Yaroslavl and Mogilev regions). The training content was analyzed in the following areas: causes of learning; formed skills; the degree of specificity of skills; the duration of programs, allowing estimating the scope and depth of the formed skills.

In preparing the survey instrument, the authors took the list of generated skills as a basis (Vasiliev, et al., 2013).

The effectiveness of training was evaluated by the achievement of its objectives. In addition, experts were asked questions related to problems in the field of internal training of employees.

Processing of the results was carried out using the methods of descriptive statistics and regression analysis.

## 3. The results of the research

### 3.1. Analysis of the programs content

The experts' answers to the question about the significance of the factors determining the need for training are presented in table 1. The significance of each factor was assessed on a five-point system from 1 (absolutely unimportant) to 5 (very important).

**Table 1** Average values of importance of reasons determining the need for training of personnel

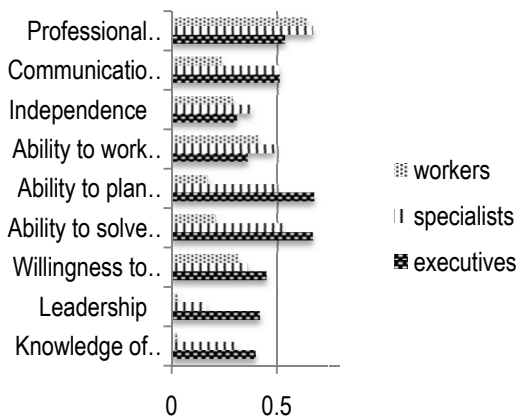
Factor	The average value (standard deviation)		ANOVA	
	Russia	Belarus	F	Significance
Implementation of requirements of supervisory authorities	3.063 (1.595)	3.589 (1.289)	5.056	0.026
The alignment of workers' knowledge and changes in legislation	3.619 (1.361)	3.802 (1.240)	0.749	0.388
The alignment of workers' knowledge and requirements of engineering and technology	3.810 (1.105)	4.043 (1.128)	1.635	0.203
Training the employees to perform other functional duties	3.730 (1.066)	3.352 (1.393)	3.307	0.071
Implementation of programs determined by the development strategy of the organization	3.857 (1.390)	3.276 (1.403)	6.321	0.013

Source: the authors

The average values of all factors are located in a fairly narrow range – from 3.063 to 4.043 points. However, the priorities of the Russian and Belarusian employers are a little different. According to Russian data the leading factors are associated with the strategic development of companies and change of engineering and technologies. In Belarus, along with the change of engi-

neering and technology, the priority is the need for alignment of workers' knowledge and changes in legislation. The factor of strategic development, which Russian employers put in the first place, was the least significant for the Belarusian experts. When comparing differences using analysis of variance, statistically significant differences in the estimates of the factors are fixed at three positions of the five: the higher importance of implementation the requirements of supervisory authorities for Belarus, the higher importance of strategy of organization development and training the employees to perform new functions for Russia.

The overall distribution of focus of internal training in the context of the skills is shown on Figure 1.



**Figure 1** The frequency of the competencies formation during internal training for groups of personnel (as a proportion of the number of Russian and Belarusian experts)  
Source: the authors

The structure of the competences formed in the process of internal training differs for groups of personnel. When training workers, employers give priority to professional competence, which corresponds to the output of the previously mentioned report, that these skills are the most deficient in this group of personnel. However, in the process of education there is not given sufficient attention to overcome the lack of competencies, connected with the ability to solve problems.

A large percentage of organizations form professional competences of executives. At the same time, only half of the companies and less pay attention to the formation of competencies associated with communications, leadership, and willingness to change. Also less than a half of employers use internal programs for specialists, aimed at the formation of independence and ability to work in a team.

Training programs for workers have the greatest degree of specificity, and training programs for managers have the least degree of specificity.

**Table 2** Specificity of the competences formed in the process of internal training, %

The ability to use acquired competences	Group of personnel		
	workers	specialists	executives
In this organization only	24.1	14.2	12.6
In organizations of similar profile	48.1	47.3	22.4
In any organization	27.8	38.5	65.0
Total	100	100	100

Source: the authors

This structure of educational programs is due to the nature of the formed competencies, but it has cross-country differences. For all groups of personnel the Belarusian employers note much more possibilities to use competences only in the organization, and, consequently, much less the competences are universal. For example, a high degree of specificity of knowledge in Belarus was noted more often (in 3.0 times for workers, in 4.4 times for specialists and in 2.8 times for executives). In all cases, the Chi-square is statistically significant at the level  $p < 0.01$ . Probably, this differentiation may be caused by various reasons, such as:

- greater concentration and centralization of production in Belarus, larger industrial enterprises, which leads to a lessening of competition in the labor market for workers with certain competencies,
- a feature of the labor legislation of the countries. Unlike Russia, the resignation in Belarus has additional restrictions. It includes not only a longer period of a written notice of resignation (one month instead of two weeks), but also the possibility of voluntary resignations only if the employment contract was concluded for an indefinite period (article 40 of the Labor code of the Republic of Belarus). Fixed-term employment contract does not offer this option to employees (The Labor Code of the Republic of Belarus No. 296-z, 1999). Therefore, in the case of high variability of the external environment and the rapid obsolescence of knowledge, this restriction provides additional protection of the employer, who receives more guarantees of

the use of formed competences in the organization.

The content of the training is associated with its duration. Indeed, a longer program may not only give narrow knowledge and (or) practical skills, but it also forms a broad, integrated vision of the problems, supported by the theoretical foundation. At the same time, it is impossible to evaluate training programs with long duration unambiguously positive, because there is a risk of substitution of the formation of high-demand skills with the theoretical material, which has an indirect relationship to the objectives of the organization. The distribution of duration of training on the groups of personnel is presented in Table 3.

**Table 3** The distribution of duration of internal training programs, %

Duration of program	Group of personnel		
	workers	specialists	executives
Up to 15 hours inclusively	46.7	44.6	47.0
From 16 to 40 hours	38.0	35.1	22.4
From 41 to 249 hours	14.6	16.2	21.6
Over 250 hours	0.7	4.1	9.0
Total	100	100	100

Source: the authors

Almost half of personnel of all groups have been trained on short-term internal programs for up to 15 hours inclusively. Both in Russia and Belarus the volume of such programs does not allow issuing after the training the document of the established (state) sample. These programs are not counted in statistics of Russian additional professional training and professional education as well as in Belarusian statistics of adult education. Taking into account such short-term programs, in fact the coverage of personnel of industrial enterprises by training in two countries is about twice higher than the official.

The second on the prevalence of training programs are programs lasting from 16 to 40 hours. According to the Russian legislation their volume allows issuing the documents certifying professional development. In Belarus, in order to obtain a similar document it is required to pass the course from 36 to 80 hours. Long programs of professional retraining (more than 250 hours in Russia) are demanded by employers rather weak, although the demand for them increases from workers to specialists and then to the executives.

Programs that form specific skills and not associated with a high risk of dismissal of a trained employee, as a rule, have a smaller length in comparison with programs aimed at the formation of general competences, and associated with high risk of dismissal.

There are some differences between countries in duration of internal training programs. Russian employers are more likely to train executives and specialists on programs with duration from 16 to 40 hours, and Belarusian employers use programs of a longer duration. So, for example, training of executives and specialists on programs from 16 to 40 hours is practiced in Russia, respectively, in 1.9-2.2 times more often than in Belarus. On the contrary, the programs of longer duration in Belarusian organizations are used in 4.7 times more often for specialists and in 2.0 times more often for executives. The differences are probably explained by formal national requirements to additional professional training (adult education).

### Evaluation of the training programs effectiveness

The formation of the majority of the competencies, formed in the result of internal training, experts estimate on average level (Figure 2). The exceptions to this are professional competences with the highest percentage of maximum estimates (38.5%) and knowledge of a foreign language with dominating minimum estimates (37.5%).



**Figure 2** Expert evaluation of the effectiveness of internal training programs (percentage of respondents of Russian and Belarusian experts)

Source: the authors

Only between a quarter and a third of the experts assess the result of the formation of such in-



demand competencies as communication skills, independence, ability to work in a team and willingness to change as high. High evaluation result of the formation of leadership is even lower (17.0%).

Cross-country comparisons do not capture the essential differences in efficiency of formation of communicative competences, independence, work planning, ability to solve problems and leadership. But Russian employers evaluate the formation of professional competences (Chi-square is significant at the level  $p < 0.1$ ) and foreign language skills ( $p < 0.01$ ) higher.

To analyze the factors determining the success of internal training aimed at the formation of each of the selected competencies, it is necessary to turn to regression analysis. In built probit models the result of training on the formation of each of the competencies (1 – high, 0 – medium and low) was used as a dependent variable.

As independent variables the authors used:

- variables reflecting characteristics of the organization (ownership, development stage, size of organization) and purpose of personnel training,
- resource characteristics of the organization (financial regulation, availability of the training center and training professionals in organization),
- actors making decisions about the education, competence of which affects the correct assessment of training needs and selection of methods of its satisfaction (organizational heads, line managers, HR managers),
- the country in which the organization operates.

A long list of dependent variables in a case of a small sample leads to a decrease in the number of degrees of freedom and statistical significance of the obtained results. Taking into account this fact, the authors give estimates that are significant at 1%, 5% and 10% level. The main results of the study show the following.

High level of formation of professional competences is associated with the presence of own training center in the organization ( $p < 0.05$ ). The efficiency of formation of communication competences is positively related to training organized by own employees of the organization ( $p < 0.1$ ) and presence of the organization at the stage of stability ( $p < 0.1$ ).

A higher level of formed competence in the field of independence is also positively associated with training organized by own employees of the organization ( $p < 0.05$ ) and with the involvement of HR managers in the decision-making process about the training ( $p < 0.1$ ).

Ability to work in a team is successfully formed in large organizations ( $p < 0.1$ ), which are at the stage of dynamic growth ( $p < 0.05$ ). Evaluation of the effectiveness of development of this competence for Russian employers is higher ( $p < 0.1$ ).

The success of the formation of problem solving skills in the process of internal training is positively related to favorable financial situation, presence of the organization at the stage of dynamic growth (for both  $p < 0.05$ ), and with the involvement of the HR manager and line manager in the decision making about the necessity of training of the employee (for both factors  $p < 0.1$ ).

Learning a foreign language is more effective in a stable profitable organization, which trains the employees in order to achieve the strategic goals and in cases when the head of the organization is involved in decision making process (in all cases  $p < 0.05$ ).

The effectiveness of the formation of leadership competence is due to the presence of the organization at the stage of dynamic growth ( $p < 0.01$ ). In addition, this competence is formed more successfully in large organizations ( $p < 0.05$ ).

The experts of the enterprises of both countries were also asked to choose from a proposed list of problems those that can potentially occur during training, as well as the problems that occur in their organization in training workers, specialists and executives (Figure 3).



**Figure 3** Problems of internal training of personnel (as a proportion of the number of Russian and Belarusian experts)

Source: the authors

The prevalence of problems occurring in the process of training is significantly different. The most commonly for all groups of personnel the experts note the limited financial possibilities of the organization – lack of financial resources and the impossibility of distracting employees from work during the period of training. At the same time, Fig. 3 gives a visual representation of that the prevalence of problems is largely associated with the group of trainees. With the general lack of financial resources the urgent priority is the training of workers, and the possibility of distraction from work for the period of study is more often sought for employees who do not occupy managerial positions.

Most experts point low motivation of personnel in training of workers, but in groups of specialists and executives the importance of this problem decreases rapidly. This result has an explanation associated with a gradual increase of opportunities of employees to influence the decision making process about training. Thus, 42.2% of experts noted the formal character of educational programs for workers and only 29.0% - for managers. The formal nature of training may be caused by the presence of requirements for periodic training in both countries. However, in general, the problem of low motivation of personnel is quite serious. According to survey results, 38.9% of the experts of both countries find it important to consider the motivation of the employees, and 42.0% think that it is important in some cases. The differences between the evaluations of Russian and Belarusian experts are statistically insignificant.

About 30% of the experts link the problem of internal training with a not obvious result of the training. This problem with the same frequency is observed in the training of all groups of personnel.

The dismissal of trained workers is another challenge facing employers in both countries. For managers it is less critical because of the information asymmetry of this segment of the labor market, not allowing other employers to adequately assess the abilities of the worker, but for groups of workers and specialists its value is significantly higher (32.6% and 30.1% respectively). The risk of loss of investment makes 33.3% of employers consider the possibility of dismissal of the trained employee very important and 38.0% consider this fact important in some cases.

In the group of specialists, the presence of differences with respect to the issue of the dismissal of trained employees was reported. Belarusian

employers perceive it more sharply (36% versus 22%). The reason is that the Belarusian labor legislation, unlike Russian, does not provide for the possibility of concluding the apprenticeship contract with the employee under which he is obliged to work for a set period in the organization after graduation, or to compensate the expenses of the organization on training (Chapter 32 of the Labor code of the Russian Federation, 2001). Apparently, the combination of a relatively large level of generality of the acquired competences of specialists and the lack of legal capacity to retain the employee after training, leads to such differences in the estimates of the Russian and Belarusian experts.

Indeed, according to Russian sources, 40% of employees who received training, signed apprenticeship contracts with employers. The probability of concluding the contract is directly associated with the nature of the program.

In the formation of specific human capital apprenticeship contracts were concluded only in 12.5% of cases, in the training on programs that are in demand in organizations of similar profile apprenticeship contracts were concluded in 37.2% of cases, and in the training programs, the results of which can be used almost everywhere, apprenticeship contracts were signed in 46.3% of cases.

## Conclusion

Thus, the study showed that the formation of relevant for today's labor market skills of workers of industrial enterprises of Belarus and Russia requires an integrated approach.

High demand for training general skills in combination with deficit of cognitive and social skills means that the emphasis in their formation must be transferred to the level of general education, including professional education.

Overcoming formalism and low effectiveness of the training requires a serious effort, not only by employers but also by the state. To some extent it is connected with the necessity of the passage of employees of certain professions and positions of periodic training. The regulatory authorities take into account not the result of education, but the presence of the document on its passage corresponding to the requirements.

The study has documented the differences in the formal national institutions and training practices in the firm-level in two countries, which may be of mutual interest (for example, the Russian practice of concluding the apprenticeship agreements). **SM**

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## ✉ Correspondence

### Tatiana Stuken

Dostoevsky Omsk State University  
Prospect Mira 55a, 644077, Omsk, Russia  
E-mail: [Stuken@mail.ru](mailto:Stuken@mail.ru)

# Analysis of Intangible Assets in Retail Trade

**Radojko Lukic**

Faculty of Economics, Belgrade, University of Belgrade, Serbia

**Dragana Vojteski Kljenak**

Faculty of Business Economics and Entrepreneurship, Serbia

## Abstract

There is a growing importance of econometric analysis of the impact of intangible assets on the performance of companies, which seems apprehensive concerning the innovations, new technologies, brand, knowledge and other components of intangible assets for improving the companies' performance. To our knowledge, there are few papers dedicated to the research of specifics of intangible assets impact on the performance of trading and retailing companies, respectively. We find one of the reasons for this in the lack of adequate data, especially for econometric analysis, because many companies do not enclose full data on intangible assets in their financial reports, or do it partially. Taking all this into account, we intend to elaborate the specifics and impact of intangible assets on the performance of global retailers, with particular emphasis on Serbia. We ground our research on theoretical and methodological knowledge and reliable empirical data. (Jel classification: L810, M420, Q320).

## Keywords

Innovation, customers, brand, technology, knowledge.

## Introduction

Intangible assets have profound influence on a company's value, work productivity (Marrocu, 2011) and performance in trading companies (including retailing). Due to that, detailed analysis of the impact of intangible assets on the performance of companies is given a considerable importance. Starting with the significance of the issue, this paper lays emphasis to specifics and the impact of intangible assets on the performance of trading, especially retailing companies. We aim to point that managers can exert its influence in improving the desired profits of trading companies (Christine, 2015).

Innovations, human resources, intellectual capital, information, goodwill etc. are regarded as crucial factors of creating companies' value and sustainable growth (Sorescu, Frambach, Singh, Rangaswamy, & Bridges, 2011; Greuning, 2011; Vidracsu, 2015; Lev, 2004; Villalonga, 2004; Acito, 2007; Marrocu, 2011; Lukic, Lalic & Vojteski Kljenak, 2016). In its character, they are nothing

else but the elements of non-material investment (intangible assets), and inasmuch as of this, careful research attention is devoted to them in theory and practice. We will draw our attention to the specifics of their impact on the performance in retail globally, and particularly in Serbia. The aim of the analysis is to point to the significance of managing intangible assets so as to accomplish targeted profit of retail companies.

The aim of the research is to thoroughly elaborate on theoretical and practical issues of non-material assets in retail. The knowledge of significance and the structure of non-material assets is fundamental prerequisite for its efficient management so as to meet the desired profit in concrete retail company. As far as we know, there are no fully written papers dedicated to the analysis of intangible assets in retail, especially in Serbia, in which we find our contribution to the treated problems.

There is growing contemporary literature written on the general analysis of intangible assets of

companies, both from the accounting point of view, and from its influence on performance. Nevertheless, as far as we know, there are no fully written papers dedicated to the analysis of specifics of size and structure of intangible asset in retail. We strive to research the issue, especially on the examples of global, and retailers in Serbia, in which we find scientific and professional contribution of this paper.

In the context of the analyzed problem in this study (the case of Serbia) we tested the hypothesis that between certain variables there is a connection (positive or negative), or the variable correlated with each other, and for which it is used as a correlation method.

In order to gain a better idea about the importance of intangible assets in the retail trade, Serbia was compared with other countries, primarily with developed market economy.

For the sake of implementation of econometric analysis in the future it is necessary to develop a unique enclosure system of intangible assets in financial reports of retail companies, especially in Serbia. It will contribute to better analysis of non-material assets in retail.

The primary restriction of research in this work is reflected in the notion that reliable empirical data are not fully comparable since retail companies enclose data in financial reports differently. Partially, it was due to frequent normative change of International Financial Reporting Standards and others. Nevertheless, we consider that research results in this work can serve as basis for further theoretical, methodological and empirical analysis of the given issue, and especially to managers in retail to efficiently manage the non-material assets so as to make desired profit. In that we also find scientific and professional contribution of this paper.

Relevant data for the research in this work were collected from different sources, such as: literature, studies, papers, and annual financial reports of analysed retail companies. Web sites also served as sources. We collected data on trade and analysed retail companies in Serbia from the Business Registers Agency of the Republic of Serbia.

### 1. System of indicators of non-material value in retail

The structure of assets in retail is specific compared to other economy sectors, and so is the structure of intangible assets. This is due to the nature of its business – bulk purchasing and sell-

ing in small quantities of goods, primarily to end customers. Figure 1 shows the hierarchy of retail assets.

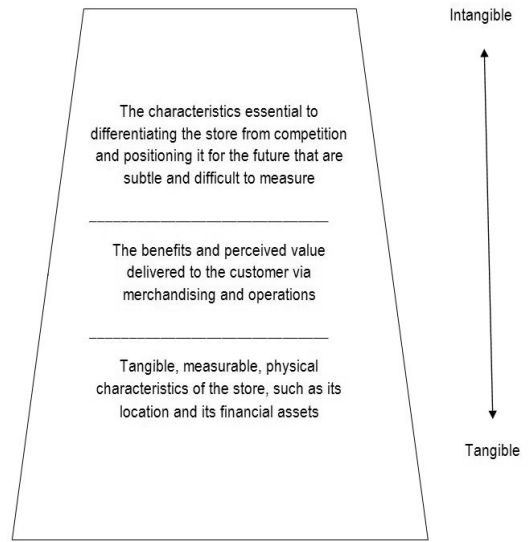


Figure 1 The retail asset hierarchy  
Source: Acito, 2007

In accordance with specifics of business operation in retail, there is a system of (ratio) indicators of intangible value that has been developed. It is shown in Figure 2.

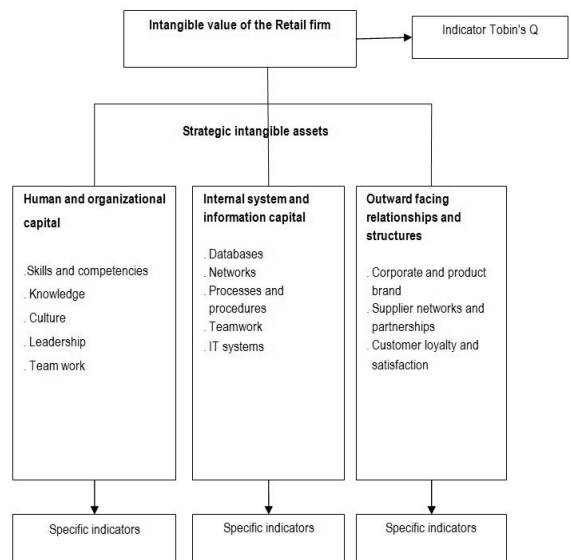


Figure 2 System of indicators of intangible value in retail  
Source: Acito, 2007

Adequate measure of intangible assets' contribution to the market value is considered to be Tobin's *q* ratio (Dybvig, 2010). It is defined as relation of firm market value and its assets replacement value, i.e.

Tobin's  $q$  = Total market value of firm / Total assets value of firm

Reduced version of Tobin's  $Q$  ratio is:

Tobin's  $q$  ratio = Market equity value / Account equity value

In contrast to return on equity, as a measure of past firm performance, Tobin's  $q$  ratio refers to measurement of firm performance in the future (Villalonga, 2004; Acito, 2007). Table 1 illustrates top ten retailers by  $Q$  ratio in 2015.

**Table 1** Top ten retailers by  $Q$  ratio in 2015

Company	Country	$Q$ ratio
H & M Hennes & Mauritz AB	Sweden	6,465
Tractor Supply Company	U.S.	5,176
BİM Birleşik Mağazalar A.Ş.	Turkey	4,759
Next plc	U.K.	4,679
Inditex, S.A.	Spain	4,570
Dollar Tree, Inc	U.S.	4,514
Nike, Inc.	U.S.	4,353
The TJX Companies, Inc.	U.S.	4,338
Ross Stores, Inc.	U.S.	4,331
Fast Retailing Co., Ltd.	Japan	3,951

Source: Deloitte, 2015

As we can see, retailers which prevail by  $Q$  ratio come from the United States of America. There are major differences in food retail between retailers in relation to  $Q$  ratio. This is shown by the data in Table 2.

**Table 2** Tobin's  $Q$  ratio of food retailers

Food retailer	2000	2005	Changes
Whole Foods Market	2,53	5,71	3,18
SuperValu	0,56	1,08	0,52
Ingles Markets	0,76	0,97	0,21
Albertsons	1,09	0,82	-0,27
Winn-Dixie	1,02	0,59	-0,43
Ahold USA	1,46	0,86	-0,60
Kroger	1,65	0,98	-0,67
Safeway	2,30	0,99	-1,31

Source: Acito, 2007

Altogether, Tobin's  $Q$  ratio is adequate measure of intangible assets and its impact on market value of retail companies.

## 2. Intangible assets of selected global retailers

Non-material assets have been significant factor of performance in economy, especially in trade sector and retail (Yu, 2014; Mohr, 2014). There are differences among countries concerning in-

tangible assets in service and retail sector and their share in gross domestic product. So, for example, share of non-material assets in gross domestic product in retail, hotel and transport amounted as follows: Japan 2.7% (2010), Korea 2.1% (2010), Germany 3.5% (2004), and UK 6.4% (2004) (Chun, 2015). Likewise, it differs among retail companies, types of store and category of products. Under influence of numerous controlled and uncontrolled factors, intangible assets in retail are dissimilar from country to country. Table 3 show non-material assets and intellectual capital of retail in the US for 2009.

**Table 3** Non-material assets and intellectual capital in U.S. retail, 2009

	Intangible assets as a share of market value (%)	Intellectual capital on and off the balance sheets (\$ billions)	Intellectual capital share in market value (%)	Economic competence on and off the balance sheets (\$ billions)	Intangible assets: Intellectual capital + Economic competence (\$ billions)
Retail	78.4%	\$267	43.69%	\$211	\$478
Food retail	75.3%	\$161	41.97%	\$128	\$288

Source: Hassett, 2011

We came to conclusion that the share of non-material assets in market value of US retail is high, which is also the case in other countries with developed market economy. The fact that speaks in that favour is growing share of private brands in contemporary retail (Keller & Lehmann, 2006). In other words, there is emerging power of brand as a component of non-material asset in retail. So, for example, in February 2016 the value of brand (in million dollars) of selected retail companies amounted: Wal-Mart (US) 53,657, Home Depot (US) 28,798, CVS Caremark (US) 22,891, IKEA (Sweden) 17,009, Target (US) 15,331, Aldi (German) 14,552, Lowe's (US) 12,712, Tesco (UK) 12,499 (Brand Finance, 2016b). To a great extent it determines the performance of global retail companies. There are

also significant investments in development of new information and communication technologies and knowledge advancement (competences) of the employed in retail. Share of intangible assets in market value is also high in all companies (Vi-drascu, 2015), including retailing. Table 4 shows the non-material value (assets) of selected retail-ers.

**Table 4** The estimate of intangible assets of selected retail companies, (September 22), 2016 (in billion dollars)

Company	Market value	Accounting value	Non-material value	Share of non-material value in market value
WalMart	222.62	83.61	139.01	62.44%
Home Depot	156.71	6.32	149.68	9.51%
Target	39.45	12.96	26.49	67.14
Tesco	18.38	8.62	9.76	53.10%
Kroger	36.88	6.80	30.08	81.56

**Note:** Calculation performed by the author based on the data: Market Watch: Stock Market News - Financial News; We mark market value of firm with MV and accounting value with A, we came up with: Non-material assets = (MV – A).  
**Source:** Market Watch, 2016

The data in the given table show high share of non-material value (assets) in market value of presented retailing companies. Therefore, it belongs to important factors of business success of the observed companies. The similar trend is with the other companies that operate on the global level. In order to thoroughly envisage the importance of non-material assets in retail, Table 5 shows the share of non-material assets in total assets of selected retailing companies for the period 2011 – 2015.

**Table 5** Share of non-material assets in total assets of selected retail companies (%), 2012 – 2015

Company	2012	2013	2014	2015
Wal-Mart	10.67%	10.09%	9,52%	9.09%
Home Depot	2.76%	2.84%	3.18%	3.39%
Costco	-	23.14%	23,22%	23,03%
Target	0.25%	0.22%	0.74%	0.72%
Tesco	9.09%	8.69%	7.57%	8.52%
Marks & Spencer	8.03%	9.13%	10.22%	10.46%

**Note:** Calculation performed by the author based on annual reports  
**Source:** Market Watch, 2016

Data in the given table show a high share of non-material assets in total assets in retail companies Wal-Mart, Tesco and Marks & Spencer, in

which we recognize the fact that those companies have major investments in innovation, as crucial factor of business success. In order to deeply contemplate the importance of intangible assets in retail we will analyse data from Fast Retailing company. Table 6 shows the data on intangible assets of Fast Retailing company for the period 2013 – 2015.

**Table 6** Share of intangible assets in total assets of the Fast Retailing company (%), 2013 – 2015

	2013	2014	2015
Goodwill	4.10%	2.69%	2.33%
Other intangible assets	5.86%	4.73%	3.52%

**Note:** Calculation performed by the author  
**Source:** Fast Retailing, 2016

The data derived from this table indicate that the share of intangible assets (Goodwill and other intangible assets) in total assets of the Fast Retailing company is less compared to Wal-Mart and Mark & Spencer. Unlike the trade sector, information and communication (IT) sector is unique to intangible assets influence on performance. As illustration, we will analyse the world wide known company Apple, which has very high level of intangible assets share in its economic value. Data in the Table 7 indicate this.

**Table 7** Components of enterprise value in company Apple on 28<sup>th</sup> April 2016 (\$ billions)

Enterprise value	Components of enterprise value	Disclosed intangibles components	Types of intangible assets	Brand value
\$536	Tangible assets \$274	Disclosed intangibles \$9	Goodwill \$13 (5%)	Brand value \$121
	Intangible assets \$261	Assets breakdown \$252	Contract \$13 (5%)	
			Consumer \$26 (10%)	
			Technology \$79 (30%)	
			Marketing \$131 (50%)	

**Source:** Brand Finance, 2016a

Data in the table show that in Apple company intangible assets participate in total value with 49%, which is very significant from the impact on total performance point of view. What is peculiar is that only 3.4% of intangible assets are disclosed. As crucial factors of business perfor-

mance, share of technology and marketing is substantial in the structure of intangible assets. Also, there is major share of brand value in total intangible assets.

### 3. Intangible assets of trade in Serbia

Under the impact of various factors (for example investment in innovation) the significance of intangible assets differs among various countries. Concerning this, in further elaboration we will highlight the specifics of intangible assets of the trade in Serbia. Table 8 shows non-material assets of trade in Serbia for the period 2013 – 2015.

**Table 8** Intangible assets of trade in Serbia for the period, 2013 – 2015

	2013	2014	2015
Total assets (000 RSD)	2,160,474,147	2,157,565,402	2,234,368,510
Intangible assets (000 RSD)	37,694,358	31,913,439	35,150,488
Tangible assets (000 RSD)	564,345,163	533,244,474	572,301,081
Relation between intangible assets and tangible assets (intangible assets / tangible assets)*	0,066 (6.60%)	0,059 (5.90%)	0,061 (6.10%)
Relation between tangible assets and intangible assets (tangible assets / intangible assets)*	14,971	16,709	16,281
Share of intangible assets in total assets (intangible assets / total assets) (%)*	1.74%	1.47%	1.57%
Net income (000 RSD)	89,730,566	79,234,350	102,303,232
Return on assets (net income/ total assets)*	0.041	0.036	0.045
Return on intangible assets (net income / intangible assets)*	2.38	2.48	2.91
Return on revenue (net income / total revenue) (%)*	3.00%	2.70%	3.31%
Number of	193,210	191,172	195,621

employees			
Intangible assets per employee (intangible assets / number of employees) (000 RSD)*	195,095	166,935	179,686
Total revenue (000 RSD)	2,987,680,991	2,924,565,910	3,084,081,630
Intangible assets turnover ratio (total return / intangible assets) *	79,26	104,38	87,26
Productivity of business (total return / number of employees) (000 RSD)*	15.463,386	15.298,087	15.765,595

Note: \* Calculation performed by the author  
Source: Agencija za privredne registre, 2017

Data in the given table show that the share of intangible assets in total assets of trade in Serbia amount approximately to 1.5%. In other words, the share of tangible assets is predominant with about 98.5%. Also, the share of intangible assets in tangible assets is disproportionate (about 6%) – huge discrepancy between material and non-material assets in favour of material physical assets. The share is significantly lower than in countries with developed market economy. An employee creates intangible assets between 166.935 and 195.095 dinars. Efficiency of intangible assets usage (measured with turnover ratio) is high at the first glance, but one point should be kept in mind: low share of intangible assets in total assets. It has adverse effect on the performance of trade in Serbia. Intangible assets return ranges from 2.38 to 2.91. Concerning the obtained results, it is necessary to invest more money in innovation, private brand and other components of intangible assets of the trade in Serbia. Final effect would be improving its total performance.

In the analysed period, the average relation between intangible and tangible assets is 0.0633, i.e. in total material physical assets intangible assets participated on average with 6.33%. It is significantly lower compared to the countries with developed market economies, for example, USA, which has adverse effect on its performance. In order to improve the performance of trade in Serbia in the future it is necessary to invest much more in various business innovations. Table 9 presents the correlation of several indicators of intangible assets in trade of Serbia, for the period



2013-2015.

**Table 9** Correlations

		Intangible assets (000 RSD)	Intangible and tangi- ble assets relation	Total assets return	Intangible assets per employee (000 RSD)	Productivity of work (000 RSD)
Intangible assets (000 RSD)	Pearson Correlation	1	-.548	.998*	-.111	.916
	Sig. (2-tailed)		.631	.036	.929	.263
	N	3	3	3	3	3
Intangible and tangible assets relation	Pearson Correlation	-.548	1	-.500	.892	-.167
	Sig. (2-tailed)	.631		.667	.299	.893
	N	3	3	3	3	3
Total assets return	Pearson Correlation	.998*	-.500	1	-.054	.937
	Sig. (2-tailed)	.036	.667		.965	.227
	N	3	3	3	3	3
Intangible assets per employee (000 RSD)	Pearson Correlation	-.111	.892	-.054	1	.297
	Sig. (2-tailed)	.929	.299	.965		.808
	N	3	3	3	3	3
Productivity of work (000 RSD)	Pearson Correlation	.916	-.167	.937	.297	1
	Sig. (2-tailed)	.263	.893	.227	.808	
	N	3	3	3	3	3

\*. Correlation is significant at the 0.05 level (2-tailed).

**Note:** Calculation performed by the author with use of SPSS, based on the data from the Business Register Agency, The Republic of Serbia  
**Source:** Agencija za privredne registre, 2017

The results of correlation analysis showed that only the relationship between the first two variables (intangible assets and return on total assets) was statistically significant ( $p < 0.05$ ; Pearson Correlation 0.998; Sig. (2-tailed) 0.036), while the other correlation (between intangible assets and labor productivity) is not the case ( $p > 0.05$ ; Pearson Correlation -.111, Sig. (2-tailed) 0.916; Pearson Correlation .916, Sig. (2-tailed) 0.263).

All in all, the intangible assets are one of the critical success factors of the business of trade in Serbia. Adequate management of intangible assets investments can make their target profits fulfilled. The hypothesis tested in this research work is confirmed: intangible assets are a significant factor in the performance of trade in Serbia. This is the case with trade in other countries.

#### 4. Intangible assets of company Delhaize Serbia

Given the fact that Delhaize Group (as part of Ahold Delhaize from 2016) does business in Serbia with important market share, we will analyse in detail its non-material assets with special insight into one of its entities which does business in Serbia (Delhaize Serbia). Table 10 shows data on goodwill and intangible assets share in total assets of Delhaize Group for the period of 2013 – 2015.

**Table 10** Percentage share of goodwill and intangible assets in total assets of company Delhaize Group, 2013 – 2015

	2013	2014	2015
Share of Goodwill in total assets (%)	25.52%	25.95%	26.58%
Intangible assets share in total assets (%)	6.31%	6.29%	6.13%
Intangible investment depreciation share in gross margin (%)	0.57%	0.56%	0.48%

**Note:** Calculation performed by the author based on Annual Report 2015 data  
**Source:** Delhaize Group, 2015

According to the data showed in the table, share of intangible assets in total assets is slightly higher than 6%. It is lower than in Wal-Mart (2015 – 9.09%) and Marks & Spencer (2015 – 10.46%) (See Table 5). Intangible investment depreciation share in gross margin ranges from 0.48% – 0.57%. It is similar to other retail companies in the world (for example, Russia). In order to envisage the trends of intangible assets development in Delhaize Group, Table 11 shows data on its market capitalisation for the period 2011 – 2015.

**Table 11** Market capitalisation of Delhaize Group company, for the period 2011 – 2015

	2011	2012	2013	2014	2015
Market capitalisation (million €, end of year)	4423	3083	4425	6213	9339

Enterprise value (million €, end of year)	7082	5155	5899	7210	10119
Total capital (million €, end of year)	5416	5186	5073	5453	6171
Intangible assets (million €, end of year)*	-993	-2103	-648	760	3168
Intangible value share in market capitalisation (%)*	-22.45%	-68.21%	-14.64%	12.23%	33.92%

**Note:** Value of enterprise = Market capitalisation plus net debt.  
Net debt = Financial obligations minus cash. Financial obligations = Short-term loans plus long-term loans.

\*Calculation performed by the author

**Source:** Delhaize Group, 2015

In the given table intangible assets are measured as difference between market capitalisation and total assets (as a measure of accounting value of the firm). It shows the tendency of positive increase in the last two years of the analysed period, which positively reflects in the performance of Delhaize Group company. Table 12 shows intangible assets of Delhaize Serbia company (part of Ahold Delhaize since 2016) in 2014 and 2015.

**Table 12** Intangible assets of Delhaize Serbia company, 2014 and 2015

	2014	2015	Index 2015/2014
Intangible investment (000 RSD)	3,942,314	4,785,547	121.35
Goodwill	197,432	197,432	100.00
Depreciation of intangible investments	88,900	82,521	92.82
Material physical assets	35,895,916	38,945,414	107.65
Total assets	66,600,435	73,304,405	110.06
Total business expenses	71,646,608	73,853,030	103.07
Share of intangible assets	5.91%	6.52%	110.32

in total assets (%)*			
Relation between intangible assets and material physical assets*	0.1096 (10.98%)	0.1228 (12.28%)	111.83 (111.29)
Share of Goodwill in total assets (%)*	0.29%	0.26%	89.65
Share of depreciation of intangible assets in total operating expenses (%)*	0.12%	0.11%	91.66

**Note:** \* Calculation performed by the author

**Source:** Delhaize Group, 2015; Agencija za privredne registre, 2017

According to the data in the given table, intangible assets in 2015 in Delhaize Serbia increased by 21.35% compared to 2014. The share of intangible assets in total assets of Delhaize Serbia company is on the level of parent company, considerably higher compared to average of total trade in Serbia, but it is lower in relation to companies such as Wal-Mart and Tesco (see Table 5). All in all, it has positive effect on its total performance, considering intangible assets as crucial factors of business success.

In order to clarify the specifics of accounting treatment of intangible assets we will bring one case from concrete trading practice. So, for example, retail company Delhaize Serbia applies the following concept of accounting treatment of intangible assets: "Intangible assets are non-monetary assets (they do not represent tangible physical assets) such as patents, licences, concessions, trademarks, hallmark, accounting software, franchise, investment in development of new products, processes and devices, copyright and other. There is a possibility that there will be an economic benefit for these resources in the period longer than one year, to the amount that exceeds costs. Intangible assets are initially measured by purchase price or cost price. After initial recognition, intangible assets are expressed as cost less accumulated depreciation and impairment. The right to use the land, even though it is limited to 99 years, due to the very essence and the anticipated conversion to ownership of the land, the Company is considered to have an indefinite useful life on land and after the expiry of this period, it has opportunity to turn the right to use to the right of ownership of construction land, without compensation. Subsequent expenditure on investments in intangible assets can be capitalized only regarding the expected future benefits of as-

sets they refer to. All other expenses represent expenses for the period in which they were made. Depreciation of intangible assets starts with the following month in relation to the month in which the assets were available for use. The basis for depreciation is purchase price. Intangible assets are depreciated on straight-line method within five years, with depreciation rate of 20%. Depreciation method and useful life is estimated at the end of each reporting period and when necessary, they are corrected". According to: Delhaize Serbia Ltd., Belgrade, Notes to financial reports, 31 December 2015. Business Registers Agency, The Republic of Serbia.)

In 2015 depreciation rate of intangible assets in Delhaize Serbia was 20%, and the estimated lifetime 5 years (According to: Delhaize Serbia Ltd., Belgrade, Notes to financial reports, 31 December 2015. Business registers agency, The Republic of Serbia). In the same (2015) year, depreciation of intangible assets participated in total expenditures with 0.060% (Calculation performed by the author based on the data: Delhaize Serbia Ltd., Belgrade, Notes to financial reports, 31 December 2015. Business registers agency, The Republic of Serbia). The situation is similar in other retailing companies in Serbia (Mercator-S, IDEA).

The share of intangible investment depreciation in total expenditures in trade is insignificant, and differs among countries. For example, in Russia 2014 it amounted: motor vehicle and repair 0.10%, wholesale 0.10%, retail 0.50% and social nutrition 0.40% (Торговля в России 2015, 2015).

## Conclusion

Intangible assets gradually became crucial factor of retail companies' business success. There is an increasing share of intangible assets in trade value and total assets of global retailers. It specially refers to innovation, brand, knowledge and technology. Special system of intangible investments indicators for trading business was developed, within which more attention is paid to Tobin's Q ratio. Fundamental prerequisite for efficient managing is integrated approach in the analysis of indicators of intangible assets in retail (based on econometric analysis). Adequate managing of intangible investment can fulfil the desirable profits of retailing companies.

Under the influence of different factors, above all technology innovations, development of private brand and advancement of knowledge, the share of intangible assets in total assets in trade

and retail differs among countries. So, for example, share of intangible assets in total assets of retail companies in Serbia is significantly lower compared to countries of developed market economies. It reflects their overall performance. That is why there should be more investments in creating intangible assets, especially private brand, information and communication technologies and advancement of knowledge. **SM**

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#### ✉ Correspondence

##### Radojko Lukic

Faculty of Economics Belgrade  
Kamenička 6, 11000, Belgrade, Serbia

E-mail: [rlukic@ekof.bg.ac.rs](mailto:rlukic@ekof.bg.ac.rs)

# Challenges of the Company in the New Economy and Development of E-business Strategy

**Monika Angeloska-Dichovska**

Faculty of Economics Prilep, St. Clement of Ohrid University Bitola, Republic of Macedonia

**Tatjana Petkovska Mirchevska**

Institute of Economics, Ss. Cyril and Methodius University Skopje, Republic of Macedonia

## Abstract

The rapid development of technology and the Internet drastically alter both the consumers and companies' environment. The Internet is widely accepted by consumers, which manifestly changes their behavior.

The rapid and profound changes in the environment, especially the technological changes, have a huge impact on the contemporary transformation of many business entities as well as on the adoption of new business models. The changeable and unstable environment in the new economy urges business entities not only to constantly adjust, but also to accept a strategic approach specific to their e-market performance. The new economy works by a different set of rules from the traditional economy, and brings new challenges for business. Therefore the need for strategic planning is imposed as an imperative, that is, the strategic access to the e-business environment, if companies want to survive and to develop on the newly created markets. The Internet and information communication technology provide better opportunities for businesses to establish distinctive strategic positioning.

The purpose of this paper is to point out the procedures to be followed in developing an e-business strategy in the new economy. Developing an e-business strategy depends on the type of enterprise, industry, competition, consumer behavior, nature of application etc.

## Keywords

E-business strategy, new economy, strategic analysis, changing behavior, Internet consumers.

## 1. Characteristics of the new as opposed to the old economy

The digital revolution, expressed through the dynamic and rapid development of technology and the Internet and their wide application by the population and business entities leads to a new economy, that is, to the transformation of the old into the digital economy. The digital revolution changes people's way of living, but it also causes fundamental changes in the business activities of the business entities and their customers. These developments lead to changes in the overall economy, more specifically, to the creation of a new economy (digital economy, Internet economy, and web-economy).

According to Turban et al. (2008), "new economy refers to an economy that is based on digital technologies, including digital communication network (the Internet, intranets, extranets), computers, software and other related information technologies. In this new economy, digital networking and communication infrastructure provide a global platform over which people and organizations interact, communicate, collaborate, and search for information" (pp. 14-15).

The new economy is based on a different set of rules from the traditional economy, and managers of both traditional and internet based companies have had to face the challenge that comes from the digital revolution. Lee outlines (as cited in Combe, 2006, pp. 55-59) the main attributes of

the Internet that present both a challenge and an opportunity for businesses:

- Economics of exchanging information – the Internet allows for information to be posted and downloaded and used as input in business activities.
- Connectivity and interactivity – the population and business entities have access to the Internet and the opportunity for electronic and two-way communication regardless of the distance.
- Network economies of scale – the marginal expenses for sending information are practically zero; hence business entities can achieve economies of scale by providing value-added products and services for customers, in a cheaper, faster and more efficient manner using the Internet.
- Speed of change – technology enables quicker transaction processes and greater expectations of customers.
- Economics of abundance – new economy creates abundance of information where the value can be reduced in case important information is not selected from unimportant information.
- Merchandise exchange – the web-site displays a wide range of products and services and additional services such as discounts, links to complementary products, product review, price comparisons, payment, delivery and etc.
- Communication channel – the Internet, as a communication channel, provides a wide range of information on products and their prices, low communication costs, short response time, after-sales services, online technical support and etc.
- Transactions channel – easy access for all Internet users, low transaction costs, low administrative costs reduces amount of paper used, improves transaction processes and etc.
- Distribution channel – opportunity for supply and distribution of digital products (financial information, news, music, software, reservations etc.).

The Internet has introduced new rules in the new economy, which have led to changes in the supply and demand of products and services, in the manner of determining prices, manner of performing transactions, market research and marketing, in the manner of decision making, in the pos-

sibility for individual customization of products and services, in the manner of communicating with customers and etc.

The new economy is oriented towards the demand, whereby knowledge resources are of great significance, there are low barriers for entering the market, a low risk tolerance and customer personalization (Vaskovic & Lutovac, 2009, p. 41).

In the new economy, economic, business and consumer factors change under the influence of the information and communication technology. Markets become dynamic and complex, production becomes flexible and customized, and consumer tastes become dynamic and segmented.

As emphasized by Combe (2006, p. 4), there are key differences between the old and new economy from the perspectives of the overall economy, businesses and consumers (see Table 1).

**Table 1** Key differences between the old and new economy

Issues	Old economy	New economy
<b>Economy factors</b>		
Markets Competition Structure Value driver	Stable National Manufacturing Physical capital	Dynamic and complex International and global Service Human capital
<b>Business factors</b>		
Organization Production Growth driver Technology driver Competitive advantage Relationships	Hierarchy Mass Capital and labor Machines Low cost/high production Independent	Network or virtual Flexible, customized Innovation and knowledge Digital and electronic Innovation, speed, quality Collaborative
<b>Consumers factor</b>		
Tastes Skills Educational needs Workplace relations Nature of employment	Stable Specialized Trade orien- tated Confrontational Stable	Dynamic, segmented Multiple and flexible Lifelong learning Collaborative Insecure, opportunistic

Source: Combe, 2006

In the new economy, under the strong influence of the Internet, the behavior of consumers changes. The Internet is used differently by different categories of people, thus, their behavior

changes when using the Internet, namely, there is a specific behavior of Internet users. Lewis and Lewis have identified five different types of Internet users (as cited in Chaffey, Chadwick, Mayer & Johnston, 2006, p. 78), more specifically, models of Internet usage:

- Those who search for direct information – users who seek information on products, markets or use their free time for searching and usually do not plan to shop online;
- Those who search for indirect information – users known as surfers who like to search and browse various links and usually click on various advertising links;
- Direct customers – users who buy certain products online; these users find the sites of brokers or cyber-intermediaries that provide comparisons of prices and products to be important locations for visiting;
- Bargain hunters – users who want to find available sales promotion offers, such as free samples or competitions;
- Those who search for entertainment – users who want to connect to the web for entertainment through participation in competitions, such as a quiz, puzzle or other interactive games.

Research (own research, 2014) into consumer behavior on the Internet in the Republic of Macedonia confirms that Macedonian consumers on the Internet are “those searching for direct information” (49.1%), and that only 7.5% are actually “direct buyers” who usually come to the idea of buying or ordering online upon the recommendation of a friend/colleague, relative (48%) and from advertisements on the social media (35.2%), while advertisements on traditional media (newspapers, TV, printed catalogues) become irrelevant for the Internet users, even though for companies (41%) this media is still very relevant.

The functioning of the social media is also significant in the new economy. They are an integral part of the everyday modern life of almost every man. Social media are becoming an increasingly more important source of information used by consumers, especially in the search phase in the model of making a decision on buying. Facebook, Twitter and LinkedIn are at the top of the list of social networks that are becoming quite popular among consumers and businesses, and marketers. The number of users of these networks is increasing every day, thus changing the plans of

business enterprises and the approach of these networks.

According to the data of Internet World Stats (26 April, 2015), in the first quarter of 2015, Europe had 24.1% of the total Facebook users worldwide, Asia 28.8%, while the US/Canada had 17.2%. In the Republic of Macedonia (according to Internet World Stats), there are 1,000,000 Facebook users (as of November 15, 2015), more specifically, the percentage of Facebook penetration is 46.5%. On the other hand, the increased use of social networks allows business enterprises to foster brands and influence the process of purchasing.

Many business entities adhere to many rules in terms of marketing on the social media. Business entities integrate social media in their marketing strategies by: preparing plans for publication, monitoring comments, using tools for managing announcements, conducting promotions and recruiting fans, and having separate teams responsible for social networks. Very often they use the tools of hootsuite.com for monitoring comments and managing announcements on the social media, as well as the tools of wildfireapp.com for creating interactive promotions on the social media.

The research of Pitney Bowes Software (published on eMarketer, 3 December, 2012) conducted in the US, Great Britain, France, Germany and Australia shows that marketers need to be careful when choosing a social media, and should synchronize their activities on the social media with the preferences of their customers, as their research confirms that there is a disparity in the presence of consumers on certain social media and the presence of marketers. They emphasize the disparity in the presence on Twitter, Google and other social networks. For example, for Twitter 57% of marketers stated they use it compared to 31% of consumers.

The digital boom has led to the development of new activities, but also to the restructuring of existing activities and to the emergence of new trends with a positive and negative impact. Hence, among the positive impacts are the tendency of the Internet to dim the power of the channels for bargaining by providing businesses with new, more direct access from clients, and the possibility for improving the efficiency of the activity in various ways, expanding the total size of the market by improving its position over the traditional substitutes. Among the negative trends of the Internet are: it provides customers with easier ac-

cess to information on products and vendors, which strengthens their bargain power; decreases entry barriers; creates new substitutes; intensifies rivalry among competitors, as it is an open system; it expands the geographical area; it increases fixed costs of business enterprises and etc. (Porter, 2009, pp. 102-104).

The development of the widespread application of the Internet and the Internet technology have led to significant changes in the manner in which work is performed. With the development of the Internet, all business enterprises (micro, small, medium and large) have equal opportunities to present their production programs on the Internet with small and affordable costs for everyone. The Internet in the business environment has led to significant changes in the following areas: procurement management, inventory management, distribution management, communication channels management, payment management, mediation etc. (Vaskovic & Lutovac, 2009, pp.44-45).

Social, technological and economic factors create a complex and competitive business environment, in which the power of the consumer becomes greater. These factors initiate business pressure on the business enterprises and impose the need for adjusting to the environment (Turban et al., 2008, pp. 11-16).

## 2. Strategic planning for entering the e-market

New developments within the environment of business enterprises create new problems and challenges, but also opportunities for finding solutions for them. In order for business enterprises to be more efficient in their functioning, they must respond to changes in the environment, namely, to the changing demands and needs of their customers.

In order for business entities to succeed on the e-market, they need to build strategies with a clear focus, or as Porter stresses (2009, p.130), they need to have the following characteristics:

- having a strong Internet technology and being familiar with it,
- building distinctive strategies with a clear focus,
- an accent and focus on creating value for customers,
- distinctive ways of conducting physical activities and comprising property that is not on the Internet, and

- deep knowledge of the industry and creating their own skills, connections and information.

The essence of a strategy lies in choosing activities in a different way, or in performing activities in a different way from those of the rivals (Porter, 2009, p. 43). According to Combe (2006, p. 213) a strategy can be viewed as a series of decisions and actions that are taken to achieve stated aims and objectives. According to another definition, a strategy is an integrated and coordinated set of obligations and actions in the direction of utilizing the basic competencies of business enterprises and gaining competitive advantages (Michael, Hitt, Duane & Robert, 2008, p. 4).

Nowadays, the modern way of creating a strategy integrates the Internet in order to respond accordingly to the dynamic developments in the environment. A strategy that includes elements of the Internet can be called an Internet strategy or e-strategy. According to Turban et al. (2008) "e-strategy, or e-commerce strategy, is the formulation and execution of a vision of how a new or existing company intends to do business electronically (p. 640) or, according to Chaffey (2004) "using application of internal and external electronic communication that support corporate strategy" (p. 189).

With the purpose of having a picture on the importance of the business environment and the Internet for the development of an e-business strategy in Republic of Macedonia, a survey was conducted in 182 companies from the Republic of Macedonia in regard to strategic thinking, awareness of e-business, impact of e-business applications, Internet presence and social media benefits. More than half of the business entities (56%) do not know about the e-business activities of their competitors, and 40% of the total surveyed entities do not have information on the Internet presence of their suppliers. Half of the surveyed entities (51.6%) have incorporated e-business (e-commerce) elements in their mission and vision. About two-thirds of the entities believe that e-business applications, activities and models can improve their operations, while 26% of the surveyed entities do not know whether these applications, activities and models can contribute to their more successful functioning. They have understood and accepted the social media boom in their strategic thinking, hence, 80% of the entities believe that their presence on social media such as Facebook, Twitter, LinkedIn and others can con-



tribute to a greater promotion of the products and services they offer. From the data analyzed on the strategic approach of companies, it can be noted that they do possess certain elements of an e-strategic approach in their business operations in the country, but, that there is a lack of a complete approach to the immediate and broader external and internal e-business environment.

In the process of e-business planning, all elements of the immediate and more broader environment need to be taken into consideration, as well as the company's internal factors, or as Phillips highlights (2003, p. 105), an answer should be given to the following ten questions:

1. How will the e-business integrate into the corporate strategy?
2. Is it necessary to create a separate department for the e-business project?
3. Are the opportunities and threats arising from the e-business fully understood?
4. Can barriers for entering be set up and in which way?
5. Who are the new competitors on the e-business market?
6. Which of the existing products and/or services are suitable for the e-business market?
7. How will the e-business activities affect the organizational structure, the operational processes, tax liabilities etc.?
8. Which e-market is being targeted?
9. Are there cash reserves available in case of a negative cash flow?
10. Has a group been formed for monitoring, coordination and assessment of the e-business development?

The research that has been conducted using references on strategic planning indicates that the process of strategic planning, both for the traditional business and the e-business, is basically carried out through the same phases. Table 2 provides an overview of the strategic planning process according to Turban et al. (2008, p.641), Suklev and Drakulevski (2001, p.75), Friend and Zehle (2004, p.26) and Chaffey (2004, p.196).

**Table 2** Overview of the strategic planning process

Turban, E. et al	Suklev B., Drakulevski Lj.	Friend G., Zehle S.	Chaffey
Strategy initiation	Evaluation of the environment (externally and internally)	Strategic analysis (Stakeholders analysis, vision, mission, goals, company analysis and environment)	Strategic analysis (external environment and internal resources)
Strategy formulation	Strategy formulation (vision, mission, goals, strategy, analysis and selection of strategy)	Generation of strategic options	Strategic objectives (vision, mission and objectives)
Strategy implementation	Strategy implementation (structure, culture and leadership)	Evaluation and selection strategy	Strategic definition (option generation, option evaluation and option selection)
Strategy assessment	Assessment and control strategy (company performance)	Implementation of strategy	Strategic implementation (planning, execution and control)
		Monitoring and review	

**Source:** the authors based on Turban et al, 2008; Suklev and Drakulevski, 2001; Friend and Zehle, 2004; Chaffey, 2004.

However, when analyzing a classic business strategy and an e-business strategy, several features need to be taken into consideration (Chaffey, 2004, p. 193):

1. Planning horizon: A traditional business strategy is based on predictability in order to forecast the future and to then develop business plans in one-, three-, five- or ten-year spans, while an e-business strategy focuses on adaptability and responsiveness with an implementation time of three months or less and limited predictability.
2. Planning cycles: Competitive advantage is very fleeting in terms when the pace of technological change is rapid.

3. Power base: On one side is the positional power or strength in the marketplace, while on the other side is the informational power where success is based on access, control and manipulation of critical information.
4. Core focus: From factory and production goods, the focus in e-business strategy is based on the customer.

In the strategic planning process for an e-business, certain issues need to be taken into account that result from the on-line presence of the business entity, hence, the formulation of the strategy depends on the entity, the industry in which it operates, competition, the nature of the application, etc. Further in this paper, only the second phase of e-strategic planning will be reviewed, in order to outline the elements that need to be considered when creating an e-business strategy.

### 3. Developing an e-business strategy in the new economy

Once the strategic analysis is completed, a strategy is then formulated based on the obtained results (opportunities and threats), or alternatives from the analysis, and in accordance with the goals, mission and vision of the business entity.

The development of the strategy depends greatly on understanding the environment in which the business activities and transactions of the entity are being carried out. Factors related to consumer needs, the way in which services are provided, competition, dealers and suppliers have the greatest influence on the strategy. Local and international economic conditions along with regulations and social circumstances have a broader impact. Ultimately, technological innovations are of vital importance in achieving competitive advantage and creating a market (Vaskovic & Lutovac, 2009, p. 42).

According to Chen (2005, p. 213), in developing an e-strategy some significant characteristics of e-markets need to be taken into account, such as: some transactions are virtual, the markets are unstable, the markets are fast-moving, companies are highly interconnected and there is high uncertainty in the markets.

When developing an e-business strategy it is necessary to follow certain steps (questions), and to apply appropriate analyses that will ease this process. Table 3 provides an overview of the proposed steps by Chen (2005, p. 250), Venkatraman (2000, p.16) and Chaffey (2004, pp. 219-230),

who start with an analysis of the current situation and setting of priorities and strategic visions for e-business and continue with the necessary infrastructure and possible benefits along with developing various possible scenarios. In developing an e-business strategy, one set of questions can be accepted or an integrated approach can be made of several groups, with the purpose of developing a competitive, successful and comprehensive strategy.

**Table 3** Steps (questions) for developing an e-business strategy

Stephen Chen	N. Venkatraman	Chaffey
1. What are the current state of the industry and the possible effects of e-business on the industry?	1. What is your strategic vision for the e-business activities?	1. What are the e-business priorities?
2. What are the benefits that e-business can provide to the customer and to the firm and what new value propositions can e-business provide?	2. How do you govern e-business activities?	2. How should the enterprise restructure in accordance with the priorities?
3. What time is necessary for e-business activities and are the market and technology ready?	3. How do you allocate key resources for the e-business activities?	3. How can an overview be made on the opportunities of the new business and on the revenue models?
4. What strategic posture do we adopt?	4. What is your operating infrastructure for e-business activities?	4. How can new technologies be utilized for new markets and for the development of products and services?
5. What are the possible scenarios for how the industry will develop?	5. Is your management team aligned for the e-business agenda?	5. How can a positioning strategy be made?

**Source:** the authors based on Chen, 2005; Venkatraman, 2000; Chaffey, 2004

Hackbarth and Kettinger (as cited in Philips, 2003,) “suggest that e-business strategy pass through three levels of increasing complexity, which they categorize as experimentation, integration and transformation.” (pp. 106-107). In the first level an e-business strategy does not exist, in

the second level the e-business strategy supports the existing corporate strategy, and in the third level the e-business strategy is a guide to the corporate strategy. The methodology for strategic penetration goes through 4 phases, as follows: initiation (review of project-plans, stakeholders and etc.), diagnosis (industrial analysis and analysis of the company), breakout (evaluation and assessments) and transition (transitional e-business strategy).

The basic competitive strategies, or generic strategies that are applied in e-business are as follows: price leadership strategy, differentiation strategy and focus strategy.

In e-business, price leadership can be achieved through several forms, such as: economy of scale, control of all types of costs, reducing promotional activities, imitation products, lower distribution costs, reducing staff, investing in technology that will contribute to the reduction of costs etc.

In formulating the pricing strategy, one should have in consideration that price comparison on the Internet is very simple, very often the prices are set by the buyers, the prices of on-line and off-line products differ (Turban et al., 2008, p. 657).

The differentiation strategy refers to the possibilities of business enterprise to differentiate from the competition through certain features of the products and services, by using prestigious technology, innovations, special customer services etc. The promotion that needs to bring closer the differentiated products to the customers also plays a key role in this type of strategy.

Promoting responsibility towards customers, promoting efficiency, promoting innovation and promoting quality are the four specific ways that can lead to reduction of costs and/or to increasing the differentiation, which will result in a company's competitive advantage (Garet & Jennifer, 2008, pp. 343-344).

The focus strategy is based on the selection of a certain segment of the market, or consumers. By adopting this strategy, business enterprise will have lower costs, as only a certain segment is concerned and not the entire market, as well as the opportunity to develop knowledge and expertise based on the characteristics of the segment, and to use them in improving their future operations (Combe, 2006, p. 236).

In literature there is a debate in regard to the adequacy of the previously mentioned generic strategies in today's new technological environment. There are proposals for a new framework of generic strategies that would more adequately

reflect the new competition. According to Chen (2005, pp. 238-240), they are as follows: strategy for best product, strategy for customer solutions and strategy for systems lock-in. Today, it is very important for products to be introduced quickly and for them to have a dominant design. With good production options, or with superiority of products and services, enterprises are able to establish good connections with consumers. The second strategic option is directed towards consumers, and a little less to the product. Getting to know and doing research on consumers will help the company meet the needs of consumers more easily and faster. The third strategic option (system lock-in) has the widest possible scope, in this case the company considers all the players in the systems which contribute to the creation of economic values. In this strategic position, bonding plays its most influential role. The company is particularly concerned with nurturing, attracting and retaining the so-called "complementors" along with the normal industry participants. Table 4 gives the characteristics of the three strategic options.

**Table 4** Characteristics of the tree option for strategic positioning in the e-business environment

	<b>1. Best product</b>	<b>2. Customer solutions</b>	<b>3. System lock in</b>
<b>Scope</b>	- Low cost - Differentiated	- Bonding - Joint development of product - Outsourcing	- Variety and number of complementors - Open architecture
<b>Scale</b>	Product: market share	Customer: customer share	System: complementor state
<b>Bonding</b>	Link to product: - First to market - Dominant design	Link to customer: - Customer lock in - Learning - Customization	Link to system: - Complementor lock-out - proprietary standards

Source: Chen, 2005

With the development of the Internet, enterprises have more strategic alternatives (for development of the market and/or the product, for diversification, penetration etc.), for entering the electronic market, but the choice for this needs to rely on good alignment of the strategic capabilities of the business enterprise and its environment.

## Conclusion

The Internet and the widespread use of information technology have introduced new rules in the new economy, which impose a behavior different from the one today for business entities.

Consumer behavior in the new economy becomes different with the presence of the Internet and the Internet technology, which strongly impact the consumer decision-making process on buying off-line and on-line. Hence, it is necessary for enterprises to get to know consumer behavior on the Internet and create strategies accordingly. The social media are becoming an increasingly more important source of information that is used by consumers, particularly in the search phase in the model of making a decision on purchasing. On the other hand, the increased use of social networks allows enterprises to foster brands and to impact the process of purchasing. The social media are becoming a significant marketing tool for enterprises. With the rapid technological development and their widespread adoption and easy application of numerous technologies, enterprises have the opportunity to apply Internet applications and technologies for marketing purposes.

New business models have emerged with the Internet and Internet technologies, which require new knowledge, changed activities and new directions for the success of these models.

The new environment is characterized by instability, uncertainty and frequent changes, and is based on the orientation of the enterprises, their customers, suppliers, competitors, as well as of the public sector towards the electronic way of operation.

In the new economy the business enterprises have the opportunity to directly generate a total or a certain part of their income from the Internet, or based on products and services associated with the Internet, or whose products and services enable the use of the Internet for electronic working.

The operating conditions of business enterprises are becoming more uncertain and dynamic with everyday technological innovations. Hence, the need for strategic planning or strategic accession to the e-business environment becomes an imperative, if enterprises wish to survive and develop on the newly created e-markets. Therefore, when entering the e-market, business enterprises need to follow the strategic planning steps: strategic analysis (external and internal e-environment), strategic goals (vision, mission, and goals), strategy formulation and implementation and control. In order for business enterprises to thrive over

time, they need to constantly follow changes that are happening in the competitive environment, and to harmonize them with their internal resources and capacities.

Business enterprises that will not develop a clearly defined e-strategy will are not likely to survive the electronic market. It is not enough for them just to develop a website; it is necessary for them to be able to adapt quickly and often to the conditions in the environment, or to be strategically flexible. In times of a digital revolution, strategic flexibility is characteristic, which enables adaptation to the changing environment. In order for the business enterprise to be able to respond timely to the demands of the environment, it needs to constantly perform monitoring, learning and upgrading.

The Internet technology provides better opportunities for business enterprises to establish distinctive e-strategic positioning. However, the development of an e-business strategy requires taking notice of the characteristics arising from the Internet and the changes in the environment, thus, a set of steps need to be followed that will facilitate the formation of this type of strategy. The information technology and the Internet have transformed the basic generic strategies into new e-strategies that are focused more towards products with a dominant design, or towards a more detailed analysis of consumer requirements.

The phases of strategic planning in the new economy remain the same as in the traditional; however, the factors that are taken into consideration when creating an e-strategy, such as the techniques that are applied, are broader and more comprehensive. **SM**

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#### ✉ Correspondence

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**Monika Angeloska-Dichovska**

Faculty of Economics Prilep  
Marksova 133, Prilep, Republic of Macedonia  
E-mail: angeloska\_monika@yahoo.com

# Indebtedness of Enterprises and Profitability Improvement

**Kristina Mijić**

University of Novi Sad, Faculty of Economics in Subotica, Subotica, Serbia

**Dejan Jakšić**

University of Novi Sad, Faculty of Economics in Subotica, Subotica, Serbia

## Abstract

This paper presents an analysis of the efficiency of the indebtedness of companies in the Republic of Serbia. In order to investigate whether the companies' borrowing is accompanied by the efficient investment of resources and the achievement of better profitability, the correlation analysis of level of indebtedness and profitability was conducted. The research was based on a sample of 42,057 observations of companies that operated in the Republic of Serbia in the period 2009-2013. The research results indicate that the debt is negatively correlated with the level of profitability, which shows a weak ability of companies to improve their performance through additional debt.

## Keywords

Indebtedness, profitability, economy of Serbia.

## Introduction

Companies need to provide sources for funding their activities in order to achieve growth and development on the market. Companies can finance their activities from their own capital or by debt. Financing from owner's equity is achieved by increasing the capital by the new ownership or the retention of profit. The company's ability to generate profits is one of the key factors of financing and it affects the company's ability to attract additional capital investment. On the other hand, companies may decide to finance their activities by indebtedness which causes additional expense such as interest rate (Jakšić, & Mijić, 2013). Even then, the profit has an important role when the creditors consider the risk of collection of receivables. Creditors determine whether the company is able to generate cash flows, or indebtedness should be based on one of the collaterals (mortgages, guarantees, pledges, etc.).

Additional borrowing of companies should be related to the efficient and effective investment in business activities. Performances of the company can be expressed through profitability as a key

indicator of the possibilities of the company to generate profit in relation to the invested resources. Companies that gain profit in spite of debt make a positive impact on economic development since they provide the ability to stimulate investment and additional employment. On the other hand, if the companies make a loss they could have serious problems, such as the problem of short-term payment, insolvency, bankruptcy, and unemployment.

In order to investigate whether the additional borrowing of companies in the Republic of Serbia is effective and whether it results in higher profitability, the analysis of the relation between debt and profitability was carried out. For the study, the data about profitability and debt was used based on the sample of companies from 15 business sectors in the period 2009-2013. Data were taken from the Amadeus database which contains financial data and other information of public and private companies in Europe (Amadeus, 2015).

### 1. Research methodology

The indebtedness of a company is determined by the analysis of balance sheet structure in terms of relation between capital and debt. The structure of balance sheet liabilities affects the security, viability, and autonomy of enterprises as debtors (Rodić, Vukelić, & Andrić, 2007). The indebtedness (or liabilities ratio) is measured as the ratio of total debt to total assets. The acceptable level of debt ratio should be at 50%, which means that companies finance their activities with 50% of owners' equity and 50% of liabilities. The following table shows the method of calculation, unit and the reference value of indicators of indebtedness – leverage (LEV).

**Table 1** Debt ratio

Liabilities ratio	Calculation	Unit	Reference value
Leverage (LEV)	Liabilities / Total assets	%	=50%

Source: The authors' illustration according to Rodić, Vukelić, & Andrić, 2007

Profitability can be measured by various ratios that indicate the ability of company in achieving net income compared to the invested resources. The following table provides the overview of profitability indicators and the method of calculating reference values.

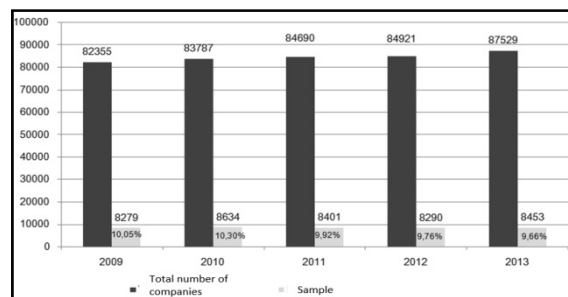
**Table 2** Profitability ratios

Profitability ratios	Calculation	Unit	Reference value
Return on assets (ROA)	Net income / Total assets	%	≥10%
Return on equity (ROE)	Net income / Capital	%	≥15%
Gross margin	(EBIT + cost of interest) / Total revenue	%	>0
Net margin	Net income / Total revenue	%	>0

Source: The authors' illustration according to Dyson, 2010

Since the return on assets (ROA) has a positive effect on the market value of company (see more: Asiri, 2015), the analysis of profitability of the Serbian economy is based on the application of ROA.

Initial sample consists of 42,913 observations of companies that were operating in the Republic of Serbia in the period 2009-2013. In order to reduce the influence of extremely high or low rate of ROA and LEV, 1% companies with the highest and 1% of the company with the lowest values of ROA and LEV were eliminated from the initial sample. The final sample includes 42,057 observations of annual ROA and LEV in the period 2009-2013. The following figure shows the characteristics of sample and population.



**Figure 1** Total number of companies and sample size  
Source: The authors' illustration according to RSZ 2014; RSZ, 2013; RSZ, 2012; RSZ, 2011; RSZ, 2010

Analysis of the efficiency of borrowing in the function of achieving better profitability was conducted in two steps. First, the descriptive statistical analysis of ROA and LEV of companies in the Republic of Serbia was conducted. Second, a correlation analysis between ROA and LEV was carried out, in order to give an answer to the question whether the additional borrowing is accompanied by higher profits.

### 2. Descriptive statistics of indebtedness and profitability of companies in the Republic of Serbia

The indebtedness and profitability of Serbian economy is expressed on the basis of indicators of LEV and ROA in the period 2009-2013. It was measured according to aggregated data from the balance sheets and income statements. The following table presents the results of LEV of companies in the Republic of Serbia in the period 2009-2013.

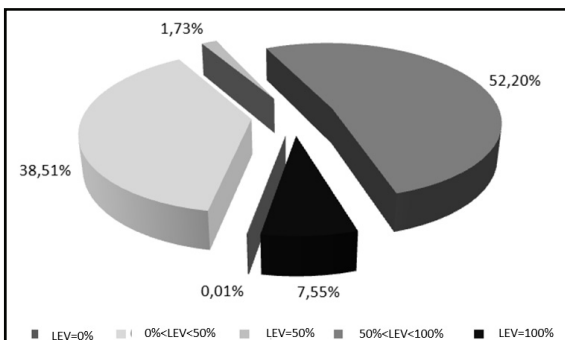
**Table 3** The indebtedness of companies in the Republic of Serbia in the period 2009-2013

Year	2009	2010	2011	2012	2013	2009-2013
Number of companies	8,279	8,634	8,401	8,290	8,453	42,057
LEV	57.61	59.05	57.95	57.62	56.06	57.67
Min.	0.00	0.00	0.00	0.00	0.00	0.00
Max	1.00	1.00	1.00	1.00	1.00	1.00
St. dev.	0.28	0.28	0.28	0.28	0.28	0.28

Source: The authors' calculation

Analysis of the indebtedness of companies in the Republic of Serbia in the period 2009-2013 indicates that the average indebtedness of companies was 57.67%. That means that companies' activities were financed 57.67% from liabilities, and 42.33% from equity. Although the average debt is slightly above the traditional boundaries (50%), it can be said that the indebtedness of companies in the Republic of Serbia is acceptable and that companies on average are not too indebted.

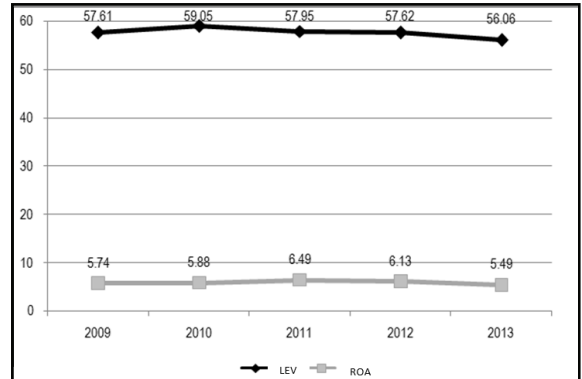
The descriptive statistical analysis also indicates that the LEV is in the range from a minimum of 0% to the maximum 100%. This means that there are companies in the Republic of Serbia which are financed entirely from capital, or from liabilities. Only 5 of the 42,057 observations of companies showed financing their activities exclusively from equity. On the other hand, 3,177 or 7.5% of companies were financing their activities entirely from the liabilities. Figure 2 shows the distribution of companies according to the level of indebtedness.

**Figure 2** Distribution of the companies according to the level of indebtedness

Source: The authors' illustration

The indebtedness of companies in the Republic of Serbia was relatively balanced and it does

not record significant fluctuations since it ranged from 56.06% to 59.05% (Figure 3). Since 2010 it reveals the constant improvement of the structure of financing in terms of reducing the share of liabilities.

**Figure 3** Indebtedness and profitability of companies in the Republic of Serbia in the period 2009-2013

Source: The authors' illustration

The following table shows the profitability of companies in the Republic of Serbia in the period 2009-2013.

**Table 4** The profitability of Serbian companies in the period 2009-2013

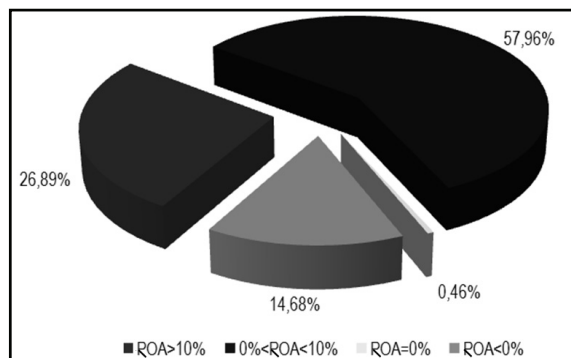
Year	2009	2010	2011	2012	2013	2009-2013
Number of companies	8,279	8,634	8,401	8,290	8,453	42,057
ROA	5.74	5.88	6.49	6.13	5.49	5.95
Min.	-35.63	-35.50	-35.56	-35.29	-35.51	-35.63
Max.	55.26	55.28	54.50	55.29	55.28	55.29
St. dev.	12.32	12.09	11.94	11.87	10.79	11.82

Source: The authors' calculation

The profitability of companies in the Republic of Serbia in the period 2009-2013 is positive and the average value of 5.95% means that companies generated 5.95 RSD from 100 RSD of total assets invested. Although the profitability of companies in the Republic of Serbia is positive, it is not at the satisfactory level of 10%. Further analysis shows that the profitability of companies in Serbia ranges from -33.56% to 55.29%. Negative profit-



ability indicates that the companies made a loss. Figure 4 presents the distribution of companies according to the level of ROA.



**Figure 4** Distribution of the companies according to the level of ROA  
 Source: The authors' illustration

The results of distribution of companies based on the level of ROA show that 26.89% of companies achieved satisfactory profitability (above 10%). Most of the companies (83.85%) operated with profit. The neutral result was achieved by only 0.46% of companies, while 14.68% of companies achieved a loss.

### 3. Correlation analysis between indebtedness and profitability

In order to investigate whether the borrowing of companies in Serbia is related to the effective investment of resources and higher profitability the following hypothesis is set:

*H<sub>0</sub>: There is a strong positive relationship between LEV and ROA of the companies in the Republic of Serbia.*

In order to test the hypothesis, a non-parametric test correlation based on Spearman coefficient was conducted (according to Field, 2009). The statistical test was carried out using the statistical software package SPSS Statistics IBM version 21. The results of the correlation analysis for the period 2009-2013 are presented in the following table.

**Table 5** Correlation analysis


2009		ROA	LEV
Spearman correlation coefficient	ROA	1.000	<b>-0.360</b>
	LEV	-0.360	1.000
	p		<b>0.000</b>
	Number of observations	8.279	8.279
2010		ROA	LEV
Spearman correlation coefficient	ROA	1.000	<b>-0.393</b>
	LEV	-0.393	1.000
	p		<b>0.000</b>
	Number of observations	8.634	8.634
2011		ROA	LEV
Spearman correlation coefficient	ROA	1.000	<b>-0.392</b>
	LEV	-0.392	1.000
	p		<b>0.000</b>
	Number of observations	8.401	8.401
2012		ROA	LEV
Spearman correlation coefficient	ROA	1.000	<b>-0.422</b>
	LEV	-0.422	1.000
	p		<b>0.000</b>
	Number of observations	8.290	8.290
2013		ROA	LEV
Spearman correlation coefficient	ROA	1.000	<b>-0.390</b>
	LEV	-0.390	1.000
	p		<b>0.000</b>
	Number of observations	8.453	8.453
2009-2013		ROA	LEV
Spearman correlation coefficient	ROA	1.000	<b>-0.391</b>
	LEV	-0.391	1.000
	p		<b>0.000</b>
	Number of observations	42.057	42.057

Source: The authors' calculation

In the period 2009-2013 the value of correlation coefficients were constantly negative and ranged from -0.360 to -0.422 with a level of significance of 0.01. Results indicate the existence of asignificant negative correlation between the level of indebtedness (LEV) and profitability (ROA) of companies in the Republic of Serbia during the period 2009-2013. It can be concluded that the additional borrowing in the Republic of Serbia is not accompanied by the achieving of a better level of profitability. Thus, the null hypothesis H<sub>0</sub> is rejected and the alternative hypothesis is accepted. According to results it can be concluded that the additional borrowing and higher level of indebtedness are followed by an inefficiency of investment and lower profitability ratio.

## Conclusion

According to the Chamber of Commerce and Industry of Serbia (Privredna komora Srbije, 2015), the period 2009-2013 was a period of economic growth, relatively stable level of indebtedness and a positive profitability. Analysis of indebtedness of companies in the Republic of Serbia shows that companies on average have more liabilities than own capital. The average indebtedness of companies in the period 2009-2013 was 57.67%, which means that 57.67% of company's activities were financed by debt.

Analysis of the relationship between the level of indebtedness and the level of profitability indicates that companies in Serbia do not make an efficient investment from borrowing which is above the traditional level. A higher level of indebtedness is not accompanied by the higher rate of return on assets. Namely, there is a significant negative correlation between the level of indebtedness and the level of profitability, which means that companies which have a higher level of indebtedness generate lower (worse) profitability. This may be a problem for the survival and growth of companies with the higher level of indebtedness. 

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## ✉ Correspondence

### Kristina Mijić

Faculty of Economics in Subotica  
 Segedinski put 9-11, 24000, Subotica, Serbia  
 E-mail: [mijick@ef.uns.ac.rs](mailto:mijick@ef.uns.ac.rs)

# Study of the Problems of Technologizing of Industrial Complex of Russia

**Alexander Miller**

Omsk State University named after F.M. Dostoevsky, Omsk, Russia

## Abstract

The development of the global economic system leads to the fact that modern production is becoming more technological and capital intensive, requires highly skilled labor and cannot provide work places for a large number of low-skilled workers. In addition, each high-tech work place creates several additional work places in other industries. Many technologies that were first used in industrial production were later used in other industries, increasing their efficiency and competitiveness and thus ensuring the overall economic development. Scientific research and development for the industry are becoming more transdisciplinary; hybrid research areas as well as cross-disciplinary technologies appear.

All this happens under the formation of the sixth technological structure in the world economic system. It is characterized by the development of nanotechnology, IT-technologies, a sharp decline in energy and materials production. This is the reason why the world's hi-tech-trends, such as software engineering, additive production, robotics, development of new materials for a specific product, which gives it unique properties, appear.

The main problem is that the Russian industrial complex is not ready for unconditional acceptance of these global technological challenges for the most part organizationally, not economically. We need a simple and well-defined organizational and economic mechanism of technologizing of domestic production. Despite the current economic difficulties, there are enough sources of such technological transition funding. They are: entry into the large-scale investment and infrastructure projects on a national scale; participation in projects of field development of the leading oil and gas companies; the programmes of innovative development and R&D programmes of state companies, industrial state programmes; subsidies and grants of development institutions; private funds of enterprises, etc.

This issue is extremely important and urgent but the Russian scientific community, by all accounts, currently is only moving from the generalization of the problems of the domestic industry technological backwardness to the development of the methodological basis of the Russian industry technological transition in the framework of clearly marked in recent years, promising areas and the availability of internal challenges and obstacles. It is important to emphasize that for some countries the current global trend is technologization but for Russia this trend can be classified as catching-up technologization that determines various subtleties of its scientific results.

## Keywords

Technologization, industrial complex, technological structure, technological transition, innovations.

## Introduction

**A holistic vision of the problem of technologization of the industrial complex of Russia in the innovative transformation of the Russian economy.**

Technologization of the industrial complex of Russia takes place in the framework of development in the global economic system of the sixth technological stage, characterized by the devel-

opment of nanotechnologies, IT-technologies, a sharp decline in energy and materials production. This is the reason why the world's hi-tech-trends, such as software engineering, additive production, robotics, development of new materials for a specific product, which gives it unique properties, appear.

The randomness of the selection of the above mentioned global technological trends in industrial production is confirmed by the forecasts. Thus,

the software market for computer engineering, according to experts, will increase by 8.5 % per year; global sales of industrial robots will grow at least 5 % a year; the growth rate of additive manufacturing exceeds 25 %. About 80 % of innovations in leading industries and sectors of the economy are based on the introduction of new materials and production technologies (Russian Federation in figures, 2015).

Russia is far behind in these areas. Thus, the average global density of industrial robots equals 62 robots to 10 thousand people working in the industrial sector. In comparison, in Russia 2 robots account for the same number of people employed in the industrial sector. Russia's share in the total number of operating in the world additive manufacturing systems is only 1,4% (Russian Federation in figures, 2015). Scientific and technological achievements are a bit better in computer programming and engineering as well as in the creation of new materials; but still the level of Russia in these areas is not comparable with the world one. Moreover, there is no critical necessity for the development of internal need that is understood as the need of national organizations in these developments.

## 1. Methodology

### 1.1. Scientific background to the study of technologization of the industrial complex of Russia

The foundations of modern understanding of technologization were laid by Th. Schumpeter. In the book "Theory of economic development" he shows its key role in the economic development of society. He believes that technologization should be understood as innovation in production and non-production sphere of technological, organizational and economic nature. According to Schumpeter, there are five cases of implementation of new combinations of production factors: 1. Implementation of a new good which is still unknown to consumers, or the creation of new quality or another good. 2. Introduction of a new (virtually unknown in this sphere of activity) method of production which is based on the new scientific discovery and can represent a new method of the relevant goods' usage. 3. Development of a new market where such sphere of activity has not been presented yet, regardless of whether this market has existed before or not. 4. Obtaining a new source of raw materials or semi-finished products, regardless of whether this source has existed be-

fore or it has simply not been taken into account or considered unavailable, or it will be created in the future. 5. Carrying out appropriate restructuring, for example, ensuring a monopoly position or undermining the monopoly position of another business entity (Schumpeter, 1982, 452 p).

Th. Schumpeter accordingly gave a detailed description of organizational and technological activities affecting the nature and speed of the economic system development. Organizational and technological activities are aimed at: the creation, organization of production and sales of radically new products or products with new consumer properties; the creation and application of new (or upgrading of existing) technologies of production, distribution and use of products; the application of structural, financial and economic, personnel, informational and other innovations providing either cost savings, or the growth of production volumes and sales of marketable products in the process of their development, organization of production, production and distribution.

The theory of "long waves" developed by N. Kondratieff explains the idea of technologization in collaboration with economic downturns and upturns. The essence of this theory, in its most general terms, can be described in the following way: every major technological shift leads to the creation of numerous large and small innovations and opens up new areas of capital application; rapid accumulation of capital in new industries leads to long-term economic growth; increase in production of new products leads to market saturation, and the demand for new products falls sharply; the amount of capital involved in new industries during the period of active expansion of production becomes excessive; there begins a long depression, which can be overcome only as a result of the next technological breakthrough.

There exist two approaches which consider a specific mechanism of primary catch-up technologization.

The first approach is presented in the study of G. Mensch and A. Kleinknecht, who believe that the deterioration of the enterprise condition creates incentives for the development of new technologies. On the contrary, when an enterprise prospers there is no need to change anything seriously in already-established production. G. Mensch indicates that the end of prosperity of old industries increases the tendency of capital owners to invest in new products and technologies. Despite the fact that the profit in the depression phase is small, the owners see less risk in investment of capital in

changes than in investment of capital in old products and technologies or debt obligations (Mensch, 1979, pp.60-74). A. Kleinknecht stresses (Kleinknecht, 1987, 235 p.) that during the prolonged economic crises the transition of an industrial enterprise from the strategy of profit maximization (which it adheres to in a period of prosperity) to the strategy of minimization, depending on the market conditions, takes place. As long as the existing products and technologies bring substantial profit, the tendency to the development of new technologies is low, as production activities are always associated with risk. When there comes a prolonged crisis and prospects in traditional industries deteriorate, the risk of the emergence of new technologies stops being an insurmountable obstacle, as any other alternatives can be even more risky. The overall conclusion which can be done on the basis of this scheme is the following: the largest number of emerging basic technologies evolves in the period of heavy and prolonged depression.

The second approach was developed by G. Clark. From his point of view, a prosperous industrial enterprise, which is confident in the prospects of expansion of the market and profit growth, shows increased organizational and technological activities (Clark, 1981, pp. 308-322). In case of difficulties the company is not engaged in technological changes.

Therefore, the bulk of the primary emerging technologies is implemented in the period of long-term improvement of conditions.

The target reference point is the development of theoretical and methodological and practical aspects of technologization of enterprises of the industrial complex of Russia. It actualizes the concept of technologization of enterprises as global and national challenge to the modern innovation economy; the spread of elements of the new technological stage in the sectors of the domestic manufacturing industry; monitoring of technologization of enterprises of the Russian industrial complex.

The concept of technologization of industrial enterprises of manufacturing industry should be understood as the way of a system organization of production and economic activities of enterprises, based on bringing the used equipment and technologies in line with global technological stage and market conditions. The differences from the periodic replacement of equipment and technologies that companies used to implement and implement generally are:

- 1) A significant tightening of the requirements for technical and technological content of the production process in recent years.

Some time ago or even today there existed (or still exist) a machinery and equipment for manufacturing of products through traditional machining; we used (or still use) such automation of production processes as relays and switches; and the standard materials used in production were (are still) metals and plastic. In the future everything will change greatly: additive production and laser processing will be used for manufacturing of products; industrial robotics and sensor systems will be an integral part of production processes; composite materials will be used widely.

- 2) In today's Russia such system work has never been performed.

Some private initiatives in this field can not form a critical mass of different advanced domestic production of high technological level, complementing each other. The creation of such "high-tech cluster" in the present conditions can be realized only upon the development of organizational and economic mechanism at the national level, which will be subdivided into sectoral and regional levels as well the level of enterprises.

The choice of manufacturing industries for priority technologization is explained both by the presence of "chain" of added value in these industries (which increases the competitiveness of the country) and the changes in institutional conditions for domestic enterprises in 2014-2015 (which include devaluation of the ruble, sanctions and decline in oil prices). The combination of these factors leads to a quite logical turn towards the manufacturing sector in state priorities of the economic development of Russia.

Now the average age of the equipment in manufacturing industry in Russia is 12 years. Depreciation of fixed assets equals 45%. In a number of strategic industries (machine tools, electronic industry, pharmaceutical, medical industries) the share of imported equipment and products reach 80%, and in some cases it is even 90%. In most cases almost all Russian equipment is old (Industry of Russia, 2014).

At the meeting of the Presidium of the Presidential Council of the Russian Federation on economic modernization and innovative development of Russia "On the development of new production technologies" in September 2014 the following perspective (from the point of view of world

trends) technological directions were identified: additive technology, new materials, industrial automation and robotics (The solutions as a result of the meeting of the Presidium of the Council under the President of the Russian Federation on economy modernization and innovation development. About development of new manufacturing technology, 2014). These directions can be considered clear benchmarks for technologization of the manufacturing enterprises of the Russian Federation

### **1.2. Justification and disclosure of the content of the technical and technological approach to the study of technologization of the industrial complex of Russia**

The main tasks of technologization of the industrial complex include:

1. Disclosure of the technical and technological approach will allow to obtain fundamentally new results while studying the processes of technologization of industrial enterprises. The essence of the technical and technological approach is that technologization is considered as a non-isolated reproduction process, but a process which is included in the technical and technological cycle of an industrial enterprise.

This approach has its own unique features:

1) it is based on the reproduction interpretation of technologization which is inextricably interlinked with the development of the industry; 2) target orientation of management on the resource requirements of the technologization process, namely, quality information and technical support at all its stages aimed at improving the competitiveness of manufacturing industries; 3) taking into account special priorities, principles and functions of management of development of the enterprise technologization; 4) information flexibility which suggests that the processes of technologization are formed, first, on the basis of the specificity and dynamics of the factor influence and, second, from the signals of deviations from the desired reproduction path; 5) versatility in application in relation to enterprises of various branch affiliation; 6) predetermination by the conditions of modern technological evolution; 7) the ability to reduce fragmentation and segmentation in the methodology of the subject area of the research.

The approach will allow to: 1) formalize technologization as a key process of technological policy of industrial development in Russia; 2)

identify the specificity of catching up technological modernization; 3) synthesize the effect of macro- and micro factors; 4) give economic evaluation of the integrated result of technologization of manufacturing enterprises.

2. Disclosure of the multifaceted content and expansion of multi-orientation of implementation of technologization in domestic manufacturing industry in the framework of the priorities of the Russian scientific and technological complex development are focused on solving new problems associated with the development of a new technological stage. In this connection, it is advisable to identify institutional constraints to the development of modern production technologies. The first constraint is the strong presence of the state in the industry. A high role of the state in the industry and a huge amount of public order determine the attitude of industrial enterprises to innovations, the need for production renovation and introduction of new technologies. In Russia the state creates innovative development by means of using the administrative resource, although international experience shows that private companies introduce innovations more readily and more efficiently. If an industrial enterprise has a government order it means that this company doesn't actually need new technologies. The situation is different with private enterprises which "serve the market" and, therefore, need new technologies.

In addition, there is a dilemma: on the one hand, the state recognizes that its objective is to increase the number of jobs in the country; on the other hand, it also stands for an active introduction of innovations, which leads to an increase in production efficiency, increase in the level of automation, and, accordingly, the release of workers. The introduction of production technologies leads to the decrease of dependence on a large number of low-skilled labour resources, and increases the dependence on a small number of highly qualified employees. It means that it will be necessary to release a significant number of low-skilled workers; and this invariably causes social tensions, which the state is also trying to control.

The second constraint is connected with a high level of monopoly. The use of new production technologies enables an enterprise to gain a com-

petitive advantage by improving manageability, speed and efficiency of production processes. In developed countries, the main investor in research and development is the industry, whose share in the total cost of private business in this area is 60-90%. Such significant amounts of investment in R&D are explained by the desire of companies operating in a competitive environment, to reduce their costs. In Russian conditions, when there are practically no competitors in some industrial sectors, it is extremely difficult to motivate entrepreneurs to innovative behavior.

The third constraint is related to the fact that national proposals of technological innovation for the introduction in the industry are very limited. Currently 62% of Russian enterprises do not see the possibility of using domestic equipment and raw materials instead of imported ones because of the lack of the former. Herewith, 35% of enterprises have a claim relating to domestic equivalents (Russian Federation in figures, 2015). Under these conditions, in some cases it is easier and cheaper for the Russian industrial enterprises to buy foreign scientific and technical production. In addition, one more serious problem is connected with the fact that manufacturers just do not have enough information about domestic developments.

The lack of incentives for the introduction of industrial technologies is the fourth institutional constraint. Inflexible fiscal policy, high social insurance burden, and administrative barriers contribute to the reduction of investments of Russian manufactures in innovative technologies. If the burden on manufacturing business is further increased, especially the compulsory social insurance payments, enterprises will push innovations in the residual financing principles even stronger. In addition, investments in own or purchased innovations carry certain risks, which also reduces the motivation to free up more funds for them.

The innovation policy which followed supports so-called "garage" innovations, the main consumer of which is small and medium-sized business. In this regard, there is an urgent need to develop a mechanism which will allow to stimulate large enterprises so that they invest in R&D and introduce innovative technologies.

This leads to the conclusion that for the effective development of innovations in the Russian industry it is necessary: firstly, to create favorable conditions, and secondly, to concentrate efforts and resources on the priority (in terms of global technology trends) directions.

3. The argumentation of the content and the development of directions of realization of organizational and economic mechanism of the technologization of manufacturing enterprises in the conditions of economic constraints open up new fields of research connected with processes of technologization of both manufacturing enterprises, and enterprises in various industrial branches.

## 2. Study results

The expected results will be focused on two areas:

The first result is associated both with the expansion of theoretical knowledge and obtaining new data about the processes of technologization of manufacturing enterprises. It is expressed in the development of a new scientific concept of technologization of manufacturing enterprises, which develops the theory of the organization and the general theory of modern management. The increment of scientific knowledge is based on the justification of the specific of technologization of manufacturing enterprises, which lies in the transformation of traditional subject matter, object, goals, objectives, principles, functions and technologization tools in accordance with the value and target guidelines of the organization of industrial production, focused on solving the production problems of the manufacturing industry. The concept will be based on technical and technological approach to the formation of modern technologization processes, quantification and parametric methods that underpin the assessment tools. In aggregate, it can improve the quality of managerial decisions in the subject area of the research, allowing to establish a quantitative determination regarding the quality characteristics of technologization of manufacturing enterprises, as well as determine the parametric ratio of technologization parameters and management of manufacturing system of manufacturing enterprises. The developed concept of technologization of enterprises as a global and national challenge for the modern industry will find its application in the theoretical and methodological substantiation of the spread of elements of the new technological stage in the sectors of the domestic manufacturing industry (additive production, digital production, robotics, etc.).

The second result is focused on the theoretical and methodological basis of the principles and mechanisms of regulation of technologization of manufacturing enterprises from the viewpoint of a

dynamic system process. This process includes management actions which are aimed at the organization, analysis, planning, forecasting, regulation, control over the formation and direction of the technologization impact on the performance of the manufacturing enterprises; and are designed to provide enterprises with optimal income in the current and future periods. To achieve this result we propose a model of monitoring of technologization of manufacturing enterprises of the Russian Federation in the conditions of economic constraints. The proposed monitoring will be based on the study carried out by A. Bogdanov on the conditions and factors ensuring the equilibrium of systems. According to his study, the highest form of organization is "the triune organization of things, people and ideas". The violation of equilibrium of the system may lead to its negative or positive change. The first means destruction, the second - means its development. This very fact determines the degree of a stable state of the system (Bogdanov, 1989, 304 p.). The processes of technologization need to be constantly monitored, assessed and forecast from the perspective of the direction of their development. Monitoring of technologization of manufacturing enterprises based on key economic indicators allows to assess the current state of the enterprise from the position of, first of all, microeconomic situation by calculating the values of these indicators which were formed during a specific reporting period (Miller, 2013, pp. 105-113). Such monitoring can be called monitoring of the main technologization process. Meanwhile, integrated assessment of technologization also involves tracking future mega- and macro-economic trends, economic, social and political aspects of the enterprise development. Thus, it is advisable to monitor the preventive process of technologization. Monitoring of preventive technologization process should be understood, above all, as monitoring of "the future periods", tracking the most probable directions of the future enterprise development in order to adjust the current development strategy. If monitoring of the main technologization process operates according to the system "current development - future development", i.e. the results of today's period allow to generate proposals for improving the functioning of the enterprise in the future, it means that monitoring of preventive technologization process uses a system of "future development - current development"; in other words, it tracks forecasted potential future options in order to develop preventive measures to pre-

pare the enterprise for both prospective changes in the external business environment, and the formation of technologization processes. The dynamic development of the manufacturing enterprises implies that they should conduct not just monitoring of preventive and main processes, but also monitoring of technologization consequences for manufacturing enterprises. It can be noted that performance of modular technologization monitoring lies primarily in the fact that it gives the opportunity to focus not only on the problems of technologization processes, but also on the ways of their solving, which, in addition, saves costly time for making forward-looking strategic decisions regarding the enterprises of the manufacturing sector. A characteristic advantage of the proposed monitoring tools is the ability to draw conclusions on the technologization implementation, which allows an industrial enterprise to strengthen its competitive position; increase its attractiveness; increase efficiency of utilizing its potential and the quality of organizational and administrative methods of management; as well as comprehensively approach to the justification of investment in technologization taking into account risk factors.

## Conclusion

In order not to fall out of the world "industrial-innovative train" it is vitally important for Russia to move from labor-intensive industries to more innovative industries with high added value. To achieve technological safety and integration of national economy into the world one at leading levels one should stimulate the development of our own innovation-oriented manufacturing industry and develop "cross-cutting" technologies that can be applied in different industries. Within the framework of public-private partnership such factors as support of the development of advanced production technology, training of workers, providing access of manufacturing enterprises to financing on attractive terms are required.


It is necessary to reverse the situation where expensive loans, inflexible tax burden, the decline in domestic demand lead to the fact that many domestic manufacturing enterprises are on the edge of survival, rather than are competitive; as a result the demand for domestic development is not growing.

Consequently, the main areas of the use of the achieved results will be: updating the content of state programmes towards adding some sub-programmes (sections) on technical re-equipment



in accordance with the aims of the new technological stage; granting in contests of development institutions some activities aimed at supporting research in the field of digital and additive manufacturing, robotics and new technologies.

## ACKNOWLEDGMENTS

The work is carried out with financial support of the Ministry of Education and Science of the Russian Federation, within the state task to HIGHER EDUCATION INSTITUTIONS regarding carrying out research works for 2014-2016, the project No. 2378. 

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## ✉ Correspondence

**Alexander Miller**

Omsk State University  
Prospect Mira 55a, 644077, Omsk, Russia

E-mail: [aem55@yandex.ru](mailto:aem55@yandex.ru)



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- Ljubojević, T.K. (2000a).
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Author, A. A., Author, B. B., & Author, C. C. (Year). Title of article. *Title of Periodical, volume number*(issue number), pages.

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Tanasijević, V. (2007). A PHP project test-driven end to end. *Management Information Systems*, 5 (1), 26-35.

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Journals paginated by volume begin with page 1 in issue 1, and continue page numbering in issue 2 where issue 1 ended, e.g.

Perić, O. (2006). Bridging the gap: Complex adaptive knowledge management. *Strategic Management*, 14, 654-668.

➔ **Journal article, two authors, paginated by issue**

Strakić, F., & Mirković, D. (2006). The role of the user in the software development life cycle. *Management Information Systems*, 4 (2), 60-72.

➔ **Journal article, two authors, paginated by volume**

Ljubojević, K., & Dimitrijević, M. (2007). Choosing your CRM strategy. *Strategic Management*, 15, 333-349.

➔ **Journal article, three to six authors, paginated by issue**

Jovanov, N., Boškov, T., & Strakić, F. (2007). Data warehouse architecture. *Management Information Systems*, 5 (2), 41-49.

➔ **Journal article, three to six authors, paginated by volume**

Boškov, T., Ljubojević, K., & Tanasijević, V. (2005). A new approach to CRM. *Strategic Management*, 13, 300-310.

➔ **Journal article, more than six authors, paginated by issue**

Ljubojević, K., Dimitrijević, M., Mirković, D., Tanasijević, V., Perić, O., Jovanov, N., et al. (2005). Putting the user at the center of software testing activity. *Management Information Systems*, 3 (1), 99-106.

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Strakić, F., Mirković, D., Boškov, T., Ljubojević, K., Tanasijević, V., Dimitrijević, M., et al. (2003). Metadata in data warehouse. *Strategic Management*, 11, 122-132.

➔ **Magazine article**

Strakić, F. (2005, October 15). Remembering users with cookies. *IT Review*, 130, 20-21.

➔ **Newsletter article with author**

Dimitrijević, M. (2009, September). MySQL server, writing library files. *Computing News*, 57, 10-12.

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VBScript with active server pages. (2009, September). *Computing News*, 57, 21-22.

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### **Basic format for books**

Author, A. A. (Year of publication). *Title of work: Capital letter also for subtitle*. Location: Publisher.

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➔ **Book, one author**

Ljubojević, K. (2005). *Prototyping the interface design*. Subotica: Faculty of Economics.

➔ **Book, one author, new edition**

Dimitrijević, M. (2007). *Customer relationship management* (6<sup>th</sup> ed.). Subotica: Faculty of Economics.

➔ **Book, two authors**

Ljubojević, K., Dimitrijević, M. (2007). *The enterprise knowledge portal and its architecture*. Subotica: Faculty of Economics.

➔ **Book, three to six authors**

Ljubojević, K., Dimitrijević, M., Mirković, D., Tanasijević, V., & Perić, O. (2006). *Importance of software testing*. Subotica: Faculty of Economics.

➔ **Book, more than six authors**

Mirković, D., Tanasijević, V., Perić, O., Jovanov, N., Boškov, T., Strakić, F., et al. (2007). *Supply chain management*. Subotica: Faculty of Economics.

➔ **Book, no author or editor**

*Web user interface* (10th ed.). (2003). Subotica: Faculty of Economics.

➔ **Group, corporate, or government author**

Statistical office of the Republic of Serbia. (1978). *Statistical abstract of the Republic of Serbia*. Belgrade: Ministry of community and social services.

➔ **Edited book**

Dimitrijević, M., & Tanasijević, V. (Eds.). (2004). *Data warehouse architecture*. Subotica: Faculty of Economics.

➔ **Chapter in an edited book**

Boškov, T., & Strakić, F. (2008). Bridging the gap: Complex adaptive knowledge management. In T. Boškov & V. Tanasijević (Eds.), *The enterprise knowledge portal and its architecture* (pp. 55-89). Subotica: Faculty of Economics.

➔ **Encyclopedia entry**

Mirković, D. (2006). History and the world of mathematicians. In *The new mathematics encyclopedia* (Vol. 56, pp. 23-45). Subotica: Faculty of Economics.

## C. UNPUBLISHED WORKS

➔ **Paper presented at a meeting or a conference**

Ljubojević, K., Tanasijević, V., Dimitrijević, M. (2003). *Designing a web form without tables*. Paper presented at the annual meeting of the Serbian computer alliance, Beograd.

➔ **Paper or manuscript**

Boškov, T., Strakić, F., Ljubojević, K., Dimitrijević, M., & Perić, O. (2007. May). *First steps in visual basic for applications*. Unpublished paper, Faculty of Economics Subotica, Subotica.

### ➔ **Doctoral dissertation**

Strakić, F. (2000). *Managing network services: Managing DNS servers*. Unpublished doctoral dissertation, Faculty of Economics Subotica, Subotica.

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Tanasijević, V. (2003, March). Putting the user at the center of software testing activity. *Strategic Management, 8* (4). Retrieved October 7, 2004, from [www.ef.uns.ac.rs/sm2003](http://www.ef.uns.ac.rs/sm2003)

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Faculty of Economics. (2008, March 5). *A new approach to CRM*. Retrieved July 25, 2008, from <http://www.ef.uns.ac.rs/papers/acrm.html>

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According to Mirković (2001), "The use of data warehouses may be limited, especially if they contain confidential data" (p. 201).

Mirković (2001), found that “the use of data warehouses may be limited” (p. 201). What unexpected impact does this have on the range of availability?

If the author is not named in the introductory phrase, the author's last name, publication year, and the page number in parentheses must be placed at the end of the quotation, e.g.

He stated, “The use of data warehouses may be limited,” but he did not fully explain the possible impact (Mirković, 2001, p. 201).

### ➔ Summary or paraphrase

According to Mirković (1991), limitations on the use of databases can be external and software-based, or temporary and even discretion-based. (p.201)

Limitations on the use of databases can be external and software-based, or temporary and even discretion-based (Mirković, 1991, p. 201).

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Boškov (2005) compared the access range...

In an early study of access range (Boškov, 2005), it was found...

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Another study (Mirković & Boškov, 2006) concluded that...

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(Jovanov, Boškov, Perić, Boškov, & Strakić, 2004).

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According to Jovanov et al. (2004), further occurrences of the phenomenon tend to receive a much wider media coverage.

Further occurrences of the phenomenon tend to receive a much wider media coverage (Jovanov et al., 2004).

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Survey results published in Theissen (2004a) show that...

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Bergson's research (as cited in Mirković & Boškov, 2006)...

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(Britten, 2001; Sturlasson, 2002; Wasserwandt, 1997)

➔ When there is **no publication date**:

(Hessenberg, n.d.)

➔ **Page numbers must always be given for quotations:**

(Mirković & Boškov, 2006, p.12)

Mirković & Boškov (2006, p. 12) propose the approach by which “the initial viewpoint...

➔ **Referring to a specific part of a work:**

(Theissen, 2004a, chap. 3)

(Keaton, 1997, pp. 85-94)

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(K. Ljubojević, personal communication, May 5, 2008).

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Tromesečno. - Nastavak publikacije: Strategijski menadžment = ISSN 0354-8414  
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COBISS.SR-ID 244849927

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