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## KNOWLEDGE MANAGEMENT, INNOVATIVENESS, AND ORGANIZATIONAL PERFORMANCE: EVIDENCE FROM SERBIA

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**ABSTRACT:** *The importance of knowledge management and its contribution to organizational performance and innovativeness has been the subject of many studies and is increasingly gaining recognition worldwide. Our study analyses the impact of knowledge management on perceived organizational performance and innovativeness in the context of the Serbian economy. The results of the empirical research on leading Serbian firms demonstrates the direct and positive effect of knowledge management. The regression results show that knowledge management generally has a positive effect on organizational perfor-*

*mance. Also, the results show that knowledge management is positively related to the different dimensions of organizational innovation (process innovation and administrative innovation). The mediating effects of process innovation and administrative innovation on the relationship between knowledge management and organizational performance are only partially supported.*

**KEY WORDS:** *knowledge creation, knowledge transfer, knowledge embedding, process innovation, administrative innovation, organizational performance.*

**JEL CLASSIFICATION:** M21, D83

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## **1. INTRODUCTION**

Since the 1990s knowledge management has been the subject of intensive studies conducted by academics and business people. The numerous studies that have been conducted in recent years are mainly related to developed economies, whereas a very small number of studies focus on investigating the impact of knowledge management in developing countries (Andreeva and Kianto, 2011) and South Eastern Europe. However, if this conclusion is relativized by observing the integrated knowledge management concept and related areas, it is possible to single out several studies related to these countries. Besides the above-mentioned Andreeva and Kianto (2011), who focused their work on the mediating effects of knowledge processes on innovation, an important initial contribution comes from Child and Czeglédy (1996), who analyzed the importance of managerial learning in institutional changes in Eastern Europe, and Lyles and Salk (1996), who investigated the influence of knowledge acquisition on international joint ventures in Hungary. Lyles (2003) also focused on knowledge flows and organizational learning. With respect to Serbia, important contributions regarding this topic have been made by several authors (Janicijevic, 2006, Bogičević Milikić and Aleksić, 2006, Babić et al., 2008, Petković and Aleksić Mirić, 2009, Petković et al., 2011). The study of knowledge management is particularly interesting for countries that are still in the process of social and economic transition, such as Serbia. The reasons for this should be viewed from two possible perspectives: the fact that in the late twentieth century the resource-based industrial economy began to be transformed into a new economic reality so that the influence of the scientific and technological revolution resulted in the creation of a 'new era', and the development of a knowledge-based economy. In the context of this new social and economic reality, Roberts and Armitage (2008) identified eight key characteristics of the knowledge-based economy.

Serbia, as a country in transition, meets the requirements of the knowledge-based economy only to a certain extent. It should be noted that Serbia constantly tends to become the knowledge-based economy, especially through the EU accession process which has intensified significantly in the recent period. However, the process of building a knowledge-based economy is inhibited by other relevant factors related to human resources: 1) the departure of a large number of highly educated individuals from the country in search of work and better living conditions; 2) the low level of investment in technology, science, and at all levels of education (primary, secondary, and higher education), and 3) the rigidity of the education system in responding to demand in the labour market.

The emigration of talented individuals from the country during or after their schooling lowers the quality of supply in the labour market, which reduces employment opportunities for qualified individuals who could become knowledge workers and holders of knowledge management processes in organizations (Drucker, 1999). As a result, domestic companies become oriented towards transactions using less knowledge and more physical labour and characterized by lower added value, which usually means hiring less qualified workers, despite the global trend of downsizing the number of manual workers in relation to knowledge workers (Davenport, 2002).

The second aspect of knowledge management in countries in transition refers to the application of knowledge management techniques in organizations and their impact on competitive advantage, innovativeness, and organizational performance. This is especially important if the current level of competitiveness of the Serbian economy is taken into account, as well as the ongoing transition process that to a large extent shapes the business environment. A large number of enterprises have been reprivatized and a number have been returned to state ownership, while others use state subsidies or still have no dominant private titular ownership. These companies slow down the transition process and adversely affect other business organizations. The microeconomic and macroeconomic contexts of knowledge management are deeply intertwined. The application of knowledge management techniques in organizations should enable long-term competitiveness, better performance, and a higher level of created value in the economy, which should stimulate overall social development.

Previous studies conducted by Babic et al. (2008) have shown that knowledge management in the process of implementing downsizing strategies results in better organizational performance. The results of that research, and the research perspective developed by Moustaghfir and Schiuma (2013), pointing to the impact of knowledge management on the improvement of innovativeness and organizational performance, constituted the basis for designing the research presented in this paper.

The main purpose of this paper is to establish a link between knowledge management and organizational performance and knowledge management and innovation, as well as to determine the moderator effect of innovativeness on organizational performance. Exploring the impact of independent variables on dependent variables was conducted by using regression analysis. The conceptual model was used for defining four hypotheses, two of which were fully supported, while the two hypotheses relating to the testing of the moderator effects of process

innovation and administrative innovation were partially supported. Apart from the theoretical importance in terms of accepting the formulated hypotheses, the paper has practical implications that point to the profitability of investing in the development of knowledge management concepts in an organization.

## **2. THEORETICAL BACKGROUND AND REVIEW OF LITERATURE**

Once civilization entered the knowledge era, the resource-based view of the firm (Barney, 1991), as a relevant conceptual framework for understanding strategic management, gained a new dimension in the knowledge-based theory of the firm (Grant, 1996, Spender and Grant, 1996) in which knowledge is seen as a strategic asset of an organization that needs to be managed (Bollinger and Smith, 2001). Knowledge management means identifying, developing, and leveraging knowledge across the organization with the purpose of achieving competitive advantage (Alavi and Leidner, 2001). Beveren (2002) suggests that knowledge management should focus on intellectual capital and human resource strategies that stimulate employees' creativity and innovativeness. Knowledge management involves a wide spectrum of activities, designed to enable management, exchange, creation, or improvement of intellectual assets within an organization (Halawi et al., 2005).

In spite of the fact that a large number of authors have investigated knowledge management activities and processes, a uniform approach that could easily classify the content of knowledge management has not yet been defined. According to Demarest (1997), knowledge management consists of five processes: construction, embodiment, dissemination, use, and management. Miller (1999) suggests that knowledge management refers to the acquisition of knowledge (capturing); that is, creation, collection, storage, distribution, and application of knowledge. Armistead (1999) divides the process of knowledge management into three sub-processes: knowledge creation, knowledge transfer, and knowledge embedding. In the context of organizational learning, Argote (1999) distinguishes between three processes: creating knowledge, retaining knowledge, and transferring knowledge. According to Darroch (2003) the knowledge management process consists of three parts: knowledge acquisition, knowledge dissemination, and knowledge utilization. Chen and Chen (2005) propose a four-stage model of the knowledge management process that includes knowledge creation, which, in addition to adding new knowledge, includes correction of existing knowledge, knowledge conversion, and knowledge circulation and completion.

Increasing knowledge in the organization can be done in two ways: by creating knowledge, which includes internal development of new knowledge or the improvement of existing knowledge, and by capturing knowledge, which refers to the inflow of external knowledge into the organization. McElroy (2002) divided the process of knowledge creation into two major processes: 1) production of knowledge, which is synonymous with the process of organizational learning during which new organizational knowledge is created, and 2) integration of knowledge, which enables sharing and distribution of knowledge. Given that knowledge creation is an extremely difficult activity many organizations are turning to a simpler way of acquiring knowledge, which involves acquisition of knowledge from external sources and adaptation of that knowledge to their own needs (Bhatt, 2000). The key advantage of acquiring knowledge over creation of knowledge lies in the reduction of risks of possible outcomes of research processes, which is especially relevant when one takes into account the fact that internal creation of new knowledge often requires greater investment than when knowledge is acquired from external sources. On the other hand, knowledge creation stimulates the development of new ideas, which encourages innovativeness and brings the significant advantage of the exclusivity of emergent knowledge, which in itself can be a source of competitive advantage.

Literature identifies dispersion of knowledge throughout the organization with the processes of knowledge sharing, knowledge transfer, and knowledge exchange. An important initial basis for understanding the process of dispersion of knowledge throughout an organization is given by Argote, Beckman, and Epple (1990), who investigate the effect of knowledge transfer on productivity by analyzing the process of transfer of learning. In later research Argote (1999) regards the transfer of knowledge as the transfer of productivity improvement throughout the organization. Argote and Ingram (2000) define knowledge transfer as a process in which one organizational unit is under the influence of another organizational unit with adequate experience. Some authors make an explicit distinction between these processes, claiming that the process of knowledge transfer involves knowledge sharing by the knowledge sources as well as the acquisition and application of knowledge by the recipient, whereas knowledge exchange involves knowledge sharing (employees provide knowledge to others) and knowledge seeking (employees seek knowledge from others) (Wang and Noe, 2010). From the managerial point of view, which includes the formulation and implementation of knowledge management strategy, the above-mentioned differences are viewed as semantic rather than substantive, which is why these terms are used simultaneously to denote the general process of spreading knowledge among staff members in an organization.

The knowledge embedding process, in essence, stands for the application of knowledge in business processes. In spite of the fact that the processes of knowledge creation, knowledge sharing, and knowledge utilization are often seen as independent and separate, in practice these processes occur simultaneously. In some cases they overlap or follow on from one another. This is particularly pronounced in the case of knowledge transfer and application, because the strategy of socialization (Nonaka and Konno, 1998), that is, personalization, (Hansen et al., 1999) directly supports the simultaneity of these processes. Because of everything that has been mentioned so far, knowledge embedding, in its broadest sense, involves the implementation of all activities related to the processes of organizational knowledge management. In a narrower sense, knowledge embedding refers to the application of knowledge in the course of business activities with the aim of maintaining competitiveness and creating added value.

Numerous studies conducted to date have shown a positive impact of knowledge management on various organizational outcomes. These studies have established a link between knowledge management and process performance (Armistead, 1999), knowledge management and innovativeness (Carneiro, 2000), and knowledge management and business performance (Carlucci et al., 2004), organizational performance (Carmel and Tishler, 2004, Zack et al. 2009), value creation (Schiuma et al., 2007), organizational effectiveness (Zack et al., 2009), and firm performance (Liao, 2011).

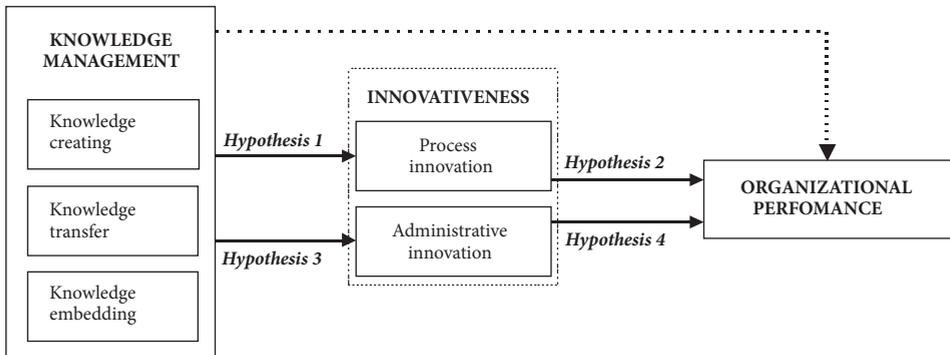
Previous work in this field had theoretical characteristics and focused on the establishment of a link between different aspects of knowledge management and listed organizational outcomes (Armistead, 1999, Gooijer, 2000, Bailey and Clarke, 2001, Kalling 2003, Francisco et al., 2003). Recent works based on empirical research have established a connection between knowledge management and organizational performance (Lee and Choi, 2003, Gloet and Terziovski, 2004, Tanriverdi, 2005, Zack et al., 2009; Kianto, 2011, Liao, 2011).

The main problem in the process of identifying and measuring the effects of applying knowledge management is linked to the fact that neither practice nor theory has been able to develop a methodology that performs the sole function of evaluating the effects of knowledge management practices in organizations. The lack of a uniform methodology can be justified in two ways. First, there is no consistent attitude to what the key performance indicators for all organizations are. Second, the effects of knowledge management are multidimensional, which prevents their precise identification and measurement. With respect to the

above-mentioned facts, it can be concluded that the evaluation of the impact of knowledge management on organizational outcomes may use different indicators, as confirmed by the research presented in literature. Thus, for example, Lee and Choi (2003) analyzed the impact of knowledge management on competitiveness, Darroch (2005) analyzed the impact of knowledge management on financial performance, whereas Zack et al. (2009) observed operational excellence.

In the process of analyzing the impact of knowledge management on organizational outcomes it has been shown that, besides knowledge management's impact on organizational performance and regardless of the way in which outcomes are measured or observed, knowledge management exerts an important influence on an organization's innovativeness. During the 1990s Porter (1990) found that innovation was the basis of long-term sustainable competitive advantage. Despite the importance of the innovative capacity of an organization to its survival and the number of works exploring the impact of innovativeness on different aspects of doing business, no consensus has been reached on a uniform definition or approach to analysis. In earlier work innovativeness was mainly associated with research and development, so the definitions of innovativeness from that period were associated with the effects of this business function in the context of new product development (Dougherty and Hardy, 1996). Williams (1999) expanded the domain of innovativeness to other aspects of doing business. He associated innovation with the discovery, invention, and application of new products, systems, or processes. Quintana et al. (2011) identified three possible approaches to the definition of innovation: 1) innovation as a process, 2) innovation as an outcome, and 3) knowledge-based conceptualization of innovation. These authors suggested that "innovation should be considered as duplicable knowledge considered new in the context it is introduced to and demonstrated useful in practice". At the same time different authors have contributed to the classification of innovation so that the following innovation categories can be found in literature: administrative innovation, technological innovation, product innovation, and process innovation (Jimenez-Jimenez and Sanz-Valle, 2005, Huang and Li, 2009, Perdomo-Ortiz et al. 2009).

**Figure 1.** Research framework



Source: Authors'

Despite the lack of uniform definitions of innovation, a number of previous studies have shown that knowledge management has a positive impact on the innovative capacity of an organization (Carneiro, 2000, Basadur and Gelade, 2006, Marques and Simon, 2006). On the other hand innovation, as a prerequisite for sustainable competitive advantage, should exert a positive impact on organizational performance. The conceptual framework of the research presented in this paper has been defined in accordance with the foregoing considerations (Figure 1).

The research objectives have been delineated in accordance with the defined conceptual framework. They can be described as follows:

- First, identifying the impact of knowledge management on organizational performance;
- Second, identifying the impact of knowledge management on innovativeness;
- Third, analyzing the joint impact of knowledge management and innovativeness on organizational performance, with the purpose of determining the possible moderating impact of innovativeness on organizational performance.

With respect to the abovementioned research objectives, the analysis of knowledge management used the approach proposed by Armistead (1999). According to this approach all knowledge management processes are divided into knowledge creation processes, knowledge transfer processes, and knowledge embedding processes. Organizational performance was analyzed through an approach based on the analysis of perceived organizational performance in relation to productivity, costs, quality of products and/or services, customer satisfaction and the like. Analysis of innovativeness was based on the approach

used in the research by Perdomo-Ortiz et al. (2009) and Jimenez-Jimenez and Sanz-Valle (2005), in which process innovation and administrative innovation can be differentiated.

The study was based on the following hypotheses:

Hypothesis 1: Knowledge management involving the knowledge creation process, knowledge transfer process, and knowledge embedding process is positively related to process innovation.

Hypothesis 2: Knowledge management involving the knowledge creation process, knowledge transfer process, and knowledge embedding process is positively related to organizational performance through their effect on process innovation within organizations.

Hypothesis 3: Knowledge management involving the knowledge creation process, knowledge transfer process, and knowledge embedding process is positively related to administrative innovation.

Hypothesis 4: Knowledge management involving the knowledge creation process, knowledge transfer process, and knowledge embedding process is positively related to organizational performance through their effect on administrative innovation within organizations.

### **3. METHODOLOGY OF RESEARCH**

Research of talent management practice was conducted on a sample of organizations with more than 50 employees. The reason for this way of constituting the sample was the assumption that organizations with more than 50 employees are able to conceptualize knowledge management strategy (Darroch, 2003).

In the process of selecting organizations for the research sample, two additional limitations were arbitrarily established. The first limitation referred to the organization's age. Since it was assumed that organizations need time to complete the process of starting a business, constituting the pool of employees, and defining a knowledge management strategy, the minimum age limit was set at five years. The second limitation referred to public, i.e., state-owned, enterprises. The argument for the second limitation was that in the Republic of Serbia average earnings in the public sector and state-owned enterprises are higher than the

average level of earnings in private companies and that many state-owned enterprises stand for natural monopolies. For that reason it was difficult to define objective criteria for assessing organizational performance, causing the sample to be constituted by private business organizations only, regardless of the origin of the capital. The sample included business organizations operating in all sectors of the economy.

Starting from the research model, it could be concluded that it was based on three independent variables and two dependent variables. The required sample size for multiple regression was defined by using the formula  $50 + 8k$  (where  $k$  is the number of predictors, that is, independent variables), which was established by Green (1991). In this specific case, the minimum required number of observed business organizations in the sample was 74.

On the basis of the planned number of business organizations in the sample and previous experience in data collection, it was assumed that 40% of organizations out of the total number of contacted examinees would complete the questionnaire. This implied contacting at least 185 organizations. By using the data obtained from the Serbian Business Registers Agency, 200 private business organizations were randomly selected, after which the data collection procedure began.

With the purpose of ensuring the needed number of organizations for the sample, data collection included three phases recommended by Menon et al. (1999). The first phase involved sending initial electronic mail or making a telephone call aimed at explaining the research purpose and subject and obtaining initial participation consent. The second phase focused on sending questionnaires and the cover letter via electronic mail. After two weeks 57 completed questionnaires were received, so that the initial response rate was 28.5%. The third phase of data collection involved making additional phone calls and sending additional reminders of the questionnaire via electronic mail.

The third phase of data collection finished after two weeks. The total number of completed questionnaires was 81. Three questionnaires were regarded as invalid: two questionnaires were only partly completed, and one questionnaire was rejected as the organization in question had less than 50 employees (their number had decreased during the current year in relation to the data presented in the official financial statements presented to the Serbian Business Registers Agency for the previous year). A total of 78 valid questionnaires was collected, with a total response rate of 39%. Research examinees included executive managers, human resource managers, and directors or heads of business units that were

familiar with the research subject and the situation in their own organization. Sample statistics are presented in Table 1.

**Table 1.** Characteristics of the organizations in the sample: summary report

	<i>Frequency</i>	<i>Proportion (%)</i>
<i>Number of employees</i>		
50 - 249 employees	36	46.2
Over 250 employees	42	53.8
Sum	78	100.0
<i>Sector</i>		
Production	41	52.6
Trade	13	16.7
Service	24	30.8
Sum	78	100.0
<i>Structure of majority ownership</i>		
Domestic private capital	45	57.7
Foreign private capital	33	42.3
Sum	78	100.0

**Source:** Authors' survey data

A five-point Likert scale was used for measuring all variables. For the purpose of reaching high internal consistency (Cronbach's alpha coefficient) between items, i.e., variables, items frequently tested in previous research were used. When necessary each item was translated and linguistically adjusted to the terminology used in domestic knowledge management practice.

SPSS software package version 13.0 was used for data processing.

Knowledge management was analyzed through three basic knowledge management processes: knowledge creation, knowledge transfer, and knowledge application. The analysis of these activities made use of items applied in research by Gold et al. (2001), Darroch (2003), López et al. (2004), Kuo (2011), Zhang and Begley (2011), Lloria (2007), Huang and Li (2009) and Wang and Ellinger (2011). For analyzing innovativeness, items applied in research by Perdomo-Ortiz et al. (2009), Jimenez-Jimenez and Sanz-Valle (2005), and Huang and Li (2009) were used. Assessment of organizational performance used items that were confirmed in the research of Delaney and Huselid (1996), Jaw et al. (2006), Green et al. (2006), Ling and Jaw (2006), Lee et al. (2010), Goldoni and Oliveira (2010), Sheehan and Cooper (2011), and Navarro et al. (2010).

#### 4. RESULTS AND DISCUSSION

The first step in the analysis of results focused on testing internal consistency by calculating the value of Cronbach’s alpha coefficient. Reliability of measurement scale was estimated by using the values recommended by George and Mallery (2003). As presented in Table 2, Table 3, and Table 4, all measurement scales of independent variables and dependent variables showed a high level of Cronbach’s alpha coefficient, which pointed to a high internal consistency. The analysis of the value of the VIF coefficient showed that multicollinearity did not represent a limiting factor in the conducted research.

The analysis of mean values in relation to knowledge management processes (Table 2) showed that organizations paid most attention to the exploitation of employees’ knowledge for practical purposes, stimulation of employees to exchange knowledge and experience in the process of communication, and transformation of customer requirements into improved products or services. It is evident that organizations focused least on creating formal mechanisms for the exchange of best practice within an organization, stimulating employees to experiment with new ideas and approaches in work, and networking with experts outside the organization. In general, organizations focused most on the process of knowledge embedding (knowledge application) and least on the process of knowledge creation.

**Table 2.** Knowledge management: Cronbach’s alpha coefficient, mean and standard deviations

Cronbach's alpha coefficient 0.948		Mean	Std. dev.
<b>KMcre - Knowledge creation process</b>			
KM1	Organization stimulates formal and informal networking between its employees and experts outside an organization.	3.26	1.242
KM2	Employees constantly experiment with new ideas and approaches in their work.	3.12	1.019
KM3	Employees exchange information with professionals and experts from their areas of expertise.	3.36	1.162
KM4	Organization enables employees to become familiar with the work of other employees in an organization.	3.72	1.194
KM5	Organization's employees strengthen their professional competences actively.	3.51	1.102
<b>KMtra - Knowledge transfer process</b>			
KM6	Employees are focused on exchanging the best practice regarding work performance with their colleagues.	3.65	1.030
KM7	Employees exchange ideas with their colleagues in a formal or informal way on a daily basis.	3.95	0.938
KM8	Organization possesses formal mechanisms enabling exchange of the best practice regarding work performance inside different parts of an organization.	3.14	1.090
KM9	Organization has procedures for collecting and distributing suggestions coming from the employees, customers/clients and business partners.	3.62	1.341
KM10	Employees exchange their knowledge and experience in the process of two-way communication.	4.01	0.904
<b>KMemb - Knowledge embedding process</b>			
KM11	Organization stimulates people sharing similar interests to work together in the process of solving problems.	3.74	1.167
KM12	Suggestions from the customers/clients are often applied in the process of improving products/services.	3.99	1.111
KM13	Organization enables application of knowledge and experience with the purpose of improving work efficiency.	3.94	0.944
KM14	Employees' knowledge is used for practical purposes.	4.05	0.979

Source: Authors’ survey data

**Table 3.** Innovativeness: Cronbach’s alpha coefficient, mean and standard deviations

Cronbach's alpha coefficient 0.946		Mean	Std. dev.
<b>INpro - Process innovation</b>			
IN1	Organization introduces many novelties into business processes.	3.78	1.147
IN2	Organization is the leader in introducing new ways of business process performance.	3.42	1.190
IN3	Organization stimulates the development of quality-improvement and cost reduction processes.	4.01	1.063
<b>INadm - Administrative innovation</b>			
IN4	Organization uses advanced management methods.	3.56	1.135
IN5	Organization introduces novelties into business strategies and ways of doing business.	3.73	1.065
IN6	Organization introduces novelties into organizational structure and management systems.	3.77	1.018

**Source:** Authors’ survey data

Although mean values are somewhat standardized in relation to innovativeness (Table 3), it can be seen that organizations focused on quality improvement and cost reduction processes. This state of affairs is in line with current business conditions at the global level and indicates that managers of organizations are looking for ways to improve quality at acceptable costs. On the other hand, it is evident that organizations focused least on adopting modern management methods and techniques. A comparison of rankings points to the general conclusion that organizations are more oriented towards process innovation that can result in certain short-term and long-term cost reduction, rather than administrative innovation that initially requires more investment and time to implement, but provides long-term positive effects.

**Table 4.** Organizational performance: Cronbach’s alpha coefficient, mean and standard deviations

Cronbach's alpha coefficient 0.949		Mean	Std. dev.
<b>OP - Organizational performances</b>			
OP1	Organization is capable of reducing costs of production/sales/services and overhead costs.	4.04	0.918
OP2	Growth/stability of income is better in comparison to the competition.	3.72	1.018
OP3	Employees’ productivity is better in comparison to the competition.	3.63	1.033
OP4	Organization is characterized by the satisfactory profitability level.	3.77	0.979
OP5	Product/service quality is better in comparison to the competition.	3.96	0.946
OP6	New product/service development is better in comparison to the competition.	3.76	1.009
OP7	Satisfaction of customers/clients is better in comparison to the competition.	3.85	0.981
OP8	Organization is capable of fast and effective response to technological and market changes.	3.78	1.147
OP9	Organization solves new problems quickly.	3.77	1.139
OP10	Organization has a good reputation.	4.32	0.904

**Source:** Authors’ survey data

The analysis of the mean values of items that were used for measuring organizational performance points to the conclusion that good reputation and

the ability to reduce costs predominate. This is consistent with the previously stated findings and points to the need to strengthen price competitiveness.

Hypotheses were tested using ordinary least squares (OLS) regression. The results of regression analysis in Model 1 of Table 5 show that each of the three observed knowledge management processes – knowledge creation, knowledge transfer, and knowledge embedding – has a positive and statistically significant impact on process innovation, which fully confirmed Hypothesis 1. What is more, the results of regression analysis in Model 2 show that these three knowledge management processes have a positive and statistically significant impact on organizational performance.

**Table 5.** Results of regression analysis

Variable	Model 1: Dependent variable, process innovation	Model 2: Dependent variable, organizational performance	Model 3: Dependent variable, organizational performance	Model 4: Dependent variable, organizational performance
Knowledge creation process	0.649**	0.632**		0.110
Knowledge transfer process	0.601**	0.598**		0.043
Knowledge embedding process	0.596**	0.662**		0.345*
Process innovation			0.633**	0.330**
R <sup>2</sup>	0.356	0.345	0.400	0.532
Adjusted R <sup>2</sup>	0.347	0.337	0.392	0.506
ANOVA F	41.930**	40.084**	50.700**	20.723**

\*\*p < 0.01; \*p < 0.05. All regressions include constant. Beta coefficient displayed.

**Source:** Authors' survey data

A three-step procedure developed by Baron and Kenny (1986) was used to analyse the mediating effect of process innovation on the relationship between knowledge management and organizational performance. The first step involved obtaining the regression results of knowledge creation, knowledge transfer, and knowledge application as independent variables, and organizational performance as the dependent variable (model 2). The second step consisted of obtaining the regression results of process innovation as the independent variable and organizational performance as the dependent variable (model 3). The third step encompassed the results of the multiple regression analysis of knowledge creation, knowledge transfer, knowledge application, and process innovation, as independent variables, and organizational performance as the dependent variable (model 4), on the basis of which it was possible to determine the support for partial mediation and partially support Hypothesis 2.

The same procedure was repeated to determine the mediating effects of administrative innovation (Table 6). The support for partial mediation was

established similarly to the previously obtained analyses, which is why Hypothesis 4 was only partially supported.

**Table 6.** Results of regression analysis

<i>Variable</i>	<i>Model 5: Dependent variable, administrative innovation</i>	<i>Model 6: Dependent variable, organizational performance</i>	<i>Model 7: Dependent variable, organizational performance</i>	<i>Model 8: Dependent variable, organizational performance</i>
Knowledge creation process	0.748**	0.632**		0.157
Knowledge transfer process	0.736**	0.598**		0.025
Knowledge embedding process	0.792**	0.662**		0.227
Administrative innovation			0.683**	0.367*
R <sup>2</sup>	0.542	0.345	0.466	0.515
Adjusted R <sup>2</sup>	0.536	0.337	0.459	0.488
ANOVA F	90.041**	40.084**	66.375**	19.362**

\*\*p < 0.01; \*p < 0.05. All regressions include constant. Beta coefficient displayed.

**Source:** Authors' survey data

On the other hand, the regression results for model 5 showed that each of the three observed knowledge management processes – knowledge creation, knowledge transfer, and knowledge embedding – had a positive and statistically significant impact on administrative innovation, which fully confirmed Hypothesis 3.

**5. PRACTICAL IMPLICATIONS, LIMITATIONS, AND FUTURE RESEARCH**

The research results presented in this paper have important practical implications. First, the research results show that by investing in the development of the knowledge management concept, process innovation and administrative innovation can be encouraged. Bearing in mind the fact that innovation is the basis of long-term sustainable competitive advantage, investing in knowledge management constitutes the ‘purchase’ of a future competitive position, even under the conditions of a transition economy. A similar conclusion can be reached if the positive impact of knowledge management on organizational performance is taken into account. If a positive impact on innovativeness is seen as a long-term effect, then a positive impact on organizational performance can be seen as a desirable short-term effect which should be a prerequisite for greater investment in knowledge management practices in the future. Third, the analysis of knowledge management processes shows that knowledge application is a higher priority task than knowledge creation. The cause of this state of affairs can be viewed from two perspectives: 1) the lack of money for investment as a consequence of the economic crisis, and 2) the general social context of a transition economy characterized by a low level of investment in education and

technology and significant emigration of talented individuals from the country. Fourth, previous analyses indirectly point to the conclusion that the ‘brain-drain’ effect, which is largely characteristic of Serbia, still does not significantly decrease companies’ innovative capacities. Fifth, the general conclusion of the conducted research is that business organizations in Serbia that managed to maintain and enhance organizational knowledge during the transition process have higher innovative capacities and better organizational performance.

The research conducted for the purpose of this paper has some limitations, which is typical of other research in the field of social sciences. The first limitation refers to the sample structure. The sample included organizations operating in production, trade, and services, and operations within these sectors had certain specifics that might have affected research variables.

The second limitation refers to the heterogeneous structure of the research examinees. The questionnaires were completed by executive managers, human resource managers, directors, and heads of business units. It was assumed that all of them were familiar with knowledge management practice in their organizations. Results showed that the difference in the size of the enterprises did not have a significant impact on the research variables, which relativized the importance of the structure of examinees.

The third limitation relates to the sample size. Although the criterion regarding the minimum required sample size for this type of research has been formally satisfied it is a relatively small sample because it encompasses 78 organizations. This is primarily the result of an undeveloped business culture and the closure of organizations to external communication, which reduces the possibilities of collecting questionnaires and increasing the number of units in the sample.

The above-mentioned limitations are also the guidelines for future research. It is necessary to focus future research on samples of organizations from one sector (for example, production or service organizations). This would prevent generalizations and the obtained results would have practical managerial implications in a particular field or sector. Directing research in combination with other criteria in order to constitute samples could satisfy the needed sample size. However, in future research additional effort should be focused on increasing the number of sample units.

In addition, future research should focus on investigating the impact of knowledge management on financial performance, where perceived performance and financial indicators from official financial statements are used as variables.

## **6. CONCLUSION**

The results of this study are fully consistent with the theoretical foundations presented by Argote and Ingram (2000), Carneiro (2000), Alavi and Leidner (2001), and Bollinger and Smith (2001). In addition, identifying the positive impact of knowledge management on innovativeness is consistent with the results of previous studies conducted by Gloet and Terziovski (2004), Darroch (2005), Huang and Li (2009), Andreeva and Kianto (2011), and Kianto (2011).

The research results presented in this paper show that not all knowledge management processes are developed to the same degree in Serbian companies, but that knowledge management has a positive impact on overall organizational performance, process innovation, and administrative innovation. This conclusion can be analyzed in terms of the sample on which the survey was conducted. The sample size meets the required representativeness criteria of regression analysis (Green, 1991). However, the sample itself was constituted from organizations with more than 50 employees, which can bring into question the above-mentioned conclusion and sample representativeness. At the same time the fact that organizations with more than 50 employees contribute over 85% of GDP should not be disregarded as it relativizes the importance of small businesses, especially if the fact that these organizations often lack a clearly defined knowledge management strategy is taken into account.

With respect to the formulated hypotheses and the obtained results, it can be concluded that knowledge management has a direct and positive impact on process innovation and administrative innovation. In this regard, any improvement in the processes related to knowledge management will also mean encouraging innovation in the organization, which ensures competitiveness in the long run. Analysis of the moderating impact has shown that knowledge management processes have a positive impact on organizational performance, but that this influence is limited and depends on other organizational factors. Investing in the development of the knowledge management concept can lead to some improvement in organizational performance. Nevertheless, it is necessary to investigate other factors that contribute to performance improvement. Two important conclusions can therefore be generated: 1) knowledge management

implies the sustainable competitive advantage of companies, which results in the creation of added value in the long run, which, when distributed, provides a richer and more developed society and a higher quality of life; and 2) knowledge management can help Serbian companies strengthen their competitive position in the global market, which can result in reduced unemployment, reduced talent emigration, growth of gross domestic product, and reduction of the foreign trade deficit.

Summarizing the previously outlined points, it can be concluded that the improvement of knowledge management practices needs to be implemented at two levels. The first level refers to the companies themselves, which need to define knowledge management strategies and stimulate the development of processes related to knowledge creation, knowledge transfer, and knowledge embedding. The second level relates to the state, which needs to increase its investment in education, technology, and infrastructure, thus strengthening the elements necessary for constituting the knowledge-based economy, parallel with the process of economic transition. In this way additional conditions for the development of the knowledge management concept would be created.

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