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**KNOWLEDGE SHARING
IN PUBLIC SECTOR ORGANIZATIONS:
DO KNOWLEDGE MANAGEMENT PRACTICES
MATTER?**

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Abstract: In this paper we test the influence of formal knowledge management practices on knowledge sharing behavior of teachers, as well as influence of teachers' motivation to share and their ability to share. The quantitative data from 117 questionnaires is used in structural equation modeling analysis, where we identify the direct positive effect of knowledge management practices and autonomous motivation on knowledge sharing, and no effect of controlled motivation and ability to share knowledge on the behavior in question.

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Introduction

In the recent decades the topic of knowledge sharing has attracted a lot of attention from both academics and practitioners who are recognizing it as an important prerequisite for organizational innovativeness, better performance and competitive advantage (Davenport and Glaser, 2002, Foss, et al., 2010, Grant, 1996). Despite the growing body of literature on knowledge sharing, a number of questions still remain under-researched. First, micro-level issues related to knowledge sharing behavior of individuals in organization have received rather limited and unsystematic attention (Foss, et al., 2010). Second, the relationships between these micro-level issues and macro-level factors have not been adequately empirically investigated (Foss, 2007). Third, the current research is biased towards a limited number of sectors of economy, namely private knowledge-intensive businesses (Rashman, et al., 2009), while much less has been done on relevance and applicability of knowledge management (KM) concepts in other fields.

This study aims to address these gaps in a number of ways. First, we have chosen to focus on public secondary schools, an under-represented sector in KM discourse (Rashman, et al., 2009). Schools by their very nature are built on and employ knowledge as the main resource for sustaining their activity, thus they represent truly “knowledge-intensive” organizations (Alvesson, 1993, Nurmi, 1998, Starbuck, 1992). Indeed, the general management literature reveals multiple references to the knowledge of teachers as being the driver of school’s success and reputation (Andreeva, et al., 2011, Chia and Holt, 2008, Edge, 2005). Current educational reforms unfolding in many countries put a pressure on schools to increase their efficiency, and leveraging knowledge may also play an important role in

this process (Jayanthi, 2011). Therefore, we believe this context to be very rich for the study on knowledge sharing, with the potential to contribute to the extension of KM theory to new settings and to enrich the topical discussion of managing in public sector (Rashman, et al., 2009). Second, we focus on micro-level component of knowledge governance – individual knowledge sharing behavior of teachers, and we aim to understand the main determinants of this behavior incorporating both individual and organizational level factors.

We build on the well-established framework of Motivation-Opportunity-Ability (MOA) to theorize on knowledge sharing, which allows us to include factors of different levels and test how their interaction influences micro-level factor – knowledge sharing behavior. We conceptualize the notion of “opportunity” in this framework as formal practices used by organization to promote knowledge sharing (knowledge management practices). Such novel view of opportunity helps to bridge the gap of insufficient attention paid to the knowledge governance mechanisms and their interaction with micro-level constructs (motivation and ability) through which managerial practices can influence individual knowledge sharing behavior. Moreover, such operationalization also lends to a clear translation into which steps managers could take to foster knowledge sharing between employees.

The remainder of the paper is organized as follows. First, we present theoretical background of our paper and develop our hypotheses. Next, we discuss our research design, including measures, data collection procedures and sample, followed by our findings. The paper concludes with discussion of our results and implications for further research and managerial practice.

Theoretical Background

Public secondary schools as a knowledge sharing context

Before turning to the theoretical background to identify determinants of knowledge sharing, we consider it important to describe those distinctive features of schools that constitute special organizational context for knowledge governance and therefore guided our problem statement, adaptation of the general theories and interpretation of the results.

First, it is necessary to clarify, what is meant by knowledge of teachers in schools, since some confusion may arise due to the nature schools' product – knowledge provided to pupils. In this study we refer, primarily, to professional knowledge of teachers (their knowledge of the subject), but also other types of expertise not limited to one subject area – methodological knowledge (how to teach), specific pedagogical skills (how to deal psychologically with children, difficult situations, etc.) and overall organizational knowledge (knowing standards and regulations, rules and practices, norms and values embedded in organizations that facilitate the organizational efficiency).

Identifying a relevant problem for a school's management, we found that just as numerous reported for private sector counterparts (e.g., Connelly, et al., 2012), the most salient issue for schools' knowledge governance is a paradoxical situation with the knowledge sharing – in spite of the knowledge of teachers being the main resource on which the organization is built, the knowledge sharing between teachers is found to be hardly practiced in a systematic manner (Andreeva, Sergeeva, Golubeva, Pavlov, 2012). At the same time, it is reasonable to expect that knowledge sharing could significantly enhance organizational performance (Husted and Michailova, 2002). The teachers and especially the principals unanimously admit the value of knowledge sharing process for a school's success, and

examples of those who dedicated time to knowledge sharing reported notable results in terms of innovative solutions in methodology, schools' management and academic achievements of students (Andreeva, et al., 2011).

Motivation-Opportunity-Ability as a framework to explain knowledge sharing

Knowledge sharing refers to circulation of knowledge existing in organizations between employees at all levels and departments (Bhatt, 2001; Szulanski, 1996). It has been argued in numerous studies that knowledge sharing contributes to organizational performance by leveraging existing knowledge in order to create new knowledge (Nonaka, 1991), respond quickly to change (Cohen & Levinthal, 1990), innovate (Brachos, Kostopoulos, Soderquist, & Prastacos, 2007; Taminiau, Smit, & Lange, 2009) and achieve competitive advantage (Teece, 2001). These effects however, are only achievable if knowledge is made collective (Leiponen, 2006), in other words, shared among organizational members. Thus, the questions of how to manage knowledge sharing effectively are most intriguing to practitioners, and for that reason translate into studies investigating determinants of knowledge sharing.

The body of literature on such determinants is quite diverse and identifies a large number of constructs, among those organization-level variables, such as organizational culture, climate, implementation of ICT, etc. (De Long & Fahey, 2000; Hooff & Huysman, 2009), group-related constructs, such as group cohesion, trust, norms of reciprocity, team communication styles (de Vries, van den Hooff, & de Ridder, 2006), and individual characteristics, such as self-efficacy, motivations and ability (Bock, Zmud, Young-Gul, & Jae-Nam, 2005; Cabrera, Collins, & Salgado, 2006a; Wasko & Faraj, 2005). The diversity of the proposed determinants, however, does not

signal the completeness and solidness of the tested theories, rather examination of particular studies reveals skewedness to either organizational or individual levels of analysis.

Recently, the framework of Motivation-Opportunity-Ability (Blumberg & Pringle, 1982) has been utilized to explain successes in knowledge management in general (Argote, McEvily, & Reagans, 2003; Ipe, 2003) as well as knowledge sharing process in particular (Chang, Gong, & Peng, 2012; Reinholt, Pedersen, & Foss, 2011; Siemsen, Roth, & Balasubramanian, 2008). The straightforward logic of the MOA framework suggests that the motivation, ability and opportunity are all necessary for the behavior in question to take place. The latest studies on knowledge sharing research have also taken up a challenge to rigorously investigate relationships between the elements of MOA framework and identify those combinations (moderating and mediating effects) that lead to higher knowledge sharing (Reinholt et al., 2011).

While these studies substantially develop MOA framework and shed much light on knowledge sharing determinants, there remain, however, a few venues for further improvement, mainly related to the ways how existing studies conceptualize and operationalize MOA elements. For example, opportunity is conceptualized as central network position (Reinholt et al., 2011) or as opportunity seeking behavior (Chang et al., 2012). Such conceptualizations are not comparable to each other and furthermore do not always correspond to the very concept of opportunity being “*particular configuration of the field of forces that enables or constraints that person’s performance and are beyond the person’s direct control*” (Blumberg & Pringle, 1982). We argue that there is much potential in looking at opportunity as intentional managerial actions in the form of practices

existing in organizations that are aimed to support knowledge sharing behavior of employees.

Second, there are also weaknesses in how motivation concept has been treated in these studies. In spite of the rich literature on motivation to knowledge sharing (e.g. Gagné, 2009; Osterloh & Frey, 2000; Quigley, Tesluk, Locke, & Bartol, 2007) and well-developed theoretical foundations on motivation (Gagné & Deci, 2005), this concept in existing MOA studies is rarely rooted in relevant theories of motivation (a notable exception is Reinholt et al., 2011) and instead operationalized as intention or willingness to share (Chang et al., 2012; Siemsen et al., 2008). Such operationalizations do not provide a meaningful account of motivation source. Those MOA studies that do include different types of motivations in their models (Reinholt et al., 2011) are also limited in the sense that they do not test the relationships between different types of motivations (e.g. "crowding out" effect as found in Foss, Minbaeva, Pedersen, & Reinholt, 2009).

Therefore, in order to build on and develop this research further, we propose to investigate how opportunity to share knowledge provided by knowledge management practices can support and constrain knowledge sharing behavior of employees. We further examine whether two types of motivation - autonomous and controlled – act as mediators for these knowledge management practices' influence on knowledge sharing. We also explicitly test if the crowding out effect of controlled motivation negatively influencing autonomous motivation takes place in this interaction. Finally, we test if ability to share knowledge is indeed associated with higher levels of knowledge sharing. In the next sections we address in more details the ways we conceptualize each of the elements of MOA framework.

Motivation: autonomous and controlled motivations to share knowledge

The first premise of MOA framework suggests that individual motivation to engage in a specific behavior has a significant impact on whether a behavior is to be performed. Recent developments in work motivation theory propose to distinguish between two motivation types – autonomous and controlled (Gagné & Deci, 2005). Autonomous motivation refers to the feeling of internal satisfaction and enjoyment of a person from engagement into an activity. Controlled motivation on the other hand refers to the external benefits an employee associates with performing this activity (recognition, feedback or other payoff). Distinguishing between these two types of motivation and their effects on individual behavior is essential from managerial perspective, as managers have different potential to influence them. Controlled motivation by its nature lies within relatively direct access for managers: they can evoke it by introducing various rewards, such as monetary bonuses, career promotion, official recognition, etc. In contrast, autonomous motivation arises within an individual relatively independently and resists direct influence. Moreover, the self-determination theory suggests (and empirically supports) that direct external stimuli may have under certain conditions a corrupting effect on autonomous motivation (Deci & Ryan, 2004). Such negative relationship is explained by the argument that a previously autonomously motivated person can start to perceive that his/her actions are no longer guided by internal satisfaction, but rather controlled by something outside him/herself. In other words, s/he shifts from “I do it because I like it” to “I do it because it brings me money”.

These two motivational types apply to any human activity, including the one of our interest - knowledge sharing (Foss et al., 2009; Kuvaas, Buch, & Dysvik, 2012). Previous research demonstrated that autonomous

motivation has a significant positive impact on such knowledge related behaviors as creativity (Forbes & Domm, 2004) and knowledge sharing (Reinholt et al., 2011). Therefore we hypothesize that autonomous motivation would have a positive impact on employees' knowledge sharing behaviors:

Hypothesis 1: The more autonomously motivated employees are to share knowledge, the more active they will be in sharing their knowledge.

Regarding the impact of controlled motivation on knowledge sharing, the literature offers controversial views and evidence. On the one hand, self-determination theory, from where the distinction between autonomous and controlled motivation originates, claims that being offered external rewards, previously autonomously motivated person can start to perceive that his/her actions are no longer guided by internal satisfaction but rather pushed externally, and thus lose the interest in the activity (Deci & Ryan, 2004). A number of empirical studies addressing various types of human behavior (but not specifically knowledge sharing) prove that certain types of rewards indeed have detrimental effect on desired behavior. This argument is supposed to apply to any human behavior, and thus has been extended to knowledge sharing (Foss et al., 2009; Osterloh & Frey, 2000). At the same time, most studies that are focused specifically on knowledge sharing conceptually disagree with this point. Using the lenses of other theories, such as social exchange theory (Blau, 1964) or expectancy theory (Vroom, 1994) they conceptualize knowledge sharing as a goal-oriented behavior, to which the "logic of an economic man" applies (Bock et al., 2005; Cabrera et al., 2006a; Foss et al., 2009; Husted, Michailova, Minbaeva, & Pedersen, 2012). The latter means that an individual engages in knowledge sharing estimating the potential costs and benefits (be it

monetary rewards, reputation, respect, status or approval), and, therefore, controlled motivation is theorized to have a positive impact on knowledge sharing. However, many of these studies find no or little empirical support for this view. For example, Bock et. al (2005) find a negative effect of anticipated rewards on knowledge sharing, Foss et al. (2009) find a negative effect of controlled motivation on sending knowledge and no effect on receiving knowledge, and Cabrera et. al. (2006b) find moderate positive effect of perceived rewards on knowledge sharing that disappears when other factors are added into the model.

We suggest that this controversy can be overcome by carefully delineating two different constructs – external stimuli and external motivation per se. While the first category refers to rewards or punishments offered by environment (e.g., “my organization offers monetary bonuses for knowledge sharing”), the second one refers to individual *attitude* towards these stimuli (e.g., “I *want* to share knowledge because I will get a bonus for this”). Though these constructs can be related, they are not equal. For example, an organization may offer a bonus, however, this bonus might not be perceived as relevant or important by an employee and thus will not automatically lead to the desired behavior. Therefore, we rather stand on the position that if an employee already has controlled motivation towards specific behavior, s/he will be willing to engage in this behavior, as motivation already indicates predisposition towards behavior, irrespectively whether it is external or internal:

Hypothesis 2: The more controlled motivated employees are to share knowledge, the more active they will be in sharing their knowledge.

At the same time, acknowledging the arguments that autonomously motivated employees can lose interest in the enjoyable activity after they start to associate external benefits (e.g. rewards) with it (Forbes and

Domm, 2004), we agree that combination of autonomous and controlled motivation can cause so-called “crowding out” effect (Osterloh & Frey, 2000). Therefore, to illustrate this effect, we hypothesized that there would be a negative relationship between the two types of motivation:

Hypothesis 3: Autonomous and controlled motivations of employees for knowledge sharing are negatively correlated.

Opportunity: knowledge management practices

The second premise of MOA framework claims that even a motivated individual will not engage in a behavior unless the environment (i.e. organization) provides opportunities for this. According to Blumberg and Pringle, opportunity refers to “particular configuration of the field of forces surrounding a person and his or her task that enables or constrains that person's task performance and that are beyond the person's direct control” (Blumberg & Pringle, 1982: 565).

In the context of knowledge sharing, we suggest that opportunity corresponds to the resources provided to employees in the form of knowledge management practices, i.e. intentional actions of managers and organizational routines that are specifically employed to provide staff with opportunities to share their knowledge.

The topic of knowledge management practices have been taken up in a number of studies that concern themselves with knowledge management and its effectiveness (Foss, Laursen, & Pedersen, 2011; Quigley et al., 2007). Researchers have suggested dividing such practices into HR and ICT related and found that they should be complementing each other if KM is to provide benefits (Andreeva & Kianto, 2012; Hansen & Nohria, 2004; Robertson & Hammersley, 2000). Other authors have identified a range of “best KM practices” as recommendations for managers (Gupta & Govindarajan, 2000) and provided anecdotal evidence from successful

cases where such practices helped a company to achieve competitive advantage.

Although the topic of KM practices is undoubtedly very relevant to KM theory and practice, there is much confusion around the construct of KM practices. It is usually defined rather broadly, as, for example: “observable organizational activities that are related to knowledge management” (Zack, McKeen, & Singh, 2009) or “management practices aimed to support efficient and effective management of knowledge for organizational benefit” (Andreeva & Kianto, 2012). Understood so broadly, KM practices can refer to very different managerial actions. Besides, KM practices very often are also studied in the literature under different names and labels, such as “enablers of KM” (Ho, 2009; Pee & Kankanhalli, 2008), “knowledge management initiatives” (Chawla & Joshi, 2010), “engineering approach” (Hooff & Huysman, 2009), etc. Moreover, knowledge governance approach (Foss, 2007) which is concerned with similar phenomena (formal mechanisms used in organization to govern knowledge) uses another term - “governance mechanism” for what is essentially also “KM practice”. To make things even more confusing, what is often measured under those diverse labels are in fact very basic and common practices of rewarding personnel (see e.g. Gooderham, Minbaeva, & Pedersen, 2011; Husted et al., 2012). What is common between them is that they all study intentional managerial actions.

A different kind of confusion comes from the fact that many studies using the term “KM practices” in fact imply knowledge processes (Darroch, 2003), strategy (Zack et al., 2009), market-orientation (Darroch, 2005), or knowledge-oriented culture (Hansen & Nohria, 2004). What is meant by KM practice in these works is more related to general philosophy or cultural values of organization with respect to knowledge, but does not

measure or identify any specific managerial actions. Hence, although valuable in providing strategic directions, the results of these studies cannot sufficiently inform practitioners about what specific steps to take so that employees feel that “they are valued for what they know” (Zack et al., 2009).

We believe reason for this confusion stems from the ambiguity of knowledge (management) as a concept, which sometimes generates skeptical arguments of the kind “everything an organization does is connected to managing its knowledge” (Alvesson & Kärreman, 2002). In fact, the review of KM practices further strengthens the point that the term KM and KM practices might refer to anything that is done in organization. In order to constructively overcome this confusion and bring this conversation forward, we propose a more fine-grained and specific understanding of KM practices. We suggest that to achieve clarity in the construct it is necessary to delineate a specific knowledge process to be managed, and then identify a range of common (or recommended, benchmarked) managerial actions that are/can be taken to govern this process. The repertoire of such actions will stretch beyond exclusively reward systems and structural conditions (Gooderham et al., 2011) or information systems (Golden & Raghuram, 2010), but should include and measure general managerial practices, that at the same time will be relevant to the specific context. As many case studies and anecdotal evidence showed, the specific actions of managers can significantly enhance knowledge sharing behavior of employees (Gupta & Govindarajan, 2000; O'Dell & Grayson, 1998; Van Alstyne, 2005). Basing on these studies, we hypothesize a positive effect of managerial practices that support knowledge sharing on individual sharing behavior:

Hypothesis 4: The knowledge management practices that support knowledge sharing positively influence individual knowledge sharing behavior.

Ability to share knowledge

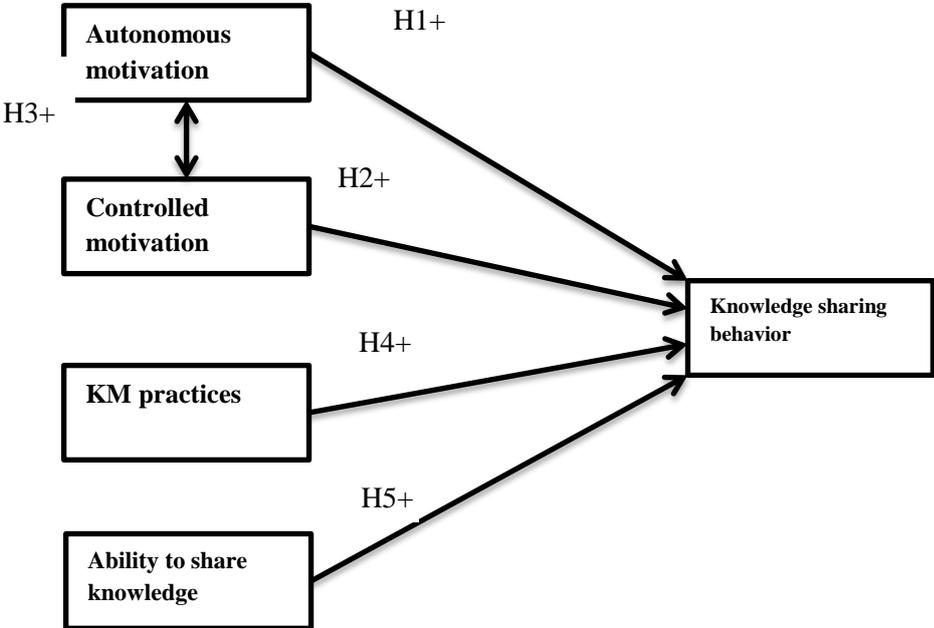
The third premise of MOA framework sensibly suggests that even with existing organizational opportunity and individual motivation to engage in a behavior, one would not be likely to share knowledge if he/she is not able to do so. Indeed conceptual discussions of knowledge sharing process often implicitly refer to the individual ability as major determinant of knowledge sharing, for example within the concepts of cognitive capital (Nahapiet & Ghoshal, 1998), cognitive barriers between novices and experts (Hinds & Pfeffer, 2002), general characteristics of knowledge transmitters and receivers (Husted & Michailova, 2002) or absorptive capacity (Cohen & Levinthal, 1990). Moreover, empirical studies demonstrate the significant impact individual ability has on knowledge sharing behavior (Reinholt et al., 2011; Siemsen et al., 2008). Inferring from these studies, we hypothesize positive relationship between individual ability and knowledge sharing behavior.

Hypothesis 5: The more capable are employees to share knowledge, the more active they will be in sharing their knowledge.

To summarize, our research model includes the following determinants of knowledge sharing behavior of employees: knowledge management practices as opportunity, controlled motivation and autonomous motivation (Foss et al., 2009; Ryan & Connell, 1989) and ability (Constant, Kiesler, & Sproull, 1994; Wasko & Faraj, 2005). Our model, thus, incorporates both

macro- and micro-level variables and potential interrelations among them. The model and our hypotheses are graphically represented in the Figure 1:

Figure 1. Theoretical Model.



Research Design

Measures

All our measures were based on well-validated scales available in the literature. *Knowledge sharing behavior* was measured by 6 items adapted from Wu et al. (Wu, Hsu, & Yeh, 2007) without distinction between sending and receiving knowledge, since those did not load into different factors in previous studies (Cabrera et al., 2006b). To measure both *types of motivation to knowledge sharing* we used a scale from Ryan and Connell (Ryan & Connell, 1989), which was also used by Foss et al

(2009). *Knowledge management practices* scale was constructed on the basis of literature review during which we identified those practices that were relevant to the context in which data was collected. The scale as a result contained four items describing general practices that companies normally utilize for knowledge sharing. All of the described above items were measured by a 6-point semantic differential scale and anchored with “strongly disagree” and “strongly agree”. Finally, we chose to operationalize *ability* as work experience in the profession. Such choice was guided by the consideration of the nature of our respondents’ profession (public school teachers whose professional activity is to share knowledge). Specifically, we assumed that the ability to share is already in place, secured by the education and further selection mechanisms, however, it varies between teachers, most likely depending on their work experience as a teacher. We measured work experience in profession in years by an interval scale with the following ranges: less than 1 year, 1-3 years, 4-10 years, 11-15 years, 16-20 years, 21-25 years, more than 25 years. As we adopted our scales from international sources, the initial measures were built in English. In order to ensure that respondents fully understand the questions, the survey items were translated to Russian, following the translation procedure recommended in the literature on cross-national research (Singh, 1995).

Exploratory (EFA) and confirmatory factor analyses (CFA) were run to check for the reliability and validity of the chosen measurement scales (Hurley et al., 1997). During CFA, a few items were excluded from knowledge sharing behaviour, controlled motivation and knowledge management practices scales, resulting in three-item scales for all latent variables¹. Table 1 presents descriptive statistics for resulting variables and Table 2 introduces the items representing variables of our study, factor loadings, internal consistencies and validity indexes of the scales. In addition to Cronbach's α ($\geq 0,7$), we also computed composite validity (CR; $\geq 0,7$) and average variance extracted (AVE; $\geq 0,5$) indexes (Bagozzi, Yi, & Phillips, 1991). Table 2 demonstrates that our scales' parameters fall very well into the recommended limits. To summarize, our analysis suggests that our scales are reliable and possess composite, convergent and discriminant validity.

Table 1. Descriptive statistics for the scales.

#	Variable	Mean	SD	Correlations				
				1	2	3	4	5
1	Autonomous motivation	4,92	1,004	1	0,280**	0,242**	0,138	0,422**
2	Controlled motivation	3,41	1,46	0,280**	1	0,215*	-0,054	0,230*
3	Knowledge management	3,94	1,32	0,242**	0,215*	1	-0,057	0,401**

¹ The initial (exploratory) factor analysis showed that all the items load well on the theoretical scales and show good reliability. However, CFA results led us to exclude more items from the scales, because of the modest sample size – 119. It is suggested that for reliable results the structural model should contain 10 times more observations than the items estimated (i.e. our model should contain not more than 12 items), thus we were forced to sacrifice some of the items to keep all constructs in the model. However, we are awaiting more survey responses and hope to increase the sample size which will allow keeping all items in the model. Especially this will be informative with the case of knowledge management practices scale, since this will provide richer implications for managers.

	practices							
4	Ability	5,05	1,82	0,138	-0,054	-0,057	1	0,097
5	Knowledge sharing behavior	4,04	1,10	0,422**	0,230*	0,401**	0,097	1

*** correlation is significant on the 0,000 level (two-tailed)

** correlation is significant on the 0,01 level (two-tailed)

* correlation is significant on the 0,05 level (two-tailed)

Table 2. Reliability of measurement scales**

Constructs and items		Factor loading	Cronbach alpha	C.R.	Average Variance Extracted
Knowledge sharing behavior			0,801	0,81	0,60
I usually spend a lot of time sharing knowledge in our school					
When discussing a complicated issue, I am usually involved in the subsequent interactions		0,858			
I usually involve myself in discussions of various topics not only specific topics		0,672			
I actively participate in knowledge sharing activities in our school*		0,813			
Being a member of our school, I usually actively share my knowledge with others*		0,730			
Autonomous motivation			0,859	0,87	0,69
<i>Why do you share knowledge with others?</i>					
I think it is an important part of my job		0,827			
I find it personally satisfying		0,800			
I like sharing knowledge		0,872			
Controlled motivation			0,857	0,91	0,71
<i>Why do you share knowledge with others?</i>					
I want my supervisor(s) to praise me		0,866			
I want my colleagues to praise me*		0,802			
I might get a reward		0,899			
It may help me get promoted		0,806			
Knowledge management practices			0,707	0,76	0,52
There are rest rooms available where teachers can talk to each other and share experience in our school					
The school assigns every new employee a senior mentor and coaching to help him/her during orientation.		0,676			
The school holds regular meetings where colleagues can share successful experiences or resolve work problems		0,810			
There are annual conferences concerning certain products that require in-depth discussion among colleagues in our school*					
The school invites high-performance employees to share their knowledge with others in meetings*					
The school invites employees who have just acquired new knowledge from outside sources to share what they have learned with others*					

* items were excluded from the scales during CFA.

** Scale parameters presented are calculated based on the items that were kept after CFA

Data collection and sample

The sample of our study is represented by employees of Russian public secondary schools. As discussed above, such organizations are inherently knowledge-intensive, as their main product is knowledge and the nature of their work involves providing knowledge to students (Edge, 2005; Starbuck, 1992). Besides, the schools are historically weak at knowledge sharing, as the work of school teachers has traditionally been individual and autonomous, requiring minimum interaction with colleagues (Fullan, 2002). At the same time, knowledge sharing is currently seen as an important factor of schools' success in today's fast-paced environment when the role of a teacher is being reconsidered and more and more challenged due to the rapid development of information technologies (Zhao, 2010).

We collected the data by the means of web-administered questionnaire in the 6 secondary schools of Frunzensky district in St. Petersburg, Russia. We limited our study population to one district of St. Petersburg for two reasons: the general conditions under which schools are operating throughout Russia are the same federal standards for all the public schools, but the particular requirements and environments might vary in different districts. Limiting our population to one district allowed us to control for such environmental differences.

We presented our research to principals and managers of all 50 schools in the district during their common meeting, and representatives of 18 schools (36% of the total target population) showed initial interest in our project. After follow-up negotiations, 6 schools were ready to launch school-wide survey (12% of the target school population). According to the key school characteristics (size, specialty, number of employees), our schools' sample is quite representative of the target school population. The survey was distributed in the fall of 2011 by providing the participating schools' principals a link to a web-platform.

Given that the average number of employees in school is about 50, our estimated targeted teachers' population consisted of approx. 300 teachers. We have obtained 119 filled questionnaires, which constitutes 40% response rate. Deleting outliers resulted in the sample of 117. As our sample consisted of the responses from 6 different schools with varied response rate, it was necessary to check for the potential differences among the individual school sub-groups in the sample. No major differences in responses among schools were found thus our sample can be used as a total for further analysis.

The final distribution of demographic characteristics of the sample is presented in the table 3. The characteristics of our sample (biased towards female middle-age and older respondents) are typical for the general

teacher population of Russian public secondary schools (Agranovich & Kozhevnikova, 2006) therefore we suggest that our sample is representative in the context of our study.

Table 3. Demographic characteristics of the sample.

<i>Characteristic</i>	<i>Number of respondents</i>	<i>% of the sample</i>
<i>Gender</i>		
Female	105	88,3%
Male	11	9,2%
Non-response	3	2,5%
<i>Age</i>		
20-24 years	8	6,7%
25-29 years	8	6,7%
30-34 years	5	4,2%
35-39 years	17	14,3%
40-49 years	41	34,5%
50-59 years	20	16,8%
More than 60 years	19	16%
Non-response	1	0,8%
<i>Education</i>		
Vocational secondary education	9	7,6%
Undergraduate education	2	1,7%
Bachelor or master degree	91	76,5%
Double degree (two majors)	14	11,7%
PhD	2	1,7%
Non-response	1	0,8%
<i>Tenure in current school</i>		
less than 1 year	18	15,2%
1-3 years	20	16,8%
4-10 years	24	20,2%
11-15 years	15	12,6%
16-20 years	14	11,7%
21-25 years	17	14,3%
More than 25 years	11	9,2%
<i>Overall experience as a teacher</i>		
less than 1 year	7	5,9%
1-3 years	9	7,6%

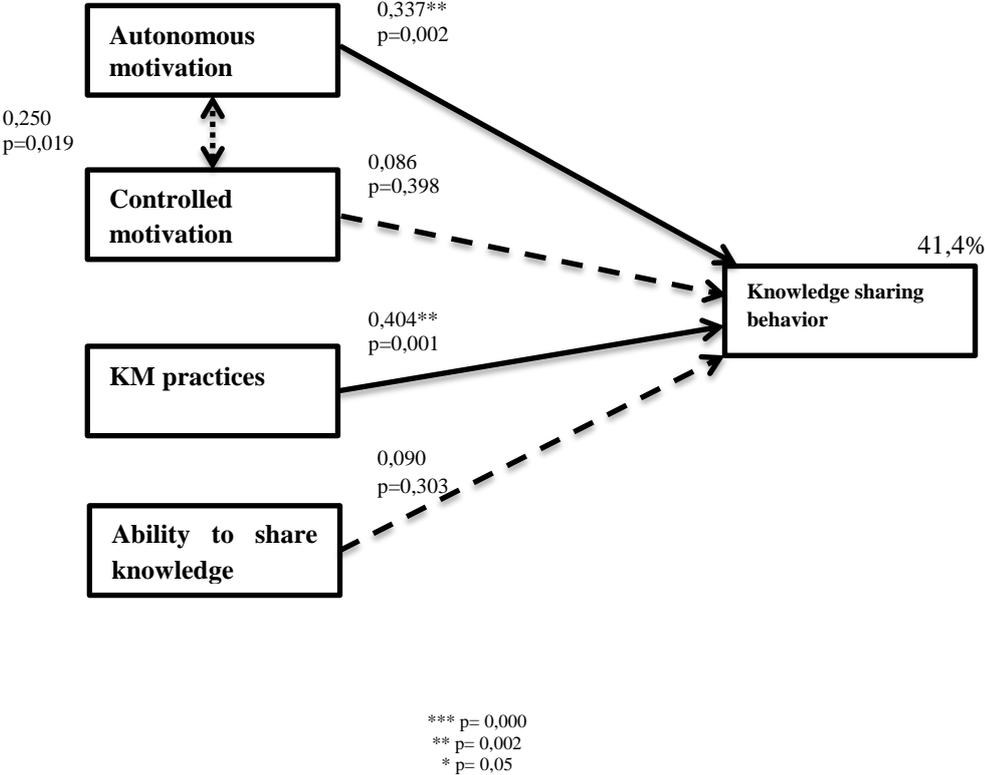
4-10 years	7	5,9%
11-15 years	14	11,7%
16-20 years	23	19,4%
21-25 years	25	21%
More than 25 years	34	28,6%
Total	119	

Findings

In order to examine the interaction between the effect of knowledge management practices and two types of motivation on knowledge sharing, we used structural equation modelling (SEM) (Anderson & Gerbing, 1992) as it allows testing hypotheses that include multiple simultaneous dependencies among latent variables, distinguishing between direct and indirect effects, while accounting for measurement errors of the multi-item constructs. After EFA and CFA, we computed the structural model based on the measurement model during CFA. The model yielded the following goodness of fit statistics: $\chi^2 = 58,732$ with $p = 0,485$ ($\geq 0,05$), $\chi^2 / df = 0,995$ (≤ 3), GFI = ,929 ($\geq 0,9$), AGFI = ,891 ($\geq 0,8$), TLI = 1,001 ($\geq 0,95$), CFI = 1,000 ($\geq 0,95$), RMSEA = ,000 ($\leq 0,05$) with $p = ,907$ ($\geq 0,05$). It shows that our theoretical model has a good fit between the data and the model (as all of the indexes fall very well within recommended limits (provided in brackets), except for AGFI that is a bit lower than the most strict rule of $\geq 0,95$, however, it is still within recommended interval of $\geq 0,8$ (Jöreskog & Sörbom, 1993).

Figure 2 illustrates our findings. Standardized path coefficients are presented above or to the left of the arrows, and squared multiple correlation is presented on the top of the variable.

Figure 2. Structural equation model.



As Figure 2 demonstrates, we identified that knowledge sharing behavior is directly positively influenced by autonomous motivation and knowledge management practices (therefore, our hypotheses 1 and 4 are confirmed). At the same time, controlled motivation and ability to share have no impact on knowledge sharing behavior, so our hypotheses 2 and 5 are not supported. Also, there is no negative correlation between autonomous and

controlled motivation, which refutes hypothesis 3. Therefore, only 2 of our hypotheses are confirmed. Overall, our model explains 41,4% of the variance of knowledge sharing behavior.

Discussion and Conclusions

This paper examined the impact of knowledge management practices that support knowledge sharing, two types of motivation to share knowledge and ability to share on individual knowledge sharing behavior among teachers of secondary public schools. Our findings suggest that autonomous motivation and knowledge management practices are the main predictors of knowledge sharing behavior of teachers (with the latter having stronger influence), while controlled motivation and ability have no impact on it.

The significant and strong impact of knowledge management practices on knowledge sharing behavior not only provides important evidence to the debate on the usefulness of knowledge management as a practice (Andreeva & Kianto, 2012) but also bears clear message to managers on what can be done to stimulate knowledge sharing behaviors of teachers. Our study suggests that providing physical space for knowledge sharing, using mentoring and coaching among teachers as well as holding regular meetings where colleagues can share their experiences enhances knowledge sharing among employees.

The second predictor of knowledge sharing behavior in our study is autonomous motivation, and this result raises further questions about the factors (if any) that can potentially contribute to increase of autonomous motivation, that is, by its conceptual definition, supposed to lie beyond the managerial influence. Reinholt et al. (2011) have recently suggested that managers can increase employees' autonomous motivation for knowledge sharing by using the job design that promotes autonomy, providing feedback on knowledge sharing performance and exercising transformational leadership. However, self-determination theory stands on the idea that the external impact on autonomous motivation is limited (Gagne & Deci, 2005). Therefore, the main managerial implication we propose is related to the selection process – even if managers cannot increase autonomous motivation for knowledge sharing of the existing employees, they still can include it as a criteria into employee selection process and thus hire candidates that already have high level of the autonomous motivation to share.

The lack of the direct impact of controlled motivation on knowledge sharing behavior indicates that intentional managerial actions to reward knowledge sharing (that lead to the increase of controlled motivation) have limited influence on the desired behavior, in contrast with the set of knowledge management practices that were found to be the main predictor

in our study – as the latter include not “pushing” actions but creating conditions for sharing. At the same time, this result can be interpreted differently in the light of the specifics of our study context. Qualitative data that we have collected in parallel to the reported survey indicates that the schools that we studied rarely offer any rewards for knowledge sharing, therefore, we might not find any impact in our data.

The absence of significance of ability to share for knowledge sharing behavior goes against the existing literature. This result could be attributable to the measurement issue, as we operationalized it as a work experience in the field. Future research could address this problem by including other constructs in addition to work experience to control for perceived competence, such as self-efficacy or self-rated expertise.

Interestingly, our study shows that two types of motivation - controlled and autonomous - are positively correlated (though not to a big extent). This result seems to contradict accepted in the literature “crowding out” effect between these types of motivation. There might be several explanations for it. First, it might be interpreted by the mentioned above confusion in the literature between external rewards and external (or controlled) motivation, as most of the studies that reported negative relationship between two types of motivation actually addressed not external motivation per se but external rewards and thus are not directly comparable with our study

(Alexy & Leitner, 2011; Cameron, Banko, & Pierce, 2001). Therefore, further research is needed to incorporate all 3 concepts – controlled, autonomous motivation and external rewards in one model to test their interaction effects. Second, this finding might be interpreted in the light of specifics of our research context, as Russian public schools offer extremely low salaries. When the level of available external rewards is so low, any additional rewards might be perceived positively, and it leads us to propose that crowding out effect happens only after certain threshold of material well-being of an individual is reached. This idea also needs further empirical investigation.

An important contribution of our study is that it demonstrates how to apply general frameworks developed initially for private sector to study the context of secondary public schools. Such study not only strengthens and extends the existing theory by applying it in a different setting. In this manner, the paper makes theoretical contributions both to knowledge management discourse, extending the understanding of knowledge sharing process and its manageability, and to public management discourse, explaining how the distinctive features of a public organization can contribute or hinder the knowledge sharing between its' employees.

This study also has some limitations. The first one refers to the sample size and the chosen method of analysis. Though SEM allows assessing a web of

relationships and thus was very appropriate for this study, it also has some limitations (Brannik, 1995). With the samples ≤ 250 (as used in this study) it may over-reject true models (Bentler & Yuan, 1999), leading the researchers to exclude some items from the model, as happened in this case. Therefore, further examination of the proposed research model with the full presented scales in a bigger sample may be important. Secondly, this study has not examined in the detail the interaction effects among the elements of MOA framework, as motivation, ability and opportunity are not fully independent variables (Reinholt et al., 2011; Siemsen et al., 2008). Unfortunately, due to the sample size, these issues were excluded from current analysis. However, one of the further interesting avenues for examination lies in the testing the moderation effects of the motivation types and ability on the link between knowledge management practices and knowledge sharing behavior – for example, if knowledge management practices matter more for knowledge sharing behavior of less autonomously motivated employees.

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№ 39 (R)–2006	В. Г. Беляков, О. Р. Верховская, В. К. Дерманов, М. Н. Румянцева	Глобальный мониторинг предпринимательской активности Россия: итоги 2006 года
№ 40 (R)–2006	В. А. Чайка, А. В. Куликов	Динамические способности компании: введение в проблему
№ 41 (R)–2006	Ю. Е. Благов	Институционализация менеджмента заинтересованных сторон в российских компаниях: проблемы и перспективы использования модели «Арктурус»
№ 42 (R)–2006	И. С. Меркурьева, Е. Н. Парамонова, Ю. М. Битина, В. Л. Гильченко	Экономический анализ на основе связанных данных по занятым и работодателям: методология сбора и использования данных
# 43 (E)–2006	I. Merkuryeva, E. Paramonova, J. Bitina, V. Gilchenok	Economic Analysis Based on Matched Employer-Employee Data: Methodology of Data Collection and Research
№ 44 (R)–2006	Н. П. Дроздова	Российская «артельность» — мифологема или реальность' (Артельные формы хозяйства в России в XIX — начале XX в.: историко-институциональный анализ)
№ 1 (R)–2007	Е. В. Соколова	Бенчмаркинг в инфраструктурных отраслях: анализ методологии и практики применения (на примере электроэнергетики)
№ 2 (R)–2007	С. П. Куш, М. М. Смирнова	Управление поставками в российских компаниях: стратегия или тактика
№ 3 (R)–2007	Т. М. Склад	Проблема ленивой монополии в российском здравоохранении
№ 4 (R)–2007	Т. Е. Андреева	Индивидуальные предпочтения работников к созданию и обмену знаниями: первые результаты исследования
№ 5 (R)–2007	А. А. Голубева	Оценка порталов органов государственного управления на основе концепции общественной ценности
№ 6 (R)–2007	С. П. Куш, М. М. Смирнова	Механизм координации процессов управления взаимоотношениями компании с партнерами
# 7 (E)–2007	D. Volkov, I. Berezinets	Accounting-based valuations and market prices of equity: case of Russian market

№ 8 (R)–2007	М. Н. Барышников	Баланс интересов в структуре собственности и управления российской фирмы в XIX – начале XX века
# 9 (E)–2007	D. Volkov, T. Garanina	Intellectual capital valuation: case of Russian companies
№ 10 (R)–2007	К. В. Кротов	Управление цепями поставок: изучение концепции в контексте теории стратегического управления и маркетинга.
№ 11 (R)–2007	Г. В. Широкова, А. И. Шаталов	Характеристики компаний на ранних стадиях жизненного цикла: анализ факторов, влияющих на показатели результативности их деятельности
№ 12 (R)–2007	А. Е. Иванов	Размещение государственного заказа как задача разработки и принятия управленческого решения
№ 13 (R)-2007	О. М. Удовиченко	Понятие, классификация, измерение и оценка нематериальных активов (объектов) компании: подходы к проблеме
№ 14 (R)–2007	Г. В. Широкова, Д. М. Кнатько	Влияние основателя на развитие организации: сравнительный анализ компаний управляемых основателями и наемными менеджерами
# 15 (E)–2007	G. Shirokova, A. Shatalov	Characteristics of companies at the early stages of the lifecycle: analysis of factors influencing new venture performance in Russia
# 16 (E)–2007	N. Drozdova	Russian “Artel’nost” — Myth or Reality? Artel’ as an Organizational Form in the XIX — Early XX Century Russian Economy: Comparative and Historical Institutional Analysis
# 1 (E)–2008	S. Commander, J. Svejnar, K. Tinn	Explaining the Performance of Firms and Countries: What Does the Business Environment Play'
№ 1 (R)–2008	Г. В. Широкова, В. А. Сарычева, Е. Ю. Благоев, А. В. Куликов	Внутрифирменное предпринимательство: подходы к изучению вопроса
№ 1A(R)–2008	Г. В. Широкова, А. И. Шаталов, Д. М. Кнатько	Факторы, влияющие на принятие решения основателем компании о передаче полномочий профессиональному менеджеру: опыт стран СНГ и Центральной и Восточной Европы

№ 2 (R)–2008	Г. В. Широкова, А. И. Шаталов	Факторы роста российских предпринимательских фирм: результаты эмпирического анализа
№ 1 (R)–2009	Н. А. Зенкевич	Моделирование устойчивого совместного предприятия
№ 2 (R)–2009	Г. В. Широкова, И. В. Березинец, А. И. Шаталов	Влияние организационных изменений на рост фирмы
№ 3 (R)–2009	Г. В. Широкова, М. Ю. Молодцова, М. А. Арепьева	Влияние социальных сетей на разных этапах развития предпринимательской фирмы: результаты анализа данных Глобального мониторинга предпринимательства в России
# 4 (E)–2009	N. Drozdova	Russian Artel Revisited through the Lens of the New Institutional Economics
№ 5 (R)–2009	Л. Е. Шепелёв	Проблемы организации нефтяного производства в дореволюционной России
№ 6 (R)–2009	Е. В. Соколова	Влияние государственной политики на инновационность рынков: постановка проблемы
№ 7 (R)–2009	А. А. Голубева, Е. В. Соколова	Инновации в общественном секторе: введение в проблему
# 8 (E)–2009	A. Damodaran	Climate Financing Approaches and Systems: An Emerging Country Perspective
№ 1 (R)–2010	И. Н. Баранов	Конкуренция в сфере здравоохранения
№ 2 (R)–2010	Т. А. Пустовалова	Построение модели оценки кредитного риска кредитного портфеля коммерческого банка (на основе методологии VAR)
№ 3 (R)–2010	Ю. В. Лаптев	Влияние кризиса на стратегии развития российских МНК
№ 4 (R)–2010	А. В. Куликов, Г. В. Широкова	Внутрифирменные ориентации и их влияние на рост: опыт российских малых и средних предприятий
# 5 (E)–2010	M. Storchevoy	A General Theory of the Firm: From Knight to Relationship Marketing
№ 6 (R)–2010	А. А. Семенов	Появление систем научного менеджмента в России
# 7 (E)–2010	D. Ivanov	An optimal-control based integrated model of supply chain scheduling
№ 8 (R)–2010	Н. П. Дроздова, И. Г. Кормилицына	Экономическая политика государства и формирование инвестиционного климата: опыт России конца XIX — начала XX вв.

№ 9 (R)–2010	Д. В. Овсянко	Направления применения компонентов менеджмента качества в стратегическом управлении компаниями
# 10 (E)–2010	V. Cherenkov	Toward the General Theory of Marketing: The State of the Art and One More Approach
№ 11 (R)–2010	В. Н. Тишков	Экономические реформы и деловая среда: опыт Китая
№ 12 (R)–2010	Т. Н. Клёмина	Исследовательские школы в организационной теории: факторы формирования и развития
№ 13 (R)–2010	И. Я. Чуракова	Направления использования методик выявления аномальных наблюдений при решении задач операционного менеджмента
№ 14 (R)–2010	К. В. Кротов	Направления развития концепции управления цепями поставок
№ 15 (R)–2010	А. Г. Медведев	Стратегические роли дочерних предприятий многонациональных корпораций в России
№ 16 (R)–2010	А. Н. Андреева	Влияние печатной рекламы на восприятие бренда Shalimar (1925 – 2010)
№ 17 (R)–2010	В. Л. Окулов	Ценность хеджирования для корпорации и рыночные ожидания
№ 1 (R)–2011	А. А. Муравьев	О российской экономической науке сквозь призму публикаций российских ученых в отечественных и зарубежных журналах за 2000–2009 гг.
№ 2 (R)–2011	С. И. Кирюков	Становление и развитие теории управления маркетинговыми каналами
№ 3 (R)–2011	Д. И. Баркан	Общая теория продаж в контексте дихотомии «развитие – рост»
# 4 (E)–2011	К. V. Krotov, R. N. Germain	A Contingency Perspective on Centralization of Supply Chain Decision-making and its Role in the Transformation of Process R&D into Financial Performance
№ 5 (R)–2011	А. В. Зятчин	Сильные равновесия в теоретико-игровых моделях и их приложения
№ 6 (R)–2011	В. А. Ребязина	Формирование портфеля взаимоотношений компании с партнерами на промышленных рынках
№ 1 (R)–2012	А. Л. Замулин	Лидерство в эпоху знаний

# 2 (E)–2012	I. N. Baranov	Quality of Secondary Education in Russia: Between Soviet Legacy and Challenges of Global Competitiveness
№ 3 (R)–2012	Л. С. Серова	Микро-предприятия в экономике России: состояние и тенденции развития
# 4 (E)–2012	G. V. Shirokova, D. M. Knatko, G. Vega	Separation of Management and Control in SMEs from Emerging Markets: The Role of Institutions
№ 5 (R)–2012	Г. В. Широкова, М. А. Сторчевой	Влияние социальных сетей на выход на зарубежные рынки: из опыта трех российских предпринимательских фирм
№ 6 (R)–2012	А. К. Казанцев	Инновационное развитие университетов: аналитический обзор ведущих российских вузов
№ 7 (R)–2012	Д. В. Муравский, М. М. Смирнова, О. Н. Алканова	Капитал бренда в современной теории маркетинга
# 8 (E)–2012	E. B. Samuylova, D. V. Muravskii, M. M. Smirnova, O. N. Alkanova	The role of brand characteristics in brand alliance engagement with different types of partners: an exploratory study
№ 9 (R)–2012	Е. Ю. Благов	Факторы ценообразования многосторонних платформ: современное состояние и перспективы исследований
# 10 (E)–2012	E. K. Zavyalova, S. V. Kosheleva	Assessing the efficiency of HRD technologies in knowledge-intensive firms
# 11 (E)–2012	E. K. Zavyalova, S. V. Kosheleva	Human potential as a factor of developing national competitiveness of Brazil, Russia, India and China
# 12 (E)–2012	D. M. Muravskii, S. A. Yablonsky	Determining disruptive innovation potential of multi-sided platforms: case of digital books
№ 13 (R)–2012	В. Ю. Аршавский, В. Л. Окулов	Контролируемый эксперимент по принятию решений в условиях неопределенности и риска
№ 14 (R)–2012	А. А. Муравьев	К вопросу о классификации российских журналов по экономике и смежным дисциплинам
№ 1 (E)–2013	G. V. Shirokova, L. S. Sokolova	Exploring the Antecedents of Entrepreneurial Orientation in Russian SMEs: The Role of Institutional Environment

№ 2 (R)–2013	А.Ф. Денисов	Не упустить детали, или что может усложнить жизнь специалисту по УЧР
# 3 (E)–2013	A. Muravyev, I. Berezinets, Y. Iina	The Structure of Corporate Boards and Private Benefits of Control: Evidence from the Russian Stock Exchange.
№ 4 (R)–2013	Т.М. Скляр, Е.В. Соколова	Организационно-управленческие инновации в здравоохранении