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The Main Factor Affecting Companies' Knowledge Management Maturity

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***Abstract*— Knowledge management (KM) is the process of capturing the value from the knowledge assets and intellectual capital of the organization. Knowledge and effective knowledge management could be a source of competitive advantage. However, due to intangible nature of knowledge resources managers and academics struggle to evaluate the effectiveness of KM systems in organizations. The main objective of this paper is to understand and describe the specific factors that influence on the level of KM development in Russian companies.**

***Keywords*—knowledge management, knowledge management life cycle, country specifics, knowledge management practices, knowledge sharing**

I. Introduction

The goal of knowledge management (KM) is increased efficiency in production and business processes as well as innovation potential of the organization. Therefore efficient knowledge management can lead to a competitive market position. Knowledge management is especially important for high-tech organizations because the employees` knowledge represents main production resource and key source of competitive advantage.

The goal of this paper is to identify specific characteristics of KM system in Russian companies building upon the concept of knowledge life cycle. The paper is based on the results of empirical survey of Russian top-managers. The survey is devoted to the particular characteristics of various phases of corporate knowledge life cycle.

This paper is structured as follows. In the first part the review of modern research on KM is provided and theoretical model is justified. Methodology section is devoted to the developing of KM maturity scale based on the knowledge life cycle concept. The results of the survey of 104 top-managers of Russian companies are then provided. The paper continues with the discussion of strong and weak points of KM processes in Russian organizations, and proceeds with conclusions and suggestions for further research.

II. Theoretical Review

For the purpose of this study we define knowledge as a set of valuable information that is embedded in organization` employees or any of the production processes, systems and organizational culture [Bukowitz and Williams, 1999].

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Authors propose different models related to KM organizational processes. Comparative analysis of these models uncovers the variety of knowledge management processes combinations. For example, the inventor of the term "knowledge management" Karl Wiig classifies these processes into 4 types:

1. Building knowledge
2. Holding knowledge
3. Pooling knowledge
4. Using knowledge

As part of knowledge building, knowledge in the organization is acquired, analyzed, renewed, structured and codified. The process of knowledge holding includes keeping knowledge in the archives and embedding it in the existing processes and procedures. Knowledge pooling includes search of new knowledge, coordination and combination with existing knowledge. Knowledge using relates to the analysis of the problem or situation, identification of knowledge useful in this situation, and choosing among the alternative solutions to the problem.

However, the main assumptions lying in the foundation of the majority of the models have limitations [Andreeva, Sergeeva, 2016]. A number of knowledge process models focuses on knowledge codification, storing and reuse [Wiig, 1993; Van der Spek, Spijkervet, 1997]. Particularly, identification of these components (codification, archiving, storing and reuse) is caused by the perception of knowledge management as a function of systematization of already existing knowledge.

Cyclical models of KM systems functioning have an iterative character as well as the actual process of KM system creation. Besides, lifecycle models embed the systemic thinking principles reflecting the variety of internal processes of the organization. This is especially important for KM system. That is why it is important to look at the knowledge life cycle as a whole.

On the other hand, lifecycle models have some disadvantages. Firstly, these models usually have prescriptive nature as they prescribe what kind of KM system should be but do not mention the details. Secondly, lifecycle models do not consider the degree of correspondence of KM system to the organizational strategy or cultural context [Rubenstein-Montano et al., 2001].

Lifecycle model developed by Bukowitz and Williams [1999] represents the detailed model of working with intellectual and knowledge assets in the organization (see Table 1 for the description of the model).

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TABLE I. KNOWLEDGE LIFECYCLE MODEL BY BUKOWITZ AND WILLIAMS [1999]

	Stage	***Description***
1	Get	Access and filter information to identify relevant and valuable content
2	Use	Combine information in unique ways to enhance and support innovation
3	Learn	Discovery of information in order to apply content based on experience and organizational memory
4	Contribute	Participants share their knowledge and offer their comments into a shared space or 'repository' to assist and develop the overall community or organization
5	Assess	Evaluation of knowledge acquisition and use of the organization in the form of intellectual capital
6	Build/Sustain	Plan and allocate resources to support the attainment of future knowledge for the organization
7	Divest	Evaluate "assets" which do not create value for the organization and allocate the associated resources elsewhere.

The authors highlight that the first four model stages (Get, Use, Learn, Contribute) focus on tactical issues, while the last three (Assess, Build/Sustain, Divest) have more strategic nature.

Even though this model might be perceived as redundant at some degree, it was chosen as a theoretical base for this research. The survey proposed by the authors of this model was modified according to the goals of the research.

III. Research Methodology

Measuring KM effectiveness is a difficult task because of intangible nature of knowledge assets. There are several approaches towards corporate KM maturity estimation. For example, Balanced Scorecard methodology of Kaplan and Norton (The Balance Scorecard, 1996), is adapted for KM. Other inductive and deductive methods are proposed in [Arora, 2002; Skyrme, Amidon, 1998; Stewart, Ruckdeschel, 1998; Sveiby, 2007]. Another example is [Kuriakose et al., 2011] where authors propose mechanism for KM evaluation including estimation of mental, cognitive, process, technology and institutional levels. One of the limitations of this methodology implementation is difficulty of the measurement process and evaluation criteria choice.

To solve this problem we propose a new express-method based on the Bukowitz and Williams [1999] model that could estimate the level of maturity of KM system on the various stages of corporate knowledge lifecycle.

The survey was developed on the base of the PricewaterhouseCoopers [Bukowitz, Williams, 1999] survey. Our express-survey estimates effectiveness of the KM system of the company through additive maturity scale.

Bukowitz and Williams model was tested on Russian companies. During several in-depth interviews with practitioners in KM field we found how the stages of Bukowitz and Williams model correspond to the real KM states in Russian organizations (based on the personal experience of interviewed).

Basing on the results of in-depth interviews, it was indicated that not all stages of the Bukowitz and Williams lifecycle model are present in the majority of Russian organizations. Stages 5 and 7 – "Assess" и "Divest" – are absent in the majority of Russian companies. This result correspond to the conclusions in the previous paragraph comparing Bukowitz and Williams model with other KM models.

The survey was conducted on a sample of EMBA (Executive Master of Business Administration) program students and alumni at Graduate School of Management in St. Petersburg during 2010-2015. One of the program enrollment conditions is having at least 5 years of managerial experience. Based on the results of the survey, the majority of the respondents represent large companies that are based in St. Petersburg and Moscow

In order to estimate KM maturity of the company we adapted the survey proposed by Bukowitz and Williams consisting of 140 questions (20 questions for each life cycle stage). We analyzed the questions of five stages included in the theoretical model. In reliance on the results of in-depth interviews and after careful analysis of the survey questions (the questions were translated from English, particularized and simplified) we selected 18 questions measured by 3-point Likert scale: 2 points – Strongly agree, 1– Neither, 0 – Strongly disagree.

Hence the maximum score was 36 points. Based on the results, the average score was 17 points.

Apart from the questions related to KM, other questions on respondents' internal factors were added: company size; company age; geographical location.

The size of the organization is the factor that can influence the intensity of knowledge sharing, and in the majority of empirical studies this factor is included as a control variable. In most cases it is assumed that the lesser the size of the firm, the more intensive is knowledge sharing as the employees could communicate more frequently. However the results of empirical studies are controversial: some authors found negative effects [Makino, Delios, 1996], positive effects [Laursen, Salter, 2006], and non-significant effects [Tsang, 2002].

The company`s age is one of the KM determinants: the more senior the organization or the division, the higher its "organizational inertia" and the less its abilities to learn and to adapt for changing environment [Cyert, March, 1963]. A

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number of academic papers demonstrated that the more immature firms have various advantages related to knowledge sharing and other knowledge management processes [Frost, Birkinshaw, Ensign, 2002].

Geographical location is another factor affecting knowledge management, as proximity to the major cities correlates to intellectual capital level of the region. Of course, the socio-economic context could play a large role in intellectual capital formation of the organizations [Stanishevskaya, Imaykin, 2010].

Based on the consideration of knowledge life cycle stages, series of in-depth interviews and focus groups, several hypotheses on knowledge management functioning in Russian companies have been formulated.

Hypothesis 1. The factors of size, age, geographical location of companies are positively correlated with the level of knowledge management system development.

Hypothesis 2. The fifth stage of knowledge life cycle ("Build/Sustain") has the highest level of development in Russian companies. Top-management support is the key influencing factor defining the level of maturity of KM system in Russian companies.

Hypothesis 3. The fourth stage of knowledge life cycle ("Contribute") has the lowest level of development in Russian companies.

The nonparametric Kruskal-Wallis test was used as a statistical method for the data analysis. Small sample size, the use of rank variables, and the deviation from the normal distribution of observations determined the choice of the non-parametric method as the most reliable in terms of the validity of the results.

Kruskal-Wallis test is used for comparing two or more independent samples of equal or different sample sizes. Kruskal–Wallis test does not assume a normal distribution of the residuals. The null hypothesis is that the medians of all groups are equal, and the alternative hypothesis is that at least one population median of one group is different from the population median of at least one other group. The pairwise correlation analysis was also performed based on such criteria as age, size, geographical location. IBM SPSS Statistics 20.0 statistical package was used for the analysis.

IV. Results and Discussion

In order to identify the differences between high and low performing in KM organizations we divided the sample in three groups based on their total survey score: "advanced", "mature" and "novice". The average score is 17 points. The top quarter of total score distribution (22-36 points) comprised the group of "advanced" in KM organizations, the bottom quarter of total score distribution comprised the group of "novices" (0-10 points). The remaining companies were grouped under "mature" label. Therefore among the "advanced" group members there is a noticeable prevalence of large companies. For "mature" group, large and medium size companies are prevailing. "Novices" group is comprised mostly by small enterprises.

The majority of respondents indicated that their organizations were founded during last 15 years. The "advanced" group was comprised mostly from equal number of the organizations from various ages. In the "mature" group young companies are prevailing. In the "novice" group there is only one company founded before 1990.

The highest score for all three types of organizations is for one of the strategic stages, namely Build/Sustain. This stage is significantly developed because top-management support included in this stage is considered to have a high level of development according to the respondents. Besides, many respondents indicated that their organization generally supports innovations. Moreover, respondents mention that informational systems provide an access to actual and relevant information.

The least developed stage is Contribute stage. This is mainly due to lack of employees whose direct responsibilities would include knowledge sharing coordination (business analysts and knowledge managers). The problem of absence of business analysts, knowledge managers and other knowledge specialists is discussed in Russian literature [see Gavrilova, Leshcheva, Kudryavtsev, 2012].

Besides, many respondents indicate that there are numerous barriers for knowledge flows in their organizations, so these bottlenecks should be more effectively resolved. Another problematic point is engagement of all employees in the process of knowledge sharing.

The scores for each life cycle stage for three groups are presented in Table 2.

TABLE II. TABLE 6. THE AVERAGE SCORES FOR KNOWLEDGE LIFECYCLE STAGES IN THREE TYPES OF ORGANIZATIONS

Stage	"Novices"	"Mature"	"Advanced"
Get	0,51	0,89	1,57
Use	0,34	0,97	1,45
Learn	0,49	1,03	1,46
Contribute	0,17	0,37	1,08
Build/Sustain	0,83	1,39	1,73

Average scores for three types of organizations are illustrated on Fig. 3.

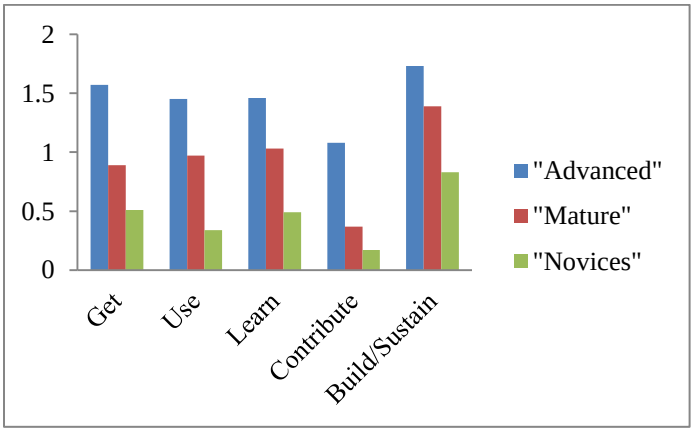

Figure 1. Average scores for three types of organizations

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Kruskal-Wallis criteria showed no statistical differences among the groups based on size (p = 0,58), age (p = 0,94), and geographical location (p = 0,58).

Based on preliminary analysis and in-depth interviews several hypotheses on knowledge management realization practices were formulated. The results of hypotheses testing are presented in table 3.

TABLE III. THE RESULTS OF HYPOTHESES TESTING

No.	Hypothesis	Result
1	The factors of size, age and geographical location of the company are positively correlated with the level of KM system development	Not supported
2	Top management support is the leading factor correlating with the level of KM system development in Russian companies	Supported
3	The fourth life cycle stage of KM (Build/Sustain) is the least developed stage in KM system	Supported

The results demonstrated that size, age, and geographic location do not influence the maturity of KM systems in Russian companies.

The hypothesis of top-management support as the leading factor influencing the level of KMS maturity was supported. Indeed, descriptive analysis demonstrated that many respondents note high level of top-management support as well as high level of IT as KM tools. This result could be explained by the fact that the majority of respondents consider top-management as an important issue of KM dissemination and development. Moreover the majority of respondents understood the importance of IT support for all the KM processes.

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