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KNOWLEDGE MANAGEMENT SYSTEMS: ISSUES IN ENTERPRISE HUMAN CAPITAL MANAGEMENT IMPLEMENTATION IN TRANSITION ECONOMY

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Abstract: Creating knowledge management systems (KMS) is a vital factor in the competitiveness of organizations. Therefore, we have viewed the concept of KMS from the position of its impact on the economic results of the company and the inclusion of innovative components in KMS according to the following blocks: knowledge preservation, search for knowledge in special networks, providing conditions for new knowledge generation, knowledge sharing training. As the analysis showed, in temporary transition economies the level of implementation of the traditional components of KMS is on average slightly more than 50%. Innovative components are used less – the highest level is 48% (for element "Search for knowledge in special networks"). Only 12% of the sampled companies have all the features typical for the system in their activity on knowledge management. However, the companies which developed more KMS components are characterized by higher profitability and ratio between the average monthly wage at the enterprise and in the sector. The identified issues related to slow implementation of KMS in the enterprises within transition economies are mainly caused by insufficient awareness regarding the KMS benefits and the possibility of their use as core factor to facilitate asset growth and to enhance human capital reproduction.

Key words: human capital, innovations, knowledge management system (KMS)

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Introduction

Innovative HR-management is typical for successful modern enterprises. It is the management based on knowledge, leadership and staff talent development. The assessment of the experts who identified managing talent as one of the three topics that fall within the so-called "red zone" (the most important one) in HR management with the highest expectations regarding economic efficiency (BCG, 2012) indicate awareness of the increasing role of knowledge for successful business. However, many transition economies, including Ukraine, are characterized by low cooperation efficiency in labour relations, insufficient use of modern networking capabilities and innovation in staff development. Considering the aforementioned features, Ukraine keeps a low position in the

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recognized world rankings. Particularly, Ukraine currently ranks 114th out of 140 world countries on the ability to retain talent (WEF, 2015), thus, the prospects for further innovative development of enterprises cannot be considered optimistic. Bearing in mind slow economic development of transition countries convoluted by the use of physically and morally obsolete fixed assets, the opportunities for relatively fast economic growth can be achieved only by improving human capital use. One of the modern and effective ways of such development is the creation of effective knowledge management systems (hereinafter – KMS).

Given this, the authors view identifying innovative components of knowledge management systems, examining the issues for the implementation at enterprises in transition economies and assessing the impact of KMS components upon the economic efficiency of enterprises as the objective of this research.

Literature Review

Nowadays knowledge management systems are an integral part of HR management. One of the founders of modern HR-management M. Armstrong has described in detail their use and characteristics. In numerous reprints of his textbooks one can clearly identify the differences in the concepts of "organizational learning" and "the learning organization", and the foundations of the learning process are analysed in detail, based on different strategies for managing people which were systematized since the late 20th century. Supporting the importance of dividing knowledge into explicit and tacit, the characteristics of the knowledge-creating company which are revealed at different stages of the knowledge exchange and use have been identified (Armstrong, 2006). Staff talent management (Maślanka-Wieczorek, 2014), as well as the impact of intellectual potential on the employment structure (Węgrzyn, 2014) get more and more attention.

The development of modern technologies and attempts of numerous companies to use them for their own purposes led to the emergence of many studies imperative to clarify current understanding of KMS and their characteristics. In this respect, there is a lot of profound research, both theoretical and applied. In particular, factors ensuring the effectiveness of internal communications for knowledge dissemination are important for transformation processes of knowledge management (Martynenko, 2015). Today the development of information technology is studied at various levels: starting from organizations to the human resource management processes at the government level (Bileviciene et al., 2015).

Clarification of the technical processes specific to the KMS implementation, including those with the use of information technology, is thoroughly investigated in the works of well-known researchers in the field of knowledge management (Alavi, 2000; Alavi and Leidner, 2001). The scientists systematized the views on the intrinsic knowledge characteristics that can appear in different forms, i.e.: vis-à-vis knowledge transfer, the formalization in knowledge repositories, as a way of thinking and action. The theoretical conclusions about the use of explicit and tacit knowledge considering the technical resources which exist in the organization

are formed on this basis. W. King has identified an important application of KMS use, emphasizing the need in staff motivation for professional development in case of work with KMS components (King and Marks, 2008).

In modern KMS classifications the need for greater use of communications that occur between the participants of business processes in both internal and external environment of the organization is increasingly taken into account. This approach is the basis of the KMS typology according to the processes' openness criterion suggested by Sven A. Carlsson. He defines three types of inter-organizational networks for strategic knowledge managing: extra-networks, inter-networks, and open networks (Carlsson, 2002).

It should be mentioned that most of the ideas are basically outcomes of the most generalized KMS classification: their division into technological (informational) and social / organizational (contextual). The differences between those are caused by the employees' knowledge formation and use method: use of formalized (explicit) knowledge (informational KMS) or the use and development of the unique experience of employees (contextual KMS). Today one can find cases demonstrating successful combination of these two types of systems in the enterprises. Therefore, some theoretical studies of modern KMS components, for instance (Sajeva, 2010), there are key KMS elements which are developed through a combination of two approaches: social and technological ones. Other approaches have also been substantiated in this context and have proven a need for combining technological advances in information handling and personal aspects of working with KMS, including personal expectations such as growth of productivity in working with KMS (Lin and Huang, 2008)

In general, today's management theory has a sufficiently developed conceptual framework and applied knowledge management tools. The most profound and original approaches to the study of the content and principles of KMS operation are systematized in Table 1.

As the table shows, the development of methodological approaches to knowledge management lead to the trend that researchers pay less attention to knowledge typology on its own. It also lead to the gradual shift of research focus from purely technical characteristics of the systems and the possibilities of their improvement through modern information technologies to the needs of personnel adaptation for the work in new conditions. While agreeing with the ideas of the human capital importance as a key element of any KMS regardless of its technical and organizational complexity, we also want to focus on another aspect.

We believe that the issue of assessing the impact of the most important components upon the KMS success remains to be poorly examined. Today the appropriate factor analysis is focuses primarily on the aspects of improving the KMS directly: there are detailed studies in this regard, namely (Abdel-Aziz and Hawajreh, 2012; Dubosson and Fragniere, 2009). However, the importance of the applied research significantly reduces without a clear reference to the effect, in particular, achieving the objectives of the organization.

Table 1. Summary of key studies concerning KMS essence and functioning

Author	Major Subjects of Research		
	Working with Knowledge Arrays	Parameters of KMS Functioning	
		Technical	Social / Organizational
Armstrong, 2006	N/A (use of existing division of knowledge and its management stages)	N/A (considered to have already been created)	'knowledge-creating company" concept, improvement of staff cooperation in the use of knowledge
Alavi, 2000; Alavi and Leidner, 2001	knowledge content, their division into explicit and tacit; forms of exchange and use	the possibility of using company's technical resources in knowledge management	allocation of the new forms of knowledge accumulation, particularly, as behaviour experience preservation
Carlsson, 2002	N/A (use of existing division of knowledge)	N/A	links of KMS matters with the environment, KMS classification basing on the openness of knowledge management processes
King and Marks, 2008	N/A	N/A (considered to have already been created)	emphasis on the need for staff development as a KMS success factor
Lin and Huang, 2008	N/A	technological advances in knowledge management related to the assessment of a possible increase in productivity of working with knowledge arrays	
King, 2009	the concept of knowledge management life cycle	the possibility of using IT at appropriate stages	N/A
Sajeva, 2010	N/A	"socio-technical approach" to KMS creation: the combination of technical capabilities and appropriate improvement of the organizational culture related to their use by the staff	
Matayong S. and A. K. Mahmood, 2013	N/A	the processes of forming and maintaining efficiency of KMS	

In order to find those KMS components which allow enhancing the competitiveness of enterprises to its maximum, there is a need to clarify the KMS content considering the context of the economic efficiency of their implementation in the workplace. Combining the idea of economic feasibility of any administrative decisions, including KMS creation, and methodological principles of systems approach to research, the authors believe that the most accurate concept of modern knowledge management system can be summarized as follows: *knowledge management system is a well-arranged set of elements which interaction ensures the process of creation, development and beneficial use of knowledge in order to increase the value of assets and improve the quality of external and intra-organizational cooperation.*

Methodology

We have investigated the issues of KMS implementation in the enterprises of transition countries in one of the transition economies: we have considered a case of Ukrainian enterprises. The authors have conducted the study in person basing on the expert survey of the businesses' administration. The survey was conducted in December, 2015. The sample included only industrial companies, given that they are always ahead of the enterprises representing other sectors in terms of innovation. In order to obtain the most accurate results on trends and issues of KMS components spread the sample included industrial enterprises of the regional centre (the city of Rivne, Rivne Oblast) as those that are potentially most familiar with modern trends of knowledge management, since it is driven by their activities in cross-border region.

The sampled population included 97 industrial enterprises. The required number of enterprises (16) to ensure the representativeness of the sample was determined by statistical calculation with non-repeated sampling. In order to determine the sample size we have calculated average and marginal errors, the values of which are acceptable to consider the sample to be reliable, i.e. the average error is μ_x=0.107; the marginal error is Δ_x= 0.214. The sample fully reflects a structural division of the sampled population of industrial enterprises according to their scope of activity. Consequently, the results are reliable and can be used in order to assess the issues of KMS spread and evaluate their impact on enterprise performance.

We have used the method of correlation analysis in order to analyse the impact of KMS components on the economic performance of enterprises. This analysis has also used the well-known principles of closeness assessment and directions of communication: basing on the absolute value and the coefficient sign of the pair correlation of a specific factor (KMS matter) and the corresponding result.

The authors faced in their study a particular problem: the number of innovatively active industrial enterprises in the city that could be included in the sample and were willing to provide information was not big enough. Apart from that, a significant number of formally innovative enterprises are innovative only declaratively, that's why such new capacity as KMS is not common. Increasing the sample size by these companies in order to obtain high-quality data set according to our goals was considered to be impractical.

The starting point of our empirical research is to improve the composition of KMS factors. Basing on the previous methodological studies it is clear that today the role of innovative components gets more and more important: both within assets and the organization of some management processes. We believe that in view of today's technical and technological progress innovation in the KMS composition and functioning are no longer in the technical specifications or in the way of their use. On the contrary, it is new skills, new ways of their sharing, distribution, and facilitation of their use for sustainable development of the organization that can be innovative components which can provide a competitive advantage to the enterprise, if they are used correctly.

Thus, we suggest using all innovative approaches in knowledge management as KMS innovative components; however, for a more detailed analysis of their impact on the company's results we recommend to divide them into specific knowledge management functions (stages). For the purposes of our study, basing on the theoretical principles of knowledge management and KMS creation itemised above, and the existing issues of effective KMS creation in businesses of transition countries, we believe it is appropriate to conduct a suitable assessment based on KMS components listed in Table 2.

Table 2. The Composition of the managed assets in the traditional and innovative KMS components

KMS Components	Managed Asset	Symbol	Composition of Key Figure Block
Traditional	Formation of knowledge management environment	X_{11}	Providing the staff with training materials, books, specialized magazines, audio and video materials
		X_{12}	Free access to databases containing unclassified knowledge
		X_{13}	Investment in staff training
		X_{14}	Providing the employees with information concerning their tasks on time
		X_{15}	Research of traditional objects (market research, studying staff needs and motivation system efficiency)
Innovative	Preserving knowledge	X_{21}	Electronic knowledge base of innovative nature (scientific, specialized information)
		X_{22}	Using the informational / educational programmes according to the executed functions
		X_{23}	Spreading out best behaviour practices in conjunction with partners, clients, staff
		X_{24}	Saving correspondence history in corporate networks in order to use the experience to improve working methods
		X_{25}	As records – employees' reports on their work with the analysis of the contribution of the employee him/herself and other participants involved in the task
		X_{26}	Creation of information infrastructure (use of intranets, web portals)
	Search for knowledge in special networks	X_{31}	Client networks
		X_{32}	Partner networks
		X_{33}	Competitive (formal and informal) networks
		X_{34}	Public networks (social networks, blogs, forums)
	Ensuring enabling environment for the generation of new knowledge	X_{41}	Formation of staff feedback with the ability to provide ideas and evaluate them
		X_{42}	Compensation and support of employees' innovative ideas by top management
		X_{43}	Assessment of the response to changes (staff and contact audience of the company)
		X_{44}	Establishment of distance learning (via Skype etc.)
	Training on knowledge sharing	X_{51}	Organization of public discussions on new knowledge and its use
		X_{52}	Creation of working groups

		X_{53}	Forming cross-functional project teams
		X_{54}	Training from clients (creation of customer service centres)

Our results based on the use of such KMS components' separation have significant difference from the studies conducted by other authors due to the following peculiarities:

1) the system of factors that we have suggested include traditional and innovative components typical for the companies focused on using the strategy of innovative advance and obtaining competitive advantages by improving human capital management;
2) the selected KMS components can be used not only for assessing progress on their implementation and conducting diagnostics of the existing systems; they can be the basis for analysing the impact of KMS components upon the relevant indices of enterprise performance.

Analysis

As it is revealed in our study, the unwillingness of management and personnel to move from traditional methods to innovative knowledge management is the most important factor in slowing down the process of forming corporate KMS. The lack of funds on knowledge management system formation within the enterprise is the major price factor. However, the industrial companies expressed a hundred per cent agreement on the importance of the role of knowledge and interest in their preservation and dissemination. Nevertheless, the analysis of their features related to knowledge management showed that only 12% of the sampled companies have all the features typical for the *system*. Given the identified deficiencies of KMS formation, the authors evaluated the prevalence of both traditional and innovative components listed in the Table 1 in the enterprises. The results of the noted study are provided in Table 3.

Table 3. Use of KMS components at enterprises (respondents' self-assessment)

Figure Block	Compo-nents	Average Index Rate		Figure Block	Compo-nents	Average Index Rate	
		for block	for components			for block	for components
X_1	X_{11}	0.52	0.65	X_3	X_{31}	0.48	0.52
	X_{12}		0.69		X_{32}		0.37
	X_{13}		0.37		X_{33}		0.46
	X_{14}		0.43		X_{34}		0.57
	X_{15}		0.47	X_4	X_{41}	0.45	0.40
X_2	X_{21}	0.47	0.35		X_{42}		0.51
	X_{22}		0.58		X_{43}		0.56
	X_{23}		0.44		X_{44}		0.34
	X_{24}		0.42	X_5	X_{51}	0.31	0.24
	X_{25}		0.39		X_{52}		0.31
	X_{26}		0.64		X_{53}		0.29
					X_{54}		0.41

Understanding the difficulties that exist at the level of innovation leadership perception by the management of certain companies, as well as the objective factors provided by the respondents, we, conversely, expected a higher level of use of at least traditional KMS components. Nonetheless, as the analysis showed, the level of implementation of the traditional components (indices in block X_1) is on average slightly more than 50%. Therefore, the use of innovative methods and tools of knowledge management in enterprises is even less.

The successful methods of gathering new knowledge included in the block X_3, common to many foreign enterprises, do not require large financial costs. However, the level of use of these information resources is only 48%. For the other components the situation is even worse.

Comprehending that none of the surveyed enterprises has got a set of existing knowledge management elements which can be considered KMS in its full sense, we simultaneously believe that even fragmentary use of KMS components can have a positive impact on the economic performance of the enterprises. In order to investigate the relationship closeness between the KMS components and economic performance we have defined the following dependent variables:

1) the level of profitability,
2) the ratio between the average monthly wage at the enterprise and in the sector.

These resulting indices enable measurement of impact of the quality of the KMS prototypes created in the enterprises on the results describing the achievement of business objectives, for which, KMS is actually created: the growth of financial and human capital through creating appropriate sources of their reproduction. The results of relationship evaluation are shown in Table 4.

Table 4. Correlation between the KMS Components and Economic Performance of Enterprises

Resulting Index	Correlation Coefficient between Factor Features and Resulting Index				
	X_1	X_2	X_3	X_4	X_5
profitability level	0.750	0.642	0.288	0.674	0.601
ratio between the average monthly salary at the enterprise and in the sector	0.545	0.596	0.270	0.559	0.671

As one can see, KMS components are still poorly used as instruments for creating competitive advantages. The fundamental absence of relationship between the innovative factors of search for new knowledge through advanced networking capabilities – factor X_3 – is common for both resulting indices. Given that this factor is the most common one for the enterprises among the innovative KMS components (see Table 3), however the knowledge which is the object of search in the relevant information networks is obviously poorly subordinated to the strategic goals of the enterprises. The companies which developed more KMS components are characterized by higher profitability. The use of traditional components (X_1), as well as innovative tools for knowledge preservation (X_2) and providing favourable

conditions for generating new knowledge (X_4) retain to be the most helpful ones in achieving profitability. The impact of the "Training on Knowledge Sharing" component is at the turn of the importance basing on its relationship strength (X_5).
As for the correlation coefficient of average monthly salary at the enterprise and in the sector, in this case it is quite the opposite: training on knowledge sharing plays the crucial role. As for other factors, it is evident that the remuneration does not directly depend on the development factors and constructive knowledge use. Therefore, the enterprises use outdated business strategies aimed at extensive attraction of resources, and human resources potential is not taken into account in this regard.

Summary

Awareness of the modern methods regarding the fullest use of creative potential of the employees of the enterprises through KMS creation is very low in transition economy. Referring to the informational and financial constraints that hinder KMS implementation, the representatives of the surveyed enterprises are apparently not aware of the benefits that such a component of HR management can provide. The analysis of the connection between the knowledge management components and economic results which illustrate the opportunities to achieve competitive advantage through the profitability growth and human capital reproduction quality increase leads to the conclusion that there is a need to promote and stimulate the implementation of innovative approaches to preserving, searching, generating new knowledge, and training its proper use at the enterprises. The set of KMS components that we have suggested may surely vary for businesses depending on their goals and objective possibilities to involve this or that component. Research limitations in such studies are the readiness of companies to provide information about the characteristics of the existing management system. Therefore it is necessary to promote results that show the benefits of KMS using. Their advantages can be a good argument to involve scientists for developing practical recommendations to improve knowledge management in enterprises. So, it is needed to continue future study in the field of knowledge management in direction of evaluation of the KMS impact on other economic results: increase in assets, value added, market share etc.

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SYSTEMY ZARZĄDZANIA WIEDZĄ: KWESTIE WDRAŻANIA ZARZĄDZANIA KAPITAŁEM LUDZKIM W PRZEDSIĘBIORSTWACH W GOSPODARCE W OKRESIE TRANSFORMACJI

Streszczenie: Artykuł prezentuje koncepcję, że tworzenie systemów zarządzania wiedzą (SZW) jest istotnym czynnikiem konkurencyjności organizacji. Dlatego też dokonano w nim przeglądu SZW z punktu widzenia jego wpływu na wyniki ekonomiczne firmy oraz włączenie innowacyjnych komponentów SZW takich, jak: utrzymanie wiedzy, poszukiwanie wiedzy w specjalnych sieciach, zapewnienie warunków dla nowego generowania wiedzy, szkolenie dzielenia się wiedzą. Jak wykazała analiza, w gospodarkach będących w fazie transformacji poziom realizacji tradycyjnych składników SZW wynosi średnio nieco ponad 50%. Innowacyjne składniki stosowane są rzadziej – najwyższy poziom to 48% (dla elementu "Szukanie wiedzy w sieciach specjalnych"). Zaledwie 12% przedsiębiorstw objętych próbą posiada w swojej działalności wszystkie cechy typowe dla systemu związanego z zarządzaniem wiedzą. Zidentyfikowane problemy związane z powolną implementacją SZW w przedsiębiorstwach w gospodarkach okresu transformacji.
Słowa kluczowe: kapitał ludzki, innowacje, system zarządzania wiedzą (SZW)

知識管理系統：企業人力資本管理中的問題實施過渡經濟

摘要：創建知識管理系統（KMS）是組織競爭力的重要因素。因此，我們從其對公司經濟結果的影響的立場和KMS中包含創新組件的角度來看待KMS的概念，包括知識保護，在特殊網絡中搜索知識，為新的知識生成，知識共享培訓。如分析所示，在臨時轉型經濟體，KMS的傳統組件的實施水平平均略高於50％。創新組件使用較少-最高級別是48％（對於元素“在特殊網絡中搜索知識”）。只有12％的抽樣公司在知識管理活動中具有系統的典型特徵。然而，開發更多KMS組件的公司的特點是企業和行業的平均每月工資較高的利潤率和比率。已確定的與轉型經濟體內企業緩慢實施KMS有關的問題主要是由於對KMS效益的認識不足以及將其作為促進資產增長和加強人力資本再生的核心因素的可能性所致。
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