Innovations in Organisational Knowledge Management
Typology, Methodology and Recommendations

Tatiana Gavrilova, Dmitry Kudryavtsev and Anna Menshikova
Graduate School of Management, St. Petersburg State University, 7/9 Universitetskaya nab., St. Petersburg, Russia

Keywords: Knowledge Management, Innovation, Knowledge Typology, Customer Orientation, Knowledge Representation.

Abstract: The INNOVARRA project is focused on the research and development of new models and methods of knowledge management in the enterprises. The project aims to identify and develop knowledge management methods and tools, which are the most appropriate for particular knowledge type and domain of any company, as well as have the greatest impact on the final results of Russian companies. Special attention is paid to the knowledge typology development, which helps to differentiate and select knowledge management tools and methods. Research methodology is interdisciplinary and includes both the behaviourist methods of empirical studies (surveys, statistical analysis) and design-oriented methods such as ontology engineering, system analysis and enterprise architecture management.

1 INTRODUCTION

Knowledge is a key resource for creating and maintaining a competitive advantage in modern post-industrial economy. Knowledge management (KM) is an interdisciplinary approach to achieving organizational goals through the most effective usage of knowledge.

Despite the fact that KM is actively discussed for more than 20 years among academics and practitioners of management, the effect of business investment in KM is insufficient. One of the main practical problems is the issue of choosing methods and tools for KM. It is difficult for business to understand which methods and tools of KM have the greatest effect on the final results. Besides it is not obvious which methods and tools are suitable for the use in the particular knowledge domain. From theoretical point of view there are discrepancies in the findings of the empirical studies explaining knowledge processes. For example, the existing empirical evidence regarding the impact of the rewards of knowledge sharing behaviour to be contradictory – some found a negative relationship, some found a positive relationship, and some found no relationship at all.

Several prominent contributions suggested that such discrepancies can be resolved by uncovering and explicitly incorporating contextual conditions in which the behaviour is taking place into the analysis (e.g. Bamberger, 2008; Johns, 2006).

In response to the calls for more context aware theorizing, A. Sergeeva and T. Andreeva (Sergeeva and Andreeva, 2015) suggested a "Who? / Where? / Why? / What?" framework of context dimensions for knowledge sharing research. The current paper describes ongoing INNOVARRA project, which analyses and structures KM methods and tools focusing on "What?" element of the context framework. The project INNOVARRA (Innovations in Organizational Knowledge Management: Typology, Methodology and Recommendations) aims to identify and develop KM methods and tools, which are the most appropriate for particular knowledge type and domain of the company. Additionally the project study, what KM methods and tools have the greatest impact on the final results of Russian companies.

2 BACKGROUND AND METHODS

The solution to the aim of INNOVARRA project is based on the international best practices and has an interdisciplinary approach, involving five tracks of the research. Figure 1 illustrates these tracks. The

Gavrilova, T., Kudryavtsev, D. and Menshikova, A..
Innovations in Organisational Knowledge Management - Typology, Methodology and Recommendations.
In *Proceedings of the 7th International Joint Conference on Knowledge Discovery, Knowledge Engineering and Knowledge Management (IC3K 2015) - Volume 2: KEOD*, pages 447-452
ISBN: 978-989-758-158-8

first track analyses the effect of existing KM methods and tools on business results of Russian companies ("as is" country-specific analysis). The second "integrating" track describes knowledge types and domains and creates the foundations for linking them with the corresponding KM methods and tools. Tracks 3.1-3.3 provide the examples of methods and tools for several organizational knowledge domains, particularly: for product/service and customer knowledge, for operations management knowledge, for strategic management and organizational development knowledge.

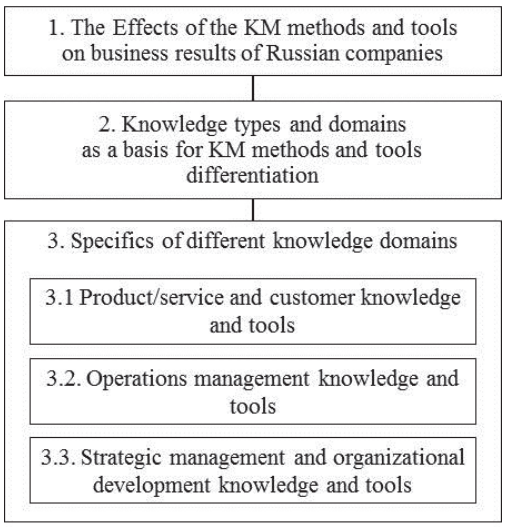

Figure 1: Main tracks of INNOVARRA project.

Track 1

A number of studies have addressed the relationship between intellectual capital, KM and performance of companies (e.g., Andreeva, Kianto, 2012; Kimura et al, 2010; Starowiz and Marr, 2005; Youndt, 2004). Nevertheless, the empirical data on how intellectual capital and KM work in Russian context is limited, and the existing findings are controversial. For example, one study suggests that intangible assets have a less explanatory power in Russian companies' value in comparison to tangible assets (Garanina, 2011). Another study demonstrated that KM practices have a positive impact on organizational performance of Russian companies (Andreeva and Kianto, 2012). Therefore, further empirical examination of these issues is needed. Besides, a number of KM scholars highlight the Western–Eastern division in the conceptual tradition and management practice and argue that KM practices are not so easily transferable across countries (Nonaka and Takeuchi, 1995; Glisby and Holden, 2003). Some authors argue that indeed Russia represents a different context where knowledge-based processes work differently (Andreeva and Ikhilchik, 2009; May and Stewart, 2013). While some research has been done on the applicability of foreign management theories in Russia in general (Andreeva and Ikhilchik, 2011), the applicability of intellectual capital and KM concepts in the Russian context has not been studied yet empirically.

Track 2

The basis for the differentiation of KM methods and tools in INNOVARRA project is the developed knowledge typology and a description of the typical enterprise knowledge domains. Research in the field of knowledge types is presented in (De Jong and Ferguson-Hessler, 1996; Alavi and Leidner, 2001). Different knowledge types require different knowledge strategies, methods and tools. At the most general level focus on explicit knowledge will trigger codification strategy, while tacit knowledge – personalization strategy (Hansen et al., 1999). Grant differentiated knowledge based on the following characteristics: transferability, capacity for aggregation, appropriability, specialization. These characteristics let him to suggest four mechanisms for integrating knowledge: rules and directives; sequencing; routines; group problem solving and decision making (Grant, 1996). Some studies included knowledge tacitness, explicitness or codifiability in the empirical model and demonstrated that the determinants of the knowledge sharing behaviour differed depending on the type of knowledge shared (Levin and Cross, 2004; Reagans and McEvily, 2003). Ideas about the differentiation of KM methods and tools depending on the types and domains of knowledge are supported by research by Jobe and Schulz (Schulz, Jobe, 2001). In their work on the basis of empirical research, they have shown a positive relationship between the "focused" strategy, KM and performance of the company. "Focused" strategy involves the use of different methods of codification of knowledge depending on the type of knowledge. Research in knowledge/information representation emphasizes the importance of cognitive fit theory, which explains what problem representations (visual, tabular etc.) are best used to support certain types of tasks (Vessey, 1991; Gavrilova et al., 2014).

Different enterprise knowledge domains (e.g. product knowledge, customer knowledge, operations management or strategic management knowledge etc.) have different knowledge characteristics and knowledge types. As a result different knowledge areas require corresponding methods and tools. As

part of the INNOVARRA project the description of typical enterprise knowledge areas will be presented in the form of generalized (reference) enterprise knowledge map. Research in the field of knowledge maps ispresented in the (Vail, 1999; Eppler, 2008). The results from enterprise functional decomposition (Kudryavtsev, Grigoriev, 2011) and reference classifications of business processes (e.g. APQC's Process Classification Framework, https://www.apqc.org/pcf) will be used in the development of the generalized (reference) enterprise knowledge map. An example of associating knowledge areas (areas of expertise) with knowledge types is provided in (Chandrasegaran et al, 2013), where for each phase of product design the prevalent form of knowledge representation is given.

Track 3

Track 3.1

Currently, research on the role of market and customer orientation in the context of innovation and knowledge creation activity is in its active stage of development considering under both narrow and broad approach. Within the narrow research scope approaches to the involvement of consumers in the innovation process are studied.

Analysis of publications in Scopus and Web of Science databases shows a significant increase in the number of publications on the relationship of innovation and market and customer orientation, as well as related areas of research in several waves since 2005 (including research on user -driven innovation, lead user innovation, customer-focused innovation). Despite the fact that this research subject had been proposed much earlier (e.g., see E. von Hippel (von Hippel & Euchner, 2013)), this research development began only after the technological progress that allowed to actively involve users and customers in the process of interaction, communication and thus increased the role of customer innovations acceptance (Lusch & Nambisan, 2015; Slater et al, 2009). The methods to support knowledge creation in new product development are studied in (Hoegl, Schulze, 2005).

Track 3.2

Context-aware computing, which can be applied to operations management knowledge, plays an important role in the modern information systems (Preuveneers, Berbers, 2008; Zhang et al., 2011). Schilit and Theimer firstly proposed such computing in 1994 (Schilit, Theimer, 1994). They considered context as some information characterizing locations and the time of an object. Dey (Dey, 2001) defined context as "any information that can be used to characterize the situation of an entity." Because of the increased user mobility, computing power and functionality of mobile devices and sensors, and amount of available information, ways to adapt computing devices and information systems to the needs of users, based on the use of the user profiles and preferences, are no longer sufficient. According to the scientific community and the expectations of the end-users, services that are part of ubiquitous computing should be adapted to the specific circumstances or situation, and perhaps for this purpose to determine all the relevant parameters. Such circumstances and situations, including personal preferences and tasks, often referred to as context. A large set of approaches exists to represent context using formal languages, e.g. UML, OWL, and some others. Approaches to context representation using informal languages are known as well, e.g. using a graphical user interface in the tool Context Toolkit (Dey, Salber, Abowd, 2001).

Track 3.3

Research in methods of structuring and representation of knowledge in the field of strategic management and organizational development are carried out in different areas. Some works are being conducted by experts in the field of economics and management (Tikkanen, Lamberg, 2005), some – by experts on visualization and knowledge representation (Lengler, Eppler, 2007), some – by experts in enterprise modeling and enterprise architecture (Frank, 2002; Iacob et al, 2012). Visual (Eppler, Platts, 2009) and tabular methods have high potential for these knowledge areas. Visual knowledge representation will include different methods for different type of content (Kudryavtsev, Gavrilova, Leshcheva, 2013). The use of the tabular (or matrix) methods in management is considered in the work (Phaal et al, 2006). However, not many works explore the joint use of visual and tabular (matrix) methods (Grigoriev, Kudryavtsev, 2013).

3 RESULTS AND APPLICATIONS

Research results include:

1. Identification of KM practices that affect the key elements of the intellectual capital of Russian companies and, accordingly, have the greatest effect on the performance of Russian companies;
2. Development / updating the typology and the generalized knowledge map (knowledge domains) of the enterprise, which helps to differentiate KM methods and tools;

3. Development of KM methods and tools for specific knowledge types and domains (for product/service and customer knowledge, operations management knowledge, strategic management and organizational development knowledge).

These results and their novelty are described hereafter.

Project findings allow to clarify what elements of intellectual capital are most frequently used in Russian companies, and which of them contribute most to value creation. They also demonstrate which KM practices contribute most to development of intellectual capital elements. Analysis of the data expands the existing theoretical concepts in the areas of KM and intellectual capital. The novelty of the project in terms of the impact studies on the results of KM practices of the company is as follows:

- Synergetic combination of control theory of intellectual capital and the theory of KM.

- The collection of empirical data on the elements of intellectual capital and KM practices of Russian companies will provide an opportunity to examine the relationship between the elements of intellectual capital, company KM, its competitiveness and performance. These issues were not previously subject to systematic empirical research, either globally or based on Russian data.

- Combining the two different approaches to the evaluation of the company – through subjective assessment of the organization and through open financial performance.

This study is the first to investigate the hypothesis on the influence of various elements of intellectual capital and KM. It is planned to be checked not only with the help of open source, but with the help of information provided by the managers of Russian companies. First, the hypothesis is tested on the basis of the initial information, collected through questionnaires (where senior managers shared their opinion about various elements of intellectual capital and KM in the company and their impact on the results of its operations), then this relationship is tested, taking into account the information provided in the company's financial statements, which reflect data on various indicators of financial performance of companies.

The suggested knowledge typology includes many popular dimensions (e.g. generality, content type, form, representation/modality, owner, etc.) and pay more attention to representation of knowledge (text, graphics, charts, numbers and formulas, etc.), content types (what knowledge, how knowledge etc.), as well as the knowledge owner (employees, customers, partners). The novelty of the project in terms of knowledge typology refers to the detailed specification of each type of knowledge based on the ontological approach (Kudryavtsev et al, 2013) and in analysis of knowledge modality. Further, we explore and describe the link between areas of enterprise knowledge (generalized knowledge map of the enterprise) and types of knowledge, as well as propose KM methods and tools for various types of enterprise knowledge. We plan to provide such a link through the analysis of typical enterprise activities (the basic processes, management, providing; types of administrative activities, etc.) and typology of problems (Jonassen, 2000).

Development of KM methods and tools for specific knowledge types and areas provide the following contributions.

With respect to knowledge on products/services and customers the novelty of the objective is to create an integrated approach to defining the principles of a successful balance between the factors of organization's success in external interaction with customers and in establishment of cross-functional relationships within the organization to facilitate the exchange of knowledge and solve the problem of "intra-organizational information stickiness" and the gap created in the organizational abilities (Atuahene-Gima, 2005). Special importance of the approach is proved by the previous work in the field of features of customer-orientation in Russian companies (Rozhkov, 2014; Smirnova et al, 2015), showing a gap in understanding of the opportunities and putting into practice the integration of clients into in-house processes. Finally, reliance on model testing on the sample of the Russian companies makes it possible to produce a significant contribution to understanding not only the possibility of building a successful customer focus in the context of an emerging economy, but also the role of customer orientation in supporting and stimulating the innovation activity success of the company through the exchange of knowledge and creation of sustainable capabilities.

The novelty of working with knowledge in operation management track consists in the usage of the context-aware technology applying to production networks. In particular, an approach to knowledge logistics, a methodology of context management, a context-aware methodology and a hybrid technology for intelligent decision support in an open information environment, and integrated models of adaptive control of dynamic supply chains based on Web services have been developed. The supposed

research is oriented to semantic interoperability of resources (components) of the production networks based on context-oriented KM for decision support by the participants of these networks.

With respect to knowledge in strategic management and organizational development the review and comparative analysis of structuring and representation methods is provided. Visual knowledge structuring methods for strategic management and organizational development will by classified using ontological (semantic) analysis. Finally the method combining visual and table representations is suggested in order to link strategy with enterprise operations.

4 CONCLUSIONS

An effective use of knowledge in the company helps to find a better way in achieving organizational goals. INNOVARRA project aims to strengthen the context awareness of KM efforts by linking KM methods and tools with organizational knowledge types and domains, which are the most suitable for them. Additionally the project studies specialties of KM adoption in Russia – the practices, which have the greatest impact on the final results of Russian companies.

ACKNOWLEDGEMENTS

Research has been conducted with financial support from Russian Science Foundation grant (project No. 15-18-30048).

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