St. Petersburg University
Graduate School of Management

Master in Management Program

MODERATING ROLE OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN THE RELATIONSHIPS BETWEEN KNOWLEDGE MANAGEMENT PRACTICES AND ORGANIZATIONAL PERFORMANCE: EVIDENCE FROM RUSSIA

Master's Thesis by the 2nd year student Concentration — Information Technology and Innovation Management Pavel TCAREV

Research advisor: Professor, Tatiana A. GAVRILOVA

St. Petersburg
2018

ЗАЯВЛЕНИЕ О САМОСТОЯТЕЛЬНОМ ХАРАКТЕРЕ ВЫПУСКНОЙ КВАЛИФИКАЦИОННОЙ РАБОТЫ

Я, Царев Павел Сергеевич, студент второго курса магистратуры направления 080500 - «Менеджмент», заявляю, что в моем отчете по работе над магистерской диссертацией на тему «Модерационный эффект ИКТ в отношениях между практиками управления знаниями и организационной эффективностью: свидетельства из России», представленной комиссии для публичной защиты, не содержится элементов плагиата.

Все прямые заимствования из печатных и электронных источников, а также из защищенных ранее выпускных квалификационных работ, кандидатских и докторских диссертаций имеют соответствующие ссылки.

Я ознакомлен с действующим в Высшей школе менеджмента СПбГУ регламентом учебного процесса, согласно которому обнаружение плагиата (прямых заимствований из других источников без соответствующих ссылок) является основанием для выставления за выпускную квалификационную работу оценки «неудовлетворительно».

_____ (Подпись студента)

25.05.2018

STATEMENT ABOUT THE INDEPENDENT CHARACTER OF THE MASTER THESIS

I, Pavel Tcarev, second year master student, program «Management», state that my master thesis on the topic “Moderating Role of Information and Communication Technologies in the Relationships between Knowledge Management Practices and Organizational Performance: Evidence from Russia.”, which is presented to the Master Office to be submitted to the Official Defense Committee for the public defense, does not contain any elements of plagiarism.

All direct borrowings from printed and electronic sources, as well as from master theses, PhD and doctorate theses which were defended earlier, have appropriate references.

I am aware that according to paragraph 9.7.1. of Guidelines for instruction in major curriculum programs of higher and secondary professional education at St.Petersburg University «A master thesis must be completed by each of the degree candidates individually under the supervision of his or her advisor», and according to paragraph 51 of Charter of the Federal State Institution of Higher Education Saint-Petersburg State University «a student can be expelled from St.Petersburg University for submitting of the course or graduation qualification work developed by other person (persons)».

_____(Student’s signature)

25.05.2018

АННОТАЦИЯ

Автор	Павел Сергеевич Царев
Название магистерской диссертации	Модерационный эффект ИКТ в отношениях между практиками управления знаниями и организационной эффективностью: свидетельства из России
Факультет	Высшая школа менеджмента
Направление подготовки	Менеджмент
Год	2018
Научный руководитель	Татьяна Альбертовна Гаврилова
Описание цели, задач и основных результатов	Цель данной работы – понять, выступает ли степень развитости информационных и коммуникационных технологий модератором в отношениях между различными практиками управления знаниями и организационной эффективностью в российских компаниях. Для достижения заявленной цели были поставлены следующие задачи. Во-первых, необходимо понять, как практики УЗ применяются в России. Во-вторых, определить, связано ли применение данных практик напрямую с организационной эффективностью. В-третьих, определить роль, которую ИКТ играют в данных связях. Исследование показало, что уровень развития ИКТ является модератором в отношениях между стратегическим управлением знаниями и эффективностью компании. Доказательств того, что модерационный эффект присутствует в других связях найдено не было. Также было доказано, что практики УЗ оказывают позитивное влияние на эффективность российских компаний. Наибольшее влияние оказывают практики в сфере управления человеческими ресурсами и стратегический подход к УЗ. Более того, было обнаружено, что практики в области организационной структуры и корпоративной культуры взаимосвязаны. Результаты работы будут полезны для дальнейших исследований в сфере УЗ, а также для менеджеров российских компаний, заинтересованных в выстраивании системы управления знаниями в организации и максимизации результатов при ее внедрении.
Ключевые слова	Практики управления знаниями, информационные и коммуникационные технологии, организационная эффективность

ABSTRACT

Master Student's Name	Pavel Tcarev
Master Thesis Title	Moderating Role of Information and Communication Technologies in the Relationships between Knowledge Management Practices and Organizational Performance: Evidence from Russia
Faculty	Graduate School of Management
Main Field of Study	Management
Year	2018
Academic Advisor's Name	Tatiana Gavrilova
Description of the goal, tasks and main results	The goal of the research is to understand, if information and communications technologies act as a moderator in the relationships between different knowledge management practices and organizational performance in Russian companies. To reach the stated goal several objectives were set. Firstly, to explore, how knowledge practices are applied in Russia. Secondly, to discover the direct effect that KM practices have on the organizational performance. And finally to define the role of ICT in these relationships. The empirical study has shown that ICT is a moderator in the relationships between strategic management of knowledge and organizational performance. The evidence that moderating effect exists in other relationships was not found. The research has also shown that knowledge management practices has a positive direct effect on organizational performance of Russian companies. HRM practices and strategic management of knowledge in a company have the biggest positive impact. Moreover, the practices connected to organizational structure and corporate culture are strongly interconnected. These results would be useful for further studies in the area of knowledge management and for managers in Russian companies, who are willing to create a KM system and have maximum outcome from their initiatives.
Keywords	Knowledge management practices, information and communication technologies, organizational performance

TABLE OF CONTENTS

Introduction 6

Chapter 1. THE REVIEW OF EXISTING LITERATURE ON KNOWLEDGE MANAGEMENT AND ITS EFFECT ON ORGANIZATIONAL PERFORMANCE 9

1.1 The concept of knowledge management 9
1.2 Knowledge management processes 11
1.3 Knowledge management practices 15
1.4 The influence of knowledge management practices on organizational performance 19
1.5 The role of ICT in knowledge management 23
Summary of chapter 1 27

Chapter 2. EMPIRICAL STUDY OF KNOWLEDGE MANAGEMENT PRACTICES IN RUSSIA AND THEIR INTERACTION WITH ICT 29

2.1 Existing research methods in social studies and the type of current research 29
2.2 Research design 31
2.3 Measurement of variables 32
2.4 Data cleaning and analysis methods 33
2.5 Descriptive statistics 35
Summary of chapter 2 38

Chapter 3. RESULTS OF THE STUDY OF KM PRACTICES APPLICATION IN RUSSIAN COMPANIES: DISCUSSIONS AND IMPLICATIONS 40

3.1 Findings of the empirical study 40
3.2 Theoretical contribution 46
3.3 Managerial implications 47
Summary of chapter 3 48

Conclusion 50

References 51

Appendix 1. The questionnaire 57

Introduction

Topicality

Nowadays it is difficult to overestimate the necessity of knowledge management (KM) in organizations. Efficient knowledge management creates the capability, which becomes the basis for the future competitive advantage of any company (Davenport and Prusak, 2000). Companies in different sectors of economy and various industries face an increasing flow of information, which need to be managed and analyzed, in order to create knowledge and stay competitive on their markets. That is why the knowledge management is a topical area for research in management science.

Despite the fact that KM has been one of the key areas of management studies over last decades there are still a number of unsolved questions, which need to be explored deeper. Some authors try to understand the essence of knowledge (Bellinger et al., 2004), others concentrate on knowledge management processes and the ways they could be managed in order to achieve higher results (Nonaka, 2000; Cabrera, 2002; Roland, 2006). However, one of the most interesting area from the perspective of practical application is the actual relationship between KM practices and organizational performance. Authors all over the world tries to discover the best way to use knowledge management activities to increase company's performance (Gholami et al., 2013; Andreeva and Kianto, 2014; Massingham, 2014; Giampaoli et al., 2017). In spite of wide specters of multidisciplinary studies in the field there are still many uncertainties, and new empirical works may bring clarity.

One of such fields that need to be studied is the role of information and communication technologies (ICT) in knowledge management. There are two different approaches to the question in scientific community. Some authors consider ICT the basic asset for KM (Cabrera, 2002). The other group of authors prefer not to overestimate the necessity of ICT and emphasize non-technological social interactions (Davenport and Prusak, 2000). However, even supporters of the first point of view do not have common view on the place of ICT in knowledge management.

Based on the above-mentioned statements there is still a question, if knowledge management practices have a direct impact on organizational performance, financial and non-financial ones. And the second question is which exact role ICT have.

Research gap

Though there is a number of authors, who believes that ICT's role in KM is limited the technological approach still dominates. The idea that ICT enables KM being is supported by the number of authors (Stankovsky and Baldanza, 2000; Desouza, 2003, Lee and Choi, 2014). The field has been studied in different countries and industries, and a lot of very specific and tailored models were created for particular countries and industries. Notwithstanding, there is need for covering a few gaps.

First of all, there is an uncertainty, how particularly ICT help to enhance organizational performance applying KM practices. We know that ICT enable human resource management practices, changes in organizational structure, culture and processes and the overall ability of manager to introduce knowledge-centric approach (McDermott, 1999; Robey et al., 2000; Basu and Blanning, 2003; Zahra, 2013; Elhazzam, 2015). But it is important to clarify does ICT play an important role, while assessing an effect KM practices in all these spheres has on the overall organizational performance.

Secondly, people are a key element of knowledge management. Today all the KM practices deal with the utilization of people capacity and uncovering potential in knowledge, which was also created by people. Taking it into consideration, results of similar models may vary depending on the country, where the data was gathered. In this context, an empirical research based on data collected from Russian companies is needed. Only few researches were performed in the field in Russia, but they focused on different aspects and were based on surveys conducted in several countries (Andreeva and Kianto, 2012; Andreeva and Kianto, 2014).

As can be seen, despite the vast specter of studies in the field of KM, further research would benefit theory and practice.

Research problem and objectives

In this study, the author examines the direct effect that different KM practices have on the company's performance, its organizational and financial aspects. The work does not have a focus on particular industry and it examines various KM practices in different fields to provide managers with an insight into increasing performance of the company by application of KM approach. We also find it crucial to study the mediation role of ICT in the relationship between KM practices and organizational performance. We believe that it could help to understand, if ICT is important for implementation of KM practices and, if it is so, which practices depend the most.

The main question of the thesis is the following: Does the effect KM practices have on organization performance depends on the developed information and communication technologies in the organization?

Hence, the objectives of the research are:

1. To explore, how KM practices are used in Russian companies;
2. To discover the direct effect that KM practices have on the organizational performance;
3. To define the role of ICT in the relationships between KM practices and organizational performance.

To reach the set objectives we firstly concentrate on reviewing previous studies on the topic of knowledge management. Then, we create an appropriate methodology of the work and conduct empirical research. The final chapter is dedicated to discussion of the findings and their implications.

Chapter 1. THE REVIEW OF EXISTING LITERATURE ON KNOWLEDGE MANAGEMENT AND ITS EFFECT ON ORGANIZATIONAL PERFORMANCE

Today there is no debate around the topic that we live in era of knowledge economy. However, this understanding still leads to big discussion, what knowledge is, how it is created and shared, how company can stimulate these processes and which tools could be used to do it. Many works were written on the topic starting from philosophical works on epistemology, which studied the nature of knowledge and the ability of a human to operate it. James Venters believes that though the knowledge as a distinct subject for social studies emerged in the beginning of the 20th century, its application to economic concepts began only in the 1960s (Venters, 2003). Later, scientists and practitioners started to examine ways to manage knowledge of individuals in a social group for better understanding of its behavior and development and it became the landmark for KM theory appearance in the 1990s.

In order to examine ways, how organizations enhance performance through orchestration of knowledge, it is important to break down the concept of knowledge management into basic components and see, how it is organized and in which direction this area of study develops.

In this chapter we give an overview of existing literature on the concept of knowledge, which processes it includes and by which practices companies may influence these processes. After that we address the question, how KM practices influence organizational performance. The important part of literature review is dedicated to the problem of the role of information and communication technologies (ICT). We want to study current opinion on this topic in the scientific community and to see, what could be done to make ICT role clearer. The overall purpose of this chapter is to create a theoretical background for the further empirical study.

1.1 The concept of knowledge management

Knowledge is the complex concept: it can be seen as knowledge of an individual or as group knowledge. In this work we will look at it from the perspective of organizations. Any organization is a social unit consisted of people, however organizational knowledge is not just a sum of individuals' knowledge within the company. In scientific literature there are many approaches to knowledge and therefore, many definitions arose. The definition usually depends on the field of particular work, the object of the research and the main goal of the study. The organizational knowledge is perceived by a number of authors (Newell et al., 2009) as "a learned set of norms, shared understandings and practices that integrates actors and artifacts to produce valued outcomes

within a specific social and organizational context". That is why the organizational knowledge arises not simply from processing all the information gathered and summing up the intellectual work of employees, but mixing covered and uncovered subjective insights and mobilizing commitment of people (Nonaka, 1991).

It is very important to understand, that knowledge is not just all data, which the organization possesses. Data is just a sum of symbols; it is unprocessed and has low usability itself. When data is processed and relations are identified, it becomes information. Knowledge in its turn implies finding patterns within information (Bellinger et al., 2004). It means that knowledge is already processed information, which is helpful for making forecasts and making decisions depending on the found patterns. This process of transformation of information to knowledge is usually provoked by new incentives from outside. From this hierarchical structure one may conclude that the main factor for knowledge existence is the presence of information and the capacity to interpret it.

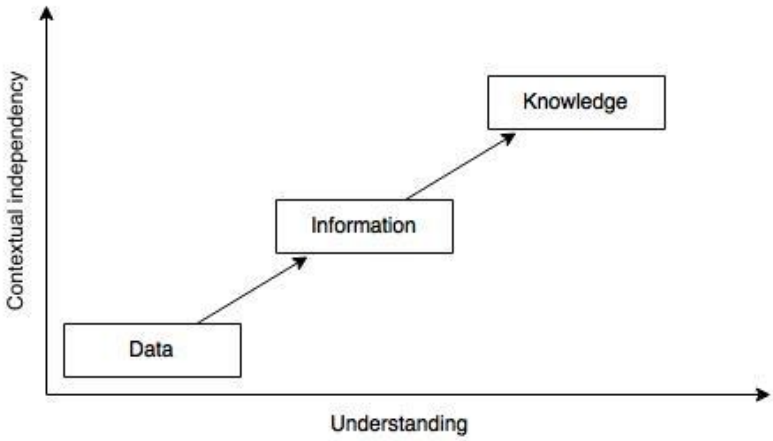

Figure 1. Data-Information-Knowledge hierarchy
Source: Based on (Bellinger et al., 2004)

An interesting definition was given by Davenport and Prusak (2000) in their book "Working Knowledge: How organizations manage what they know". They define knowledge as a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organizations, it often becomes embedded not only in documents and repositories but also in organizational routines, processes, practices and norms. According to this definition, organization knowledge is much more complex than just a sum of individual skills and experience. Thus, the organization knowledge is the independent topic for examination with its own

origins and rules. It can be seen as an applied holistic approach, which states that the system should be viewed not as a sum of part but as a whole.

The complex nature of knowledge is a basis for its variety. There are different types of knowledge depending on information, from which it is derived, the entity processed information, and the ability of other entities to see this knowledge. According to Colilns (1993) five type of knowledge could be identified:

- Embrained knowledge is an abstract knowledge that depends on conceptual skills and cognitive abilities;
- Embodied knowledge is action oriented and is likely to be only partly explicit;
- Encultured knowledge refers to the process of achieving shared understandings;
- Embedded knowledge is knowledge, which resides in systemic routines;
- Encoded knowledge is information conveyed by signs and symbols.

This complex system, which consists of tacit and explicit knowledge, can't be considered an asset in the organization if it is not managed. Without proper management, this huge amount of information, which goes through the company, has very low utility. That is why, according to Davenport and Prusak (2000), "knowledge management is concerned with the exploitation and development of the knowledge assets of an organization with a view to furthering the organization's objectives. The knowledge to be managed includes both explicit, documented knowledge, and tacit, subjective knowledge".

So, the process of KM is much more complex than information management and must be approached systematically. For its comprehension it is crucial to look at this process in dynamics and see different perspectives at each of the steps. In this work we will concentrate on four basic processes of KM: creation, sharing, reuse and acquisition.

1.2 Knowledge management processes

Knowledge creation

The process of how knowledge is created from information was the topic for many scientists. It is the first step of knowledge management, describing transformation of information and personal knowledge into organizational one. The understanding of this first step leads to more accurate creation of the prospective knowledge management frameworks. One of the most reputable models of knowledge creation was proposed by Nonaka and Takeuchi (1995). They believe that knowledge creation means constant conversion between tacit and explicit knowledge. The authors developed a

four-approach model, which explains, how knowledge is created and transferred. Different mode implies different tools and triggers.

- Socialization. In this type of knowledge-creation the basic role is devoted to social contacts, by means of which a tacit knowledge of one person is transferred to others.
- Externalization. This process is based on creation of specific rules, models and concepts, which means the formalization of knowledge. This process also means the conversion of tacit into explicit knowledge.
- Combination. In this process already existing explicit knowledge is combined, merge and reviewed in order to create new explicit knowledge.
- Internalization. This process implies transfer of explicit into tacit knowledge by transforming abstract ideas in the concrete ones.

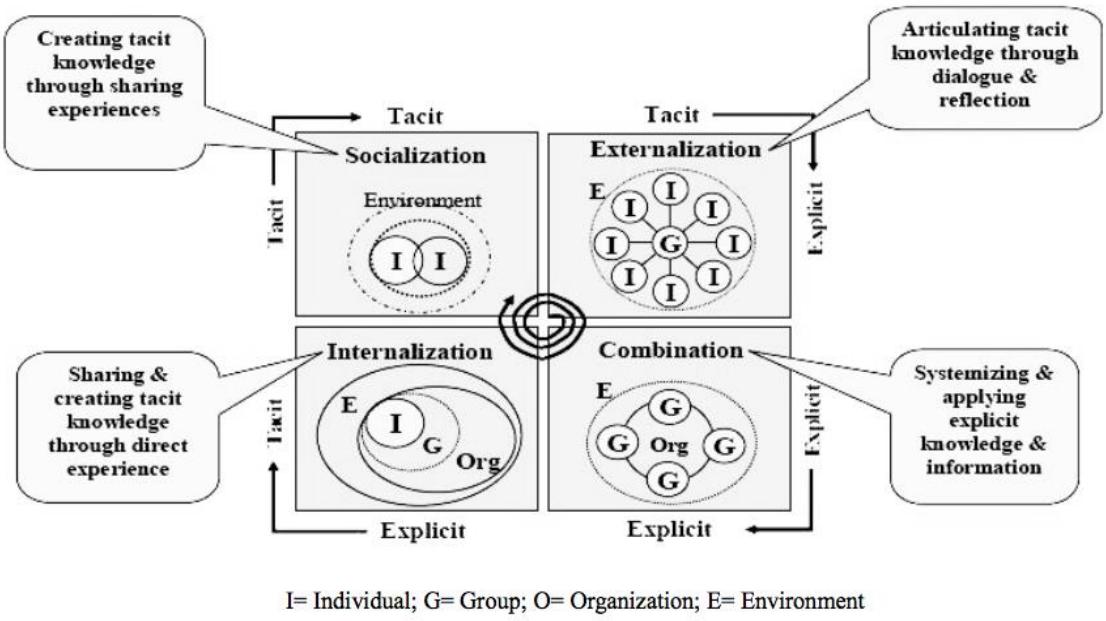

Figure 2. An adapted Model of Nonaka & Toyama's Knowledge Creation
Source: (Gray & Densten, 2005, p. 597)

As you can see, the process of creation of new knowledge within the organization is connected to interaction between an individual and a group. That is why the channels of interaction and communication play important role in process of organizational learning. Creation of organizational knowledge hardly can be detached from the process of sharing, because social processes are as important as cognitive ones and the appearance of the new thought is equal to rethinking of existing knowledge (Brix, 2017).

Knowledge sharing

Knowledge sharing is not less important than the process of knowledge creation. Before knowledge is shared it is tacit and has a small impact on the performance of the whole company. Individual knowledge is important on the personal level, but since it is not shared it can't be recognized as an organizational asset.

The process of knowledge sharing consists of two basic phases: externalization (showing and describing) and internalization (absorbing). Though knowledge sharing is of crucial importance there are several barriers. According to Hendriks (1999), these barriers could appear in form of time and space or may be connected to different cultural, spiritual or conceptual frameworks.

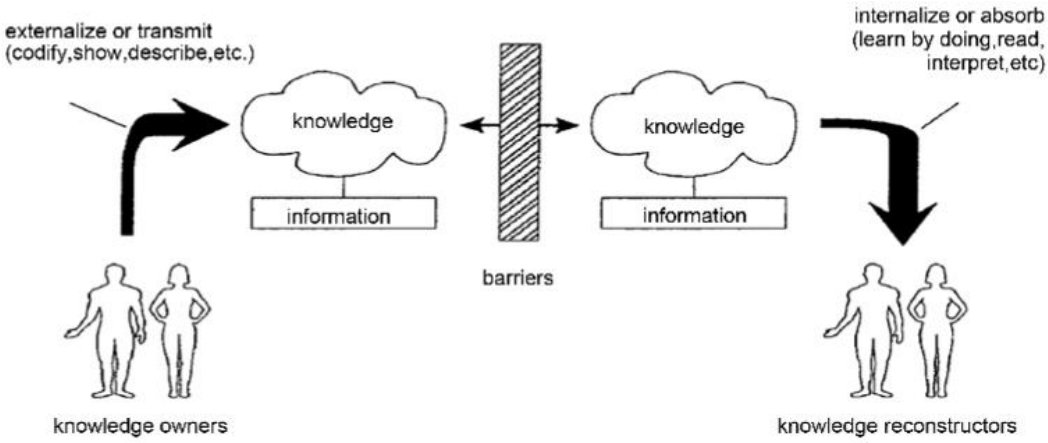

Figure 3. A simple model of knowledge sharing

Source: (Hendriks, 1999)

Occurring barriers may have three different sources. They may be individual, organizational and technological. Considering organizational level, there are several factors influencing knowledge sharing. Among them are corporate culture, internal competitiveness, hierarchical organizational structure and lack of infrastructure for knowledge sharing. (Riege, 2005). Nowadays technological factors play an important role because the level of technological development is high, but there are still problems with the implementation of integrated systems. Ángel Cabrera & Elizabeth Cabrera (2002) in their works wrote that IT department is the one responsible for knowledge management because IT infrastructure and different applications facilitate the process and create a basis for KM system.

Creativity is another important factor of knowledge sharing. More creative atmosphere facilitates the process by creating the stimulus to share tacit knowledge. Thus, according to recent research (Li et al, 2016), innovation culture within the company is important for knowledge sharing. At the same time, competition is usually an obstacle, because it creates lack of sense of cooperation,

which is crucial for sharing of knowledge.

All in all, the process of knowledge sharing is an important step to create an organizational learning system. However, there are a number of factors (individual, organizational and technological), which create obstacles to this process and thus must be addressed. Moreover, the role of IT is constantly rising thanks to developing communication technologies.

Knowledge reuse

Even when the knowledge is created and there are no obstacles for its share among the entities within the organization, it is still not enough for efficient knowledge management. Reusing existing knowledge is crucially important for the organization; that is why it plays a critical role in knowledge management system.

In the work "Toward A Theory of Knowledge Reuse: Types of Knowledge Reuse Situations and Factors in Reuse Success" Markus (2001) suggests splitting the process of knowledge reuse into four main stages. First of all, in order to reuse existing knowledge in the future it should be captured and documented. It is mostly a by-product of working process, which could appear unintentionally, without specific purpose. The second stage is packaging, which consists of codifying, filtering and classifying knowledge for facilitation of the further search and reuse. In addition to these two processes the knowledge is distributed, either passively or actively. The final step is reusing itself, which consist of recall and recognition. Recall means finding it in a proper place under proper codification and recognition implies matching found knowledge needs of the user.

Knowledge reuse can be classified on the basis of main participants in the process, those who create and those who use this knowledge again. So it can be internal and external. Internal reuse means reuse of the knowledge by the person, by whom it was created. Accordingly, external reuse implies different creator and the user. (Fruchter R. & Demian P., 2002). Markus (2001) suggest his own classification. According to his view, there are four type of knowledge reuse situations:

- Shared work producers: Persons who produce later use the knowledge again.
- Shared work practitioners: Reuse each other's knowledge.
- Expertise-Seeking Novices: Those, who look for knowledge, which they don't usually use.
- Miners Secondary Knowledge: People, who look for knowledge from different fields to use it further in other areas.

From the classification of knowledge reuse we may conclude, that accumulated knowledge within the organization may be reused not only by the person or groups which has created this particular knowledge, but also by third parties, which didn't participate in the process of creation and which are not a direct receiver of knowledge in a process of sharing. For this reasons, in addition to diverse channels of communication, there should be specific tools for knowledge organization, packaging and storage, so that an interested person can retrieve when it is needed.

Knowledge acquisition

In comparison to knowledge creation, knowledge acquisition is the process aimed at obtaining from outside. This process plays critical role in knowledge management, because any organization can't generate all the necessary knowledge for sustainable growth. The knowledge, which can be acquired from experts opinions, official documents, reports and other sources often can be efficiently used and bring benefits. However, not all the knowledge is necessary for the particular organization. That is why the identification and selection of useful knowledge is important.

From the organization perspective, the main external sources of new knowledge are suppliers, customers, competitors and partners. According to Chan (2009), there are three main types of knowledge, which the organization can obtain during interaction with these parties: "about", "from" and "for". Its acquisition helps to draw a broad picture of the environment, in which the organization operates.

The process of knowledge acquisition is divided into four main steps: choice, elicitation, completion and validation. Before looking for knowledge outside the company it is necessary to formulate the problem. Then the specific type of knowledge is elicited by one the existing methods. From the point of view of Turban (1993), these methods can be divided into three main categories: automated, semi-automated and manual. Automated knowledge acquisition implies using information technologies and algorithms for higher efficiency, which is also known as machine learning. In contrast, manual acquisition means conducting surveys and interviews and their further analysis.

1.3 Knowledge management practices

As we have seen, knowledge management within the company is an iterative process. As an important part of company's life, it should be controlled to be efficient, and there are a big number of methods and practices from different spheres connected to KM. The literature on KM practices is extensive, and many authors cover the question of KM practices usage. However, there is no unified definition and authors give different explanations of the concept. Hence, it is important

before starting the analysis to underline, what is meant by KM practice in this research.

Reading the literature on KM, one may meet many concepts, which have more or less similar meaning. The biggest confuse occurs with identification of KM practices, enabler and tools. In this research we use the definition given by Andreeva and Kianto. The researchers define knowledge management practices as *the set of intentional organizational and managerial activities that are aimed at enhancing knowledge processes of the firm* (Anreeva & Kianto, 2014). Under this definition, the main criteria for distinguishing KM practices are intentionality, activity and connection to at least one knowledge process.

The difference in approaches and theoretical background have made an obstacle to creation of one widely accepted list of KM practices, which fall under same criteria and have the same scope. Relying on the definition given we are going to analyze the previous works on the topic. The review of the contribution made by other authors helps to make own classification to meet the objectives of the current research.

Knowledge management is a multidisciplinary sphere and lies on the intersection of different departments' activities. The practices used to enhance knowledge processes may be connected to human resources, information technology or corporate strategy but they all are aimed at making organizational knowledge work better. There are mentioned four main groups of success factors for KM in existing literature on the topic. The first category consists of human-oriented concepts like leadership, culture or employees. The second one focuses on organizational structure and processes. The third group is technology-oriented and deals with IT infrastructure and particular tools. Such ideas from management practices as strategy, goal or measurement are also crucial for the studies in the field of knowledge management (Heisig, 2009). As we may conclude, KM is an important part of the entire management system; it influences different spheres within the company and needs to set a general direction for many departments.

Andreeva and Kianto, in their research on difference between service-oriented and product-oriented companies in terms of KM practices and their influence on organizational performance, have identified five group of practices from the sphere of strategy, corporate culture, organizational design, human resource management, and information and communication technologies, which were specially designed to enhance KM. They argue that without linkage to strategy KM efforts would not have any impact. Authors consider organizational culture an important facilitator to KM. They state that the HRM and organizational design are strongly connected to KM and the practices in these spheres may either positively or negatively influence KM. (Andreeva & Kianto, 2014). All the practices covered in the study, though being a responsibility of different departments, still aimed

at facilitating KM processes. The authors reduced the number of practices to five by performing factor analysis and made a working model, but there are also practices in other spheres, which are not covered.

In other work, Kianto et al. analyzed the role of intellectual capital and knowledge management in organization's value creation, and KM practices here are called the systematic management mechanisms of intangible resources. Company's ICT in one given moment in time is a big asset, however, from the dynamic view, the value creation potential depends mostly on the way intangible resources are managed. In addition to strategic practices, organizational structure, ICT, HRM and culture, the authors examine the effect of learning mechanisms and knowledge protection practices (Kianto et al., 2014).

The concept of human resources management is broad, and many different KM practices could be considered part of HRM. In the research on KM influence on innovation performance the group of Finnish scientists decided to give deeper outlook of KM practices in HRM. They have separated this block into several concrete groups: recruiting, training and development, performance appraisal, and compensation. They argue that it is important to implement KM focus on every stage of company-employee interaction in order to increase firm's innovation (Inkinen et al., 2015). Such concentration on particular practices is justified, because it gives an opportunity to uncover deeper dependences and provide more insights.

Another study conducted by Giampaoli, Ciambotti and Bontis investigates the connection between KM practices, problem solving, organizational performance and financial performance. In this paper all KM practices claim to build an infrastructure. The authors identified six different groups of KM practices. Basing on the previous research they created a survey in which the question on KM infrastructure covers the practices in the following spheres: work design, training and development, reward, culture, ICT and decentralization. (Giampaoli et al., 2016) They neglected the importance of KM strategy and didn't put it into the survey, but, on the other hand, more attention is paid to organizational design and HRM.

Table 1. KM practices

Kianto & Andreeva (2014)	**Giampaoli et al. (2017)**	**Kianto et al. (2014)**	**Inkinen et al. (2015)**	**Lee & Choi (2014)**
KM strategy		KM strategy		
Org. culture	Culture	Org. culture		Culture
Org. design	Decentralization		Org. design	Structure
	Work design			
ICT	ICT	ICT	ICT	IT
HRM	Reward	HRM	Compensation	People
	Training and development		Training and development	
			Performance appraisal	
			Recruiting	
		Learning	Learning	
		Protection	Protection	
	Supervisory work			

As it can be seen from the previous studies, knowledge practices are not specific actions in a particular. In contrast, knowledge management system is built on the principle of interaction between different departments. Organizational knowledge is based on the information derived from all the data accumulated within the company through the processes of creation or acquisition. According to Bhart, in order to sustain the process of data transformation into information and then into knowledge the company needs to secure interaction between three main components of the knowledge management system: technologies, people and techniques (Bhart, 2001). Hence, KM practices should be aimed not only to enhance every three components but also to create conditions for efficient interaction. This observation is a helpful practical recommendation for managers and a substantial contribution to the research in the sphere, however, in his work Bhart does not provide specific steps and practices.

For the further consideration we decided to take all the main topics mentioned in the literature. The main blocks of practices taken as a benchmark are KM strategy, ICT, HRM, organizational culture, structure, organizational learning, intellectual property protection and supervisory work. Now we need to examine, if these group of practices may have a direct effect on organizational performance. With this intention we are going to see, how KM practices and performance are connected.

1.4 The influence of knowledge management practices on organizational performance

From the previous studies we have seen that there are a number of different KM practices, which an organization may implement. However, the particular role of these practices within the system of increasing company's performance is not obvious. There are many different approaches to analyze relations between KM practices and performance, so for this study it is important to build an appropriate model to meet the goal set. Moreover, the organizational performance itself is a difficult object to measure and before making hypotheses there is a need to make it clearer, how organizational performance was presented in former knowledge management studies.

For the purpose of this research we need to understand if KM practices enable organizational performance and, if they do, what exactly is enhanced and which indicators may be taken in order to test this impact. Organizational performance definition given by Davidson and Griffin (2003) means the ability of any organization to meet requirements set by stakeholders. This elegant definition, on the one hand, shows the main purpose of the company and, on the other hand, gives a tip, where to look for specific performance indicators, which strongly related to the stakeholders' view of the company's activities. In other words, performance is measured in respect to the previously stated goals and objectives. Some authors suggest using some widely used conventional quantitative indicators, such as ROA (Bierly, 1996). However, according to Delaney and Huselid, the usage of subjective metrics for performance measurement ensures high validity and reliability (Delaney & Huselid, 1996). For this reason, in the paper we focus mainly on works with the perceptional approach in order to find landmarks for the building of consistent model.

Several authors assume that the concentration on respondents' perception of firm's ability to enhance its capabilities and ability to stay competitive on the market is the representative measurement of performance. In their work they adapt metrics of former studies concentrating on capabilities to develop a new product, to respond to market demands and to capture new opportunities. They also studied the time spent to put the product on the market and the productivity

of the company. The authors also examined financial aspects, the focus was made on perception of sales volume, profit and margin (Giampaoli et al., 2017).

In other empirical study the researchers decided to evaluate in the same way KM impacts money saving, time saving, increase in revenue and innovativeness of the firm (Andreeva & Kianto, 2014) A big advantage of such approach is simplicity. By distinguishing four basic indicators, on the one hand, they make a questionnaire easy to understand and to answer all questions, and, on the other hand, cover three big spheres, finance, processes and innovations, connected to company's overall performance. But there is a problem of how different respondents understand these questions and which they put in them. So, in our opinion, it is better to give more specific criteria.

The actual performance of an organization, irrelatively to the field or industry, depends on a number of factors, such as strategy, structure, employees' abilities, market orientation, internal and external environment, etc. Knowledge is an important organization's resource in the modern world. In the number of works it is studied how knowledge management practices directly or indirectly influence many indictors, which are critical for survival.

An empirical research conducted by the group of Iranian scientists proved that knowledge management practices influence organizational productivity, financial performance, staff performance, customer satisfaction, innovation and work relationships. This research proves the hypothesis that improvement of KM processes leads to the enhanced performance. The researchers investigated the relationship between KM practices, related to each of the process and organizational performance in small and medium enterprises (Gholami et al., 2013). The results discovered in the empirical study prove that there is a necessity for further research in the field, because it has several limitations such as cultural influence and the size of the companies analyzed.

As it was stated, KM is the complex process, which consists of different processes and a big variety of tools and practices. Massingham assessed the effectiveness of different tools and toolkits and their influence on performance. He applied large longitude project and his research discovered that knowledge strategy toolkit, consisted of sourcing decision, future capability requirements and competency mapping, is the most effective toolkit (Massingham, 2014).

In another paper by Andreeva and Kianto (2012), empirical research proved that the observed companies' financial performance and competitiveness are affected by KM practices. The research is based on the survey, in which 234 organizations from Russia, Finland and China participated. KM practices in the research were divided into two groups: those empowered with information and communication technologies and those connected more to HR management. These two type of practices are shown to be interrelated, which means they should go hand in hand in order to increase

company's performance. (Andreeva and Kianto, 2012) The results of the research are of high interest, because the authors not only proved the connection between KM practices and performance of the company but determined that the proven factors may be interconnected and the effect respectively depends not only on the use of particular practices, but on how KM system is built within the company.

In the later research the interconnection of two different toolkits was proved by Lee and Choi. Basing on the previous literature they built a four stage model. The authors tested the effect KM practices connected to structure, culture, people and IT have on KM processes, which in turn mediated by organizational creativity influences organizational performance. All in all, according to the empirical research, IT tools are proved to have limited capacity, without taking into consideration other KM practices and organizational context, namely: T-shape skills, learning, trust, formalization, centralization and collaboration. They have built an integrated model of KM effect on performance assessing all the relations within the framework (Lee and Choi 2014). The findings of this research showed a non-obvious low enabling effect of information technologies. The possible explanation for such results may lie in the specific characteristics of immature tradition of KM application on Korea. It shows that the proven practices may show different results depending on culture and other uncontrolled factors.

Despite the fact that company's KM efforts positively impact organizational performance, there could be also different basic characteristics of the firm itself that defines the level of this influence. Kianto and Andreeva have studied the difference of nature of KM and its benefits in product-oriented and service-oriented companies. The results have shown that strategic management of knowledge, organizational design, and organizational culture are used equally in these two groups of companies. At the same time, ICT is more frequently applied in product-oriented companies, and HRM practices are more popular in service-oriented firms. According to the survey, the outcomes are pretty much the same for both groups, and only time-saving is discovered to be more relevant for service-oriented companies, which might be explained by the specific nature of this type of business. Moreover, the authors showed that the explanatory power of KM practices is stronger for product-oriented companies. This finding contradicts previous research on the topic (Kianto & Anreeva, 2014). The theoretical contribution of this work is substantial. An intercultural research showed that companies tend to use KM practices to improve performance regardless of the type of core business. The fact that the authors received results contradicting discoveries of the previous literature shows that there are still a lot of space for future explanatory research in the field.

Hsu proves that there is a link between knowledge sharing, human capital development and organizational performance. In his work the author empirically proves that KM practices have a positive impact on employees' development and thus are improving the wide range of performance indicators. After studying results of the survey from 256 Taiwanese the scientist came to the conclusion that innovation strategy and management involvement are critical enablers for knowledge sharing in the company, consequently influencing human capital, which is a direct predictor of organizational performance (Hsu, 2008). By showing the causal link between basic KM enablers and organization performance the research gives an opportunity to investigate these relations deeper using different variables in different circumstances.

Another author has stated that organizational performance depends strongly on the ability to add knowledge into the process of value creation. Like the previous researchers, he believes that efficient KM processes are critical factors for high level of performance (Roland, 2006).

Basing on the existing research in the sphere of knowledge management practices we make the following hypotheses:

H1: Strategic management of knowledge positively influences organizational performance of Russian companies;

H2: Supervisory work positively influences organizational performance of Russian companies;

H3: Knowledge-centered human resource management positively influences organizational performance of Russian companies;

H4: The development of information and communication technologies positively influences organizational performance of Russian companies;

H5: Knowledge-friendly organizational culture positively influences organizational performance of Russian companies;

H6: Collaborative organizational structure of knowledge positively influences organizational performance of Russian companies;

H7: Organizational learning positively influences organizational performance of Russian companies.

1.5 The role of ICT in knowledge management

In today's fast-speed world the immediate access to necessary knowledge is not a whim but a critical factor for organization's survival. The fast flow of information became possible because of technological innovations, which have taken place in previous decades. Thanks to new technologies, all the processes of knowledge management within organizations became more efficient and less time-consuming. Data mining applications, Intranet solutions, Extranet, wireless web and other information and communication technologies allow to constantly create new knowledge, effectively acquire external one, quickly share it and embody.

However, even now the role of ICT tools in knowledge management is arguable. The development of technological solutions and their increasing implementation in the sphere of KM prompt practitioners and academics to believe that every KM system is built mainly on the solid basis of IT infrastructure (Davenport & Prusak, 2000; Stankovsky & Baldanza, 2000). On the other hand, overestimation of the ICT role in KM can lead to deterioration of KM system within the company, because the key elements of the system, people and processes, are neglected (Kaplan, 2002). Some critics even have a radical view on this topic, arguing that the concept of knowledge itself negates the idea of ICT usage in KM (Cook and Brown, 1999). So different perspectives on the role of ICT in knowledge managing creates an uncertainty how technologies should be used by management in order to enhance KM within the organization.

First of all, the importance of information and communication technologies on the overall process of KM has been studied for a long time, and there are many evidences that they positively influence KM processes. Creating new knowledge usually requires a lot of time and people's effort. Unfortunately, in organizations people has different schedules and different goals to spend their time on frequent meetings and meaningful discussions with their colleagues. In this case information technologies provides organizations with the tools, which enhance communication among employees. They help to categorize, organize, and to identify knowledge resources within the organization (Chugh et al., 2013). Moreover, new technologies make it possible to dig deep into existing information and find rules and patterns in it, which is the critical step in knowledge creation.

IT tools currently play crucial roles in knowledge sharing also. Cabrera (2002) believed that IT department, responsible for maintenance of IT infrastructure, plays important role in knowledge sharing. Launching IT tools in the organization significantly reduces time of knowledge transfer by eliminating time and space limitations. Modern mobile and wireless technologies allow sharing knowledge anywhere and anytime literally on the go. Furthermore, IT tools give a possibility to

visualize knowledge and make it more perceivable. It helps a person, who possesses knowledge, to codify, show and to describe it to recipients. It enables organizations to create virtual communities of like-minded persons and facilitate sharing of ideas, experience and documents. From this point of view, they are considered facilitators, rather than drivers (Ruikar et al., 2007).

Information technologies used in knowledge management help organizations to reuse exiting knowledge by enhancing the efficiency at all steps from capturing to application. IT tools provide companies with the ability to codify and store knowledge, and when the categorization becomes too complex, modern technologies solve this problem by including functions such as indexing, hyperlinking and duplication removal (Schacht et al., 2015). With the use of IT applications the access to the knowledge and its search in the system becomes easier for all employees, which leads to more intensive reuse.

It is hard to overestimate the importance of IT in the process of knowledge acquisition. Here again the main role of computer technologies is communication. As in case of sharing and creation of knowledge, IT helps to extract tacit knowledge form different parties by providing efficient communication. The ability to receive feedback from employees, customers, suppliers, partners and competitors on-line and its further analyses helps to save time and money. Computer software is used to analyze open sources of information, so increasing the knowledge base about the outer world and conditions on which the organization operates.

All in all, technologies can significantly enable knowledge management. However, the existence of tools doesn't mean their proper application. IT tools are not a panacea, they do not solve all the problems connected to KM, but their implementation within the organization, ceteris paribus, can facilitate existing processes and improve organization's performance. So, basing on the previous review we may assume that ICT plays an important role in the KM system as an enabler and now we want to examine the papers on the topic of ICT interaction with other KM practices.

A technological penetration within all the spheres of a company's life automatically increases the importance of ICT for sustainable functioning. Respectively, knowledge management initiatives are often based on ICT solutions, and existing technological capabilities are important enablers for their realization (Desouza, 2003). This idea does not state that technologically based KM systems are the only possible right way to implement KM within the company. However, the practices in different spheres are interrelated and the implementation of one will have a limited capacity without putting other in action.

In spite of relative disillusionment in the ability of ICT to be cornerstone in KM infrastructure, it is still one of the main factors, influencing the success of KM initiatives (McDermott, 1999;

Fernandez and Sabherwal, 2010). ICT implementation and building decent technological infrastructure helps to increase automation and reutilization of KM processes in the company (García-Álvarez, 2015). Hence, we see a reason for studying the effect company's ICT background have on KM practices in each of the spheres mentioned in the above.

As it was mentioned before, one of the critical and the basic element of KM in a company is the attitude to knowledge and the clear strategy. The management need to understand how to use the knowledge in order to meet company's goals. It also should be assessed and compared to the knowledge of main competitors. We suppose that KM practices in the field of strategy influence organizational performance, so the strategy not only need to exist but there should be understanding of how to execute it. This process implies analyzing the internal and external conditions and communicating goals to everyone in a team. In this process ICT is considered to be an enabler, because appropriate computer system makes an implementation of strategic knowledge-based vision easier and more efficient (McDermott, 1999).

Considering the way ICT influences human resources management, it may be stated that communication technologies in general positively affect HR planning, recruitment, training and development, compensation and performance appraisal (Elhazzam, 2015). It means that the usage of ICT enhances the way company implements HRM strategy. Hence, better development of ICT within the organization implies more efficient human resources practices. Furthermore, management perceive that HRM practices enhanced by ICT solutions have a stronger positive outcome for the whole organizational performance (Zahra, 2013).

ICT capabilities are limited to the overall environment within the company and many factors not directly connected to technological infrastructure. The results of knowledge management technologies implementation are strongly connected to the initial strategy towards knowledge within the company and the culture of the organization, facilitating interpersonal and interdepartmental interactions and knowledge processes. This means that the technology introduced without specific or latent needs derived from the structural and cultural circumstances will be not effective. At the same time, the complementarity of organizational resources leads to the fact, that the change in corporate structure and managerial intentions to create the knowledge-friendly culture in the organization depends on the level of ICT development and its accordance to the goals set. ICT should support collaboration of employees from different groups horizontally and vertically within the company and facilitate cooperation with outside stakeholders (Malhotra, 2000). The only way for a company to achieve high organizational performance through knowledge management is to comply the structure of the organization with the developed ICT (Jansen et al, 2000).

Furthermore, company's business processes are not limited to human co-working, which are only the intermediate part in the whole system of numerous processes of value creation. From the perspective of knowledge, there is also the question of division of work and responsibilities. And there is also a number of different daily processes, which consumes time and need to be improved. And the role of ICT here is to eliminate the obstacles in decision making and make the system integrated (Basu and Blanning, 2003).

The level of ICT development in the organization has an effect on the appearance of new frames and connections between departments and individuals, removing obstacles for horizontal interaction (Robey et al., 2000). Moreover, developed information and communication technologies make it possible to lower the level of formalization and make a structure flatter by removing hierarchical links or making them less bureaucratic and rigid (Lopez et al., 2009). All in all, if the company invest in constant development of ICT and maintain technological infrastructure on a high level, it has higher potential for successful structural transformation. Consequently, reforms in the organizational culture as a whole depend on the ICT capabilities.

In current turbulent environment the need for efficient organizational learning mechanisms becomes more and more vital. Companies have to adapt to external and internal environment gaining lessons from its past experience. Information-communication technologies are a significant enabler for initiatives connected to organizational learning. At the same time, the research conducted among 230 companies in Slovenia shows that the correlation between these two factors is moderate and the direction may change. The authors argue that there may be situations, in which ICT cause rigidity, thus impeding organizational learning (Dimovski and Škerlavaj, 2004). The previous research on the topic also states that ICT have a potential to act in both directions, being either an enabler for learning mechanisms or disable them (Robey et al, 2000).

To sum up, we see that information-communication technologies are crucial for knowledge management in a company. Knowledge management processes could be significantly empowered by ICT. The related KM practices in various spheres also depend on the ICT background the company has. So, in order to achieve maximum benefits for organizational performance through the usage of KM practices the company needs to develop the appropriate ICT system,

After reviewing works on the role of ICT in knowledge management we want to check the following hypotheses:

H8: The level of ICT development positively moderates the relationships between strategic management of knowledge and organizational performance;

H9: The level of ICT development positively moderates the relationships between supervisory work and organizational performance;

H10: The level of ICT development positively moderates the relationships between knowledge-centered human resource management and organizational performance;

H11: The level of ICT development positively moderates the relationships between organizational learning of knowledge and organizational performance;

H12: The level of ICT development positively moderates the relationships between collaborative organizational structure and organizational performance;

H13: The level of ICT development positively moderates the relationships between knowledge-friendly organizational culture and organizational performance.

Summary of chapter 1

In the first chapter we have seen that knowledge management is a complex process, which needs to be treated as an important part of a company's life. Organizational knowledge itself is a multilayer concept and it is not simply an amount of data accumulated, what creates a basis for the development of the independent managerial discipline. In order to use knowledge company's management need to consider a row of interconnected process linked to knowledge creation, share, acquisition and reuse.

There are several ways company may influence these processes in order to bring positive impact on the organization, which are known as KM practices. After analyzing different visions on the concept and comparing different definitions we have identified KM practice as intentional managerial activity that is aimed at enhancing knowledge processes. We have looked at several researches of the topic of KM practices and it has helped to create a list of practices, which are not to broad, but without deepening into specific disciplines' peculiarities.

After identifying main KM practices based on previous studies we analyzed the literature on the relations between these managerial actions and company's performance. The results of the literature review showed that some of this practices have a direct effect on organizational performance. Judging from our analysis we have picked the following KM practices for our research: KM strategy, organizational structure, organizational culture, ICT, organizational learning, HRM and supervisory work.

From the previous research we have understood that the role of ICT in KM infrastructure is still arguable. On the one hand, some authors believe that technologies create the basis for the whole

KM system in the company. And on the other hands, there is a different point of view, which states that it is incorrect to attach such importance to ICT.

Finally, we have set the goal of the current research and identify several objectives needed to reach this goal. We want to bridge the gap between the studies dealing with KM practices – organizational performance relationships and the understanding of the role of ICT.

Chapter 2. EMPIRICAL STUDY OF KNOWLEDGE MANAGEMENT PRACTICES IN RUSSIA AND THEIR INTERACTION WITH ICT

In the previous chapter we have discovered that KM is a complex sphere, which needs a profound research. There is a number of knowledge management practices, which are used by corporations in order to enhance the processes of knowledge creation, sharing, reuse and acquisition. We have identified that these practices could be an effective tool to increase organizational performance. We have identified research gap and formulated the main objectives of the study.

The second chapter of this paper is devoted to research design. In order to build an effective methodology, appropriate for the current study the author needs to identify the type of the research. Then, it is important to understand, which techniques could be used for the chosen type and create frame of the future work, including the way to collect suitable data, methods to analyze and interpret. For this reason, in the thirst part of the chapter we will compare existing research methods, looking at the differences in order to select the most appropriate one. After that the author presents the research design, including methodology.

2.1 Existing research methods in social studies and the type of current research

There are two big groups of existing research methods, which are applied in business studies: quantitative and qualitative.

Quantitative methods are those, which deal primarily with categorical or numerical data. In social science this type of research methods require evidence that is observable and testable. They are used in order to measure observations and find out how different phenomena are related. (Balnaves & Caputi, 2001)

In order to obtain appropriate data, the researcher could use existing databases (secondary data) or conduct a structured survey in order to obtain comparable data. Another way to collect data for quantitative research is structured interview, which implies only given limited number of answers, so it is not an open discussion.

After necessary data is collected it is analyzed by use of specific software like Microsoft Excel, IMB SPSS, Stata, etc. It is important to keep in mind, that by using quantitative methods the author must clarify all the aspects of the research design before collecting data. (Babbie, 2010) It means that when the author desires to collect quantitative data for hypotheses testing he needs to be sure, which particular data he needs.

Qualitative research methods, in contrast, are used when it is hard to collect numerical data and there is necessity to gather textual description of the issue. This type of data also can be secondary and primary. For its acquisition the researcher may use surveys with open questions, individual interview or focus group (Mack et al., 2005).

These two big groups of methods differ not only in a way they process different types of data. Data analysis is the final step in the research, but the choice of methods also depends on the goal, the author set in his/her work. To illustrate the difference between quantitative and qualitative methods we may look at the Table 2.

Table 2. Comparison of qualitative and quantitative research methods

	Quantitative	**Qualitative**
Focus	Confirm and predict	Understand and discover
Sample size	Big	Small
Type of data	Numerical	Verbal
Analysis of data	Computerized analysis	Human analysis
Design characteristics	Structured	Flexible

Source: adapted from (Cooper and Schindler, 2006)

However, current studies are not trapped in these two categories. Quantitative and qualitative methods could be merged in order to build a research design, which is applicable for solving complex tasks. It helps to offset weaknesses of both types of methods and provide more comprehensive evidence for studying research problem. There are three main ways to merge quantitative and qualitative methods: converge two datasets and bring them together, build one dataset on another, or one data could provide a supportive role for another. (Creswell, 2006)

As we may see, the development of research design and choosing appropriate method is an important step, which depends on a type of research the author conducts. There are two type of research: exploratory and explanatory. The former is conducted when the topic is not widely studied and there is still gap for further understanding of the chosen field. The latter, in contrast usually provide the answer to the specific narrow question in already studied area. The current research could be characterized as explanatory for the following reasons:

- though the topic of how performance could be effected by KM practices is understudied in the Russian context, there is a big amount of studies on the topic in the world;
- the main question of the paper is narrow and is based on previous studies;

- the purpose of the research is to examine the relationships between three phenomena and cover the gap in understanding their interconnection;
- the expected finding of the research is the set of recommendations in the field of ICT implication for KM in order to improve organizational performance.

2.2 Research design

Due to meet the objectives of current research we suggest using survey. Several reasons could be named, why it is an appropriate method for this study. First of all, in order to conduct a proposed research a big amount of data is required. We want to understand the attitude to KM in a particular social group, Russian companies, and the set goal is to measure the dependence of performance on the level of KM practices usage in these companies. Having a low budget and limited time frames the survey allows to address the chosen group efficiently, uncovering general trend in people experiences and opinions (Driscoll, 2011). Secondly, by using structured survey the researcher may gather the standardize information from different people and easily transform primarily qualitative information into quantitative, which could be analyzed with specific software, such as IBM SPSS (Robson, 2002). To sum up, the survey method is a good way to test the hypothesis based on synthesis of information from existing literature by using large amount of data gathered from different people.

We are going to use quantitative methods and to gather the appropriate data from the survey we assign numerical values to the answers by applying 6-points Likert-scale.

1. Extremely satisfied
2. Very satisfied
3. Somewhat satisfied
4. Somewhat dissatisfied
5. Very dissatisfied
6. Extremely dissatisfied

The 6-point scale was chosen for the following reasons. Firstly, we need to uncover certain dependencies, thus the neutral answers could cause problems. Though the person could have a neutral opinion concerning the topic, we are not interested in such answers and hence we could exclude the possibility to stay neutral and commit to either positive or negative side. There is a debate on the topic of 6-points usage, however it is considered appropriate and depends on the objectives of every individual case (Gwinner, 2006). Moreover, according to Chomeya 6-points

scale gives higher reliability and discrimination in comparison to 5-points scale. The application of 6-points Likert scale gives the higher Cronbach's Alpha Coefficient and reduce the deviation and the risk come from the deviation of personal decision making (Chomeya, 2010).

Because the purpose of our research is to identify certain trends in Russian companies the survey is conducted in Russia only.

The target group of respondents are heads of departments and heads of the companies with the number of employees not less than 20. The limitation to the number of employees is dictated by the previous studies on the topic and the goal to obtain more representative data.

The companies were selected by using the database of the Graduate School of Management. The questionnaire was sent via e-mail to 1090 companies' representatives and the response rate is 23%. Thereby, the number of collected responses is 254.

2.3 Measurement of variables

To create a survey, which would measure the usage of KM practices within the organizations and receive the subjective data about organizational performance we are use already proved concepts, which were mentioned in the literature review. We decided not to mix variables from different models into one potential factor, because it could create overlaps and thus decreasing the validity and reliability. Table 3 exhibits, how many variables were used in a questionnaire and from which sources they had been taken.

Table 3. Measurement of variables used in the research

Variable	Items	Reference
Strategy	6	*(Kianto & Andreeva, 2014)*
HRM practices	5	
Org. Culture	6	
Org. Structure	5	
Org. Learning	3	*(Inkinen et al, 2015)*
Supervision work	7	
ICT	6	
Org. Performance	8	*(Giampaoli et al, 2017)*

As it was stated we use 6-point Likert scale in order to estimate respondents' attitude toward the development of KM practices and the organizational performance. In total survey consists of 46 question. To address the issue of strategic KM in a company we have used 6 questions connected to the role of organizational knowledge in strategy creation process and at the same time the strategic approach to KM. 5 questions we asked in order to discover the HRM practices encouraging knowledge creation and sharing. To understand, if the company has knowledge-friendly organizational culture we have imputed 6 questions about conditions for knowledge sharing among employees and among different departments, the attitude towards employees' initiatives and new ventures and general atmosphere of trust. By asking 6 question about the creation of multi-disciplinary teams, cross-functional cooperation and interaction of different hierarchy levels the authors want to see if the company's structure favors knowledge creation, sharing and reuse. 3 items organizational learning cover the topic of the ability to reuse knowledge by storing and using of best practices from the past experience. We included 6 questions in a survey to understand, how respondents evaluate the ability of current ICT infrastructure to facilitate creation, analysis and sharing of knowledge. Also, this block covers the topic of interaction with external players. A couple of questions were designed to see the role of ICT in acquisition of external knowledge about competitors, customers and environment.

The block about organizational performance includes 8 items. As we mentioned in a previous chapter, we do not use standard quantitative indicators. For this reason, the questions in the block cover issues of efficiency, innovativeness, flexibility, problem solving and financial performance. The full questionnaire is presented in Appendix 1.

All in all, basing on the previous research we conclude that KM practices may have a direct and indirect effect on different aspects of organizational performance. Judging from this we think it is important to test, if suggested group of practices have a direct impact on performance in Russian companies and if ICT moderates these relationships.

2.4 Data cleaning and analysis methods

List experiments help to elicit and to measure interrelationships and factors, which do not have defined quantitative measures, especially regarding sensitive structures such as knowledge management. Survey data should be edited before analysis can be conducted.

First of all, we have removed floor and ceiling effects. Considering tests for scores, the share of maximum scores' respondents is called a mark of test difficulty. In surveys, "correctness" of answers is rather a common tendency that takes either minimal (floor effect) or maximal values

(ceiling effect), in other words, the distribution is skewed mostly at these value (Blair and Imai, 2012). In cases, when a tendency has no splitting needed for designing a model and is not clustered by other attributes, the question should be reformulated or eliminated. Empirical results usually show the presence of ceiling and floor effects quite visibly. Nevertheless, these effects may hide crucial splitting within one or two points in the scale because of wrong statement of a question. At this rate, if additional testing with adjusted questions is not possible, a weighting could be another solution. In fact, the sample size allows looking at selective mean and standard deviations for questions, and then removing those that give sharply distinguished mean and low variances.

As was described, if all the respondents strongly agree or disagree with a question, the scale is unreliable. Similarly, if one respondent answers all question so categorical, this is regarded as an ejection. That is why the estimated standard deviations and variances should be considered not only regarding incorrect questions as predictors, but also for identifying errors in responses, that is, horizontally. At this point, there are several principles which allow illustrating floor and ceiling effects. First of all, a qualitative interpretation of positive or negative shifting is needed. The focuses of interest are the cases, where the percentage of upper and lower values prevails. Another criterion is that more than 2 different answers should be presented by one respondent, calculated for 5% error. Finally, in Likert scale, the key issue is not maximum and minimum values, but the point of frequencies' concentration, which is equal for a biased respondent. 80% of repeating is enough for eliminating an observation (Hair et al, 2011).

After has been conducted, 201 observations remain, which are still enough for further research. Regarding verticals, none of the question demonstrates floor or ceiling effect neither before nor after excluding respondents with these effects.

In order to test the relationships between particular KM practices and the organizational performance development we apply linear regression in IBM SPSS Amos. To answer the question, if these relationships depend on the level of ICT development in the company we apply the concept of moderation effect and test it via moderated regression analysis in IBM SPSS Amos. We apply moderated regression analysis instead of subgroup analysis in order to maintain integrity of the sample. With this methodology we may test the moderating effect of ICT in the system without performing artificial transformation of a continuous standardized variable into a qualitative one, hence avoiding the loss of information. We assume that there may be a relation between ICT and organizational performance, hence the subgroup analysis is not appropriate. (Sharma et al., 1981). It is possible to test the moderating role of the variable, which has a significant main effect on the criterion. This relationship does not exclude the possibility of the moderating effect (Baron &

Kenny, 1986). Hence, basing on theoretical overview and the objectives of the current research the framework is the following.

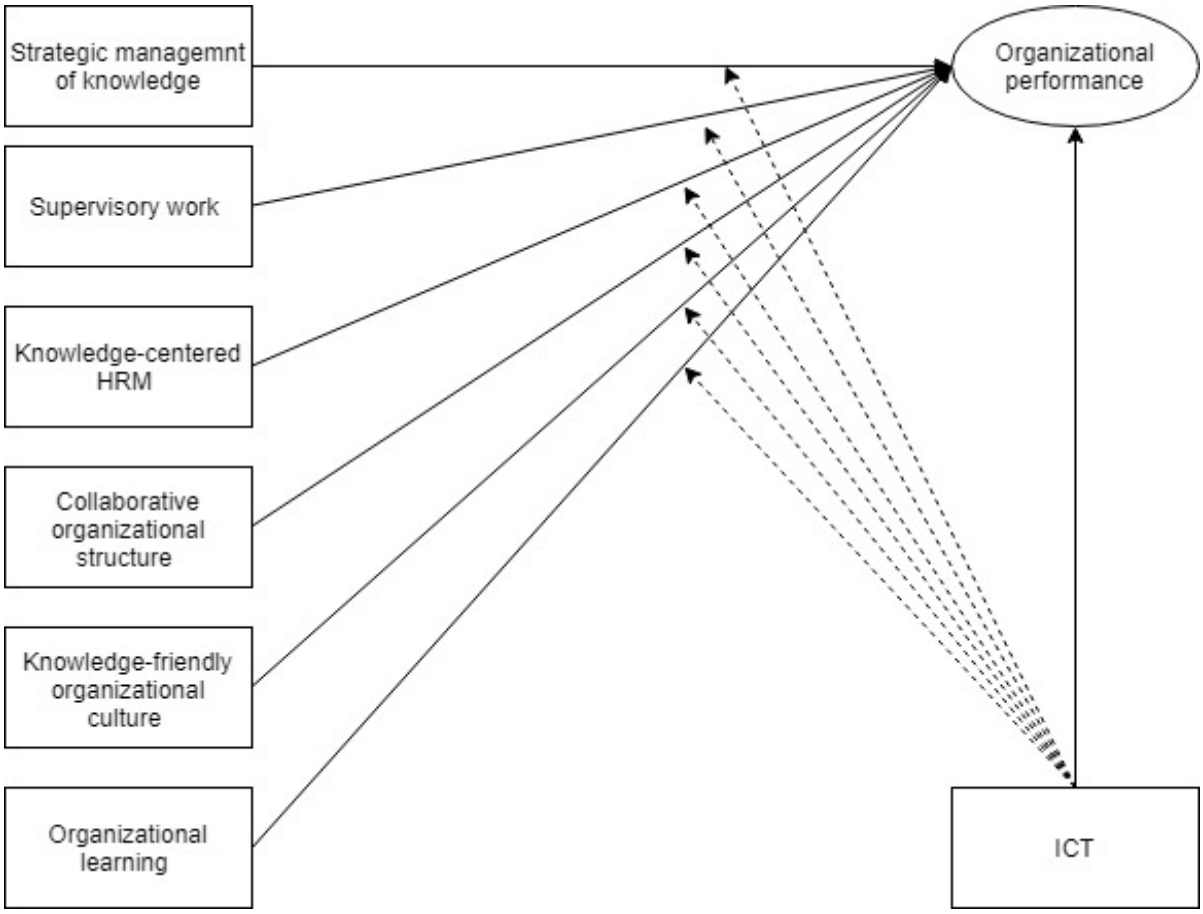

Figure 4. Theoretical framework

2.5 Descriptive statistics

In the previous chapter we have shown the approach, which author applies to reach the set objectives. We also have described, how the data for the current research was gathered and what we had done in order to make the dataset appropriate for the analysis. Before starting the analysis, we are going to look at the sample and provide descriptive statistics.

As it was stated before 254 Russian companies participated in the survey and after data cleaning the final sample consists of 201 filled questionnaires.

We collected the information about the industry, in which companies operate, and the number of employees and now we can analyze the sample from the perspective of these two criteria. According to standards and policies, prescribed by Organization for Economic Co-operation and

Developmen (OECD), the company is considered micro sized if the number of employees is less than 20. If there are up to 100 employees the company could be classified as a small one. Medium enterprise usually has staff, which consists of 100 – 500 people. And finally, large companies are those that have more than 500 employees (OECD, 2005).

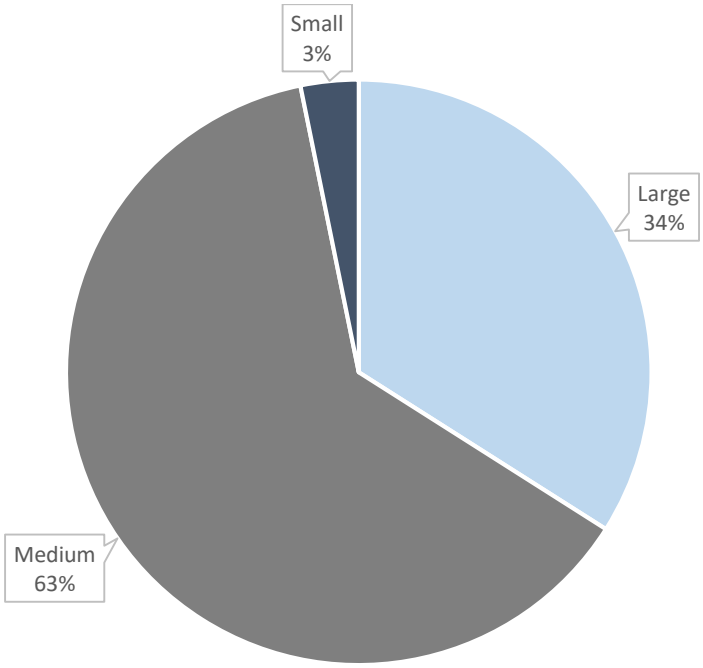

Figure 5. Distribution of surveyed companies by the number of employees

Because there was no goal to target the particular group of companies according to their size our final sample is diverse. The only group of companies, which was excluded from mailing list was the group of micro companies. The reason for such a decision was reliability maximization, because companies with less than 20 employees need to be studied separately, which is proved by previous studies on KM. Thus, as we can see on Figure 5, more than a half of respondents (63%) are managers in medium-sized enterprises. The second biggest group of analyzed questionnaires have come from large organizations (34%). The smallest part of the sample, that accounts only for 3%, are small companies with the number of employees less than 100 employees.

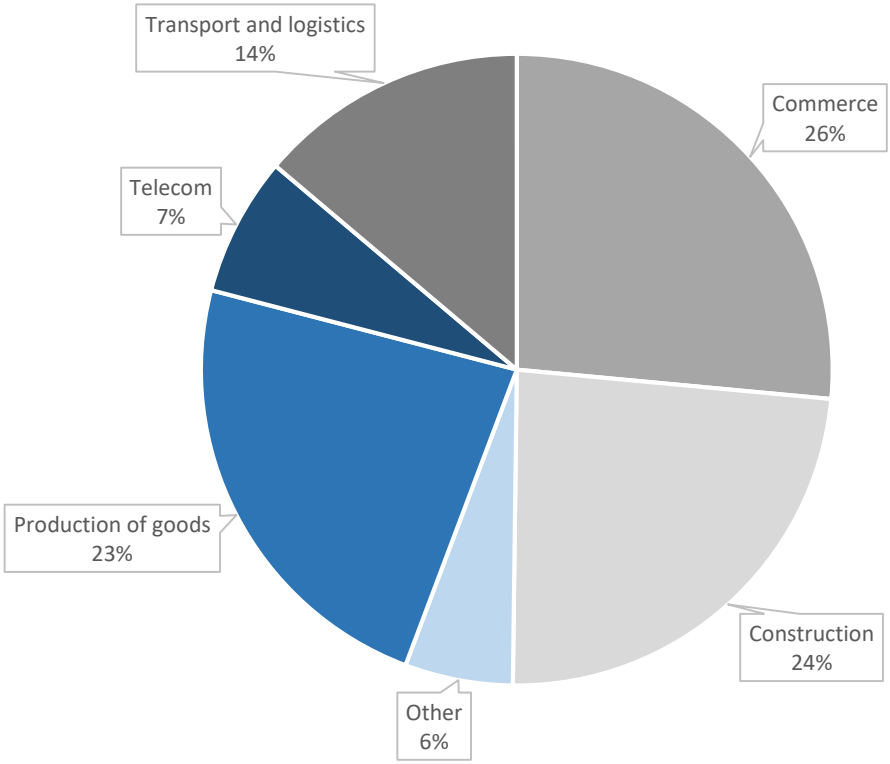

Figure 6. Distribution of surveyed companies by industry

All the companies participated in the survey are for-profit organizations, non-for-profit organizations were not a target group, because they have different measures of organizational performance. Three major groups of companies could be distinguished. Production of goods, construction and commerce amount to nearly 25% each. Transportation and logistics accounts to 14% of the sample and 7% of enterprises operate in telecommunication. The remaining 6% percent consists of bank, law firms and consulting.

Because we have excluded those questionnaires, in which respondents select one answer for all questions regardless of its content our sample gives more accurate description of the current situation with KM in Russian companies. In order to describe received answers we decided to sum up responses within one factor according to the theoretical construct we have created in the previous chapters. This method is a simple and effective way to understand the overall attitude of respondents towards the subject (Brace, 2004). Table 4 shows how managers in Russian companies perceive their companies' organizational performance and development of KM practices.

Table 4. Descriptive statistics of variables

Variable	Minimum	Maximum	Mean	Max. Possible	Std. Deviation
Performance	9,00	41,00	28,69	56	6,06831
Strategy	7,00	36,00	24,05	42	5,78338
Supervision	7,00	42,00	27,11	49	6,70760
Culture	6,00	36,00	24,26	42	6,11905
Structure	5,00	30,00	19,60	35	4,66377
HRM	5,00	28,00	19,14	35	4,78545
ICT	7,00	36,00	23,95	42	6,22511
Learning	3,00	18,00	12,77	21	3,63144

From descriptives we can conclude that the level of KM practices development in Russian companies is moderate. Organizational learning mechanisms are considered the most developed, since the mean value totals to nearly 61% from the maximum possible level. Practices connected to knowledge management in other spheres are perceived to be developed at the nearly 54 – 58% level. The lowest ratio is shown by HRM practices, accounting only to 54,6% of maximum possible. Regarding organizational performance, the surveyed managers and directors believe that in comparison to competitors their companies are showing low results in terms of general efficiency and financial performance. The mean score for this factor is only 51% from maximum. To conclude, we can observe that though KM practices introduced in a company are moderately developed organizational performance is not commensurate. It opens a perspective to measure the effect of each particular KM practice on performance and identify the most and the least influential among observed.

Summary of chapter 2

In the second chapter we have seen, that there are two main groups of research methods, quantitative and qualitative. These two groups of methods have its advantages and certain limitations, hence the choice of the methodology depends on the initial goal of the research, the circumstances, such as access to data, financial, time and other limitations. In accordance with the objectives of the current research we have decided to use quantitative approach.

We have collected data through structured survey. 254 responses were collected from directors and heads of the department in Russian companies. Small, medium and large companies

participated in a survey operate in different industries and give a representative picture of the market. Survey questions were based on the already existing studies in the field of knowledge management and organizational performance. 6-point Likert scale was applied in order to reduce uncertainty and receive only with positive or negative answers. We also impute questions about the number of employees and the industry in which the company operates.

In the chapter different data cleaning methods were shown. A ceiling and a floor effects were removed. After cleaning the data set the final sample consists of 201 filled questionnaires, which is enough to conduct a regression analysis.

In order to answer the designed question, we applied multiple regression analysis and moderated regression analysis in IBM SPSS Amos.

Chapter 3. RESULTS OF THE STUDY OF KM PRACTICES APPLICATION IN RUSSIAN COMPANIES: DISCUSSIONS AND IMPLICATIONS

3.1 Findings of the empirical study

Before running regression analysis, we decided to conduct factor analysis in IBM SPSS to see, if the variables chosen from the previous studies on the topic construct expected factors. The reason for this step is that we picked variable for our study from different articles and there is a possibility that some of them are redundant or may go to another factor. Also, a reliable scale (suspected factor) consists of items, which are to estimate proportionally and comprehensively some etalon meaning. That is why the questions that impose extra implicit factors, and errors, as a result, should be eliminated. Of course, this can be done only after a survey has been conducted, because it is difficult to predict, what items are sensitive and have underlying assumptions. To understand, what questions are inappropriate, Cronbach's alphas after deleting ("Alpha if deleted") should be compared, and factor loadings should be examined for sufficiency (Melnyk, 2012).

For extraction we have used Principal Component Analysis and as a rotation method Varimax with Kaiser Normalization. Because the sample size is 201 the threshold for factor loadings cut-off is 0,4 (Hair, 1998).

The Table 5 exhibits results of the factor analysis. The overall sample is adequate, that is proved by Kaiser-Meyer-Olkin measure equal to 0,915 and Bartlett's test of sphericity significance. First of all, we excluded several variable with factor loading less than 0,4. All the variable, except one, have good, very good or excellent factor loadings (Comrey and Lee, 1992). The final number of factors is less than it was expected from literature review. All the received factors, except one (Supervisory work) have a Cronbach's Alpha more than 0,8, which is more than the recommended value (Nunnaly, 1978). The factor with a Cronbach's Alpha more than 0,7 but less than 0,8 is still acceptable (Gearge, and Mallery, 2003)

Table 5. Factor analysis

Item	Component					
	1	2	3	4	5	6
Strategic management of knowledge (ST) Cronbach's α = 0,814						
1 F	,683					
1 D	,647					
1 E	,602					
1 B	,508					
1 C	,690					
1 E	,545					
Supervisory work (SW) Cronbach's α = 0,765						
2 C		,532				
2 E		,568				
2 F		,654				
2 G		,724				
Org. culture and org. structure (OCS) Cronbach's α = 0,845						
3 A			,525			
3 B			,630			
3 F			,702			
3 D			,672			
3 F			,547			
4 A			,542			
4 C			,552			
4 D			,529			
HRM Cronbach's α = 0,828						
5 A				,650		
5 B				,547		
5 C				,622		
5 D				,650		
5 E				,464		
ICT Cronbach's α = 0,851						
6 A					,561	
6 B					,522	
6 D					,835	
6 E					,840	
6 F					,546	
Organizational learning (OL) Cronbach's α = 0,827						
7 A						,780
7 B						,884
7 C						,897

Though according to theory we have distinguished 7 factors, connected to different sphere of knowledge management within the company, the final results have shown that 6 factors are enough. In fact, the analysis has shown that there is no need to separate cultural aspects of KM and those connected to organizational structure. It means that the correlation between the answers to these two

group of questions is significantly high. In the end these variables form one factor, proving that splitting was redundant. The possible reason for such a result may be that the questions from this two blocks seem interrelated to respondents. We consider organizational culture and organizational structure from the perspective of knowledge management processes and the changes in these two aspects as managerial initiatives to intensify knowledge creation, share, acquisition and reuse. From this perspective organizational culture and organizational structure may be interrelated, thus implying the dependency of one practice on another. Moreover, there are works, which study the mutual interaction of these two factors and their effect on organizational processes. They argue that these two factors, which previously have been studied independently should be seen as one system. (Janicijevic, 2013). Since we want to know about particular application of practices connected to organizational culture and structure with regards to knowledge management, we already know that they go hand in hand, and changes in one sphere provoke changes in another and design questions from perspective. Taking all this into consideration, we may use this one factor showing the level of organizational culture and structure suitability for efficient knowledge management.

The goal of the research is to see, if the influence, which KM practices have on organizational performance depends on the level of ICT development within the company. To find the answer to this question we have run two regressions.

The first includes 6 independent variables, represented by factors extracted in factor analysis and performance as a dependent variable. After that we have added interactions terms in order to test the moderating effect of ICT. We also use the number of employees a basic variable for multi-group analysis in order to test, if the model is different for small and medium enterprises and large companies.

The tested model is well fit with the Comparative Fit Index (CFI) equals to 1.0 and Root Mean Square Error of Approximation equals to 0,025. The proportion of the variance in organizational performance variable predictable from KM practices variables (R^2) is equal to 0,567.

$$Y = b0 + \beta_1 ST + \beta_2 SW + \beta_{3.} OCS + \beta_4 HRM + \beta_5 ICT + \beta_6 OL + \varepsilon,$$

Y - dependent variable

β_0 - the intercept

$\beta_{1..6}$ - beta coefficients for different variables

ST – Strategic management of knowledge

SW – Supervisory work

HRM - Human resource management

ICT - Information and communication technologies

OSC - Organizational structure and culture

OL - Organizational learning

ε - error

Table 6. KM practices influence on organizational performance

			B	P
Performance	<---	Strategic management of knowledge	,418	***
Performance	<---	Supervisory work	,242	***
Performance	<---	Organizational structure and culture	,228	***
Performance	<---	Human resource management	,440	***
Performance	<---	Information and communication tech.	,293	***
Performance	<---	Organizational learning	,047	,309

Note: p < 0,1 is "", p < 0,05 is "**", and p < 0,01 is "***"*

The Table 6 exhibits the results of the regression analysis, conducted without moderating variables. The results show that 5 out of 6 factors positively influence organizational performance (H1 – H6). These findings go in line with the previous studies and prove that the named KM practices may be used in Russian context (Kianto & Andreeva, 2014; Inkinen et al, 2015). In our analysis we used mean-centered factors, thus the comparison of regression weights is appropriate. So, we can conclude that strategic knowledge management and KM practices in human resource management have the biggest influence on organizational performance among all factors used in our study with the 0,418 and 0,440 beta coefficient respectively with the p value less than 0,01 in both cases. It means that the wider application of these practices leads to respective increase in a company's performance.

Moreover, organizational performance is also influenced by KM practices connected to supervisory work. If managers actively participate in a knowledge creation, sharing, acquisition and reuse, showing to employees by their example the necessity of these processes, the company performs better, both operationally and financially. The role of supervisors is important as they act as trend-setters, who cultivate an appropriate attitude to company's knowledge among employees. They are in power to make a company a place for open and equal discussion, where mistakes of employees are not considered as fails but as learning opportunities.

Creation of knowledge-friendly organizational culture, facilitation of cross-departmental interaction and absence of obstacle to communicate on different level of corporate hierarchy, also give a positive incentive to organizational performance increase. Employees, who are flexible and ready to offer innovative solutions should be valued, because they give an incentive for company's development.

We also may conclude that the development of information and communication technologies within the company have a direct effect on its performance. Thus, companies with the developed IT infrastructure, which facilitates internal communication and enable productive information search and analysis, are more efficient and have higher chances to stay competitive on the market.

The relationship between organizational learning and a firm's performance (H7) is not significant (p > 0,1). However, it does not mean that there are no such relationships.

Table 7. ICT Moderating effect

			B	P
Performance	<---	Strategic management of knowledge	,412	***
Performance	<---	Supervisory work	,238	***
Performance	<---	Organizational structure and culture	,240	***
Performance	<---	Human resource management	,424	***
Performance	<---	Information and communication technologies	,292	***
Performance	<---	Organizational learning	,049	,291
Performance	<---	Strategic management of knowledge_x_ICT	,157	**
Performance	<---	Supervisory work_x_ICT	-,085	,145
Performance	<---	Organizational structure and culture_x_ICT	-,067	,303
Performance	<---	HRM_x_ICT	-,023	,598
Performance	<---	Organizational learning _x_ICT	-,068	,329

Note: p < 0,1 is "", p < 0,05 is "**", and p < 0,01 is "***"*

The model, designed for testing ICT moderating effect, also shows a good fit with the data: CFI = 1,00; RMSEA = 0,114. R^2 has increased slightly and equals to 0,577.

$$Y = b0 + b1\ ST + b2\ SW + b3\ OCS + b4\ HRM + b5\ ICT + b6\ OL + b7\ ST{*}ICT + b8\ SW{*}ICT + b9\ OCS{*}ICT + b10\ HRM{*}ICT + b11\ OL{*}ICT + \varepsilon,$$

We wanted to see, if ICT moderates the relationships between different KM practices and organizational performance of Russian firms. According to the results of our analysis, ICT strengthens the positive relationship between strategic management of knowledge and performance. The moderation is significant at 95 percent confidence level, which is acceptable, because the usually the interactions are weaker than regular effects. In this case the ICT may be considered quasi moderator because it also has a significant direct effect on performance.

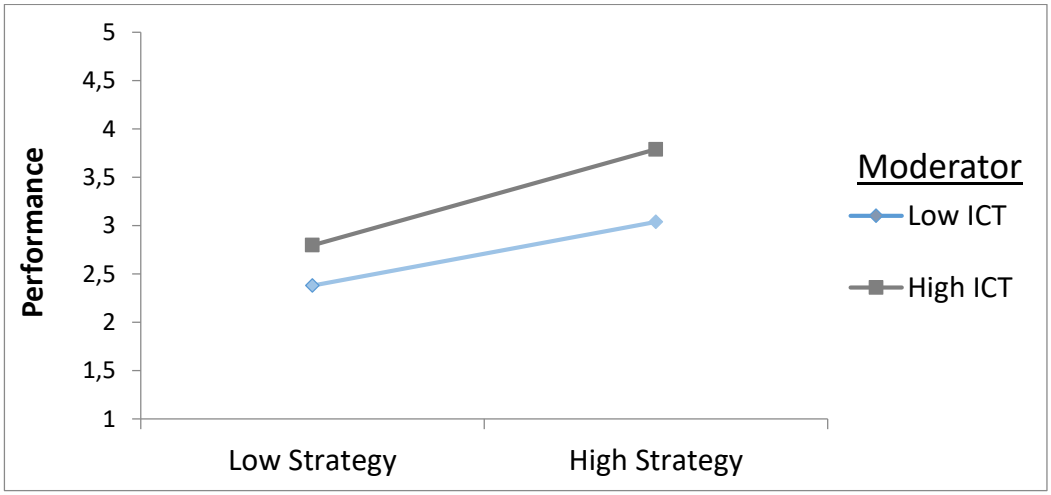

Figure 6. The moderating effect of ICT on the relationship between strategic management of knowledge and performance

The moderating variable does not change the direction of the effect strategic management of knowledge has on organizational performance. If the level of ICT development is high in a company, the effect is stronger.

Our hypotheses about the positive moderating effect ICT have in the relationships between other KM practices and performance (H9 – H13) are not supported. Hence, we may conclude that the increasing level of ICT development level does not cause significant positive changes in the effect KM practices in other spheres (HR, organizational structure and culture, organizational learning and supervisory work) have on company's performance. There is no clear evidence that the initial hypotheses are fully rejected but the obtained results with negative signs before B coefficients create a basis for hesitation.

We have also performed multi-group analysis using Chi-square difference test, on the basis of the number of employees. We have divided the sample into two groups, SME and large

enterprises. The results show that there is no difference between this two groups in terms of the effect KM practices have on performance and the moderating role of ICT in these relationships. Hence the results are applicable for both groups.

3.2 Theoretical contribution

The current study has a potential to be a starting point in further researches regarding the issue of the interdependence of KM practices and ICT in influencing organizational performance. The importance of the research evinces itself in several specific aspects.

First of all, it introduces a new approach and results to the current pool of studies on the topic of KM practices in Russia. As it was already mentioned, the model needs to be adjusted depending on the country where the survey has been conducted. Considering the field of KM and its effect on performance, there is lack of empirical research focusing on Russian companies solely. Moreover, the key issue in previous studies was to prove the presence of the effects of implementing KM practices, and testing the theory for companies of different types (Andreeva & Kianto, 2012; Andreeva & Kianto, 2014). The current research goes further in understanding the application of KM practices, and not only confirms the results of precursors, but also thoroughly studies each individual practice for structural changes when introducing a moderating factor, ICT, in this case.

Secondly, new factors were identified for future studies. Investigators have different approaches to the classification of KM practices. Based on the existing developments, new factors, suitable for Russian companies, were identified. In particular, the predictors for organizational culture and organizational structure demonstrated a high correlation, which required combining then into one factor. Such a step matters not only in this topic, but also allows taking into account how their parameters work in Russia in studies devoted to the profound disclosure of one or both of these aspects.

Thirdly, it was proved that KM practices have a direct positive effect on organizational performance in Russian context. The presence of direct influence, unlike indirect or nonlinear effects, simplifies identifying the nature of interrelationships and applying greater research tools, as well as opens up the opportunities for deeper investigation in the future. The context of a particular country is important in the reason that its companies can be compared and clustered on this basis with other firms, especially from these countries where the study is more developed.

Fourthly, the research proved that ICT moderates the effect of KM strategy on organizational performance. The latter researches regarding the relationships between information technologies and KM practices show a positive impact. (Chugh et al, 2013; López et al, 2009). Previous studies proved that the development of decent ICT infrastructure helps to implement KM strategy. Current

level of technological applications allows to enhance knowledge management processes saving time and efforts of employees. This paper goes further and puts an attention on how the interdependence strength of KM practices and organizational performance changes on different levels of ICT implementation, taking previous researches as a basis and proving the hypothesis of influence direction. In prospect, it is advisable to check separate ICT tools and applications on which precisely play the bigger moderating role. Taking into account the specification of factors for Russian companies, the study may be productive, if the survey would be conducted in other countries too. Moreover, the positive moderating effect of ICT on relationships between other KM practices and company's performance have not been proven. This does not mean, that there is no effect, however the further research is needed.

Finally, the research opens the way to deeper studies of interaction of ICT and other KM practices. In this paper, the impact of ICT on one aspect of relationship has been proven. It does not exhaust the issue of ICT implementation. Most likely, there could be more moderating effects on the other KM practices depending on a particular country or a specific sample of companies. However, a proven model of interrelations between KM strategy and organizational performance enforced by ICT contains a number of preconditions for further hypotheses.

3.3 Managerial implications

The results of the conducted research would be useful for management of Russian companies because they give a guideline for the implementation of the knowledge-based approach for enhancing organizational performance. As the volume of company's accumulated knowledge is constantly increasing its proper management becomes the basis for creating core capabilities for the future growth and competitive advantage. In our work we have shown that knowledge management practices connected to HR, organizational culture and organizational structure, organizational learning and information and communication technologies as well as making knowledge the strategic asset, may become a driver of company's operational and financial performance.

The study shows that company's performance mostly depends on two KM practices (HRM and KM strategy). According to the results, management of any firm, regardless of its size, should focus on approaching knowledge within the organization strategically. It means that there must be the clear understanding of the core knowledge the company possess, which beneficially distinguish it from competitors. This understanding should be constantly and systematically reevaluated, matching it with company's goals and competitors' position. By that means management can facilitate strategic planning and establish a capability to capture new business opportunities and be more flexible on the market. What is more, employees should be rewarded monetary and non-

monetary for their input in creation of group knowledge and its share. Motivating and evaluating employees' involvement in knowledge processes have a positive outcome for the firm's overall performance. Moreover, companies that want to approach changes in organizational structure should make it in line with developing appropriate culture. It is impossible to improve performance only by trying to apply new organizational design and creating multidisciplinary teams. Without overall atmosphere of trust and openness these changes might not have positive effect, the employees must be always encouraged to share its experience, both successful and unsuccessful and to create new innovative solutions on its basis.

Finally, we have seen the level of ICT development is not a significantly important criterion for the success of particular KM practices implementation. This means that the technological determinism can't be considered sustainable approach to KM. In order to bring value through KM practices the company does not need to concentrate only on the technological part of the process, but rather introduce other KM practices independently and without relying mostly on ICT.

At the same time, we may judge from the analysis that in companies with more developed ICT infrastructure, which enables knowledge creation, sharing, acquisition and reuse, knowledge management strategy is a more powerful factor for performance enhancement. Hence, companies should use actively existing technologies for accumulation of knowledge within the company and making strategic decisions on the basis of its analysis and comparison to direct competitors. Companies with more developed ICT has more capabilities to make right strategic decisions.

Summary of chapter 3

The last chapter of the paper contains discussion of the main findings of the empirical research as well as their theoretical contribution and managerial implications.

First of all, the results have shown that the factors used previously used in other studies on the topic of knowledge management practices applications may vary in Russian context. The variables that usually have been grouping two factors, organizational structure and organizational culture have, have formed one factor. This may be interpreted as a sign that changes in organizational structure and organizational culture are strongly interconnected.

According to the results of multiple regression, knowledge management practices have a direct impact on organizational performance of Russian companies. Only one factor, organizational learning, has shown insignificant result. It means that strategic management of knowledge, development of ICT, incentives from supervisors, creation of knowledge-friendly organizational culture, building collaborative organizational structure, as well as practices connected to HRM

positively influence organizational performance. HRM practices and strategic approach to knowledge in a company have demonstrated the strongest influence.

Finally, the moderation analysis has shown that in companies with more developed information and communication technologies strategic management of knowledge has a bigger impact on performance. At the same time the evidence of the moderating effect in the relationships between other KM practices and performance has not been found.

Conclusion

This master thesis investigates the question of the effect knowledge management practices have on organizational performance in Russian companies. In the paper the influence, which different KM practices has on performance were tested for moderation by information and communications technologies aspect. The main goal was to discover if the effect is increasing with the rise of ICT development.

The review of existing literature on the topic of knowledge management has helped to highlight the importance of the current study and has provided the theoretical basis for the research. Basing on previous studies the most important KM practices were identified. Furthermore, the original framework for the empirical investigation was built in accordance with previous studies of the prominent scientists in the field.

The survey was conducted among top managers, which allowed to gather information about KM practices application in Russian companies. We also have collected more than two hundred responses about managers' perception of their companies' performance comparing to competitors.

The analysis has shown that knowledge management practices, connected to HR, ICT, organizational culture and organizational structure, supervisory work and strategy have a direct impact on organizational performance indicators. By introducing such practices companies may increase their financial indicators, become more productive and responsive to market needs. Moreover, ICT can be considered a moderator in the relationships between strategic KM and organizational performance. However, no evidence was found of such interaction with other KM practices.

The results of the study have valuable implications for the research community addressing the problem of ICT – KM interaction from new perspective. It opens the way to new profound studies in the area asking the questions about the ability to enhance KM practices through ICT applications. Furthermore, managers of Russian companies may apply the results of the current research to adjust their vision of the KM strategy implementation. The necessity of information and communication technologies for empowering KM does not necessarily mean that the developing of ICT infrastructure will help to make other KM practices more influential.

The study has certain limitations, which proves the possibility of the future works on the theme on the other markets, applying different factors or looking at a specific industry.

References

Andreeva T. & Kianto A. (2012). Does knowledge management really matter? Linking knowledge management practices, competitiveness & economic performance, Journal of Knowledge Management. 16(4), 617-636.

Andreeva T. & Kianto A. (2014) Knowledge Management Practices and Results in Service-Oriented versus Product-Oriented Companies. Knowledge and Process Management, 21 (4), 221-230.

Babbie, E.R. (2010). *The Practice of Social Research*. (12th ed). Belmont, CA: Wadsworth Cengage.

Balnaves, M. & Caputi, P. (2001). *Introduction to quantitative research methods: An investigative approach*. Thousand Oakes, CA: Sage.

Baron R.M. & David A. K. (1986). The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations," Journal of Personality and Social Psychology, 51 (6), 1173-1182.

Basu, A. and Blannin, R. W. (2003). Synthesis and Decomposition of Processes in Organizations. *Information Systems Research*, 14 (4), 337-355.

Bellinger, G., Castro, D. and Mills, A. (2004). Data, Information, Knowledge, and Wisdom. Retrieved October 2 ,2017: http://www.systems-thinking.org/dikw/dikw.htm

Bhatt, Ganesh D. (2001). Knowledge Management in Organizations: Examining the Interaction between Technologies, Techniques, and People. *Journal of Knowledge Management*, 5 (1), 68-75.

Blair, G. and Imai, K. (2012). Statistical analysis of list experiments. *Political Analysis*, 20, 47-77.

Bierly. P., and Chakrabarti. A. (1996). Generic knowledge strategies in the U.S. pharmaceutical industry. *Strategic Management Journal*, 17 (10), 123-135.

Brace, I. (2004). Questionnaire design: how to plan, structure, and write survey material for effective market research. London; Sterling, VA: Kogan Page.

Brix J. (2017). Exploring knowledge creation processes as a source of organizational learning: A longitudinal case study of a public innovation project. *Scandinavian Journal of Management*, 33, 113-127.

Cabrera, Á. and Cabrera, E.F. (2002). Knowledge-Sharing Dilemmas. *Organization Studies*, 23, 687-710.

Chan J. (2009) Integrating Knowledge Management and Relationship Management in an Enterprise Environment. *Communications of the IIMA*, 9 (4), 37-52.

Chomeya, R. (2010). Quality of Psychology Test between Likert Scale 5 and 6 Points. *Journal of Social Sciences,* 6, 399-403.

Chugh, M., Chugh, N., Punia, D. K., and Agarwal, A. (2013). The Role of Information Technology in Knowledge Management. *Paper presented at the Conference on Advances in Communication and Control Systems 2013 (CAC2S 2013)*, 688-193.

Colilns, H. (1993). The structure of knowledge. *Social Research,* 60, 95-116.

Comrey, A.L. and Lee, H.B. (1992). A first course in factor analysis (2nd edition). Hillsdale,NJ: Lawrence Erlbaum Associates.

Cook, S. D. N. and Brown J. S. (1999). Bridging Epistemologies: The Generative Dance between Organizational Knowledge and Organizational Knowing. *Organization Science*, 10 (4), 381-400.

Creswell, J. W. (2009). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (3rd ed.). Thousand Oaks, CA: SAGE Publications.

Dave, M., Dave, M. & Shishodia, Y. S. (2012). Emerging Trends and Technologies in Knowledge management: A Holistic Vision. *International Journal of Recent Research and Review*, 3(1), 60-67.

Davenport, T. H. and Prusak, L. (2000). Working knowledge: How organizations manage what they know. Boston, MA: Harvard Business School Press.

Davidson, P and Griffin, RW (2003). Management: An Australasian Perspective (2nd edn.), John Wiley & Sons, Brisbane, Australia.

Delaney, J.T. and Huselid, M.A. (1996), The impact of human resource management practices on perceptions of organizational performance, *Academy of Management Journal*, 39 (4), 949-969.

Desouza K.C. (2003). Knowledge management barriers: Why the technology imperative seldom works. *Business Horizons*, January-February, 25-29.

Dimovski, V. and Škerlavaj M. (2004). Organizational Learning and Information-Communication. Zb. Rad. - Sveuè. u Rij., Ekon. fak., god. 22. Sv. 1, 7-19.

Driscoll, D. L. (2010). Introduction to Primary Research: Observations, Surveys, and Interviews, 153 – 174, in Charlton, C. (2010). *Writing spaces: readings on writing, Volume 1,* West Lafayette, Indiana: Parlor Press.

Elhazzam, M. (2015). The Effect of ICT on Human Resources Management Practices, *International Journal of Innovative Research in Engineering & Management (IJIREM),* 2 (3).

Fernandez, I.B. and Sabherwal, R. (2010), Knowledge Management Systems and Processes, M.E. Sharpe,Armonk, New York.

Fruchter R., Demian P. (2002). Knowledge management for reuse. *Proceedings of CIB W78 conference*, 12-14.

García-Álvarez, M.T. (2015) Analysis of the effects of ICTs in knowledge management and innovation: The case of Zara Group, *Computers in Human Behavior*, 51, 994–1002.

George, D., and Mallery, P. (2003). SPSS for Windows step by step: A simple guide and reference. 11.0 update (4th ed.). Boston: Allyn & Bacon.

Gholami1, M. H., Asli, M. N., Shirkouhi, S. N., & Noruzy, A. (2012). Investigating the Influence of Knowledge Management Practices on Organizational Performance: An Empirical Study. *Acta Polytechnica Hungarica*, 10, 205-216.

Giampaoli D., Ciambotti M. and Bontis N., (2017). Knowledge management, problem solving and performance in top Italian firms, *Journal of Knowledge Management*, 21 (2), 355-375.

Gray, J. H., and Densten, I. L. (2005). Towards an integrative model of organizational culture and knowledge management. *International Journal of Organisational Behaviour,* 9 (2), 594-603.

Gwinner, C. (2006). 5-point vs. 6-point Likert Scales. Atlanta: Infosurv White Paper.

Hair Jr, J.F., Wolfinbarger M., Money, A. H., Samouel, P. and Page, M. J. (2011). Essentials of business research methods. 2nd ed. Armonk, NY : M.E. Sharpe, Inc.

Hair, J.F, Tatham, R.L., Anderson, R.E. and Black W. (1998) Multivariate data analysis. (Fifth Ed.) Prentice-Hall:London.

Heisig, P. (2009). Harmonisation of knowledge management – comparing 160 KM frameworks around the globe. *Journal of Knowledge Management*, 13 (4), 4-31.

Hendriks, P. (1999) Why Share Knowledge? The Influence of ICT on the Motivation for Knowledge Sharing. *Knowledge & Process Management*, 6, 91-100.

Hsu, I. C. (2008). Knowledge Sharing Practices as a Facilitating Factor for Improving

Organizational Performance through Human Capital: A Preliminary Test. *Expert Systems with Applications*, 35 (3), 1316–26.

Inkinen, H., Kianto, A. and Vanhala, M., (2015). Knowledge Management Practices and Innovation Performance in Finland. *Baltic Journal of Management,* 10 (4): 432–455.

Janicijevic, N. (2013). The Mutual Impact of Organizational Culture and Structure. *Economic Annals*, Vol 58 (198), 35–60.

Jansen, W., Steenbackers, G. C. A. and Jägers H. P. M. (1999). The virtual corporation, balancing between identity and innovation, 43 – 60, in Malhotra, Y. (2000). *Knowledge management and virtual organizations*. Hershey, PA : IGI Global Publishing.

Kaplan, S. (2002). KM the right way: A step-by-step approach that will ensure that your expensive KM system actually gets used. *CIO*, July 15, 74-81.

Li, Y., Liu, Z. and Lin, Y. (2016) Where Is the Driving Force of Employee's Knowledge Sharing? The Multilevel Effect of Innovative Culture. *Economic Management*, No. 5, 75-86.

Kianto A., Ritala P., Spender J-C., Vanhala, M. (2014). The interaction of intellectual capital assets and knowledge management practices in organizational value creation. *Journal of Intellectual Capital*, 15 (3), 362 – 375.

Lee, H., and Choi B. (2014). Knowledge Management Enablers, Processes, and Organizational Performance: An Integration and Empirical Examination. *Journal of Management Information Systems*, 20, 179–228.

López, S. P., Peón, J. M. M. and Ordás, C.J.V. (2009). Information technology as an enabler of knowledge management: an empirical analysis, in King, W.R. (Ed.), *Knowledge Management and Organizational Learning, Annals of Information Systems*, 4; Berlin: Springer, 111-129.

Mack, N., Woodsong, C., MacQueen, K. M., Guest, G., and Namey, E. (2005). Qualitative research methods: A data collector's field guide. North Carolina: FLI.

Malhotra, Y. (2000) Knowledge management and virtual organizations. Hershey, PA: IGI Global Publishing.

Markus L. (2001). Toward A Theory of Knowledge Reuse: Types of Knowledge Reuse Situations and Factors in Reuse Success. *Journal of Management Information Systems,* 18(1), 57-93.

Massingham, P. (2014). An Evaluation of Knowledge Management Tools: Part 2-Managing Knowledge Flows and Enablers. *Journal of Knowledge Management*, 18 (6): 1101–1126.

McDermott R. (1999). Why information technology inspired but cannot deliver knowledge management. *California Management Review*, 41 (1), 103-117.

Melnyk, B. M., & Morrison-Beedy, D. (2012). *Intervention research: Designing, conducting, analyzing, and funding*. New York: Springer Publishing.

Newell, S., Robertson, M., Scarbrough, H., & Swan, J. (2009). Managing knowledge work and innovation (2nd ed.). Basingstoke: Palgrave.

Nonaka, I., & Takeuchi, H. (1995). The knowledge-creating company: how Japanese companies create the dynamics of innovation. 1995.

Nonaka, I. (1991). The knowledge-creating company. *Harvard Business Review*, November–December, 96-104.

OECD (2005). SME and Entrepreneurship Outlook, Retrieved from https://bit.ly/2F5h9ki

Riege, A. (2005). Three-dozen knowledge-sharing barriers managers must consider. *Journal of Knowledge Management*, 9 (3), 18-35.

Robey, D., Boudreau, M-C., Rose, G. M. (2000). Information Technology and Organizational Learning: A Review and Assessment of Research. *Accounting Management and Information Technologies*, 10 (2), 125-155.

Robson, C. (2002). *Real World Research. 2nd. Edition*. Blackwell Publishing. Malden, MA.

Roland, N. (2006). Knowledge Management in the Business-driven Action Learning Process. *Journal of Management Development*, 25 (9), 896-907.

Ruikar K., Anumba, C.J. and Egbu, C. (2007). Integrated use of technologies and techniques for construction knowledge management. *Knowledge Management Research and Practice*, 5 (4), 297-311.

Schacht, S., Morana, S. & Maedche, A. (2015). The Evolution of Design Principles Enabling Knowledge Reuse for Projects: An Action Design Research Project. *Journal of Information Technology Theory and Application*. 16(3), 5-36.

Sharma, S., Durand, R. M., & Gur-Arie, O. (1981). Identification and Analysis of Moderator Variables. *Journal of marketing Research*, 18, 291-300.

Stankovsky, M.A. and Baldaza, C. (1999). Knowledge management: An evolution architecture toward enterprise engineering. *Proceedings of International Council on System Engineering (INCOSE),* Mid-Atlantic regional conference.

Turban, E. (1993) Expert Systems and Applied Artificial Intelligence, *Macmilan Publishing*, New York.

Zahra, A. (2012). ICT and HRM: Management perceptions about the changing scenario. in *P roc. International Conference on Business Management*, 1-14.

Appendix 1. The questionnaire

Company's profile

	Please specify the company's main business
A	Commerce (wholesale and retail)
B	Transport and logistics
C	Telecommunications
D	Construction
E	Production of goods
F	Other (please specify)

Number of employees	

To what extent do the following statements apply to your company

1	**Strategic management of knowledge**	1 – strongly disagree 6 – strongly agree					
A	Our organization has a clear understanding of our current core knowledge	1	2	3	4	5	6
B	Our organization has a clear view of what knowledge and competences are the most relevant for the objectives	1	2	3	4	5	6
C	Our organization's knowledge and competences are evaluated systematically	1	2	3	4	5	6
D	Our organization benchmarks our strategic knowledge against that of our competitors	1	2	3	4	5	6
E	Our organization explicitly recognizes knowledge as a key element in the strategic planning exercises	1	2	3	4	5	6
F	Our organization has a clear strategy for developing knowledge and competences	1	2	3	4	5	6
2	**Supervisory work**						
A	Supervisors encourage employees to share knowledge at the workplace	1	2	3	4	5	6
B	Supervisors encourage employees to question existing knowledge	1	2	3	4	5	6
C	Supervisors allow employees to make mistakes, and they see mistakes as learning opportunities	1	2	3	4	5	6
D	Supervisors value employees' ideas and viewpoints and take them into account	1	2	3	4	5	6
E	Supervisors promote equal discussion in the workplace	1	2	3	4	5	6
F	Supervisors share knowledge in an open and equal manner	1	2	3	4	5	6
G	Supervisors continuously update their own knowledge	1	2	3	4	5	6
3	**Organizational culture**						
A	Openness and trust are valued in our organization	1	2	3	4	5	6
B	Flexibility and a desire to innovate are valued in our organization	1	2	3	4	5	6

C	Employees who take initiative of their own learning are highly valued in our organization	1	2	3	4	5	6
D	Willingness to share lessons learned is valued in our organization	1	2	3	4	5	6
E	In our organization, lessons learned both successful and unsuccessful are considered valuable	1	2	3	4	5	6
F	In our organization various units are encouraged to collaborate with each other	1	2	3	4	5	6
4	**Organizational structure**						
A	People from different parts of our organization interact informally with each other in a frequent manner	1	2	3	4	5	6
B	In our organization, open dialogs are common among/ between employees and manager	1	2	3	4	5	6
C	In our projects, our organization uses teams consisting of people with skills and expertise from diverse fields	1	2	3	4	5	6
D	In our organization, we frequently use cross-functional teams and projects	1	2	3	4	5	6
E	In our organization, we have purposeful overlap of functional responsibilities	1	2	3	4	5	6
5	**Human resource management**						
A	Our organization specifically rewards knowledge sharing with monetary incentives	1	2	3	4	5	6
B	Our organization specifically rewards knowledge sharing with non-monetary incentives	1	2	3	4	5	6
C	Our organization specifically rewards knowledge creation with monetary incentives	1	2	3	4	5	6
D	Our organization specifically rewards knowledge creation with non-monetary incentives	1	2	3	4	5	6
E	In our organization, knowledge sharing is a component in employees' performance evaluation	1	2	3	4	5	6
6	**Information and communication technologies**						
A	Technology is utilized to enable efficient information search and discovery	1	2	3	4	5	6
B	Technology is utilized to enable internal communication throughout the organization	1	2	3	4	5	6
C	Technology is utilized to communicate with external stakeholders	1	2	3	4	5	6
D	Technology is utilized to analyze knowledge in order to make better decisions	1	2	3	4	5	6
E	Technology is utilized to collect business knowledge related to its competitors, customers, and operating environment, for example,	1	2	3	4	5	6
F	Technology is utilized to develop new products and services with external stakeholders	1	2	3	4	5	6
7	**Organizational learning**						
A	Knowledge is transferred from experienced to inexperienced employees through mentoring, apprenticeship ,and job orientation, for example	1	2	3	4	5	6
B	The company systematically collects best practices and lessons learned	1	2	3	4	5	6

C	The company makes systematic use of best practices and lessons learned	1	2	3	4	5	6

Estimate the following last year results of your company's activity in comparison to other firms in the same industry

7	**Organizational performance**	1 – very low 6 – very high					
A	Productivity	1	2	3	4	5	6
B	The capability to develop new products/services	1	2	3	4	5	6
C	The capability to respond to new market demands	1	2	3	4	5	6
D	The capability to capture new business opportunities	1	2	3	4	5	6
E	Sales volume	1	2	3	4	5	6
F	Profit	1	2	3	4	5	6
G	Profit margin over sales	1	2	3	4	5	6