

St. Petersburg University  
Graduate School of Management

Master in Management Program

**FACTORS AFFECTING KNOWLEDGE  
MANAGEMENT INTEGRATION IN SMALL  
IT-ENTERPRISES**

Master's Thesis by the 2<sup>nd</sup> year student

Concentration — MITIM

Daria R. Morozova

Research advisor:

Tatiana A. Gavrilova, Professor

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**ЗАЯВЛЕНИЕ О САМОСТОЯТЕЛЬНОМ ХАРАКТЕРЕ ВЫПОЛНЕНИЯ  
ВЫПУСКНОЙ КВАЛИФИКАЦИОННОЙ РАБОТЫ**

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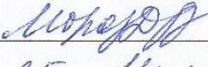
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## АННОТАЦИЯ

Автор	Морозова Дарья Романовна
Название магистерской диссертации	Факторы, влияющие на интеграцию практик управления знаниями в малых ИТ-предприятиях
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Научный руководитель	Гаврилова Татьяна Альбертовна
Описание цели, задач и основных результатов	<p>Цель работы: определить наличие взаимосвязи практик управления знаниями с практиками креативности и коммуникаций в малых ИТ-предприятиях.</p> <p>Задачи:</p> <ol style="list-style-type: none"> <li>1) Изучить и охарактеризовать практики управления знаниями в малых ИТ-предприятиях;</li> <li>2) Изучить и охарактеризовать практики креативности в малых ИТ-предприятиях;</li> <li>3) Определить взаимосвязь практик управления знаниями, коммуникативных практик и практик креативности;</li> <li>4) Сформулировать практические рекомендации для улучшения таких практик.</li> </ol> <p>Исследование показало наличие взаимосвязи практик управления знаниями, коммуникативных и креативных практик в малых ИТ-предприятиях, а также возможности для улучшения таких практик. Результаты исследования послужили аналитической базой для формулирования практических рекомендаций, в работе также обсуждаются важные практические заключения о существующих в организациях предубеждениях. Организациям рекомендуется включить в свою практику оговоренную коммуникативную структуру, использовать навигационные системы для поиска информации в системах хранения знаний, ввести временные ограничения на разработку идей, использовать карты балльных оценок, участвовать в соответствующих обучающих мероприятиях. Предложены идеи для саморазвития сотрудников.</p>
Ключевые слова	Управление знаниями, креативность, коммуникации, стартапы, малые ИТ-предприятия

## ABSTRACT

Master Student's Name	Morozova Daria Romanovna
Master Thesis Title	Factors affecting knowledge management integration in small IT-enterprises
Faculty	Graduate School of Management
Main field of study	Management
Year	2016
Academic Advisor's Name	Gavrilova Tatiana Albertovna
Description of the goal, tasks and main results	<p>The goal of this thesis is to define whether knowledge management practices implementation is related to creativity and communication practices in small IT-enterprises.</p> <p>The tasks of the present thesis are:</p> <ol style="list-style-type: none"> <li>1) To observe and characterize the knowledge management practices in small IT enterprises;</li> <li>2) To observe and characterize the creativity and communication practices in small IT enterprises;</li> <li>3) To define the relation of knowledge management, communication and creativity practices to each other;</li> <li>4) To provide practical recommendations for enhancement of practices.</li> </ol> <p>The study has found that there is a relation between knowledge management, creativity and communication practices in small IT-enterprises, which is consistent with the previous research. The study also has shown that knowledge management practices in most organizations, along with explicit creativity management practices, can be improved.</p> <p>The analysis of the findings provided a base for managerial implications and recommendations generation. The managerial implications discuss the threat of various biases and organizational decisions for small IT-enterprises. Among the recommendations suggested are the introduction of a certain hierarchy, introduction of a search system in the knowledge storage systems is applicable, introduction of time constraints for development, introduction of an ideas scorecard system, applicable trainings, and self-development ideas.</p>
Keywords	Knowledge management, creativity, communications, startups, small IT-enterprises

## Content

Introduction .....	3
1. Factors and trends in IT industry: a critical review .....	4
1.1. Knowledge management .....	4
1.2. Creativity .....	9
1.3. Social interactions and communication .....	13
1.4. IT companies and SMEs.....	16
1.5. Research gap, goal, object, research questions, and tasks .....	19
Summary of chapter 1.....	21
2. Research design: theoretical foundations and application.....	22
2.1. Research methods for KM, creativity, and SI studies .....	22
2.2. Methodology of empirical study.....	34
Summary of chapter 2.....	38
3. Observed factors and in small and medium IT-enterprises .....	40
3.1. Data gathering process: sample and channels .....	40
3.2. Results of the empirical study: considerations and analysis .....	41
3.3. Discussion of the results of the empirical study .....	63
Summary of chapter 3.....	67
Conclusion .....	68
Acknowledgements .....	69
References .....	70
Appendix 1. Likert-scale interview questions .....	76
Appendix 2. Additional considerations .....	79

## INTRODUCTION

In the modern business world, proper and efficient management of knowledge and information is one of the key capabilities that provide for the competitive advantage of a firm. Information flows become more and more saturated, and increasingly more data needs to be taken on and analyzed by the employees on the daily basis in order to generate new knowledge. At the same time, creative solutions are required to sustain the advantage and generate new products.

The current economic conditions are to a large extent shaped by intangible assets that become increasingly important as a source of competitive advantage. Peters (2010) states that there are now three main forms of the knowledge economy: learning, creativity, and openness. These three notions, to our view, profoundly determine the current conditions of IT market where companies need to excel not only in the quality of products, but also to be agile and creative in order to respond to the demand and constant competition.

In the context of operation of IT companies, issues of knowledge management effectiveness are of great significance as knowledge-related practices in such companies provide for innovative capabilities of the company and sustain the employee's creativity, which in term leads to competitive advantage and may even determine survival of the company in the market. Therefore, in the highly competitive environment, especially the one saturated with small or medium IT enterprises, it is crucial for a developing IT company to be able to effectively manage the knowledge base, processes, and supporting notions.

The aim of this study is to identify and analyze such factors that affect knowledge management practices in small scale IT companies like communication patterns, creativity levels, and preconditions for knowledge management processes, to conduct empirical investigation, and to provide possible practical recommendations for the issues identified during the investigation.

The structure of the present work is as follows: the review of previously published research literature on topics investigated (chapter I) is followed by the research methodology design (chapter II). The results of the investigation are analyzed and discussed in chapter III along with the recommendations generated. The conclusion summarizes the whole body of work and consummates this thesis.



## CHAPTER I. FACTORS AND TRENDS IN IT-INDUSTRY: A CRITICAL REVIEW

Knowledge management has become a widely discussed issue in the scientific literature and in the business environment. The notion of knowledge management (KM) is regarded and investigated in numerous aspects ranging from the social dimensions of KM practices to technology related issues. For the purposes of this study, the literature review has several foci – starting with the general overview of KM-related literature and following a bottle-neck approach, the literature discussion concerns issues of creativity, communication and interpersonal relationships in business environments, and such issues in relation to small and medium enterprises (SMEs). Where available, literature concerning the aforementioned issues in relation to the IT industry was selected. The research gap and consequently research questions are identified at the end of this chapter. Figure 1 below presents the relations of issues covered in this chapter, and shows their order of appearance in the text signified by numbers in brackets. Accordingly, these subchapters are signified by headings in **bold** (1, 2, 4, and 7) and **bold italic** (3, 5, 6, 8).

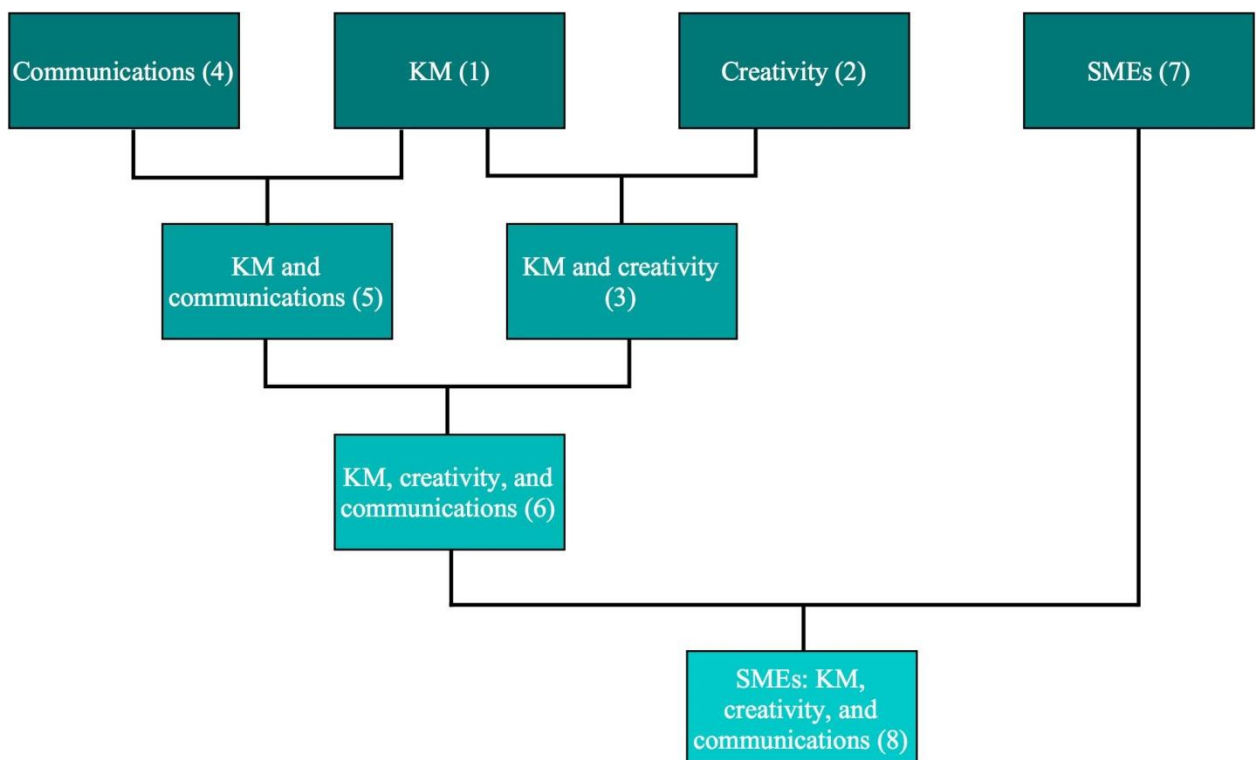


Figure 1 Structure of the literature review.

Source: author's generalization

### 1.1. Knowledge Management

In this section we refer to the general approaches to knowledge management, definitions of knowledge, and current perspectives on knowledge management in the literature, and

critically discuss them. The outline of the section is presented in Figure 2 below.

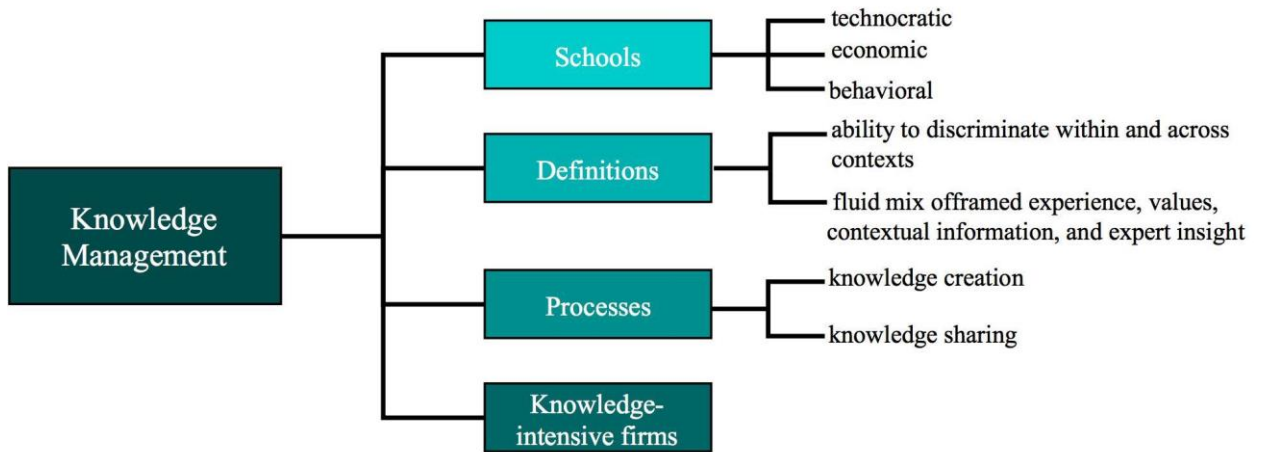


Figure 2 Layout of knowledge management section

Source: author's generalization

### *1.1.1. Schools of knowledge management*

Contemporary scholars distinguish three main schools of knowledge management. Handzic and Zhou (2005) generalize the categories as the technocratic, economic and behavioral schools. The technocratic perspective asserts the role of information and communication technologies. Main managerial considerations are the content and amounts of knowledge, its distribution, and the utilization of information.

The behavioral school regards organizational structures that perpetuate knowledge sharing and pooling as the central issues. Office and work environments are considered to be very important for the distribution of knowledge as they facilitate contacts and encourage communication. The behavioral school as well admits the importance of context, culture, and complexity of knowledge management and its strategic implications.

The third school described by Handzic and Zhou (2005) is the economic school. This approach considers knowledge to be an organizational asset and aims to create owner's value. Economic approach emphasizes the importance of patterns and copyrights, i.e. the importance of intellectual capital management.

### *1.1.2. Knowledge: definition and approaches*

The definition of knowledge, as noted by a number of researches, depends on the needs of the approach used for a work given. Newell et al. (Newell, Robertson, Scarbrough, Swan, 2009), suggest a working definition - that is, knowledge is 'the ability to discriminate within and across contexts'. Authors also derive a definition of organizational knowledge, which is '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'. It is also noted in the same work that notion of knowledge varies across the two major perspectives on knowledge work. In the epistemology of possession, knowledge is structurally viewed as 'a cognitive entity – a resource to be accumulated, captured and transferred' (p.18). In the epistemology of practice, the process view of knowing is 'a social and organizational activity – socially constructed through interactions in particular contexts', and the practice view assumes that 'knowing [...] is constituted by and constituting fields of interconnected practices'.

Important considerations regarding knowledge and the approaches to its definition are discussed by Holden (Holden, 2010) in relation to the activities that involve and create or constitute knowledge. The researcher states that knowledge is generated, codified and coordinated; it is transferred and ultimately used. Further he lists several definitions of knowledge formulated by researchers, for example, the one provided by Davenport and Prusak (p.68) is as follows: 'Knowledge is 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'. This definition, although rather eloquent and complex, reflects the major considerations that most researches refer to when discussing the definition of knowledge, such as that it can be not only something that an individual possess in his or her experience and expertise, but that it can also be shared and accumulated within the organization and therefore created not by a single individual, but collectively. This view on knowledge as a phenomenon is important for our future considerations.

### *1.1.3. Knowledge creation*

As discussed in paragraph 1.1.2. above, knowledge is created and shared, and these processes are of interest to contemporary authors. The process of knowledge-creation is deeply discussed by de Castro, Lopez Saez, Navas Lopez, and Galindo Dorado in their 2007 monograph "Knowledge Creation Process. Theory and Empirical Evidence from Knowledge-Intensive Firms", and the chapter on the EO-SECI model of knowledge-creation and transfer is of particular interest. The Epistemological and Ontological Socialization-Externalization-Combination-Internalization model (de Castro et al., 2007) developed by the authors provides for the description of every process of knowledge creation and transfer by placing the

ontological and epistemological dimensions of it on the axis. The authors argue that any knowledge creation process can be identified through naming its initial and final ontological levels followed by the initial and final epistemological nature involved. Knowledge creation and transfer in the model may be either intra-level or inter-level, and several descriptive models are derived.

#### *1.1.4. Knowledge sharing*

As mentioned above, knowledge is shared within the organization, and such process has been of interest to a number of researchers. Knowledge sharing, as defined by Bukowitz and Williams (Bukowitz, Williams, 1999), is 'an activity through which knowledge (namely, information, skills, or expertise) is exchanged among people, friends, families, communities, or organizations'. Another process that is very close to knowledge sharing is the process of knowledge transfer: as noted by Leonard (Leonard, 2007), knowledge transfer is in most situations two-way and serves the purpose of perpetuating work activities. Sometimes one-way knowledge transfer occurs when there is a need for the prevention of knowledge loss; a multiple-way knowledge transfer may be observed in situations when new products, processes or services are developed and a number of parties shift between the roles of knowledge senders and receivers. The author emphasizes the importance of knowledge transfer for the emergence of creative ideas and solutions and states that collaboration is crucial or the various areas of knowledge to intersect and then to provide for new knowledge. Several barriers may prevent or hinder knowledge transfer, for example, these barriers may be the cultural embeddedness and relativity of knowledge, or its ambiguity. The size and nature of knowledge gap between the sender and the receiver of knowledge may also be a significant barrier and affect the motivation to share knowledge at all. The two main modes of knowledge transfer are passive reception and active learning (p. 63).

#### *1.1.5. Knowledge-intensive firms*

Present research as well investigates the notion of knowledge-intensive firms, or similarly, knowledge creating companies. As stated by Nonaka (Nonaka, 2003, in Newell, 2009), a knowledge creating firm is a company that consistently creates new knowledge, disseminates it through the organization, and embodies it in new technologies and products, or, in other words, it is a company in which innovation is the primary business activity. Newell et al. (2009) define a knowledge intensive firm as a firm where most of the workers or all of them are knowledge workers, often defined as 'qualified labor' (ibid., p. 29). They also provide a typological framework for knowledge intensive firms that can be client-based, problem-solving, and output

based. Resources in such firms respectively are controlled individually, are team-based, and are controlled by the organization. IT-firms, legal and accountancy practices, advertising agencies, and management consultancy companies, as well as educational establishments, are all examples of knowledge-intensive firms.

Managing knowledge is one of the most challenging tasks a firm encounters nowadays. Skovvang Christensen and Bukh (2005) summarize important implications drawn from research dedicated to knowledge management in general and describe it from two perspectives. One of them is the artifact-oriented epistemology that focuses on explicit knowledge and considers it to be generally the same as data and information. Knowledge management in that perspective strives to represent 'the surroundings' as precisely as possible and therefore provide for the creation and sharing of knowledge via a good infrastructure. Knowledge creation in this approach is considered to be the identification and capturing of data and information from the environment in order to represent the reality as good as possible. Knowledge is shared through technological systems and managed top-down with a codification strategy.

The second approach described (Skovvang Christensen, Bukh, 2005) is the process-oriented epistemology, and it considers both the explicit and tacit knowledge. Information consists of structured data, and in specific contexts it becomes knowledge. Management is middle-up-down and focuses on the creative individual, that is, on the most essential actor of knowledge creation. Knowledge creation is described by a spiral-like process (wide-known SECI-model by Nonaka) as well as knowledge sharing as they move in different ontological dimensions. The authors as well emphasize that the complexity of creating, sharing and using knowledge depends on the company structure.

An important consideration regarding knowledge management in organizations is emphasized by Gavrilova and Grigorev (Gavrilova, Grigorev, 2005): knowledge exists in the organization no matter whether employees realize its existence or not. Therefore, there is a need to encourage and support emergent knowledge accumulation and to employ knowledge management strategies involving both human resources and machine enabled facilities.

#### *1.1.6. Summary of section 1.1.*

Review of the literature dedicated to general issues of KM shows that such issues as knowledge creation, sharing, and transfer are rather widely studied. The connection between knowledge processes in the firm and firm conditions is shown as well. In the behavioral/economic line of thought, knowledge and knowledge processes are realized and implemented in the practice of firms through sharing and transfer, and knowledge created by

employees themselves and via an infrastructure, which has an impact on the practices. For the current research of IT industry, which is a knowledge intensive industry, it is important to discuss knowledge management practices in terms of how they can be enhanced through internal alterations to structure, culture, and other soft dimensions. This implication suggests focusing on creativity, which is discussed in the next section.

## 1.2. Creativity

The following part is dedicated to discussion of general creativity studies and those dealing with KM in various aspects in more detail. The outline of the section is presented in Figure 3 below.

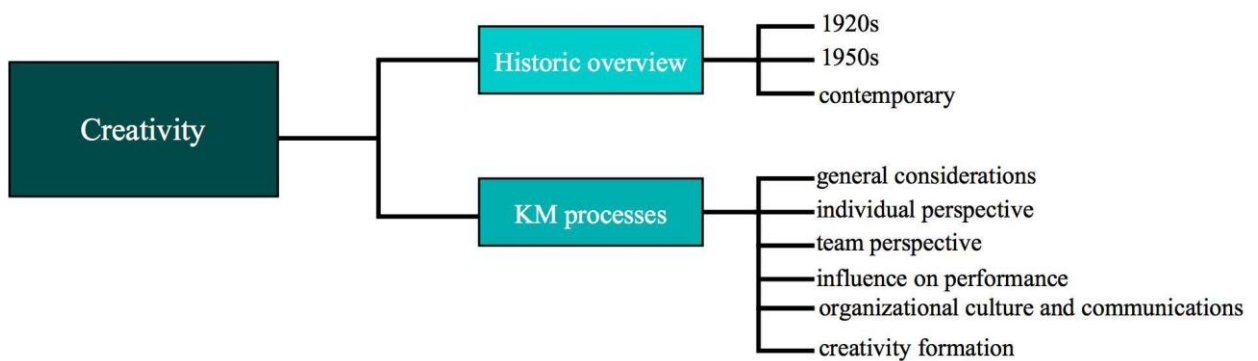


Figure 3 Layout of creativity section  
Source: author's generalization

### 1.2.1. Creativity: general discussion

Creativity is a widely discussed issue in the scientific literature. Although most of the studies are carried out regarding the psychological aspect of the notion, some researchers study creativity in managerial regard. Creativity is a notion that has gained much scientific attention as early as in the second half of 19<sup>th</sup> century, states Jacob (Jacob, 2011). Among significant research on topic she cites Wallas (Wallas, 1926, in Jacob, 2011) who identified four phases of a creative process as '(i) preparation as the phase in which the problem to be solved is clarified and understood (ii) incubation when one no longer consciously considers the problem, (iii) illumination as the phase in which the creative insight occurs, and (iv) verification, the last phase during which it is verified that the creative insight is indeed a solution for the problem to be solved' (p.343). A later attempt at creativity process description was undertaken by Osborn (Osborn, 1953, in Jacob, 2011) who proposed a two-phase model for defining a creative process: (i) idea generation, which consists of two sub processes, fact finding phase and idea finding phase, and (ii) idea evaluation.

Starting from approximately 1980s, creativity becomes an issue in managerial scientific literature as well. One of the famous researchers studying creativity in business setting is Teresa Amabile. Her componential theory of creativity is currently, after some alterations since the 80s, is presented as a model of three components. These components are expertise (knowledge-technical, procedural, and intellectual), creative thinking skills (flexibility and imagination in problem-solving), and motivation. The intersection of these components provides for creativity (Amabile, 2012). Amabile in her works discusses the importance of creativity for innovation, value of intrinsic motivation for creative problem-solving, and the effects of creativity on business performance. According to her, creativity is manageable within an organization, and a plan can be developed in order to foster creative work and engagement (Amabile, 1998).

An attempt at describing organizational creativity via a theoretical framework was undertaken in the beginning of the 90s by Woodman, Sawyer, and Griffin (Woodman et al., 1993). Defining organizational creativity as the creation of a valuable, useful new product, service, idea, procedure, or process by individuals working together in a complex social system, they discuss interactionist model of organizational creativity, linking individual performance to creative outcome via group and organizational performance. In this model, such factors of individual creativity as antecedent conditions, cognitive styles and abilities, personality, motivation, and knowledge are influenced and influence social and contextual factors within the group and consequently in organizations. At the same time, as noted by the authors, group creativity is not a mere sum of individual creativity, and the same is valid for the relationship of organizational and group creativity. Information exchange within the organizations and groups working on technical development was positively influenced by communication of group members.

Creativity as a manageable notion is often linked to creative industries. Bilton (Bilton, 2007) in his book “Creativity and Management” discusses a broad range of managerial implications of creativity in the relation to the industry traditionally described as creative (arts, music production, theatre, etc.). Regarding the management of creative teams, Bilton states that creativity managers face two major challenges - diversity and flexibility sustainment, and over-specialization avoidance. At the same time, management of creative organizations, according to Bilton, is opposed to the classical hierarchical models of management and implies a more flexible approach to intra-team relationship management. In such creative teams, roles of team members can often be diffused, and a high degree of self-awareness, interaction and empathy is crucial for the team success.

### ***1.2.2. KM and creativity***

A number of studies link creativity to knowledge management. For instance, Saulais and Ermine (Saulais and Ermine, 2012) associate creativity with the evolution of intellectual corpus of an organization. Intellectual corpus is the inventive part of the knowledge capital. Creativity diverges from chaos, and, as the evolutionary process, it is influenced by cognitive stimuli. Describing the organizational environment of creative actions, the authors propose the intellectual corpus systemic model that can be applied for the enhancement of the knowledge value chain of an organization. This system, otherwise called the AIL systemic model, unites three subsystems - Innovation Actors (A), Intellectual Corpus Information System (I), and Intellectual Corpus (L) - via out- and inbound creativity and inventivity. Under this system, knowledge actors (A) exploiting data bases (I) accumulate creative results in the form of intellectual corpus (L) for value generation, and the main emphasis is put on the appropriate KM as management of knowledge creators, their performance and own knowledge, as well as knowledge sharing and collegial creation of intellectual property.

Groenau, Thim and Ulrich (2012) studied application of creative techniques to KM problems in the context of knowledge socialization. Deterring from the conventional point of view that there are two non-overlapping approaches to creativity, artistic and engineering, and referring to Thierauf and Hoctor (2006) who stated that creativity techniques can be successfully used for KM systems development, the authors (Groenau et al., 2012) developed and tested a creative framework for KM development practices at an IT department of an industrial company in Germany. The results of this case study showed that creativity techniques can be effectively implemented if fitted into certain patterns considering the organization's peculiarities.

Knowledge creation, creativity and innovation are often linked together. For instance, Auernhammer and Hall (2014) discuss a Freiraum model which implies that a company should establish such a knowledge management model in order to promote creativity and foster innovation that would provide for an organizational structure allowing out-of-the-pattern thinking, employees' willingness to innovate and create, and a special environment designated for creative thinking. All these are as well dependent on organizational culture that includes leadership and social conditions. Application of this model in a manufacturing firm, according to the authors, results in knowledge creation processes' improvement in relation to creativity and a more innovative environment.



### *1.2.3. Individual creativity and KM processes*

Some researchers are specifically interested in individual KM aptitudes' influence on creativity. Yeh and Lin (Yeh, Lin, 2015) found that KM-based training was beneficial for creativity improvement in an e-learning environment, in other words, their study has shown that a more effective application of KM instruments was the reason for creativity level enhancement. As many IT firms integrate blended KM models into employee training, an implication of this study suggests that for creativity development of IT workers e-learning systems integrating KM instruments could be of good use.

Phipps and Prieto (2012) investigate the relationship of KM to individual creativity. Again supporting the issue that creativity is vital for organizational success, they state that knowledge provides basic building blocks that in combination provide for creative ideas and solutions. Transition from knowledge to creativity is facilitated by the entrepreneurial mindset, which defines a person's ways of thinking and problem-solving, as well as problem definition and opportunity seeking. Authors conclude that knowledge management practices of an organization therefore have an influence on individual creativity.

Rahimi, Arbabisarjou, Allameh, and Aghababaei (2011) study creativity in relation to KM on the individual level. The results of the study show that the correlation between KM and creativity levels was positive regardless of other variables such as gender, age, and similar, however, the authors emphasize importance of such factors like language, organizational culture, confidentiality, and others for KM implementation in knowledge-intensive organizations.

### *1.2.4. Team creativity and KM processes*

Gilson et al. (2015) study creativity as a building block for innovation and entrepreneurship in teams. Pointing out that a team can be more creative than an individual, the authors discuss Rhode's (Rhodes, 1961 cited in Gilson et al., 2015) model of team creativity – the 4Ps Framework. The Ps are Person, Process, Press, and Products. In this framework, *person* describes the creative actors; *process* characterizes engagement in creative actions and includes thinking, communication, learning and incubation. *Press* considers creativity as a result of people's interaction, including the patterns of communication and relationship elements, and *products* are the outcomes of the creative process.

### *1.2.5. KM and creativity: influence on performance*

Chang, Hung, and Lin (Chan et al., 2014) explore the relationship between KM and creativity from the point of new product performance. In their model, creativity mediates the relationship between knowledge creation and new product performance (NPP): knowledge

creation has a positive significant influence on NPP, which results in increased profitability of the company as the new product becomes more successful due to knowledge creation. This means that knowledge is of importance for a company's creativity, and knowledge creation increases. Therefore, an implication of the study is that companies should engage in comprehensive knowledge creation processes in order to improve their performance.

#### *1.2.6. KM, creativity and organizational culture and communications*

Creativity in connection to business, innovation and entrepreneurship is a focus of a number of current scientific works as well. In the recent Oxford Handbook of Creativity, Innovation and Entrepreneurship (eds. Shalley, Hitt, Zhou, 2015) these issues are discussed in various perspectives. For instance, Perry-Smith and Manucci (Perry-Smith, Manucci, in Shalley et. al, 2015) discuss the relationship between social networks and connections in the organizations. Starting from the personal viewpoint on creativity, authors research the impact of the individual's position within the network on his or her creative performance, and conclude that relationship quality has an impact on creativity.

Another aspect of creativity studies is the cultural element of creativity. In the same handbook (eds. Shalley et al., 2015), Leung and Wang discuss the societal culture and organizational creativity, and state that although diversity is often perceived as a beneficial factor that should positively influence creativity, experimental findings do not always confirm such correlation. Of great importance in cases of diverse companies is then intercultural competence that helps overcome hindrances caused by misunderstandings that potentially decrease creative capabilities. At the same time, a high level of creative capabilities is observed among people who can be described as multicultural, that is, those who embody more than one culture in their daily practices and attitudes.

#### *1.2.7. Creativity formation*

Creativity formation is another notion of interest currently studied in academia. For instance, Yan, Davison and Mo (Yan et al., 2013) found that knowledge seeking and knowledge contributing as sub-processes of KM within an organization have to occur in order for the state of flow (which is a state of mind when a person is absorbed in what he or she is doing) to be established, and such state of mind can further result in creativity. A means to knowledge seeking and contributing in the case of this study is Web 2.0, which allows participants of the process to both share and acquire information. The findings of this study imply, specifically for small- and medium-sized organizations, that a knowledge sharing process, which can benefit creativity, can be organized by use of external resources and not necessarily by establishment of own

formalized KM applications.

#### 1.2.8. Summary of section 1.2.

Review of literature dedicated to creativity issues and especially issues of creativity and knowledge management shows that current researchers are investigating the connections between creativity and knowledge management in different settings and both from the personal and collective perspective. Creativity appears to be positively linked to performance and may be enhanced through knowledge management practices, as well as through establishment of a nurturing environment within the organization.

### 1.3. Social interactions and communication

Issues of communications and interpersonal relationships along with emotional attitudes in organization and managerial processes are profoundly discussed in different regards ranging from strategic leadership to communication campaigns, so for the purposes of this research we only refer to several works discussion communication processes in organizations. The outline of the section is presented in Figure 4 below.

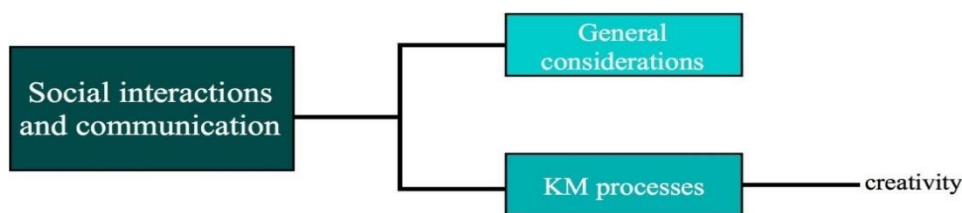


Figure 4 Layout of social interactions and communication section

Source: author's generalization

#### 1.3.1. Communications and interaction: general considerations

Cooren, Kuhn, Cornelissen and Clark (Cooren et al., 2011) provide an extensive overview of the scientific body of knowledge regarding the processes and mechanisms that are involved in communicative organizing and organizations. Referring to previous research, they state that human communication constitutes organizations: this notion is the basis for the Communicative Constitution of Organization (CCO) approach. Under this approach, organizations are 'portrayed [...] as ongoing and precarious accomplishments realized, experienced and identified primarily [...] in communication processes. Communication forms are varied (e.g. verbal and non-verbal, texts and discourses, turn-taking, faces, etc.), and in this emergent perspective of CCO are not regarded separately as something that just happens in the organization, but rather than something that constructs the organization. Thereby, COO reconstitutes ontological and epistemological positions of an organization.

In the same chapter, Cooren et al. discuss several models of communication in the COO approach, of which the most relevant and interesting one is the McPhee's four-flows model (McPhee, 2004, in Cooren et al., 2011). This model includes the four flows, or processes: membership negotiation, reflexive self-structuring, activity coordination, and institutional positioning. These flows organize and constitute organizations by producing and reproducing social structures through boundaries definition, linking of members, operations shaping and interaction adaptation. According to McPhee, these flows combine interactive episodes into a social system that is the organization itself.

### ***1.3.2. KM and communications***

Overall (2015) suggests that relationship quality within a knowledge-intensive organization is crucial for employee commitment and satisfaction, which in their turn, coupled with adequate KM measures, are the basis for effective innovation management and better performance. Therefore, leaders who foster relationship quality are more likely to enhance the knowledge within their organizations and contribute to innovative endeavors.

### ***1.3.3. KM, communications, and creativity***

Communication, KM, and creativity are the focus of Gabberty and Thomas's article (Gabberty, Thomas, 2007) on knowledge management in multinational corporations and its linkage to creativity and innovation promotion. According to them, organizational knowledge of multinational corporations (MNCs) in a creative process foregoes three zones. In the tacit knowledge zone happens the idea spark, which is next, upon exploration and generation of ideas, transferred to the non-binding refinement zone via information systems. At this point, the idea is evaluated at local and international levels. Proceeding again via information systems, it is transferred to the explicit knowledge zone (EKZ). In the EKZ, the idea is discussed with the use of ICT and either approved or implemented, or sent back for further development. The whole mechanism is enabled by communication of feedback carried out by the ICT, and from the authors' point of view provides for the knowledge dissemination across MNCs. Cultural, semiotic, and pricing issues, along with security concerns, are the limiting factors may hinder the process of communication of creative ideas.

Peng, Zhang, Fu, and Tan (Peng et al., 2012) investigated organizational innovation and individual creativity under the impact of such factors as employee relationship, knowledge sharing, and IT application maturity. Constructing a social network of employees by the analysis of their relationships and communications, the authors had found that the centrality (that is, number of connections to other members of the network) of an individual has significant positive

impact on his or her individual creativity. It is also emphasized that knowledge sharing and employee relationship enhancement are critical for innovation and creativity.

Goh and Lim (2014) studied complex relations between KM, creativity and emotional interaction in multinational corporations. The results of their study show that knowledge-sharing behavior is influenced by emotional intelligence. Knowledge is a precondition to creativity, and therefore knowledge-sharing behavior enhances creativity, exposing individuals to new ideas. The study concludes that both knowledge collection and donation positively affect creativity, and emotional intelligence has a positive effect on willingness to share knowledge, therefore, both should be promoted in an organization.

#### *1.3.4. Summary of section 1.3.*

As can be concluded from the review of literature on communications, interactions within a firm are of crucial importance and to a large extent constitute the firm's activities. At the same time, KM and creativity issues are found to be in an important connection with each other; it is even possible to conclude that the better the relationships in emotional terms are and the more effective is the communication, the better it is for the KM processes and creativity application in the organization given. Knowledge processes can be enhanced through creativity and fostered personal relationships as well, and these factors in complex can positively affect organizational performance.

### **1.4. IT companies and SMEs**

In this section we discuss research of small and medium enterprises (SMEs), including, but not limited to, those from the IT sector of economy. These are studies relating to previously discussed issues (KM, creativity, communication) in the IT sphere, and studies dedicated to KM, creativity, and communication issues in SMEs. Where applicable, research uniting all issues in question – IT, SMEs, and KM – was selected for review. The outline of the section is presented in Figure 5 below.

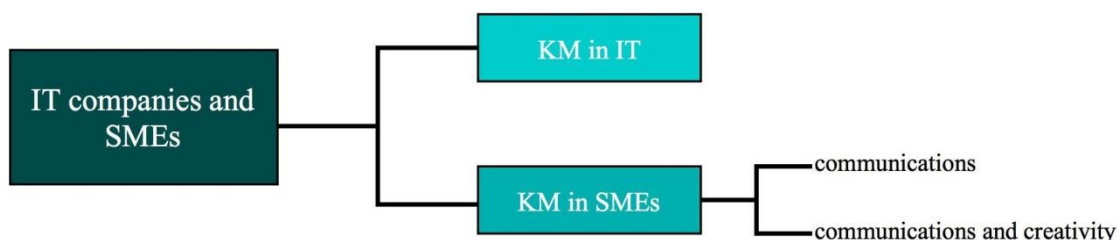


Figure 5 Layout of IT companies and SMEs section

Source: author's generalization

#### *1.4.1. KM in the IT industry*

Knowledge management processes are of vast consideration regarding the IT industry. For instance, Lai and Tsen (2013) study knowledge accumulation in Taiwan IT industry in relation to system development life cycle. Suresh (2013) researched KM practices of IT organizations in India in relation to adoption of such practices and innovations. Crawford, de la Barra, Soto, Misra, and Monfroy (2012) conducted an international study of knowledge management and creativity practices in software engineering, and emphasized the importance of communication and managerial styles for creative production. Stirbu (2014) surveyed KM trends in 551 IT companies in Romania and found that knowledge-based strategies are not common for the sector. Jain and Dahiya (2010) propose a multi-agent KM system specifically designed for the IT industry.

#### *1.4.2. KM in SMEs*

In entrepreneurial ventures, which are often classified as SMEs, knowledge management is important in terms of idea development and commercialization.

Sartori (2012) discusses collective creativity management in SMEs and states that formalization of creativity improves innovative capabilities of an organization. The Complex Knowledge Structures and Case-Based Reasoning approach proposed in the paper enable creative SMEs in organizing their knowledge in such a way that it is not lost if a member of the organization leaves it, which is more hurtful for smaller organizations than for the big ones.

Mohannak (2014) pays special attention to knowledge management in small and medium enterprises and finds that one of the main challenges is to establish and manage effective and adaptive IT systems that would help manage and share knowledge within the organization. Explicit KM strategies are not typical for SMEs, and given the fact that KM benefits innovative costs and risks, team knowledge integration practices along with the strategic developments should be fostered.

According to a study by Lee, Ho and Chiu (2008), non-financial performance of an SME is enhanced by set-up infrastructures of KM. Such infrastructures combine strategic, leadership, organizational culture and employee dimensions and require an establishment of a special unit in charge of KM. A survey of SMEs shows that such infrastructures significantly and positively influence performance in two perspectives - learning and growth.

#### *1.4.3. KM and communications in SMEs*

Du Plessis (2008) studies the importance of social interactions for small and medium enterprises and implementation for knowledge sharing and value creation. Their application, as



stated by the author, should be a starting step for the KM practices establishment at a small or medium enterprise.

Hola (2012) examines internal communications in SMEs on a sample of 800 SMEs in Czech Republic. According to her, communication is a managerial instrument and an instrument for corporate culture establishment which penetrates the whole organization. KM is often the basis for internal communication processes set up and serves the purposes of notion clarification, objectives setting, assessment of current conditions, setting of necessary regulatory factors (premises, processes, standards), setting of communications and ICT infrastructure, and finally verification and evaluation. According to Hola, internal communications affect behavior, and employees should be treated as “internal partners” (p. 43) in order for them to behave in line with the strategic goals of a company.

#### ***1.4.4. KM, creativity, and communications in SMEs***

High-tech entrepreneurial ventures, as stated in Gaimon and Bailey (2013), exploit KM practices throughout all stages of the discover-evaluate-develop-commercialize life cycle. From the very beginning of idea development, creativity, alertness, quantity and quality of ideas are improved through KM. Creative outcomes are influenced by stock of knowledge of a creative actor and benefit from collaboration, which in term is good for an enterprise's performance.

Khedhaouria and Ribiere (2013) describe knowledge sourcing processes and creativity in teams working on IT projects. They found that team members' access to internal knowledge and involvement in KM processes led to team creativity emergence. Accordingly, since team members' engagement in common knowledge sourcing practices improves creativity in the software development process, knowledge sourcing in a team should be encouraged.

Mittal and Dhar (2015), relating to their research of employee relationships in small and medium IT enterprises in an emerging market, state that creativity in such organizations is moderated by the knowledge sharing habits of the leader. Creativity leads to a sustainable competitive advantage and therefore needs to be sustained, and knowledge sharing processes between leaders and subordinates are to be encouraged.

Knowledge that results in creativity and high performance of new products launched by high-technology firms is studied by Yang and Rui (2009). The authors state that creativity increases with growing knowledge dissemination. Next, new product creativity continuously improves with increasing knowledge innovation. When knowledge dissemination is driven by communication processes and information flows, creativity is enhanced. Firms encouraging such circulation were found to be more efficient, and therefore, firms need to enhance their KM

capabilities to increase new product creativity.

Tang and Ye's study of 32 R&D teams (Tang and Ye, 2015) is dedicated to interdependence of knowledge, creativity and networks in organization. The findings confirmed that diversified knowledge among teams with the ties to outsiders (mediated by communication tools or unmediated) is beneficial for team creativity, and at the same time, decentralized networks provide for generation of better solutions for complex problems. An important implication of this study is that for creativity performance improvement in small and medium organizations knowledge sharing behavior should be encouraged and dominating behavior discouraged.

#### *1.4.5. Section 1.4.*

The analysis of the literature dedicated to SMEs, specifically IT-firms, KM and communicative processes, and creativity shows that these issues are of importance at the present time. KM processes rely on communication, and in their turn are the basis for creative processes and production of creative results. A positive relationship between the quality of results and the quality of KM and communication is found, however, there is not enough evidence as to what exactly influences and alters the interdependence of these factors. Organizational characteristics such as culture, cooperation and leadership styles, and innovative environment are found to be related to creativity and KM as well, however, the body of research is rather limited in relation to small and medium IT-enterprises.

### **1.5. Research gap, goal, object, research questions, and tasks**

As we have shown above, there is a significant number studies dedicated to problems of KM in organizations across various industries, as well as of those devoted to creativity, communications, and SMEs separately. The combinative research of all these notions in the organizational context is narrower. The main foci of that research corpus are the relationship between KM processes and creative processes in organizations both from individual and team perspective. A limited number of researchers study such connections in emerging markets, and even less are concerned with the Russian small IT-enterprises, specifically the startups. Therefore, the research gap identified for this thesis is the dependence of creativity and communication practices with knowledge management in small IT-enterprises. The research gap is identified in the relation to the complex of phenomena in **bold** in the Figure 6 below.



- 2) What are the general features of creativity and communication practices in the organizations studied?
- 3) What is the relation between knowledge management, creativity and communication practices to each other in the organizations studied?

The **tasks** of the present thesis are:

- 1) To observe and characterize the knowledge management practices in small IT enterprises;
- 2) To observe and characterize the creativity and communication practices in small IT enterprises;
- 3) To define the relation of knowledge management, communication and creativity practices to each other;
- 4) To provide practical recommendations for enhancement of practices.

In order to answer the research questions and fulfill the objectives, an empirical investigation is carried out. The methodology of this investigation and the results are discussed in the consequent chapters.

### **Summary of chapter 1**

Chapter 1 provides an overview of existing literature and research dedicated to the issues of knowledge management, creativity, communications and effectiveness in IT-enterprises in general and SMEs in particular.

Chapter 1 states the goal of this thesis as establishment of body of knowledge related to the existence or non-existence of a connection between creativity and knowledge management practices of a small-scale enterprise involved in the IT-sector and its effectiveness.

The research gap is identified and relates to the interdependence of the KM, creativity, and communication practices and their effect on effectiveness of IT-SMEs, and the corresponding research questions are formulated in order to cover it.

## CHAPTER II. RESEARCH DESIGN: THEORETICAL FOUNDATIONS AND APPLICATION

As previously shown in the literature review, there are a few key points of research and interest in the current knowledge management tendencies in the IT-industry. For the purposes of this research and to pursue the objectives stated above, we shall focus on the notion of creativity development and fostering, and influence of communication on knowledge management processes.

The first part of this chapter is devoted to an overview of existing research methods, their application and purpose. Appropriate techniques are selected and are further elaborated on in the context of the current research. The actual research design is described in the second part of this chapter by dividing it into two sub-processes.

The outline of this chapter is presented in the Figure 7 below.

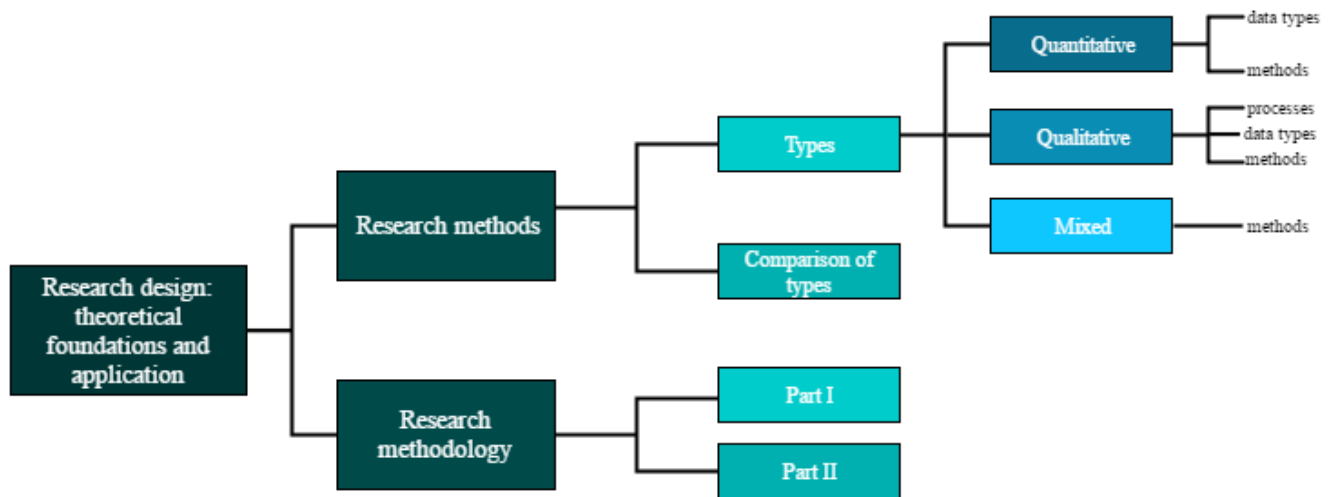


Figure 7 Structure of chapter 2

Source: author's generalization

### 2.1. Research methods for KM, creativity and social interactions studies

In the scientific tradition, research methods are classified by various parameters. As the opposition basic/applied research is not quite relevant for the purposes of current research methods justification, we shall refer to the distinction by the data type. In this case, research methods are classified as qualitative and quantitative. The overview of the variety of methods is given below.

#### 2.1.1. Quantitative research methods

Quantitative research methods are the ones designed to gather and explore numerical data that is then subject to statistical, mathematical or computational analysis. In other words,

qualitative research methods deal with the qualitative data, which is defined by Ghosh and Chopra (2003) as 'data which can be expressed numerically or classified by some numerical value' (Ghosh, Chopra, 2003, cited in Lancaster, 2005, p. 66).

Therefore, for quantitative research it is first of all important to understand what kind of data is being dealt with. We refer to the classification provided by Saunders, Lewis, and Thornhill (Saunders et al., 2009).

The primary division is categorical and numerical data. Categorical data is data that cannot be measured numerically as quantities. Numerical data is data that can be measured in such way.

There are several types of quantitative data:

1) Descriptive dichotomous data: categorical data that can't be divided into more than two sets.

2) Descriptive nominal data: categorical data that can be divided into more than two sets and these sets can't be placed in the rank order.

3) Ranked ordinal data: categorical data that can be divided into more than two sets and these sets can be placed in the rank order.

4) Interval data: numerical data for which relevant distance between two data values cannot be calculated.

5) Ratio data: numerical data for which relevant distance between two data can be calculated.

6) Continuous data: numerical data whose values can take any value and be measured accurately.

7) Discrete data: data values take precise meanings for scales that are often integers.

Acquisition of quantitative data can be carried out in several ways. First, this is possible through the analysis of secondary data represented in publicly issued information tables, reports, and similar. Secondly, there are several techniques that provide for the collection of primary data that can be expressed quantitatively. These techniques are, for instance (Welman, Kruger, Mitchell, 2005):

– Surveys: quantifiable data is represented, for example, as the number of occurrences of any given variable;

– Rating scales: quantifiable data represented by ranges;

– Observations: checklist for number of occurrences of a certain phenomenon in a certain context (time span, text, etc.);



- Structured interviews with closed questions: basically an oral variant of a survey.

For the analysis of such types of data a variety of computational techniques is applied. The majority of such techniques are either mathematical or statistical, and an appropriate technique is selected upon the definition of the type of data (1-7 above).

Summarizing the description of quantitative methods it should be mentioned that Lancaster (2005) states that the most frequent purpose of quantitative research methods application is the case of theory testing; quantitative methods are also applicable for exploratory research and hypotheses generation. Finally, Cooper and Schindler (2006) shortly define the purpose of study as the ‘precise measurement of something’ (p. 198).

### *2.1.2. Qualitative research methods*

Another major type of research is the qualitative research. Used for the cases when the information to be obtained can’t be easily represented in numbers - that is, when the object of interest is the people’s lifestyles or habits, qualitative research provides discursive information. Ghosh and Chopra (2003, in Lancaster, 2005) define qualitative data as the data ‘in form of descriptive accounts of observations or data which is classified by type’ (p. 66). In other words, qualitative research is used to obtain complex textual descriptions of how the research issues are represented in the lives of individuals and to understand their experiences, occurring events and their influences, and so on. For this matter, the notion of text not only refers to information written in a codified manner, but as well to videos, audios, works of art, and so on.

The process of qualitative research is described as a step-by-step process by Cooper and Schindler (2006). First, the research question is clarified and refined after deliberations. Upon that, a research proposal is generated, and research design strategy is developed. The research design strategy defines the type, purpose, time frame, scope and environment of the research. At the same time, data collection design and sample size and recruiting plan are defined, and discussion guide is developed and pretested. Next, data collection and preparation are carried out, and moderators, observes and participants are debriefed. Further on, insights are developed and data are interpreted, which results in a research report.

One of the peculiarities of qualitative research is that it requires a smaller sample size as compared to quantitative research. According to Cooper and Schindler (2006), qualitative research does not require much effort for representative sample generation, and therefore nonprobability sampling is common. Examples of such sampling are purposive sampling when participants are purposefully chosen by the researchers due to some specific features, snowball

sampling when participants refer the researcher to other potential participants, and convenience sampling, when any available respondents are selected for information gathering.

There are three most common qualitative methods as identified in the Field Guide (Mack et al., 2005). Such methods are observations, in-depth interviews, and focus groups, and these are explained in more detail below.

#### *2.1.2.1. Observation*

Observations can be classified into two types by the level of inclusion of the observer into the practices that are being observed. In one case, when the observer only watches and takes no part in the activities that are being researched, observation is characterized as non-participant observation.

The other type of observation is participant observation, and this is when the researcher takes immediate part in the activities being carried out. Both types of observation are widely used to obtain data on naturally and normally occurring behaviors in their daily contexts.

#### *2.1.2.2. Projective techniques*

A large group of qualitative methods is classified as projective techniques. Among the most common are the some of those that are listed by Cooper and Schindler (2006):

- Word or picture association: participants match their experiences and basically any semiotic signs to the object of the study through a mental connection.
- Sentence completion: respondents finish given sentences with their own words.
- Cartoons or empty balloons: a participant is required to write captions for a picture, like in a comic book or in a cartoon.
- Thematic Apperception Test: participants describe the feelings and thoughts of a person in a picture.
- Component sorts: respondents combine new sets of presented flash cards containing component features.
- Laddering or benefit chain: functional features of an object are linked by participants to both tangible and intangible benefits provided by this object.
- Imagination exercises: respondents are asked to confer properties and features of one object to properties and features of another object.
- Personification: participants fantasize about objects becoming people and describe the personalities of those people.
- Semantic mapping: participants describe their perceptions of several items in relation to a pre-defined number of criteria.

### 2.1.2.3. Interview

An interview can generate both quantitative and qualitative data depending on the scope and type of questions and information to be elicited. There are several types of interviews described in the literature.

According to Lancaster (2005), interviewing is one of the main techniques for data collection through questioning. Interviewing is subject to a large variety of polar approaches varying on several dimensions. These polar approaches are presented in the Table 1 below.

Table 1 Dimensions and differences of interviewing techniques

Dimensions and differences	
Formal	Informal
Structured	Unstructured
Large-scale	Small-scale
Individual	Group
In depth	Descriptive
Qualitative	Quantitative
Face-to-face	Administered

Source: adapted from Lancaster (2005)

Further on, Lancaster (2005) lists several types of interviews discussed in the list below:

- Conversations and storytelling assume that a researcher collects information when engaging in the activities of respondents and participating in their conversations. Participants are not necessarily aware of the on-going research activity.
- During individual and semi-structured interviews a researcher takes a respondent through predetermined issues and topics with a certain freedom, not necessarily following a rigid structure. In contrast to the previous method, respondents know that they are being interviewed, which might influence their answers.
- Depth interviews require profound and detailed respondent-researcher communication lasting over a prolonged period of time. According to Mack et al. (2005), an in-depth interview possesses a significant advantage as compared to a structured interview because it provides for the elicitation of multi-contextual data. Whereas data obtained from a structured interview provides for statistical analysis (especially when there is a significant number of such interviews with standardized answers carried out), in-depth interview allows better understanding of the subject's intrinsic motivations, attitudes and other behavioral traits, as well as

enables the researcher to immerse into the expert view. A disadvantage of the in-depth interview is that it is prone to subjective interpretation of information by the interviewee, and requires thorough preparation of the interviewer, as well as his or her expertise in communication skills.

According to Cooper and Schindler (2006), in-depth interviews can be classified into several subtypes. For instance, *cultural interviews* are conducted with the reference by the respondent to his or her knowledge of a culture, and is used for determination, e.g., of how an object or a notion is perceived in that culture. *Critical incident technique* studies and evaluates processes, events and their preconditions and reasons through participants' description of what has led to a certain event, what actions were undertaken, etc. In an *ethnographic study*, the interviewer and the respondent are engaged in collaboration in the field, and are going through an unstructured interview. A *grounded theory approach* requires adjustment of each next segment of interview to the results of the previous segment in order to formulate assumptions or theoretical framework for further data analysis.

- Focus group technique is a group technique. Respondents, from six to ten, participate in a group discussion. According to Mack et al. (2005), focus group research is conducted when it is important to elicit information on typical attitudes, beliefs, preferences, etc. of a certain culturally united group. In this context culture refers to a very broad range of notions, including national, professional, local, and other types of communities. To conduct a focus group, the researcher selects the necessary sample according to the criteria defining the culture (age, gender, profession, education level, etc.) and then conducts the procedure of a group interview. An important trait of the focus group is that the participants know beforehand, what is the topic of the interview and are aware of the intention of the researcher to get the participants involved in discussions not only with her or him, but primarily with each other (Saunders et al., 2009).

#### 2.1.2.4. Case study

A case study, according to Cooper and Schindler (2006), is a combination of several qualitative methods. Sometimes it is also referred to as case history. As stated by Flick (2006), the aim of case studies is to precisely describe or reconstruct a case, the subject of which can be

persons, social communities, organizations, institutions, etc. Sapsford and Jupp (2006) note that selection of cases is often carried out in such a way so as to maximize or minimize the differences which are presupposed to be theoretically important. Minimization of differences allows clarifying detailed features of a theoretical category. Maximization of differences, on the other hand, enables establishment of a range of particular set of categories. Fisher (2007) points out that case study methodology enables the researcher 'to focus on interrelationships between all the factors' (p. 59). Yin (1994, cited in Fisher, 2007) lists the following features of a case study:

- It investigates a contemporary phenomenon in the real-life context;
- It is carried out at a single location but has multiple variables;
- It implements a number of research methods and can combine both qualitative material and quantitative data;
- A theoretical proposition is commonly developed prior to the study in order to arrange data collection.

### *2.1.3. Questions: general considerations, advantages and disadvantages*

Interviews and case studies, as well as questionnaires and surveys, which will be discussed further on, implement questioning; therefore, it is feasible to discuss questions' categories and structure, as well as advantages and disadvantages of questioning for research process.

Cooper and Schindler (2006) note that generally all questions can be classified into three categories: administrative, classification, and target questions. Administrative questions serve the purpose of participant and interviews identification, as well as location and conditions definition. Classification questions are used to group participants' answers by socio-demographic criteria in order to locate and study any possible patterns. Target questions contain the investigative elements of a given research and are normally grouped by topic. Target questions may be put into two sub-categories: structured, when a respondent is given a strict set of answers, or unstructured, when the answer is not limited and a respondent uses his or her own words. A different term for such classification is closed questions vs. open-ended questions. Lancaster (2005) also uses the term pre-coded question as the synonym for closed questions and notes that this type of questions is used most often because it generates the data which is easier to analyze.

Major issues related to questioning are question content (including necessity, objectivity, precision, background knowledge, etc.), question wording (including appropriate vocabulary, frame of reference, biased wording, and adequate alternatives), and response strategy choice

(including objective of the study, level of information, and communication skill). As for advantages and disadvantages, these are represented below in the Table 2 below.

Table 2 Advantages and disadvantages of questioning

Advantages:	<ul style="list-style-type: none"> <li>- Depth and complexity of data: provides access to complex understanding of data.</li> <li>- Flexibility: a researcher can easily adapt the line of questioning according to the research environment.</li> <li>- Simplicity: easy to carry out and normally don't require complicated equipment.</li> <li>- Feedback/validity: enables quick feedback and validation.</li> <li>- Personal/motivating: allows for establishment of personal connection and gratification of the respondent.</li> <li>- Large numbers/wide coverage: effectively formulated questions in a questionnaire potentially may provide a large research scope.</li> <li>- Speed: questioning is faster as compared to other methods of data collection, such as experimentation or longitudinal observation.</li> </ul>
Disadvantages:	<ul style="list-style-type: none"> <li>- Respondent bias/reaction: reaction of respondents to questions or the person of the researcher may hinder the answers and provision of inaccurate data.</li> <li>- Data collection and analysis: challenging through complicated process of documentation of some response types.</li> <li>- Fear/antagonism: respondents may consciously distort data due to negative feelings towards the researcher or the purposes of the research.</li> <li>- Lack of control/unreliability: subjective and causal reasons may influence the process of data collection.</li> <li>- Limitations of questioning devices: some questioning methods don't provide the full available information.</li> </ul>

Source: adapted into table form from Lancaster (2005)

#### 2.1.4. Comparison of qualitative and quantitative research approaches

In order to summarize the discussion above, Table 3 demonstrates the main differences of the qualitative and quantitative research.

Table 3 Qualitative vs. quantitative research

	Qualitative	Quantitative
Focus of research	Understand and interpret	Describe, explain, and predict
Research purpose	In-depth understanding and theory building	Describe or predict; build and test theory
Sample design and size	Small sample, nonprobability, purposive sampling	Probability
Data type and preparation	Verbal or pictorial descriptions, reduced to verbal codes	Verbal descriptions, reduced to numerical codes for computerized analysis
Data analysis	Human analysis following computer or human coding; primary non-quantitative	Computerized analysis
Insights and meaning	Deeper level of understanding; determined by type and quantity of free-response questions	Limited by the opportunity to probe respondents and the quality of the original data collection instrument

Source: adapted from Cooper and Schindler (2006, p. 199)

As seen from the Table 3, the qualitative and quantitative approaches pursue different aims and may both have certain disadvantages. Therefore, it is feasible to implement mixed methods in order to avoid some of the hindrances caused by limitations of any of the approaches. For this, mixed methods can be implemented, which are discussed below.

#### *2.1.5. Mixed methods procedures*

In between the qualitative and quantitative methods are the mixed research methods. According to Creswell (2009), there are six major types of mixed research methods strategies. These are:

- 1) Sequential explanatory strategy: first phase is devoted to collection and analysis of quantitative data, and the second qualitative phase is based on the results of initial quantitative research. Such research design is intended to explain and analyze quantitative results by deepening the analysis with qualitative data.
- 2) Sequential explanatory strategy: the first phase of the research is dedicated to qualitative data collection, which is then complemented by quantitative data and

analysis that relies on the results of the qualitative phase. This strategy aims at usage of quantitative data and results for enhanced interpretation of qualitative findings.

- 3) Sequential transformative strategy: similar to the first two strategies, this one is as well two-staged. The first stage is shaped by a theoretical lens shaping the research process. The two stages are different in their nature (i.e. either qualitative or quantitative) and the first stage is always subject to theoretical determination.
- 4) Concurrent triangulation strategy: this approach requires the researcher to collect both qualitative and quantitative data at the same time. Upon collection, data are entered into a database and the researcher then analyses whether any confirmation, disconfirmation, cross-validation, or corroboration can be observed through analysis.
- 5) Concurrent embedded strategy: the main difference of this strategy, as compared to the concurrent triangulation strategy, is that a primary method and a secondary method are identified (again, either qualitative or quantitative), and the secondary method is used to support the dominant method.
- 6) Concurrent transformative strategy: in this approach, a theoretical perspective is implemented, and both qualitative and quantitative data are collected simultaneously. This strategy often embeds one method into the other and strives to converge information.

#### *2.1.5.1. Triangulation*

According to a different and simpler definition, a combination of qualitative and quantitative methods in research is referred to as triangulation. Cooper and Schindler (2006) believe that it can be used in order to enhance research quality. Generally, there are four triangulation strategies implemented:

1. Simultaneous execution of qualitative and quantitative studies.
2. Ongoing qualitative study combined with multiple-wave quantitative studies measuring temporal changes.
3. A qualitative study is followed by a quantitative study and a second qualitative study clarifying previous findings.
4. A quantitative study is followed by a qualitative study expanding the findings.

An important advantage of triangulation is that it balances the approaches, which mutually compensate their disadvantages.

Among others, a method used for triangulation is questionnaires, which is implemented for



surveys and interviews, Questionnaires allow obtaining both qualitative and quantitative data through combination of different types of questions, various distribution channels, and execution manners. This method is discussed below.

#### 2.1.5.2. Questionnaires

Lancaster (2005) cites Charlesworth's and Morley's (2000) questionnaire design and states that a questionnaire should follow several guidelines, such as:

- be concise;
- be logical;
- consist of simple and understandable questions, and avoid unclear questions;
- avoid leading questions;
- use a specific set of answers if applicable.

As mentioned above, the questions can either be closed or open-ended. Depth of questions is classified into five levels that are awareness, open/free answer, specific issues, reasons, and intensity.

Another classification of questions is offered by Cooper and Schindler (2006) who classify questions by response strategy. Under their classification, questions can be free-response questions (same as open-ended questions discussed above); dichotomous questions suggesting polar or alternative responses; multiple-choice questions that are used for answer elicitation when there's more than two alternatives; checklists allowing multiple responses for a single question; rating questions that require the respondents to place the answer on a verbal, numeric, or graphic scale (for instance, on a Likert scale); and ranking questions which are used when the order of alternatives is important and it is crucial to evaluate the influence of factors. These response strategies are described in more detail in Table 4 below.

Table 4 Characteristics of response strategies

Characteristic	Dichotomous	Multiple Choice	Checklist	Rating	Ranking	Free Response
Type of scale	Nominal	Nominal, ordinal, or ratio	Nominal	Ordinal or interval	Ordinal	Nominal or ratio
Usual number of answers	2	3 to 10	10 or fewer	3 to 7	10 or fewer	None
Desired number of participant answers	1	1	10 or fewer	1 per item	7 or fewer	1
Used to provide...	Classification	Classification, order, or specific numerical estimate	Classification	Order or distance	Order	Classification (of idea), order, or specific

						numerical estimate
--	--	--	--	--	--	--------------------

Source: Cooper and Schindler (2006, p. 374)

### 2.1.6. Data quality

An important consideration for any research process is the quality of gathered data. Lancaster (2005) considers data quality to be the criteria for effective data, and lists the following dimensions:

- **Validity:** the research method measures and describes what is intended to be measured and described. The data is valid if the researcher gained knowledge on the problem he or she is researching, and especially so if it was accessed to the full extent.
- **Reliability:** the same data collection approach should yield the same results in other situations and if carried out by other researchers.
- **Generalizability:** the extent to which the results of the research can be generalized and applied to other situations. Ideas and theories generated under the given conditions are applicable in a different setting.

Other dimensions that influence data quality and its effectiveness are sampling and measurement errors, data recording, storage and retrieval procedures, and ways of preparation for data gathering (Lancaster, 2005).

### 2.1.7. Summary of section 2.1.

In this part, the discussion was dedicated to the overview of existing research approaches and methods. To summarize the overview, the main mentioned research methods are represented in the Figure 8 below. Techniques selected for the conduction of empirical study are highlighted and are further discussed in the methodology of the present empirical study.

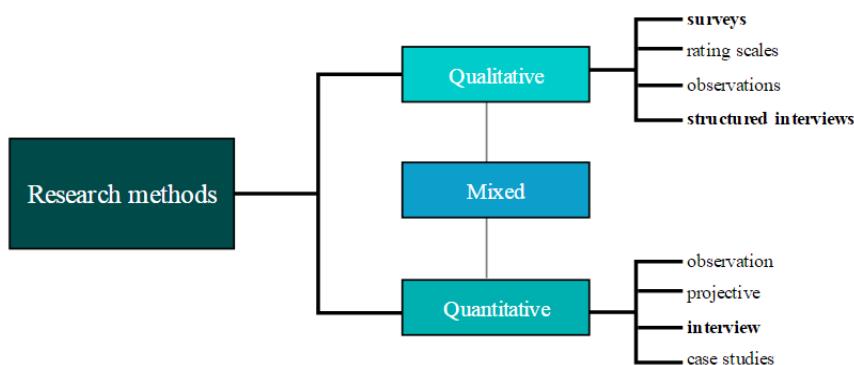


Figure 8 Research Methods

Source: author's generalization

## 2.2. Methodology of empirical study

For the purposes of the current study it is feasible to adopt the mixed approach. The method used in the present is triangulation, according to Cooper's and Schindler's (2006) definition, and it embodies two methods: structured interview and semi-structured interview. Both parts are carried out simultaneously and pursue the same goal stated in chapter 1 above.

The flow of the empirical study involving the selected methods is described below. The study is divided into two parts (sections 2.2.1. and 2.2.2.) in order to generate in-depth insights. In the first part, an on-line structured interview is carried out to characterize the situation in the small IT-enterprises in line with the theoretical background. In the second part, in-depth interviews are executed in order to expand the findings of the first part.

The Figure 9 below illustrates the research design applied in the current study. As seen from the illustration, the processes of knowledge management, creativity, and communication practices are analyzed as separate elements, and then their mutual influences are investigated.

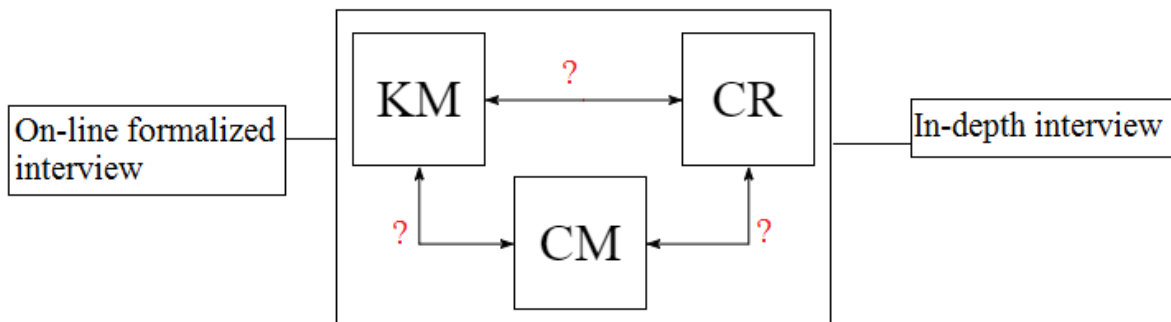


Figure 9 Research design

Source: own research

### 2.2.1. Part I - On-line structured interview

In order to present the relevant picture of the current situation in relation to the knowledge management, communications and creativity issues within the IT industry and its chosen representatives, a several-foci data gathering process is to be carried out for future analysis with the help of the on-line structured interview methodology developed by the author of the present research based on previous theoretical considerations.

This part of the research is organized in four sub-parts in a form of an online-based interview and consists of 67 questions. Out of those, 5 questions are open-ended, 4 are multiple choice questions, and 59 require the respondents to agree or disagree with a statement

concerning the company on a 5-point Likert scales ranging from completely agree to completely disagree.

The parts are: (1) general information about the company, including success criteria; (2) knowledge management processes intensity scale; (3) organizational-personal creativity scale; (4) interpersonal relations characteristics scale. For each part, a questionnaire is developed; the analysis of the data collected is to provide information on the research gap. Part (1) requires both open and close answers, and parts (2) – (4) are implementing the Likert scale.

*(1) General information about the company*

This part provides the basis for analysis of the companies and provides primary information necessary to analyze the whole set of obtained data in relation to all 3 research questions identified in chapter 1. It defines their fitness for analysis and belonging to the sample, and serves the purposes of obtaining primary information. The eight questions characterize the IT-enterprise from several points of view including general organizational practices and creativity practices importance.

Additionally, the data from this part provides for insight generation regarding the preconditions for knowledge management at a small IT-enterprise (questions 5 and 7).

The questions are as follows:

- 1) Name of organization, number of people in the team.
- 2) Number of projects/applications launched.
- 3) Link to the project/app on the web.
- 4) How long did it take for an idea to be implemented from the moment it was generated?
- 5) How many ideas were there initially for your applications? How many changes has the idea that later was brought to life undergone?
- 6) How many ideas are in work now?
- 7) Do you have a schedule on how many ideas/applications are to be developed?
- 8) What qualities of employees are the most important for the company? (*No. of answers 'creativity', 'artistic inclination' and similar to be analyzed – author's note, not included on the online form.*)

A specific measure is developed in order to estimate the relative creativity of a company over a period of time, the time-creativity coefficient (TCC). TCC is calculated as the ratio of change iterations that an idea has undergone until launch into the market to the time from idea emergence to market launch. The formula for TCC calculation is show in the Figure 10 below.

$$TCC = \frac{N \text{ change iterations}}{t \text{ from the moment of idea emergence to its market launch}}$$

Figure 10 Time-creativity coefficient

Source: own research

### (2) *KM processes intensity scale*

This part of the methodology is intended for generation of data in order to answer the first research question related to the general practices of KM in organizations selected.

According to Hicks (Hicks, 2000, cited in Ahani et al., 2013), knowledge management processes can be described by the model composed of four sub processes. These processes are signified as Create, Save, Distribute, and Use. ‘Create’ process means involvement in knowledge sharing, creation of ideas, and establishment of cross-topic relations. ‘Save’ refers to the possibility of information research and acquisition, both from external sources and colleagues, and its storage and sharing. ‘Distribute’ implies development of a community where knowledge workers exchange and share knowledge within their own group that they perceive as such. Finally, ‘Use’ dimension refers to the most important step of KM which is application of generated or accumulated knowledge and results and outputs of such application.

The questionnaire below refers to this approach in the context of economic school of KM (knowledge is considered to be an organizational asset, see paragraph 1.1.1.) and includes 5 scales. The first four are, as described above, *Create*, *Save*, *Distribute*, and *Use*. Fifth scale *Value* is added based upon consideration that knowledge workers do not always realize that their knowledge is actually there and don't treat it as an asset (Gavrilova, Grigorev, 2005, see paragraph 1.1.5.). The purpose of the questionnaire is to evaluate the intensity of KM processes in the small and medium IT organizations on different inter-related scales and to determine whether any of them is more explicit in the organizations studied. Additionally, it shows the processes that need to be developed and allows to generate appropriate recommendations on how to enhance the KM practices in order to enhance the effectiveness of the organization. The full text of the scale's questions is presented in Appendix 1.

The data generated by this questionnaire is used for future analysis with the consequent parts of the questionnaire.

### (3) *Organizational-personal creativity scale*

This part of the methodology is intended to gather data to answer the first part of the second research question related to the general creativity practices in organizations selected.

The organizational-personal creativity scale questionnaire was developed on the basis of two questionnaire sets used in scientific research. The first was developed by Kumar et al. (Kumar et al., 1997) in order to characterize creativity styles of an individual. The second by Rahimi et al. (Rahimi et al., 2011) was used in order to evaluate personal creativity of knowledge workers. Combining and revising both questionnaires and adding own dimensions previously not considered (3, 6, 14) in the questionnaire below, we pertain to evaluate a worker's creativity and his/her creative environment both judging by direct and indirect criteria.

The questionnaire evaluates objective (questions 3-6, 10, 13, 17, 18, 20) and subjective (questions 1, 2, 7-9, 12, 18, 19, 21) indices of individual creativity and includes a control scale for organizational creative environment (questions 11 and 16) previously characterized by part (1). The full text of the scale's questions is presented in the Appendix 1.

Analysis of the data generated allows characterizing the relative level of organization's and worker's creativity.

#### *(4) Interpersonal relations characteristics scale*

This part of the methodology pertains to generate data to answer the second part of the second research question related to the general communication practices in organizations selected.

Interpersonal communications within a company, as we stated in the literature review in previous chapter (Hola, 2012; Overall, 2015, Peng et al., 2015, paragraphs 1.3.2., 1.3.3., 1.4.3.), are important for team creativity and knowledge management processes of an organization. Relating to the sociometric framework of Jacob Moreno (Sociometria, n.d.) and considering important factors mentioned in contemporary scientific research, the current questionnaire was developed by the author of present research. The aim of the questionnaire is to characterize the relations within the organization both in terms of group and individual perception and to evaluate it on a relative scale. Communicative and social processes in this scale are evaluated from two perspectives – individual (questions 4, 10-15) and organizational (questions 1-3, 5-9). Such distinction allows making a conclusion about the social dynamics of a small IT-enterprise and generating further insights. The full text of the scale's questions is presented in the Appendix 1.

#### *2.2.2. Part II – In-depth interview*

The second part of the research is dedicated to elicitation of information by means of an in-depth interview. This interview is based on the same theoretical considerations as the formalized

interview above, and consists of 6 main open-ended questions, of which some have sub-questions. The interview questions are formulated so as to allow for a flowing discussion of organizational issues and not limit the respondents to expected answers or not to give them hints.

The interview script is presented below.

*In-depth interview questions*

- 1) What is your enterprise doing? How can you characterize your activities in terms of what is your product and how you make it?
- 2) How is project/product work organized? Explain in detail, if there are any procedures or peculiarities.
  - a. How is knowledge stored? Is it evaluated?
  - b. What creative practices are implemented and how?
- 3) Describe a typical communicative situation for your enterprise. How do employees communicate with each other?
- 4) Would you say there's a hierarchy in your organization? If so, how does it affect your activities? If there's no hierarchy, would you say that this affects your activities in any way and how?
- 5) What is, to your opinion, your enterprise's main asset?
  - a. Is knowledge considered an asset?
  - b. Is creativity considered an asset?
  - c. Is the communicative structure considered an asset?
- 6) Do you make any efforts regarding knowledge management and creativity management? If so, how and why? If no, why? What do you think is needed for your company to implement any managerial practices in this regard?

Further on, the generated data is analyzed through definition of common traits and answers. The final step of the research is the analytical-synthetic process which implies simultaneous analysis of the findings from steps one and two in order to generate insights and gain general understanding of how knowledge management practices, communication and creativity are related to effectiveness of organizations.

## **Summary of chapter 2**

Chapter 2 provides a comprehensive overview of existing methods applied for business research. The methods are categorized as qualitative, quantitative, and mixed, and are discussed in more detail.

The methods selected for the current study are qualitative and quantitative methods perpetuated by means of an on-line structured interview and a mediated and face-to-face in-depth. The on-line interview consists of 68 questions of different arrangement and is intended to provide insights in relation to all 3 research questions. The in-depth interview consists of 6 main open-ended questions and is as well intended for elicitation of information related to all research questions. The proposed research framework is presented in the Figure 9 in the preface of section 2.2. above.



### CHAPTER III. OBSERVED FACTORS IN SMALL IT-ENTERPRISES

In this chapter we discuss the actual process of data gathering, and provide the obtained results. The results are consequently discussed, and insights are generated along with recommendations for practitioners. Limitations of the current research and further research areas are indicated. The structure of chapter 3 is presented in the Figure 11 below.

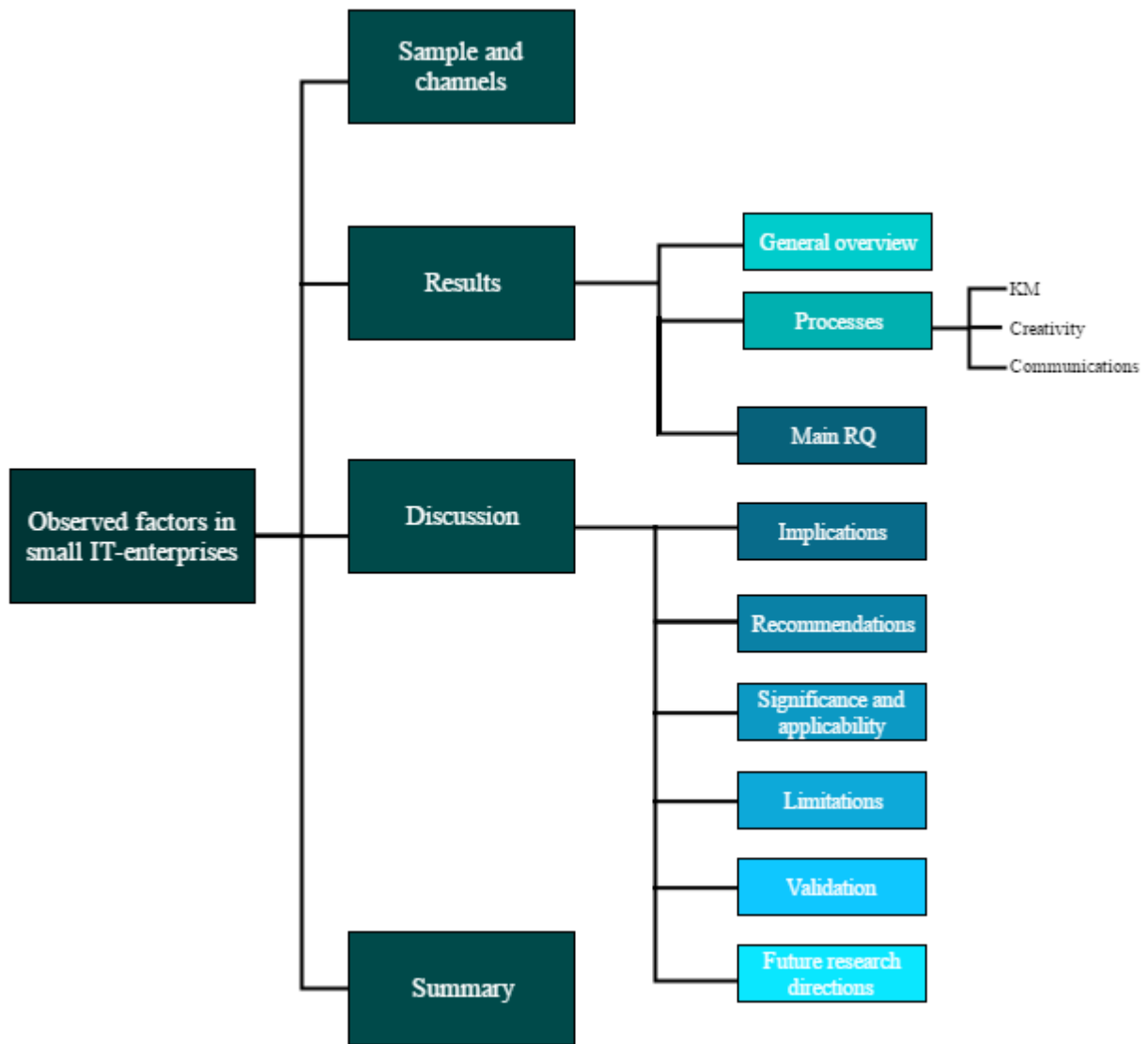


Figure 11 Structure of chapter 3

Source: own research

#### 3.1. Data gathering process: sample and channels

The first part of the data was gathered by means of an electronic on-line interview form distributed to representatives of small and medium IT enterprises. The survey was hosted at the Google Forms facilities.

The link to the interview was distributed in two ways: directly to the leaders and employees of IT-enterprises and indirectly via networks of incubators, start-up parks, research

institutions, and influential IT-community members. Generally, the search for start-up representatives was conducted in two steps: first, relevant news in the media was scanned, and then the representatives were found in the social networks or through official web-sites and messaged directly. The Table 5 below shows the distribution numbers over each channel.

Table 5 Requests sent per channel

<b>Channel</b>	<b>No. of requests sent</b>
Vkontakte social network, direct distribution (DD)	51
Vkontakte social network, indirect distribution (IDD)	8
Facebook social network, DD	19
Facebook social network, IDD	4
Emails to business owners, DD	15
Emails to business incubators, startup parks, and academic institutions, IDD	16
<b>Total</b>	<b>113</b>

Source: own research

The questionnaire distribution process took place from March 20<sup>th</sup> to April 18<sup>th</sup>, 2016.

The distribution yielded 31 received questionnaires; therefore, the response rate was 27.4%. Out of those, 30 were fully completed and valid for analysis.

The second part of data gathering took part from April 25<sup>th</sup>, 2016 to May 11<sup>th</sup>, 2016. The participants of the in-depth interviews were contacted through the author's personal network and from the pool of participants of the on-line formalized interview among those who indicated further interest in the research. The in-depth interviews were carried out with the total of 8 respondents who represented 4 IT-enterprises. The interviews were conducted face-to-face (2 instances), Skype (5 instances), and What's App (1 instance). Representatives from the same organizations were interviewed separately so as to provide a more accurate representation and avoid convergence to the same point of view or bias.

### **3.2. Results of empirical study: considerations and analysis**

The 30 small IT-enterprises, also referred to as companies, are studied in several aspects. This section is divided into two sub-parts: a general overview in section 3.2.1. is provided and then followed by detailed study of the three factors previously identified in research questions in chapter 1 and following the logic of the research methodology in chapter 2. Preliminary findings

are shortly discussed after each section.

### 3.2.1. General overview

#### 3.2.1.1. Sample description

Tables and figures below provide a descriptive overview of the sample:

- Figure 12 Distribution of companies by employee number.
- Figure 13 Number of companies by products launched.
- Figure 14 Distribution of companies by ideas currently under development.
- Figure 15 Percentage of companies having a plan for ideas to be developed.

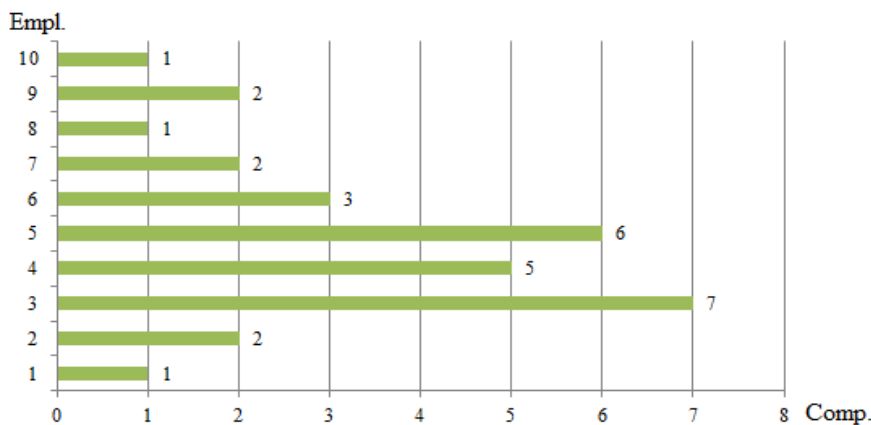


Figure 12 Distribution of companies by employee number  
Source: own research

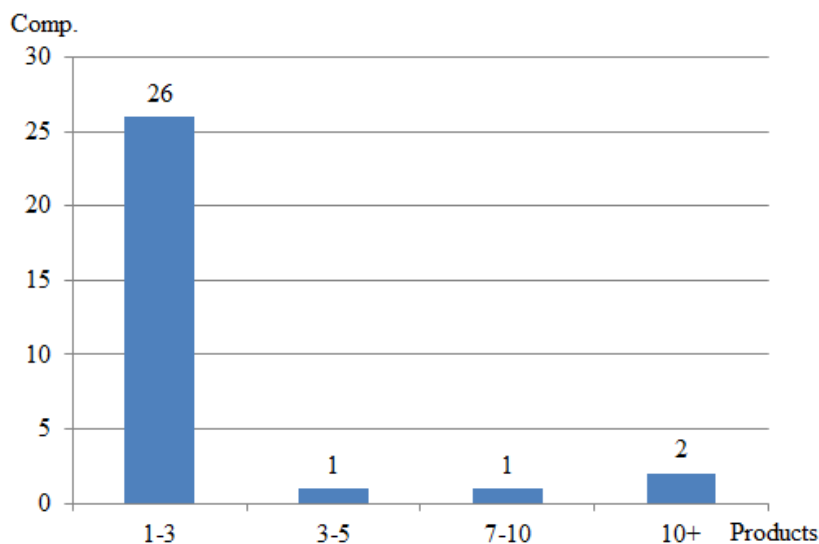


Figure 13 Number of companies by products launched  
Source: own research

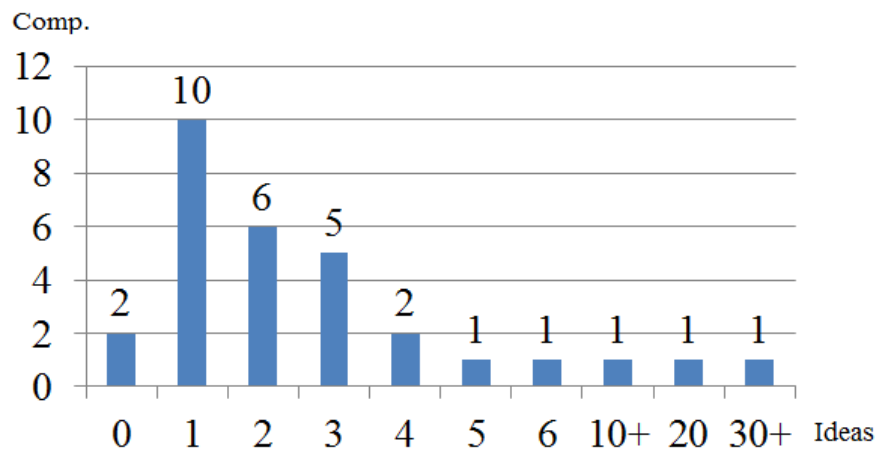


Figure 13 Distribution of companies by ideas currently under development  
Source: own research

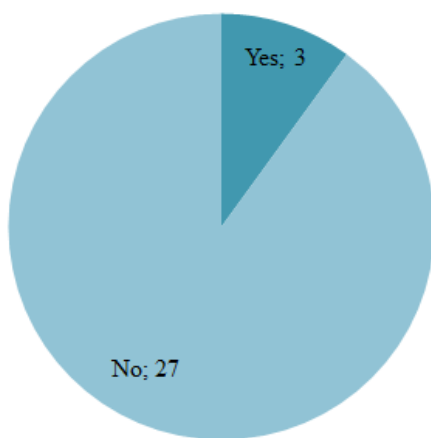


Figure 14 Percentage of companies having a plan for ideas to be developed.  
Source: own research

As seen from the figures above, a typical sample representative is a company employing three to five people (60% of sample) that have launched between one and three products (87% of sample). These companies are most likely working on development of one to three ideas (70% of sample), and do not have a plan that regulates their creative endeavors (90% of sample).

### 3.2.1.2. Time-related creativity measure: time-creativity coefficient (TCC)

TCC is a measure that shows the relationship between the time spent on development of a product and the number of iterations an idea had undergone before the product was launched in the market. A TCC belonging to the interval  $[0.25; 0.5]$  signifies that a company had spent a comparatively long time for implementation of a comparatively low number of enhancing changes. A TCC belonging to the interval  $(0.5; 4]$  signifies that a company had been comparatively active in introducing changes over a period of time given, and the higher the number, the more iterations were undertaken in a shorter period of time. TCC does not take difficulty and complexity of iterations into account and supposes that the idea itself (as in

prototype and not the ready product itself) is being changed, and as sampled companies are assumed to work on projects similar in their difficulty, TCC can be considered an indirect measure of creativity. Figure 15 below represents the distribution of TCC values in the sample.

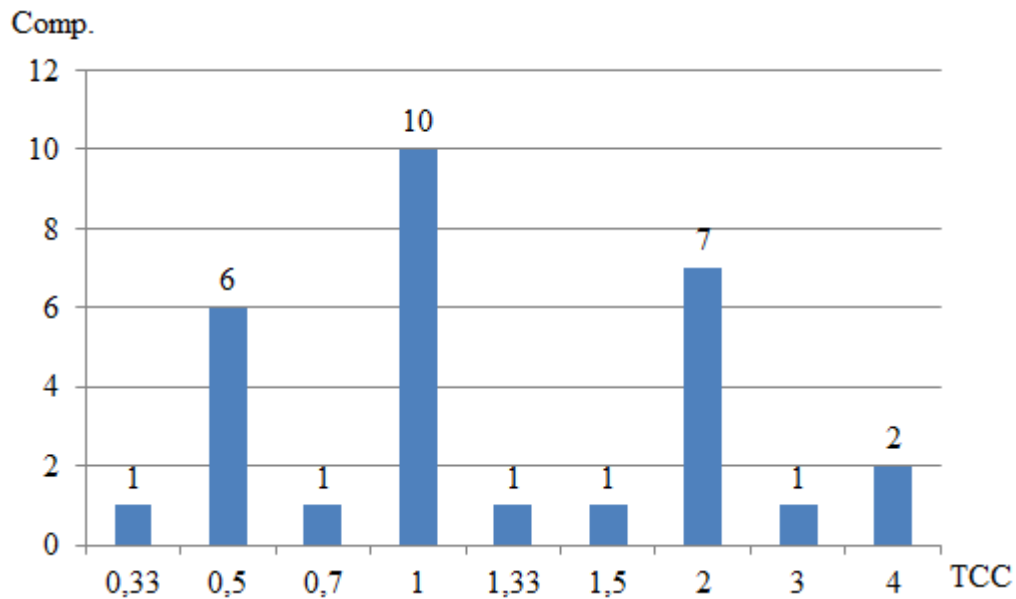


Figure 14 TCC values in the sample.

Source: own research

As seen from the Figure 14, the majority of the sample has scored a TCC equal to 0.5 and 1, followed by a TCC=2. Consistent with the information above it can be concluded that about 56% are rather fast in developing and implementing changes, and the remaining 44% require more time investments. The average TCC value is TCC=1.4.

### 3.2.1.3. Indirect KM and creativity measures

As defined in the research design, the general information section of the questionnaire included two questions related to pre-conditions for knowledge management in the organizations. Data generated by question 7 *'Ideas plan'* was already analyzed above, and now the results related to the output of question 8 *'Employee qualities'* are investigated.

The Table 6 below shows the number of occurrences of personal traits that are considered to be the ones of particular importance to the organizations. The traits marked in bold among the top ones are considered to be preconditions for organizational creativity, which allows concluding that creativity of an employee, although not always explicitly recognized as a single personality trait, is important for organizational development, and that there's an underlying need for the companies in the sector to be creative.

Additionally, analysis of all the traits mentioned by respondents shows that out of 21 adjectives mentioned, 6 are meaningfully connected to creativity (amounts to 25%, marked with

*i* in the table), 5 – to communications and personal relations (amounts to 23%, marked with *com* in the table), and 1 – indirectly to knowledge management practices (marked with *km* in the table).

Table 6 Frequency of personal traits occurrence.

No.	Trait	Occurrences
1	Skilled (professional)	6
2	<b>Enthusiastic <i>i</i></b>	<b>4</b>
3	<b>Flexible <i>i</i></b>	<b>4</b>
4	<b>Striving to develop <i>i</i></b>	<b>4</b>
5	Unity	3
6	Working capacity	3
7	Prompt <i>com</i>	3
8	Diligent	3
9	Honest (frank) <i>com</i>	2
10	Creative <i>i</i>	2
11	Loyal <i>com</i>	2
12	Communicative <i>com</i>	2
13	Believing <i>com</i>	1
14	Disciplined	1
15	Intelligent <i>i</i>	1
16	Open to new <i>i</i>	1
17	Project management skills <i>km</i>	1
18	Time management skills	1
19	Trusting <i>com</i>	1
20	Result-oriented	1
21	Decisive	1

Source: own research

### 3.2.2. Knowledge management, creativity and communication practices review

#### 3.2.2.1. Knowledge management practices analysis

This section is dedicated to the analysis of the knowledge management intensity scale results and the results of the in-depth interview questions related to the same issues in order to answer the first research question (*'To what extent are the KM-intensive vs. KM-non-intensive practices are applied in the organizations studied?'*).

##### 3.2.2.1.1. Direct knowledge management measures – On-line interview analysis

This subsection analyzes the results of the on-line structured interview.

In order to analyze the companies' situation more effectively, the statements' evaluation was encoded on a scale from 1 to 5, as mentioned above. Thus, 'completely disagree' was

encoded as a '1', 'partially disagree' – 2, 'neither agree nor disagree' – 3, 'partially agree' – '4', and 'completely agree' – 5. Hence, the data in tables below shows the inclinations of companies and their self-evaluation towards the intensity of processes given. For our analysis it means that both generalizing and individual approach for analysis can be implemented: on one hand, a conclusion can be made in verbal terms, and on the other hand, an average attitude is calculable due to the codification.

The Table 7 below represents the average score of each enterprise by scale, total average score per completed interview, and average values for the sample for each scale and in total.

Table 7 Knowledge management processes intensity scales scores

Company ID	Create	Save	Distribute	Use	Value	Average Score by Company
1	4,20	3,40	3,80	3,60	2,60	3,52
2	4,60	3,00	4,00	3,40	1,80	3,36
3	3,40	2,00	3,40	3,20	2,20	2,84
4	4,20	3,40	3,60	3,00	3,40	3,52
5	5,00	4,40	4,20	4,40	4,60	4,52
6	4,40	2,80	4,80	4,20	3,40	3,92
7	4,40	4,20	4,60	4,00	3,60	4,16
8	4,20	1,80	3,20	3,20	2,60	3,00
9	4,40	4,00	4,40	4,40	3,80	4,20
10	4,40	2,60	4,00	3,20	3,60	3,56
11	4,00	3,80	4,00	3,20	3,20	3,64
12	4,40	2,60	4,80	4,00	4,20	4,00
13	3,80	4,80	5,00	4,60	3,60	4,36
14	3,60	3,80	3,60	3,20	2,60	3,36
15	4,60	2,60	3,00	4,20	3,20	3,52
16	4,20	3,20	4,20	3,40	3,00	3,60
17	3,00	3,80	3,20	2,60	1,80	2,88
18	4,00	4,80	4,80	4,20	3,60	4,28
19	4,60	3,80	5,00	3,60	2,80	3,96
20	4,40	3,80	4,00	4,00	3,60	3,96
21	4,60	4,40	4,80	4,80	4,80	4,68
22	5,00	4,40	4,40	4,40	3,20	4,28
23	3,60	4,20	4,60	4,60	4,00	4,20
24	5,00	4,40	5,00	5,00	4,80	4,84
25	1,20	2,00	2,40	2,00	2,20	1,96
26	4,40	3,20	3,80	5,00	1,80	3,64

27	4,60	3,40	4,80	4,60	3,80	4,24
28	3,60	3,60	4,60	3,80	2,60	3,64
29	4,00	4,00	4,00	3,20	2,80	3,60
30	4,60	2,80	4,00	2,60	1,80	3,16
<b>Average by scale</b>	<b>4,06</b>	<b>3,66</b>	<b>4,13</b>	<b>3,84</b>	<b>3,08</b>	<b>3,75</b>

Source: own research

As the data from the Table 7 above shows, the overall level of knowledge management practices in the sample cannot be described as sufficiently high. Companies' overall scores range from the lowest score of 1.96 to the highest score of 4.84, and the average overall score is below 4, which means that to a large extent knowledge management practices are not widely spread or are paid enough attention.

Judging from the average points by scale, the most developed knowledge management practices are those related to creation of knowledge, according to the average score of 'Create' scale. The least developed knowledge management practices are the ones related to explicit and conscious treatment of knowledge as an asset to the company and its preservation for future use, as seen from the scores in the 'Save' column. Generally, the results of the survey show that the most developed practices are the ones that are directly related to the day-to-day activities of the knowledge intensive companies – that is, scores for 'Create', 'Distribute' and 'Use' are showing higher level of development of the corresponding knowledge management practices; for the 'Save' and 'Value' scales, however, the scores signify the need for further improvement of knowledge management practices in those areas and enhancement of practices. For instance, the low 'Save' score suggest that companies might need to look into knowledge storage systems implementation, and the low score for 'Value' suggest adoption of the approach uniting the conscious mindset and attitude towards knowledge as a potential source for competitive advantage.

Interestingly enough, a discrepancy between the scores of 'Create' and 'Value' amounting to nearly one relative point suggests that although knowledge creation is perceived as an important and frequent activity at the company, it is not necessarily considered to be a way to perpetuate the development of the company. In other words, although the companies may feel the need to create knowledge to survive in the market, they do not necessarily link knowledge creation to value creation of the company, which although could be beneficial for purposeful knowledge workers' attraction, knowledge sharing and storage. This notion relates to the low score of 'Save' scale and leads to a conclusion that unless knowledge is valued as an asset, it is unlikely to be stored for future purposes.



To sum up, the Figure 15 illustrates the overall level of knowledge management practices intensity across the companies studied per scale, according to the data of Table 7 above.

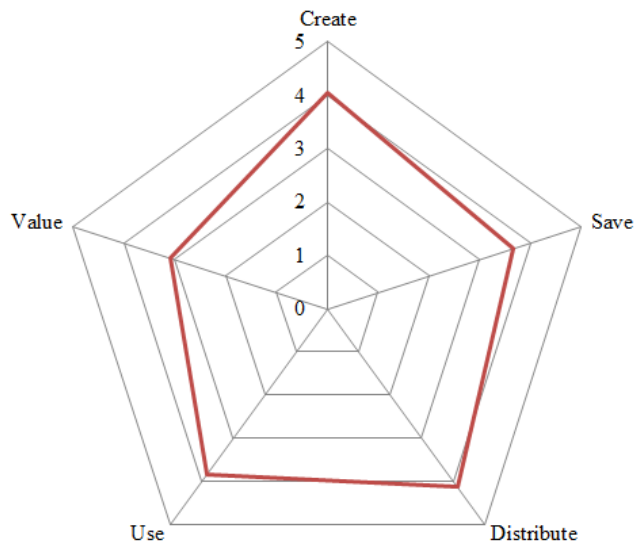


Figure 15 KM practices intensity across companies

Source: own research

More detailed analysis of the on-line interview results allows precise identification of the most problematic issues in the companies. Table 8 below shows the questions from the knowledge management processes intensity scale questionnaire that have scored less than 3.5 points on average:

Table 8 Problematic issues of knowledge management processes

Scale	Q. No.	AVG	Question
Save	2.4.	2,64	We have an evaluation and ranking scheme for new ideas.
Use	4.3.	2,68	We quantitatively measure our intellectual capital.
Value	5.3.	2,76	We can quantitatively measure the results of knowledge management endeavors.
Distribute	3.3.	2,84	Training events are taking place.
Value	5.4.	2,96	We can quantitatively measure the results of idea generation.
Value	5.1.	3,12	Workers who generate more original ideas are valued more (get bigger compensation).
Create	1.4.	3,16	We have an internal communications code that we follow.
Save	2.5.	3,16	We developed a way to find our way around our information storage system.
Value	5.2.	3,2	We encourage workers to think how their activities outside of work can help our organization.
Save	2.3.	3,28	We have a regulated ideas and information storage system

Source: own research

Such analysis supports the notion that the 'Value' KM processes are among the least

developed in the companies: in the ranking of lowest scores, this scale occurs 4 times out of 10, closely followed by ‘Save’ with three occurrences, which is consistent with considerations above. As can be seen, companies are not implementing knowledge evaluation and sharing schemes and practices (2.3, 2.4, 2.5, 3.3), are not particularly apt at estimating and evaluating their intangible resources (4.3, 5.3, 5.4), and do not necessarily treat their employees in a way to boost their knowledge sharing and generating motivation (5.1, 5.2) in an organized environment (1.4).

At the same time, the highest scores were accumulated by the questions belonging to the ‘Create’, ‘Save’, and ‘Distribute’ scales, which is also consistent with the general analysis outtakes above. The Table 9 below shows the best developed knowledge management practices in the organizations studied highlighting the questions that have scored more than 4.5 points.

Table 9 Highly developed issues of knowledge management processes

Scale	Q. No.	AVG	Question
Save	2.1	4,52	It's typical for us to discuss news related to our work.
Distribute	3.4	4,56	We have a special platform (a group in a social network, a chat, a cloud storage, etc.) to share information and ideas.
Create	1.3	4,6	All team members know each other and know how to contact each other if some information is needed.

Source: own research

As can be concluded from the table, the most developed knowledge management practices are the ones that are related to interpersonal relations and communications (1.3, 2.1) and are inherently typical for an IT-company and its implementation of communicative technologies (3.4).

The analysis of the knowledge management processes intensity scales results has shown that the most developed practices are the ones that are naturally implied by the process of creative work; the ones that need more attention in order to sustain potential development are those that require special managerial efforts. Therefore, areas for improvement of a typical small IT-organization can be highlighted (marked in *italic*) in the following scheme of scales influence on each other (Figure 16): these are the implementation of supportive ‘Save’ and ‘Value’ practices reinforcing the ‘Create’, ‘Distribute’, and ‘Use’ KM-practices within the organization:

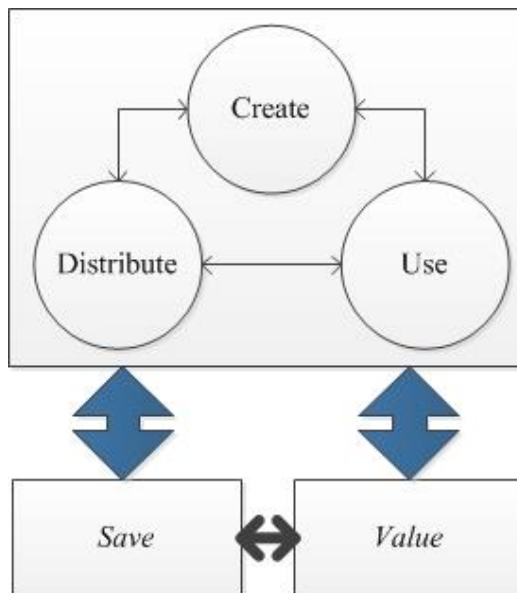


Figure 16 Areas for KM-practices improvement

Source: own research

#### 3.2.2.1.2. Knowledge management – In-depth interview analysis

In this section we discuss the results of the interviews and information revealed through discussion of knowledge management practices (questions 2, 2a, 5, 5a, 6).

*Working process and knowledge creation and distribution:* According to the experiences of the interviewees, their working process can be characterized as a group work with diffused or partially diffused responsibilities, depending on the level of task complexity and required skills. In cases of idea, prototyping or concept testing companies tend to work closer as compared to periods of precise elaboration and implementation of tasks. For instance, representatives of companies mentioned that “we’ve been talking a lot and looking through a lot of information when we were thinking of even starting, and then when we did begin it was less, just doing our things”. Similar experiences were reported by other participants who mentioned a higher level of involvement in knowledge sharing processes at initial stages. An observed tendency was that the participants only referred to information and knowledge as a source of ideas generation and enhancement, and the knowledge work predominantly took place before the development of the product. An interviewee mentioned that once the distribution of tasks became clear for their project, they “were just talking about unrelated things in our chat as well and it became extremely flooded”.

*Knowledge use and saving:* Some (3 instances) of the participants of the interviews noted that they used cloud services or social media for storage and exchange of information, such as

Google Drive, Dropbox, and Telegram, but to the most part, the interviewees considered themselves to be the “storing units” – for instance, “We don’t really store anything – I mean, we have it in our heads or in chat, and that’s it.”

None of the interviewed participants mentioned evaluation of stored information, as opposed to evaluation of ideas. At the same time, participants noted that they do not engage in learning activities as a part of their jobs, but sometimes do read professional literature or share links with each other.

*Knowledge valuation:* Although implicitly participants considered their knowledge an asset (“Well we couldn’t do anything we wanted unless we knew how to code”, “I wanted to do this myself and so I also knew how to do it and could”), they did not explicitly make efforts to evaluate or preserve it.

The analysis of the in-depth interviews supports the findings of the on-line structured interview: the processes that are directly related to the development and creation of the product are more intensive than those related to preservation and valuation of knowledge. Participants tend to estimate themselves and their memory as sufficient instrument for knowledge saving, and the use of information storage systems is quite low.

#### *3.2.2.1.3. Knowledge management processes summary*

The analysis of knowledge management processes shows that knowledge management practices in the companies studied have room for further development and enhancement. Practices directly related to active processes of creation and development of products are more explicit than those related to treatment of knowledge as an asset. These practices can be enhanced if special efforts are undertaken.

#### *3.2.2.2. Creativity practices analysis*

This section is dedicated to the analysis of the creativity scale results obtained from the on-line structured interview (its personal-organizational creativity scale part) and the insights from the in-depth interviews. The analysis is carried out in order to answer the first part of the second research question (‘*What are the general features of creativity [...] practices in the organizations studied?*’).

##### *3.2.2.2.1. Direct creativity measures*

Presented in the Table 10 below are the primary results of creativity-related analysis. The same codification approach was implemented as in the case with the knowledge management processes intensity scale. The table shows the scores on the subjective, objective and control

creativity scales, the averages per company, per scale, and in total.

Table 10 Organizational-personal creativity scale scores

<b>Company ID</b>	<b>Subjective scale AVG</b>	<b>Objective scale AVG</b>	<b>Control scale AVG</b>	<b>General AVG by company</b>
1	4,29	4,45	4,50	4,38
2	4,29	4,18	4,50	4,29
3	3,00	3,18	2,50	3,00
4	4,43	4,36	4,00	4,33
5	5,00	5,00	5,00	5,00
6	4,57	4,36	5,00	4,52
7	3,57	3,91	4,00	3,86
8	3,71	3,91	4,50	3,95
9	4,29	4,45	5,00	4,43
10	4,71	4,91	5,00	4,86
11	4,57	4,45	5,00	4,57
12	4,71	4,64	4,00	4,62
13	4,86	4,82	3,50	4,71
14	3,29	3,91	3,50	3,67
15	4,14	4,36	4,50	4,33
16	3,14	3,73	4,50	3,67
17	4,29	3,73	4,50	4,05
18	3,71	3,91	3,00	3,71
19	3,71	4,09	5,00	4,10
20	4,14	4,73	4,00	4,48
21	5,00	5,00	5,00	5,00
22	4,71	4,64	5,00	4,62
23	4,29	4,45	4,50	4,38
24	5,00	4,73	5,00	4,86
25	4,00	3,73	4,50	3,86
26	4,57	4,00	4,00	4,24
27	5,00	5,00	5,00	5,00
28	4,29	4,18	4,00	4,19
29	4,57	4,18	4,00	4,33
30	4,86	4,64	5,00	4,67
<b>Average by scale</b>	<b>4,29</b>	<b>4,32</b>	<b>4,38</b>	<b>4,32</b>

Source: own research

The table shows that the creativity scores are generally higher than the knowledge

management practices' scores. The difference in points on different scales is also rather low, and only one company had scored less than 3.5 points, which means in general the companies' creativity level can be characterized as rather high (or better said, perceived by the companies themselves as rather high).

At the same time, the nature of the creativity-related scores implies more subjectivity in assessment. For instance, the lowest average score question-wise in this scale is 3.33 (confer to the lowest of 2.64 in the KM-scales in Table 7 above), and question 1 *'I consider myself a creative person'* has scored an average of 4.4 with 15 respondents completely agreeing with the notion (5 points) and 13 respondents strongly agreeing (4 points) – in other words, 93.3% of the sampled companies' representatives think of themselves as creative. Such behavior is typical for human self-esteem (DeAngelis, 2003) and therefore should be confirmed by indirect questions as it was done with the control and objective scales and additional questions estimating preconditions for creativity.

The other reason for high creativity scores would be the real necessity for the employees of IT-organizations to be creative in order to create value in the forms of their products, which also explains the relatively higher creativity scores as compared to knowledge management scores – as emphasized by various authors in the literature review, competitive advantage is sustained through creative endeavors, therefore, creative practices should initially be more developed than knowledge management practices.

As can be seen, the general creativity level of organizations is rather high; however, some problematic areas can be identified. The Table 11 below shows the questions that have scored less than 4 points on average.

Table 11 Problematic creativity areas

Scale	Q. No.	AVG	Question
Subjective	21	3,33	I like playing with ideas rather than leap on the first one when I try solving a problem.
Objective	6	3,67	New ideas often come to me from combination of old ideas.
Subjective	10	3,67	I don't reject non-working ideas but try to change them in a way for them to be useful.
Subjective	2	3,78	I get new ideas more often than my colleagues.
Objective	3	3,89	I practice in solving creative tasks.

Source: own research

The questions point out the lack of specific creative skills or behaviors: respondents are not implementing creativity enhancing practices and are not making special efforts to develop creativity (3, 6, 10), creative environment is not likely to be stimulating in the organization and within its employee network (2), and perpetuation of idea development and design thinking is

not likely to be implemented in the sampled IT-enterprises (21).

At the same time, an inclination towards establishment of a creative environment can be observed. The highest-scoring questions 15 *'I like working in a creative team'* and 4 *'I often think how to make my work better'* have both yielded a 4.67 score which means that there is a potential for development of enhanced creative practices in the sample and that such development may be of high value to the organizations. The two subsequent questions 11 *'I like learning new'* and 18 *'I like finding connections between different ideas and phenomena'*, both scoring 4.33 points also support the notion of existing precondition for the possible successful implementation of creativity development practices.

Generally speaking, the analysis of the personal-organizational creativity scale suggests that the companies are relatively positioned at a rather high creativity level, but there is a potential to become even more creative if special attention is paid to creativity development activities. This notion is illustrated in the Figure 17 below.

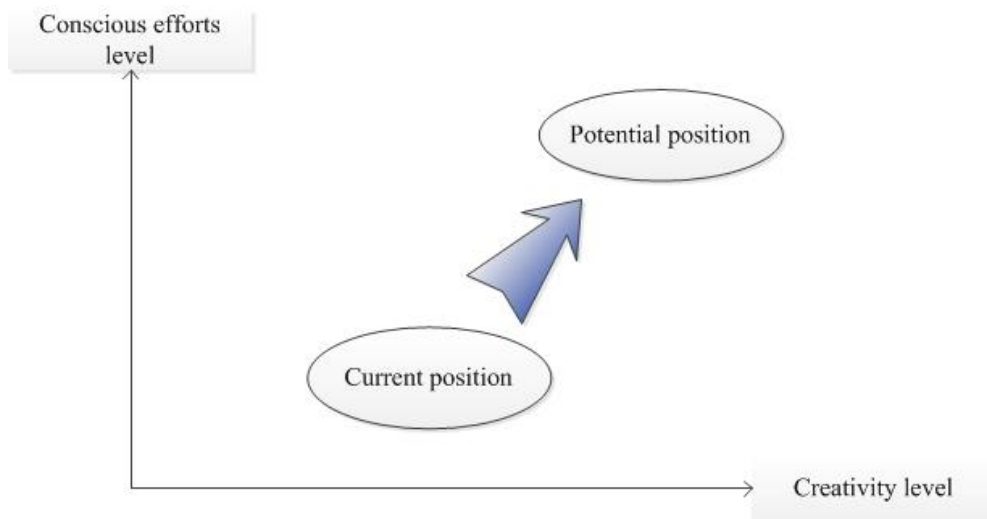


Figure 17 Potential creativity development directions.  
Source: own research

#### 3.2.2.2.2. Creativity – In-depth interview analysis

In this section we discuss the results of the interviews and information revealed through discussion of creativity practices (questions 2, 2b, 5, 5b, 6).

*Working process and creativity practices:* According to the results of the in-depth interviews, creativity is embedded into the working process of the small IT-enterprises during the whole time of work. As one of the interviewees mentioned, “we need to not only think of something cool to sell, but also to think later how we can do it better” – creativity is required at different stages of product work and it is not limited to generation of ideas for products, but as well involves processes enhancements. At the same time, the representatives did not name any

creative practices they would purposefully implement in the working process, which leads to a conclusion that none such practices and actions are explicitly undertaken.

*Creativity as an asset and managerial efforts:* Most of the participants referred to themselves as creative individuals, sustaining the results of the on-line structured interview. In justifying such notions, the participants emphasized their creative contribution (e.g., idea of the product, or ideas for enhancement). A commonly expressed opinion (6 instances) was that without creativity organizations would not be able to function (“we would make no sense”, “the whole point of doing this was making something new”, “cool thing about what we do is that we are first at this”, etc.). Therefore, it can be concluded that creativity, if not explicitly, is considered to be an asset. As for managerial efforts related to creativity, the respondents found it difficult to establish whether there were any efforts undertaken in order for themselves to enhance creativity, and some (2 instances) even found that such efforts would not be effective as, to their opinion, “creativity is either there, or not” and “you can’t teach someone be creative”.

In general, analysis devoted to creativity issues has revealed similar results to the structured on-line interview and additionally identified the existing bias towards creativity management. One of the reasons for such bias would be psychological unwillingness to admit one’s lower than wanted level of creativity, and another possible reason is the lack of awareness on existing creativity instruments.

#### *3.2.2.2.3. Creativity practices summary*

The analysis of the creativity-related issues shows that the companies consider themselves to be rather creative and additionally consider that level of creativity sufficient. Creativity management practices are an unlikely occurrence in the small IT-enterprises studied.

#### *3.2.2.3. Communicative practices analysis*

In this section, the analysis relates to the second part of the second research question (‘*What are the general features of [...] communication practices in the organizations studied?*’) and deals with the results obtained from the on-line structured interview from the interpersonal relations characteristics scale and the insights from the in-depth interviews.

##### *3.2.2.3.1. Direct communication and personal relation measures*

Scores in accordance with the fourth part of the questionnaire, the interpersonal relations characteristics scale, are shown in the Table 12 below. Both the individual and organizational aspects of communicative and interpersonal practices are addressed and the average scores on each of the scales are provided along with the cumulative average score. Additionally, average



scores per sub-scales and per companies' sample are calculated.

Table 12 Interpersonal relations characteristics scale scores

<b>Company ID</b>	<b>Individual aspect AVG</b>	<b>Organizational aspect AVG</b>	<b>General average by company</b>
1	4,43	3,75	4,07
2	5,00	4,38	4,67
3	3,71	3,75	3,73
4	4,43	4,00	4,20
5	5,00	4,38	4,67
6	4,86	4,50	4,67
7	3,86	4,00	3,93
8	4,43	4,00	4,20
9	4,57	4,50	4,53
10	4,71	4,38	4,53
11	3,29	3,88	3,60
12	4,71	3,50	4,07
13	3,86	3,88	3,87
14	2,29	2,38	2,33
15	3,57	3,38	3,47
16	4,71	4,25	4,47
17	3,14	3,25	3,20
18	4,00	4,13	4,07
19	4,71	4,25	4,47
20	3,57	4,00	3,80
21	4,86	4,38	4,60
22	5,00	4,25	4,60
23	4,43	3,75	4,07
24	4,57	4,25	4,40
25	3,00	3,38	3,20
26	4,71	3,88	4,27
27	5,00	4,50	4,73
28	2,29	2,38	2,33
29	3,57	4,13	3,87
30	3,86	4,00	3,93
<b>Average by scale</b>	<b>4,14</b>	<b>3,91</b>	<b>4,02</b>

Source: own research

As seen from the Table 12 above, general communicative and interpersonal environments in the companies tend to be rather developed. As the questionnaire was composed in such a way

that factors positively influencing communicative processes would be taken into account, it can be concluded that most companies (60% of the sampled companies scoring  $\geq 4$  points on the general average) tend to maintain a beneficial communicative environment and can be described as communities where conflict levels are low and good relationships are dominant.

At the same time, the average scores by scale show that individual aspect is in a better state than the organizational aspect of communicative practices. One of the possible reasons for such difference would be the lack of organized relationship structure in the organization, or appropriate for creative environments hierarchy (question 1 *'There's a distinct agreed hierarchy in our organization'* only yielded 2.56 points on average, and at the same time the average score for question 2 *'Communication style of the colleagues in our organization is democratic'* is 4.12)

The top-3 scores (4 questions) on the interpersonal relations characteristics scale are presented in the Table 13 below.

Table 13 Most evident traits of interpersonal relations characteristics

Scale	Q. No.	AVG	Question
Individual	6	4,32	There are no evident outsiders among colleagues.
Organizational	10	4,32	Friendly relationships are prevalent within the company.
Organizational	11	4,44	It's usual to ask for help or advice in our company.
Individual	7	4,56	Relationships within the company can't be characterized as tense.

Source: own research

As Table 13 shows, the interpersonal climate in the organizations of the sample can be described as beneficial for relationships (6, 7, 10), and can also serve as the basis for enhancement of knowledge management practices and creativity practices due to the existing preconditions for knowledge sharing (11).

In general, the state of communicative processes in the organizations sampled can be described by the following diagram in Figure 18: employees ( $E_n$ ) are mostly connected to each other with a varying degree of connections strength, and no apparent organizational communication structure is present.

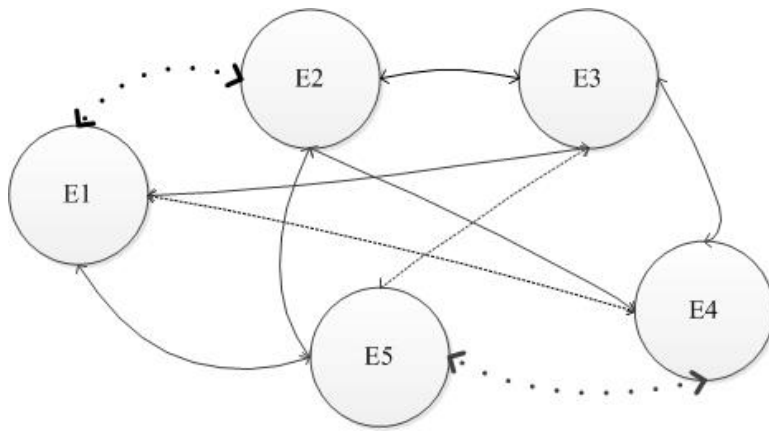


Figure 18 Generalized communicative structure of organizations: an example  
Source: own research

### 3.2.2.3.2. Communications – In-depth interview analysis

In this section we discuss the results of the interviews and information revealed through discussion of communicative practices (questions 2, 3, 4, 5, 5c).

*Working process and communicative practices:* As mentioned above, communicative processes were most intensive during the initial stages of products development and ideas generation. Communication, as noted by the participants, was both mediated and in person. The respondents noted that although sometimes separated in time (that is, communication on the same subject took place over a prolonged period of time), it could be rather intensive at the periods of discussion, and the intensity was ebbing and flowing. At the periods of intensive communication, as noted by the participants, information was shared much more actively (“We were sending each other a lot of stuff and it took time, so we just decided to kind of summarize it before sending”) than in the periods of individual work.

*Communicative situations and structure:* The responses of the in-depth interview sustain the notion identified in the structured on-line interview – the companies tend to have an informal structure and to maintain friendly relationships. As noted by several participants (3 instances), communication was “friendly – we all know each other for a while and we’ve been working on projects before, so nothing changed” and “rather chaotic – we somehow keep in touch in VK and in Telegram but I don’t know what exactly we discuss where”. A problem identified in the communicative processes was the lack of structure and consequently identified responsibility areas – “it sometimes gets really difficult when everyone is friends with everyone and no one is actually responsible, like when you know nothing will happen to you if you don’t do your stuff, and it’s annoying”. None of the respondents mentioned having an agreed hierarchy in the organization, but the founders (4 instances) tended to express dominant opinions about themselves: “I invest a lot into my staff so before I place them on our team I make sure they fit

and are honest”, “I ask people to share their external plans with me – if I don’t know what other projects they are involved in, I can’t plan their workload accordingly”, and similar.

*Communications as an asset and managerial efforts:* None of the respondents identified communication patterns or environment as an asset of their company, but an inclination towards value attribution to good relationships was noted. Two of the respondents described negative experiences caused by tensions and conflicts in the organization, and three respondents mentioned having a feeling of better work, satisfaction, and contribution of colleagues due to communicative situations (for instance, “I would say I am rather creative but also I know my colleagues can help, so I like it when we discuss”).

In general, in-depth interview provides an insight into the situation in small companies that have a leader and suggests that friendly atmosphere is prevalent in the organizations; however, it cannot always be considered an environment of overall equality. Although explicit need for a communicative structure was only mentioned once, supporting notions (“I’m getting lost”, “You need to remember what was said and why and when”) as well related to knowledge management practices were mentioned.

#### 3.2.2.3.3. *Communications summary*

The analysis of communicative practices in organizations studied via the in-depth and structured online interview highlights the connection of communication practices to knowledge management practices and creativity practices. A lack of hierarchy or structure in organizations is observed, which sometimes may hinder communication, and at the same time, communicative environment in the organizations can be characterized as positive.

#### 3.2.3. *Relation of creativity and communication practices to knowledge management practices intensity*

The following section is devoted to the answer to the third research question (*‘What is the relation between knowledge management, creativity and communication practices to each other in the organizations studied?’*). In order to analyze the findings in complex and generated recommendations and practical implications, this section is devoted to the discussion of connections between the knowledge management, creativity, and communication practices in the organizations from the sample.

In order to establish whether there is a connection between the factors, the following steps were undertaken:

- 1) the data obtained from the on-line structured interview was compiled into the table (Table 14 below) with average scores of codified results for each scale and for each company;
- 2) the codified results in the form of scores were graphically analyzed (Figures 19-22 below).

The graphic analysis shows that there is an evident tendency and relation between the level of creativity and communication practices development and knowledge management processes intensity level, and a trend can be observed (Figure 19). This notion is as well supported when the companies are ranked by knowledge management intensity level (Figure 20), by creative practices level (Figure 21), and by communicative practices level (Figure 22): generally, the higher one of the factors' level, the higher are the others. Therefore, it can be said that there is the relationship between knowledge management practices implementation in companies, and their creativity management and communication practices, and this relationship can be characterized as a positive one. However, in order to determine what exactly causes the enhancement in practices, further research and analysis are required.

Table 14 Knowledge management, creativity, and communication codified scores per company

ID	KM	CR	CM
1	3,52	4,38	4,07
2	3,36	4,29	4,67
3	2,84	3,00	3,73
4	3,52	4,33	4,20
5	4,52	5,00	4,67
6	3,92	4,52	4,67
7	4,16	3,86	3,93
8	3,00	3,95	4,20
9	4,20	4,43	4,53
10	3,56	4,86	4,53
11	3,64	4,57	3,60
12	4,00	4,62	4,07
13	4,36	4,71	3,87
14	3,36	3,67	2,33
15	3,52	4,33	3,47
16	3,60	3,67	4,47
17	2,88	4,05	3,20
18	4,28	3,71	4,07
19	3,96	4,10	4,47
20	3,96	4,48	3,80

21	4,68	5,00	4,60
22	4,28	4,62	4,60
23	4,20	4,38	4,07
24	4,84	4,86	4,40
25	1,96	3,86	3,20
26	3,64	4,24	4,27
27	4,24	5,00	4,73
28	3,64	4,19	2,33
29	3,60	4,33	3,87
30	3,16	4,67	3,93

Source: own research

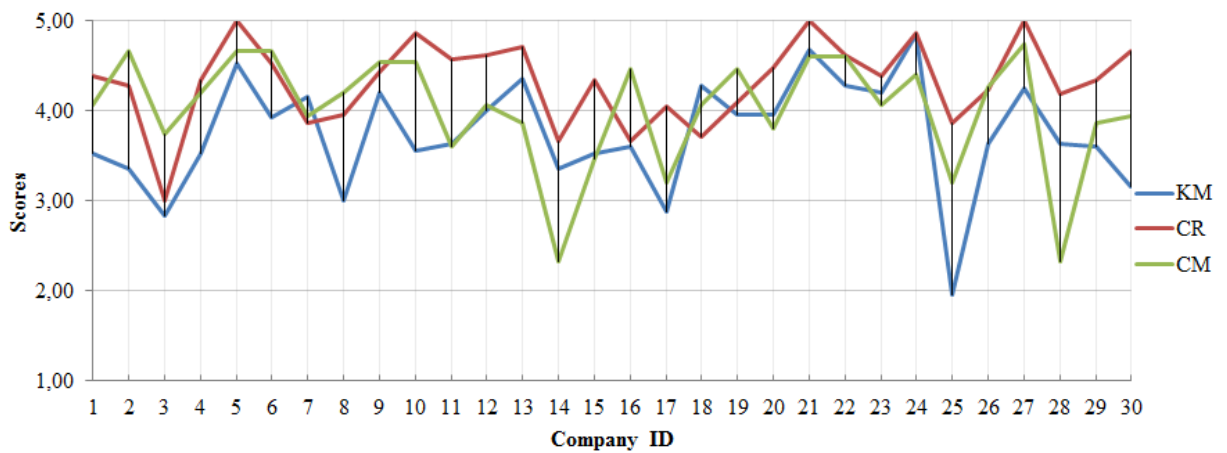


Figure 19 KM, creativity, and communication scales scores by company

Source: own research

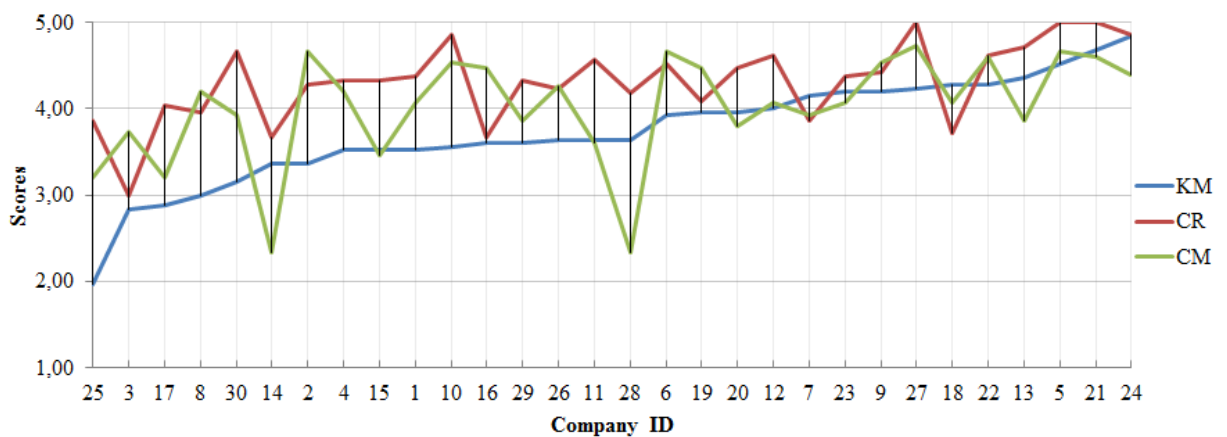


Figure 20 Companies ranked by knowledge management intensity level

Source: own research

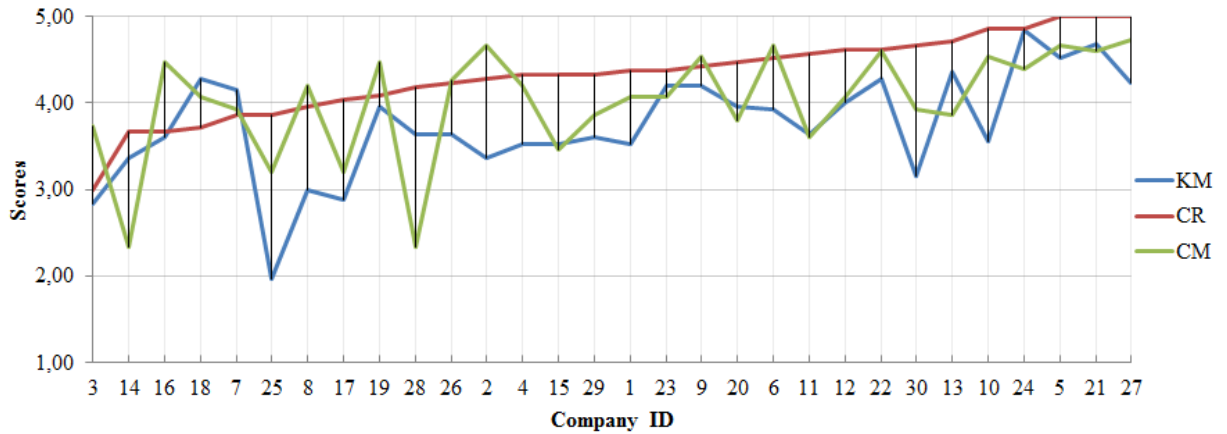


Figure 21 Companies ranked by creativity levels  
Source: own research

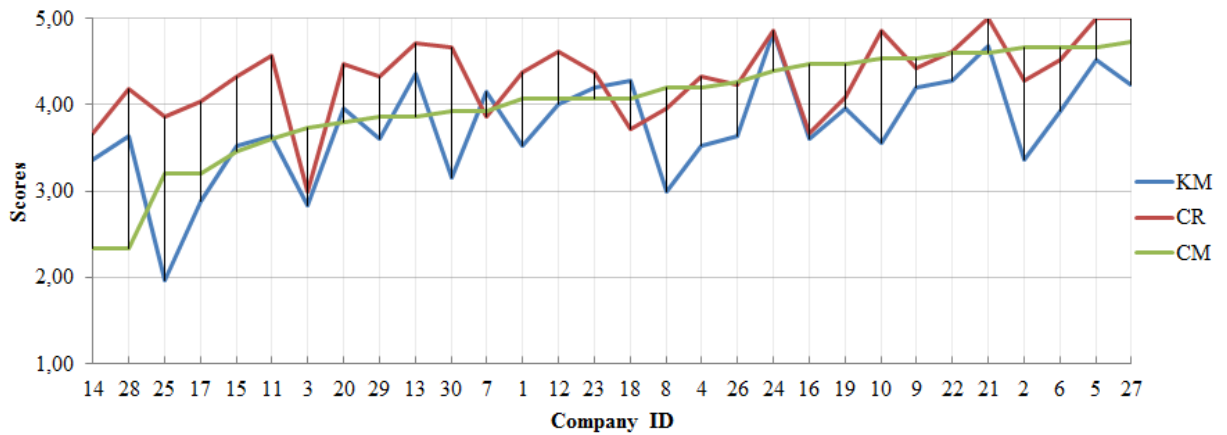


Figure 22 Companies ranked by communications level  
Source: own research

Some additional considerations to the relation of knowledge management, creativity and communication practices can be found in the Appendix 2.

To sum up, it can be said that the connection between knowledge management practices, creativity practices and communication practices exists in companies analyzed. Such results support previous findings from research dedicated to mutual influence of KM, creativity and communications (Chan et al., 2014; Perry-Smith, Manucci, in Shalley et. al, 2015; Phipps and Prieto, 2012; Rahimi et al., 2011; Thierauf and Hoctor, 2006; Yan et al., 2013). In line with the research design identified in Figure 9 in chapter 2, paragraph 2.2, the following Figure 23 represents the results of the present study:

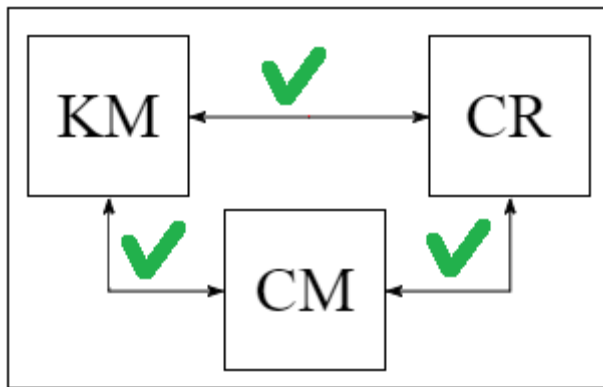


Figure 23 Results of the study

Source: own research

### 3.3. Discussion of the results of the empirical study

This section identifies the managerial implications and provides recommendations for practitioners. Significance, limitations and validation of the study are described, and areas for future research are highlighted.

#### 3.3.1. Managerial implications

The research was conducted on a sample of small IT-enterprises and lead to several important conclusions:

- 1) The observed relation between KM, creativity and communication practices suggests development directions for small IT-enterprises that are seeking to improve any of those dimensions within the company. For instance, a small IT-enterprise willing to improve creativity of its employees could engage in knowledge management developing activities. Another instance would be implementation of creativity enhancing techniques in order to consequently enhance knowledge management practices application.
- 2) The much adored friendly and relaxed communicative style does not necessarily imply higher creativity of the company. Although considered to be important for creative process, in the light of the present research it cannot be identified as the necessary condition for creativity. Therefore, ubiquitous equality and ‘friendship’ should not be taken as the necessary pre-condition for any IT-establishment.
- 3) Self-evaluation of creativity by the employees or potential employees should not be taken as a single measure of creativity. In order for a company to make sure it is hiring a truly creative individual, a set of test or interviews that do not directly ask the applicant to evaluate his or her creative aptitudes should be implemented. For



instance, such set could include a number of questions related to the applicant's habits and daily practices that are considered to be related to creativity by researcher, like those that were included in the personal-organizational creativity scale in the present research.

### 3.3.2. Recommendations

In line with the results of the present research, the following recommendations can be suggested for implementation in the small-scale IT-enterprises:

- 1) *Introduction of a certain hierarchy.* The study of communicative practices has shown that relationships are not quite organized in the startups; at the same time, organized structure would increase the overall score on the communications scale which is correlated to the KM and creativity scales. Therefore, it can be concluded that implementation of a certain pre-agreed communication structure with pre-defined roles and responsibility areas would benefit the companies.
- 2) *Introduction of a search system.* One of the factors affecting the TCC could be the level difficulty of information search and stored information access. As most of the companies sampled do not have a navigation system that enables them to navigate their knowledge storage facilities easier, a development and implementation of such organizing element can be suggested.
- 3) *Introduction of an ideas scorecard system and time regulatory instruments.* Implementation of the ideas register, or scorecard system, can be advised along with the time constraints for development of products to the companies where communication levels are not too high. The primary implementation of such scorecards would be ideas storage and unification of layout for the ease of access. Additionally, such system would enhance communicative processes making them easier available, and save time as an asset. Moreover, some frameworks like the Innovation Scorecard™ (The Innovation Scorecard, n.d.) or Ideas Management Scorecard (Ideas Management Scorecard, n.d.) can be implemented for the purposes of idea evaluation and estimation of its potential. The market as well offers a variety of ideas management software; however the feasibility of implementation of such systems in small-scale enterprises is questionable.
- 4) *Applicable trainings.* The majority of the companies do not engage in any type of trainings. As identified above, the higher the level of KM development practices, the higher is the level of creativity as well. Therefore, KM training might enhance the level of creativity in organizations. An example of applicable training program would be an

all-company knowledge systematization training, or introduction to design-thinking principles.

- 5) *Self-development ideas.* Finally, the research shows that the majority of respondents evaluate themselves as creative individuals. At the same time, not everyone is practicing creative problem solving, and the majority is not engaged in purposeful creative work processes (such as idea alterations and mix). Therefore, the belief can be rather misleading and hinder startup employees in their further development. To avoid such stagnation, self-development of employees should be encouraged highly encouraged. To start with, companies could implement reviews of relevant articles or books and share them with employees, as well as encourage them to share their experiences.

### *3.3.3. Significance and applicability of the current research*

In the in-depth interviews the notion that startups as small IT-enterprises are in need of regulatory instruments for communication and knowledge management practices was confirmed. For instance, one of the comments of a company founder was “It gets really hard sometimes when everyone is kind of a friend and you can’t really make them do everything”. Others mentioned importance of knowledge systematization (“we have a Dropbox, but we hardly are looking there ever”). Therefore, the study’s significance is that it provides an overview of problematic zones and suggests actions for improvement.

On the other hand, the study proposes a new predictive instrument that can be applied to evaluate a company’s potential regardless of the monetary investments. For future researchers it provides an analytical framework and a comprehensive methodology with a potential not only for mostly qualitative research as in the present line of work, but as well extensive quantitative investigation.

As the number of small IT-enterprises is increasing in the modern knowledge economy, the study can be applied by potential entrepreneurs and start-up members as a decision supporting tool as it provides managerial insights and analyzes experience of companies in the sector.

### *3.3.4. Limitations*

There are several limitations affecting the present study.

- 1) The scope of the study is restricted to a rather limited amount of companies. Different results might have been obtained should the study have dealt with an increased number of IT-enterprises.
- 2) The study is of a qualitative nature in the first place; therefore, some of the evaluations may have been, purposefully or not, distorted by the participants.

- 3) The participants of the study for the most part were limited to a 1:1 enterprise ratio, that is, only one representative took part in the on-line interview. An increased number of participants from one and the same organization would provide a broader picture and enable an in-depth analysis by quantitative means.
- 4) With the development of new technologies, such as the artificial intellect and chat bots, that might potentially disrupt companies engaged in development and delivery of IT-products, the present study may become obsolete after a period of time. Alternatively, the technological startup bubble, similarly to the .com bubble, may burst, undermining this study's applicability.

#### *3.3.5. Validation of the results*

The results and implications of the study were found to be feasible by the experts who have participated in the interviews, and non-participating members of the IT-community, contacted via the Facebook 'Startup Hub' community. The study results were also confirmed by one of the members of the KM Alliance (Facebook community) who was interested in the results from the beginning of the research.

#### *3.3.6. Further research directions*

The present research only investigates a limited number of organizations mostly operating in one market. Therefore, future research could be extended in the following directions:

##### *1. Market differentiation*

This study investigated 30 startups. Twenty-nine of those operate in Russia, and 1 operates in the Dutch and Belgian markets. As of April 20<sup>th</sup> 2016, the author of the present research is corresponding with Dr. Eleonora Shkolnik, director of the Ariel Venture Academy, Field Center for Entrepreneurship, Israel, in order to establish joint comparative research of IT-enterprises originating from Russia and Israel.

Additionally, further research could be conducted across several countries or several region of Russia.

##### *2. Scope expansion*

The increase of the sample for the study could provide additional information regarding the interdependence of factors and ways to enhance any of them. Analysis of increased amount of data would provide an opportunity to investigate the relationships deeper and describe the existing processes with a constructed comprehensive framework.

### *3. Quantitative expansion*

Along with the scope expansion, obtained data, if its amount is increased two- or preferably three-fold as compared to the current sample, would allow quantitative analysis and implementation of statistical tests.

### *4. Sector expansion*

The present study investigates IT-startups, the companies that develop and distribute their digital products themselves. Expansion of the study object from IT-SMEs to cross-industrial SMEs (e.g., digital agencies, creative agencies, and similar) or to larger enterprises within the same sector would allow to obtain more data and run a comparative research on KM, creativity, and communication practices and potentially generate valuable insights on the operations of companies in creative knowledge economies.

### *5. New research questions*

The study can be further continued in a number of scientific directions. For instance, the following experimental research questions of interest are arising as a consequence of the present research:

- Is there any influence of the studied factors on the effectiveness of IT-SMEs?
- As compared to other knowledge-intensive industries, is the influence of creativity, and communication on knowledge management higher in the IT-industry and its small enterprises, and why?

## **Summary of chapter 3**

Chapter 3 provides a detailed analysis of the data gathered in the research process and answers the research questions stated in chapter 1. All investigative parts are discussed, their results are analyzed and managerial implications and recommendations, limitations, significance and applicability, and further research directions are discussed. Recommendations related to the practices of small IT-enterprises are generated.

## CONCLUSION

This thesis investigates the IT-SMEs in the Russian market, the internal practices of these companies, and their relation to each other. These are the knowledge management, creativity, and communication practices.

The review of the existing research has highlighted the importance and relevance of the study. A number of studies investigate the relationships between KM practices and companies' performance, relationships between creativity and knowledge management in organizations, and other related topics, such as creativity in IT-enterprises or KM in SMEs; however, a very limited amount of studies is dedicated to the IT-SMEs, combination of the three types of practices, especially in the context of Russian market and startups operating in it.

According to the important considerations highlighted in the literature, an original research design is developed for the purposes of the present study. The research design addresses the 4 areas identified for research by the stated research questions.

The study has found that there is a relation between knowledge management, creativity and communication practices in IT-SMEs, which is consistent with the previous research. The study also has shown that knowledge management practices in most organizations, along with explicit creativity management practices, can be improved.

The analysis of the findings provided a base for managerial implications and recommendations generation. The managerial implications discuss the threat of various biases and organizational decisions for small IT-enterprises. Among the recommendations suggested are the introduction of a certain hierarchy, introduction of a search system in the knowledge storage systems is applicable, introduction of time constraints for development, introduction of an ideas scorecard system, applicable trainings, and self-development ideas.

The research is subject to several limitations (scope- and nature-related), however, it is of value to a broad circle of stakeholders, including the academia and business circles as it provides the overview of the existing conditions of the organizations operating in the market, suggest practical managerial actions, and provides a novel evaluative instrument.

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## LIKERT-SCALE INTERVIEW QUESTIONS

### *KM processes intensity scale*

#### *Create:*

- 1) All ideas are discussed.
- 2) We hold special meetings/conference calls/skype calls, etc. in order to share new information and knowledge.
- 3) All team members know each other and know how to contact each other if some information is needed.
- 4) We have an internal communications code that we follow.
- 5) We think that team communications influence our productivity.

#### *Save:*

- 1) It's typical for us to discuss news related to our work.
- 2) We document new information and ideas to store them.
- 3) We have a regulated ideas and information storage system.
- 4) We have an evaluation and ranking scheme for new ideas.
- 5) We developed a way to find our way around our information storage system.

#### *Distribute:*

- 1) We think group discussions are fruitful.
- 2) Information and knowledge sharing is encouraged in our organization.
- 3) Training events are taking place.
- 4) We have a special platform (a group in a social network, a chat, a cloud storage, etc.) to share information and ideas.
- 5) We hold special idea generation sessions – brainstorming, discussions, etc.

#### *Use:*

- 1) We evaluate and reprocess stored information and knowledge.
- 2) Gaining new knowledge is an important work process for us.
- 3) We quantitatively measure our intellectual capital.
- 4) Each member of our team has a defined competence and information work zone.
- 5) When working, we often consult with each other/our information archive/external knowledge sources.

#### *Value:*

- 1) Workers who generate more original ideas are valued more (get bigger compensation).

- 2) We encourage workers to think how their activities outside of work can help our organization.
- 3) We can quantitatively measure the results of knowledge management endeavors.
- 4) We can quantitatively measure the results of idea generation.
- 5) New ideas are one of our core assets.

*Personal creativity scale:*

- 1) I consider myself a creative person.
- 2) I get new ideas more often than my colleagues.
- 3) I practice in solving creative tasks.
- 4) I often think how to make my work better.
- 5) I like thinking about new ideas and planning their implementation.
- 6) New ideas often come to me from combination of old ideas.
- 7) Scope of my interests is rather broad and is not limited to work.
- 8) I'm resourceful and can find needed materials rather quick.
- 9) I like solving problems.
- 10) I don't reject non-working ideas but try to change them in a way for them to be useful.
- 11) I like learning new information.
- 12) I have a sense of humor about my work.
- 13) I can adapt my skills and knowledge to solve new unknown tasks.
- 14) I can analyze my work and define its advantages and flows.
- 15) I like working in a creative team.
- 16) I can characterize our company as a very creative one.
- 17) Our company strives to constantly generate new productive ideas.
- 18) I like finding connections between different ideas and phenomena.
- 19) I often have a vision about the task I'm solving.
- 20) My ideas can be odd and original.
- 21) I like playing with ideas rather than leap on the first one when I try solving a problem.

*Interpersonal relations characteristics scale:*

- 1) There's a distinct agreed hierarchy in our organization.
- 2) Communication style of the colleagues in our organization is democratic.
- 3) Colleagues spend their free time together sometimes.

- 4) I feel comfortable among colleagues.
- 5) All colleagues communicate equally among each other.
- 6) There are no evident outsiders among colleagues.
- 7) Relationships within the company can be characterized as tense.
- 8) There are people within our company who don't get along with some of the colleagues.
- 9) There is a person (people) in the company who can definitely be considered a leader.
- 10) Friendly relationships are prevalent within the company.
- 11) It's usual to ask for help or advice in our company.
- 12) If someone is criticized, it is done softly.
- 13) In our company information is shared among all colleagues.
- 14) I can say that colleagues treat each other with equal respect.
- 15) I can openly express my real thoughts and emotions among colleagues.

*Note: for analysis purposes and clarity of the questionnaire, answers to questions 7 and 8 are to be inverted, so that 1 becomes 5, and vice versa.*

### ADDITIONAL CONSIDERATIONS

To satisfy the author's interest, a correlation coefficient for the knowledge management, creativity, and communication practices scale scores was calculated. The correlation was run for the pairs of data sets listed in the Table 15 below and yielded the outputs as listed in the same table. The following sets of data were analyzed:

- Total KM scale score per company (KM);
- Total creativity scale score per company (CR);
- Total communications scale score per company (COM);

Table 15 Correlations

Set	Value
KM / CR	0,572181
KM / COM	0,479981
COM / CR	0,446072

Source: own research

As the table suggests, a moderate positive correlation is observed between each of the elements: knowledge management, creativity, and communication practices, especially so between the knowledge management and creativity practices scores. However, the author is cautious about these coefficients as the sample size is not large enough in order to make a definite conclusion.