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# The influence of knowledge management on the creation of value added by business processes

**SUMMARY OF DOCTORAL DISSERTATION**

Social Sciences,  
Communication and Information (S 008)

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VILNIAUS UNIVERSITETAS

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# Žinių valdymo įtaka organizacijos procesų pridėtinės vertės kūrimui

**DAKTARO DISERTACIJOS SANTRAUKA**

Socialiniai mokslai,  
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## SUMMARY

**Relevance of the topic.** The industrial society was based on the use of tangible resources, which were easy to calculate and evaluate. The industrial development during the last 50 years, driven by the development and advances of information and communication technologies in various sectors, led to a powerful economic growth. In the last decade of the last century, information became one of the most important resources in many organizations (Botezatu and Hosszu, 2020). Emergence of information and communication technologies in the post-industrial society brought substantial changes in organizations. The profoundness of changes even led to a development of a distinct term – “the fourth industrial revolution”. It is mostly based on cyber-physical systems (CPS), or integration of CPS and computing, communication and management, big data, internet of things, block chain, and other revolutionary technologies (Aceto et al., 2019). However, the constantly changing competencies, experience and knowledge held by people remain the main resource.

Technological paradigm shift triggered the development of information and communication sciences. Twenty years ago, research within this field was more focused on the challenges of information management; nowadays the attention is directed towards technologically based information management. However, even the application of contemporary standardized tools of information management (modern information systems, collaboration platforms, databases, analytical systems, etc.) does not guarantee competitive advantage for companies. In search of opportunities for development and penetration into open global markets, both business organizations and researchers expanded the research field of information and communication by turning towards knowledge – the most important, but at the same time hard to obtain and renew organizational resource.

The importance of managing knowledge in respect of general organizational management has gained in importance to the extent that

knowledge management now can be defined as the main instrument to increase organizational effectiveness and performance (Zack et al., 2009). The largest enterprises of the world, such as IBM, were among the first organizations to see the undisputable importance of knowledge management (Dalkir, 2005). In the first years of this millennium IBM included a knowledge management program into its list of research activities (IBM, 2015). NASA, which employs most expensive professionals, was one of the first governmentally funded organizations to acknowledge that the knowledge stored in the heads of its employees is one of its most expensive resources, which, if it would be lost, would require extremely high costs to recover. During the period of over ten years NASA has developed its knowledge management system into one of the largest and most effective knowledge management centers in the world (NASA, 2015). Such world-famous companies as *Nokia*, *Viant*, *Buckman Laboratories International*, *General Electric International*, *Siemens*, *ABB*, *Sigma*, *Xerox*, *HP*, *Bertelsmann*, *TelTech*, *COOp*, *McKinsey & Company*, and *Arthur Andersen* also started establishing separate departments for knowledge management (Probst et al., 2006); nowadays most corporations have knowledge management units (Migdadi, 2016).

There is no doubt that we live in a globalized world where information is being instantaneously transferred over very large distances via internet. One of the consequences of globalization is the emergence of knowledge economy. Its significance is based on the effectiveness of human capital, which means that employees keep generating the needed results. Contemporary knowledge economy needs knowledge management in order to increase organizational performance. Application and maintenance of good practices provides knowledge organizations additional capacities and exclusivity in the competitive space (Olubunmi, 2015). Economic growth in Europe and USA allows corporative organizations to invest into knowledge management projects. Both public and private sectors experience a need not only to accumulate knowledge held by employees, but also

to capture in one or another way the tacit knowledge, which employees acquire with experience.

Knowledge management in contemporary organizations is an integral part of organizational activities. Particular attention is paid to the relationship between knowledge management and innovation (Nowacki and Bachnik, 2016). Although the knowledge management processes and their interrelationships are rather well researched, in practice it is still very difficult to assess the effect of knowledge management on organizational performance. The issue of the influence of knowledge management on organizational performance is rather widely researched (Davenport, 2014; Hislop, 2013; Probst, Raub and Romhardt, 2006; Lee, Lee and Kang, 2005; Lev, 2001; etc.); however, it is also noted that there is a lack of research on measurement of the influence of knowledge management on organizational performance and particular organizational activities. Most publications are based on qualitative assessment: they analyze positive influence of knowledge management on organizational learning, organizational environment and organizational culture, or theorize benefits of knowledge storage and knowledge sharing. However, research on quantitative assessment of the benefits of knowledge management based on specific measurement indicators is rather fragmentary. A review of the newest research (Al Ahbabi et al., 2019; Asiaei and Bontis, 2019; Iqbal et al., 2019) leads to the assumption that knowledge management is most often treated as a supportive, instead of the key, organizational activity, although it directly affects more effective use of organizational resources. Integration of knowledge management into business processes is slow and expensive due to many rejection factors, although the value it adds to organization is undeniable (Skyrius, 2014). This is the reason why the largest organizations of the world invest heavily in knowledge management initiatives. The benefits of knowledge management are increasingly recognized not only by large corporate organizations, which have huge knowledge potential, but also by medium and small businesses (Chan and Chee-Kwong, 2008). There is more attention

given both to analysis of relation of knowledge management to product or service quality (Abbas, 2020), as well as management of customer-related knowledge (Castagna et al., 2020).

Globalization and harsh competition are forcing contemporary organizations to update traditional approaches to business. They are more often adopting the process-based approach to business management. Most often, this can be explained by the need to be more flexible, quickly adaptable and able to change in order to survive competition (Gemünden, Lehner and Kock, 2018). Project-based organizations often do not even have the possibility to use the functional approach. Of course, the choice of process-based approach is also influenced by new innovative types of organizations: network-based, virtual, interactive organizations, organizations with distributed workforce, etc. (Chamakiotis and Panteli, 2016).

Analysis of business processes has become an indispensable part of most business companies. A number of popular schools (such as LEAN, *Kaizen*, *Six Sigma*, TQM, etc.), business process analysis tools (SAP, BPMN, etc.), as well as quality standards (ISO, ITIL) make a huge influence for the largest companies of the world (Singh, 2012).

Analysis of the traditional knowledge management concepts reveals a lack of integration between knowledge management and business processes. Contemporary organizations pay a lot of attention to both activities of knowledge management and business processes. However, it is noted that knowledge management often is not integrated into many organizational activities. Business processes are most often evaluated on criteria of effectiveness and business performance, but their results are not linked to knowledge management.

Many IT products used by contemporary organizations (IS, ERP, CRM, DMS) not only help to optimize business processes in the areas of finances, project management, communication, document management or human resource management, but also have integrated knowledge management modules, although not necessarily labelled as such (Centobelli et al., 2019). At the end of the last century, it was



widely assumed that IT-based knowledge management was more relevant to medium and large companies. However, the rapidly increasing globalization and the newest cloud computing technologies made the use of new IT products much cheaper and created unlimited possibilities to apply IT systems for knowledge management in any organization. IT-based knowledge management allows not only to analyze and find the most appropriate solutions in organizations for increasing efficiency (Abubakar et al., 2019), but also offers possibilities to develop “smart” organizations (Nisar et al., 2019). Besides that, the newest automated knowledge management processes, also called third-generation knowledge management (Wang et al., 2020), create a huge value in the digital economy.

Breakthrough in IT and development of the global business environment brought changes in knowledge management activities, particularly knowledge management processes that can be optimized by application of IT. Some of knowledge management processes in contemporary organizations, such as knowledge storage or knowledge sharing, would not be possible without IT tools altogether. Optimization and improvement of knowledge management processes prompted a closer look into their links to other business processes; in turn, the attempts to understand the benefits of knowledge management in organizations led to application of value added indicators in its evaluation (Hanandeh and Ali, 2015).

One of the main aspects addressed in the research on the influence of knowledge management in organizations is its positive impact on creation of value added. Many other studies, such as Wu et al. (2009), Brunswicker and Vanhaverbek (2015), Cegarra-Navarro et al. (2016), Chang and Lin (2015), Durmic (2015), Khanal and Paudyal (2018), Lee et al. (2005), Todorović et al. (2015), Van Looy and Shafagatova (2016), Halil Zaim et al. (2019), reveal a positive correlation between knowledge management processes and organizational performance, efficiency of organizational activities, intellectual capital, financial indicators, etc. However, it is still not clear, in what extent different

processes of knowledge management affect specific business processes in the process of creation of value added.

The relevance of the topic is based on the lack of a new approach to the contemporary knowledge management, as well as insufficient assessment of the effect of integration of knowledge management and business processes, expressed in value added indicators.

### **Review of previous research**

Knowledge management as a separate research subject emerged in the middle of the last century. Authors in the knowledge management field have analyzed it in various aspects. Polanyi (1959), Nonaka (1994), Takeuchi (1995), Alavi and Leidner (1999), Drucker (2004), Choo (2006), Probst, Raub and Romhardt (2006), Senge (2006), Hislop (2013), Orna (2017), Skyrme (1997), Debowski (2010) defined the fundamental concept and models of knowledge management. Other authors also shaped different approaches to knowledge management in organizations: Grant (1996) studied management of knowledge and knowledge-related processes as a whole in organizations with the goal of integrating different knowledge management processes and types of knowledge; Hibbard (1997) analyzed knowledge management as a process of collecting and capturing from various sources (data bases, reports, communication with colleagues, etc.) group experience and group knowledge and its later use for the greatest benefit of the organization; O'Dell and Grayson (1998) identified the processes of knowledge identification, capture and use as the ones that create competitive advantage for the company; Skyrme (1997) presented a systematic approach to the management of business relevant knowledge and its creation, accumulation, organization, spread and application for the benefit of the organization; Wensley and O'Sullivan (2000) highlighted the aspects of all stages of knowledge generation, coding, development and transfer; Gupta et al. (2000) identified knowledge management as a separate process that helps organizations to search, select, organize, spread and transfer relevant information and expertise, which is

particularly important for decision making, continuous learning, and strategic planning; Staab et al. (2001) systematized knowledge management as a process that takes place in organizations and involves implementation and maintenance of functions related to search, selection, organization, spread and transfer of valuable information and expert knowledge. The purpose of knowledge management is to provide right information and knowledge to the right employees in the right time and the right form, in order to find more effective solutions to performance problems, to make rational management decisions, to create a successful long-term operational strategy; according to the approach developed by Davenport et al. (2003), knowledge management is application and development of organizational knowledge in pursuit of organization's goals. knowledge management involves management of both explicit and tacit knowledge. Management of this knowledge involves all processes related to knowledge identification, sharing and creation. Organizations that are successful in knowledge management treat knowledge as their main asset and develop such organizational norms and values that support creation of knowledge and its sharing within the organizations.

Particularly relevant for the practice of knowledge management are studies that emphasize traditional approach to knowledge, e.g. the SECI model of explicit and tacit knowledge (Ikujiro Nonaka and Takeuchi, 1995); treatment of explicit knowledge as an organizational resource in Drucker (2004); emphasis on importance of a learning organization and culture in Senge (2006); emphasis on the relationship between information and knowledge in Malhorta (2000), which gives meaning to information processing as the process of extracting knowledge from information; also the study of Probst, Raub and Romhardt (2006) on the processes of knowledge management and practical application of knowledge management in organizations; model of Information-Space presented by Boisot (1999), etc.

In Lithuania, the issues of knowledge management became a more prominent focus of scientific research at the beginning of this century.

The need for research in this field was created by Lithuanian independence and maturation of Lithuania as a competitive state in the European and global economic contexts. In their research, Augustinaitis (2002) addressed the development of information society; Gudauskas and Ramanauskienė (2004) – strategic knowledge management; Kriščiūnas and Daugelienė (2006) – knowledge based economy. Lydeka and Bareišis (1999) studied importance of individual knowledge for organizations. Interdependence between knowledge management and technology was addressed by Čivilis (2005). Mikalauskiene and Zalieckaitė (2009) studied the importance of knowledge management systems in organizations. A monograph by Atkočiūnienė et al., published the same year, addressed characteristics of information and knowledge management in contemporary organizations. Šedžiuvienė and Vveinhardt (2009) analyzed peculiarities of knowledge management in public sector organizations. Jucevičienė and Šajeva (2012) analyzed the differences between the main knowledge management models presented in international research and their applicability in contemporary organizations in Lithuania. Girniene (2014) addressed the relationship between innovation and knowledge management.

Different aspects of the value of knowledge management are also analyzed in doctoral dissertations of Lithuanian researchers defended during the last decade: Raudeliūnienė (2006) “Formation of competitive strategic decisions”, Belevičiūtė (2008) “A system architecture centred on knowledge management processes”, Jurkėnaitė (2009) “Modelling of e-government development under the conditions of knowledge economy”, Kiškienė (2010) “Science knowledge and technology transfer policy in Lithuania”, Morkvėnas (2010) “Assessment of knowledge potential in organization”, Šajeva (2010) “Maturity of organization's knowledge management system”, Girdauskienė (2012) “Engagement of management system in a creative organization”, Normantas (2013) “Research on business knowledge extraction from existing software systems”, Ambraziūnas

(2014) “Enterprise model based MDA information systems engineering method”, Giedra (2014) “Proof system for logic of correlated knowledge”, Girnienė (2014) “Knowledge management factors promoting the creation of innovations”, Katinienė (2018) “Evaluation of organisation employee knowledge synergy”. However, it must be noted that these studies only fragmentary touch upon the ways of measuring the value of knowledge management.

Business processes have been widely researched since the last decade of the last century. Different authors have provided different approaches on the topic. Harrington and Harrington (1991), Melan (1993), Adler et al. (1996), Evans, Mason-Jones and Towill (1999), Al-Mashari, Irani and Zairi (2001), Hwang and Chou (2004), Adesola and Baines (2005) in their studies have given a lot of attention to improvement and optimization of business processes. Bititci and Muir (1997), Biazzo (2000), Barber et al. (2003) have analyzed different types of processes. Scheer (1990), Davenport (1993), Hammer and Champy (1993), Becker, Kugeler and Rosemann (2003), Jeston and Nelis (2006), and other authors have analyzed the process approach in organizations.

This dissertation is based on two main theories:

1. Theory of information and knowledge management in contemporary organizations (Soto-Acosta et al., 2018), which explains the importance of information and knowledge management in new product development and building competitive advantage in contemporary organizations.
2. Contingency theory of business process management (Zelt et al., 2019) that builds on available research on context-sensitive process management and identifies the main factors critical for process management, as well as provides milestones for process evaluation and optimization.

Increasing replacement of functional approach by the process-based approach in contemporary organizations led to the need to develop classifications of business processes (Anderson, 2016). Systems of process classifications are being developed and refined

following such schools of research as by Burns and Stalker (1969), Ouchi (1979), Lillrank (1995), Garvin (1998). American Productivity and Quality Center (APQC, 2012) has identified more than 3000 different business processes and sorted the most popular of them into groups and subgroups. Within the research on business processes, there is a strong emphasis on their classification according to different criteria: Macintosh (1993) differentiates business processes according to maturity; Richter-von Hagen, Ratz and Povalej (2005), Scheer (2007) – according to their structure; Szlagowski (2014), Bhat and Deshmukh (2005) – according to the quality of dynamism; Singh (2012) – according to the purpose in organization; van Looy, Backer and Poels (2011) – according to their functions.

In Lithuania, research publications mostly discuss various approaches to business processes, while their classification does not receive much attention. More attention to the theories of processes and process management is given in works of Kvedaravičius (2002, 2003, 2006). Klimas and Ruževičius (2009) analyzed methodology of process management and implementation of changes in organizations, Kaziliūnas (2004) – process approach in management and public administration, Lodienė (2008) – conception of process management in the context of organizational management.

Different aspects of the issues analyzed in this dissertation were addressed by Lithuanian researchers in a number of doctoral dissertations defended during the last decade: Lodienė (2007) “A process view development in organizations management“, Vilkas (2007) “Networking and change effectiveness of processes“, Kundelienė (2009) “The assessment of business processes accounting quality attributes“, Butkevičius (2010) “Analysis and application of business process integration models“, Giedraitytė (2016) “Public sector innovation process barriers’ management in Lithuanian municipal administrations“, Afarjanc (2019) “The model of factors influencing the quality of e-service improvement process”.

Empirical studies on the relationship between knowledge management and business processes published in international literature have addressed several aspects:

*Effect of knowledge management practices on the performance of Nepalese financial institutions* by Khanal and Paudyal (2018) emphasized the relationship of knowledge management activities with financial and non-financial business performance; the study covered only one financial sector; the study addressed only three aspects of knowledge management; measurement was focused on the direct influence of knowledge management on organizational performance without application of mediators.

*Knowledge management and organizational performance: a decomposed view* by Mills and Smith (2011) – the analysis of the relationship between knowledge management and business processes was based on elements of organizational success; the study mostly used such broadly defined variables as “technological infrastructure”; the study included 265 employees, however, the companies were not segmented according to the type of business; the data on knowledge management infrastructure were unreasonably equated with the influence of knowledge management processes; measurement was based on subjective (opinion survey) rather than objective indicators.

*Knowledge management driven firm performance: The roles of business process capabilities and organizational learning* by Wu ir Chen (2014) – the relationship between knowledge management and business processes was analyzed through competencies; knowledge resources were treated as weights of knowledge management processes; the sample included companies from four very disproportionally divided sectors, therefore the conclusions can hardly be applied to separate segments; measurement indicators were not enough clarified and defined.

*Impact of knowledge management practices on firms' performance: a mediating role of business process capability and organizational learning* by Rehman, Asghar and Ahmad (2015) – the role of knowledge management was analyzed by restructuring

business processes; the model used assessment of the convergent and discriminant validity (according to the model presented in Hurley et al., 1997), which leads to a narrow applicability of the study; there were no mediators used.

*A business process context for Knowledge Management* by Raghu and Vinze (2007) – in this study, knowledge management was explained only through three processes (knowledge storage and retrieval, knowledge sharing and knowledge synthesis), which leads to a narrow approach; the direct influence on business processes and value added was not analyzed; the study was based on a qualitative approach and involved no measurement.

*Business process modeling through the knowledge management perspective* by Kalpič and Bernus (2014) – the study was only focused on knowledge codification and paid no attention to tacit knowledge; the relationship between knowledge management and business processes was analyzed only through the perspective of information technology.

This doctoral dissertation fills the gaps left by the aforementioned studies: it involves the measurement of the effect of knowledge management on both business processes and value added created in organizations; the effect of knowledge management is measured both directly, as well as by taking into account a mediator – business processes; the study focuses on a specific business sector – IT companies; the study uses specific indicators for both knowledge management processes and business processes (which were not used in the studies reviewed above); the study uses equal weights for all knowledge management processes (the principle of proportionality); the study evaluates both explicit and tacit knowledge; the study measures the effect of knowledge management on both organizational performance and value added; the analysis of value added includes two aspects: financial and non-financial; the study identifies the relationship between the strength of the influence of knowledge management processes and the size of the company; the study is focused on project and process-based companies.



Publications by other researchers also lack a holistic approach to the topic – e.g., Starns and Odom (2006) analyze integration of knowledge management into organizational strategy; Easterby-Smith and Prieto (2008) address the relationship between knowledge management and the internal and external business processes; Basilicata et al. (2004) examine the influence of knowledge management processes on organization's value; Jung, Choi and Song (2007) reveal similarities between the cycles of knowledge management and business processes. Review of Lithuanian research on the topic revealed an absence of publications on the relationship between knowledge management and business processes.

Analysis of previous research on the topic revealed unidimensionality of such research, when only one or a few aspects are analyzed. The prevailing fragmentation of research and the lack of systematic and constructive approach suggest the need for a theoretically grounded and empirically validated research.

### **Scientific problem addressed in the dissertation**

The discussed relevance of the topic and review of previous research show that the field of scientific problem addressed in the dissertation is not yet fully formed. The change of organizational environment, influenced by IT, also increases the effect of IT on knowledge management, particularly on knowledge management processes. The increasing amount of research on knowledge management proves the importance of knowledge management; however, analysis of previous research showed gaps in and fragmentation of research on the relationship between knowledge management and business processes. Previous research mostly discusses separate aspects of the relationship between knowledge management and business processes, there is a lack of research on the assessment of the influence of knowledge management processes on other organizational activities, the available studies do not address the influence of knowledge management processes and business

processes on the increase of organization's financial and non-financial value. Such level of theoretical grounding is not sufficient to identify the necessary potential of knowledge management, which would effectively guarantee qualitative operation of business processes. This supposes the research problem: **How to define the influence of knowledge management on business processes in order to support continuous improvement of business processes and creation of value added in organizations?**

The conceptual model created in the dissertation justifies a holistic scientific approach to the relationship between knowledge management and business processes in creating value added, as well as the answer to the question, which knowledge management processes and business processes should be assessed and researched in order to ensure continuous creation of value added in organization. Practical application of the model allows to identify those knowledge management processes, whose improvement would make the major influence on business processes in pursuit of best performance and highest value added.

**Object of the research** is the influence of knowledge management on creation of value added by business processes in organization.

**Aim of the research** is to develop a conceptual model of the relationship between knowledge management and business processes and to define the influence of knowledge management on creation of value added by business processes in organizations.

**Objectives of the research:**

1. To outline the knowledge management paradigm change in the contemporary organizational environment.
2. To analyze knowledge management models and to highlight their importance in the context of the changing organizational environment.

3. To analyze and to systematize theoretical approaches to business processes.
4. To show interconnections between knowledge management and business processes.
5. To develop a conceptual model of the influence of knowledge management processes on business processes.
6. To define the influence of knowledge management processes on creation of value added by business processes.

### **Statements to be defended**

- Knowledge management has a positive influence on creation of value added by business processes.
- Change (improvement) of business processes increases the value added created in organization.
- Measurement of the influence of knowledge management processes allows to assess the effect of knowledge management on business processes and value added.
- Integrated relationship between knowledge management processes and business processes increase the value added created in organizations.

**Scientific novelty and theoretical value of the dissertation.** In theoretical respect, the novelty of the dissertation is justified by a comprehensive analysis of Lithuanian and international research. The novelty of the dissertation consists of a systematic analysis of knowledge management paradigm change, Knowledge management processes in contemporary organization, and business processes, identification of the influence of knowledge management on business processes.

Theoretical analysis of the influence of knowledge management on business processes in contemporary organizations served as the basis to develop a conceptual model, which can be used to assess the

influence of knowledge management processes on business processes. Integration between knowledge management and business processes is analyzed through the perspective of IT: new knowledge and IT tools for evaluation and verification of business processes.

The theoretical model presents the conception of measuring business processes, which shows the relationship between knowledge management processes and different business processes. It enables to assess the value of the relationship between knowledge management and business processes, which in existing research has been only discussed as hypothetical models. By evaluating the influence of knowledge management on business processes, organizations, in pursuit of the highest value and the highest process efficiency, will be able to integrate knowledge management and business processes in a more effective way. The model can be applied in further research, as well as in practice.

**Practical relevance.** The developed conceptual model of knowledge management influence on business processes can help to identify, on a research basis, knowledge management gaps in an organization and reveal the weak links with a potential to create the highest value by improving business processes. It would support effective implementation of knowledge management in the organization, would help to identify the most important knowledge management processes and to establish the importance of integration of business processes by highlighting the value of their interconnectedness.

**Structure of the dissertation.** The dissertation consists of introduction, three main parts, conclusions, list of references and appendixes.

*The first part of the dissertation* includes analysis of the relationship between knowledge management and activities of contemporary organizations, highlights the change of knowledge management processes and identifies their dependability on organizational structure

and the nature of its activities. The need for integration of knowledge management strategy with organizational strategy is emphasized. In this part, the characteristics of knowledge management in contemporary organizations are explained through its interconnections with IT systems. The part concludes with the emphasis of the benefits of knowledge management systems and analysis of new ways of knowledge retrieval by use of big data technologies.

*The second part of the dissertation* focuses on the analysis of the main problem of the dissertation – integration of knowledge management and business processes. On the basis of methodologies for classification and evaluation of business processes in contemporary organizations, evaluation and measurement of business processes is systematically analyzed. The part identifies the main, most important business processes, as well as includes analysis of the structure of added value created in organizations in both financial and non-financial aspects. Analysis of the relationship between knowledge management and business processes concludes with the development of a conceptual model of the influence of knowledge management on business processes.

*The third part of the dissertation* presents empirical analysis of the influence of knowledge management processes on creation of value added by business processes. Methodology and methods of the empirical study are presented. The study included a two part quantitative research, quantitative analysis of the data, mathematical calculations, statistical and factor analysis. Analysis identified relationships and influences, as well as strength of influence, between knowledge management processes, business processes and value added. Finally, the research results are summarized and conclusions drawn from the study presented.

**Research methods.** In the theory parts, the following research methods were used:

*Comparative analysis* was used to compare different definitions of knowledge management, to analyze issues of integration of knowledge management into organization, and the relationship between knowledge management and IT systems. In the second chapter, this method was applied to compare the changing approaches to business processes, different criteria of evaluation and measurement of business processes, differences between individual business processes relevant to knowledge management, differences between financial and non-financial value added.

*System analysis* was used in the first part to conduct a system analysis of knowledge management concepts and processes, in the second part – a system analysis of organization (functional and process-based approaches) and different business processes.

*Analogy* method was used to summarize research on knowledge management processes and to highlight the most important knowledge management processes in the first part, and, similarly, business processes in the second part. This method was also used to summarize the methodology of application of the conceptual model of the influence of knowledge management on business processes, as well as to draw research conclusions in the third part of the dissertation.

*Deduction* method was used to explain the concept of the “new knowledge” in the context of contemporary organization and to draw conclusions of the empirical research.

The empirical part, which presents the conducted quantitative study, was based on methods of *quantitative analysis*, *mathematical calculations*, *statistical analysis*, *factor analysis*, *mediation analysis* and *cluster analysis*.

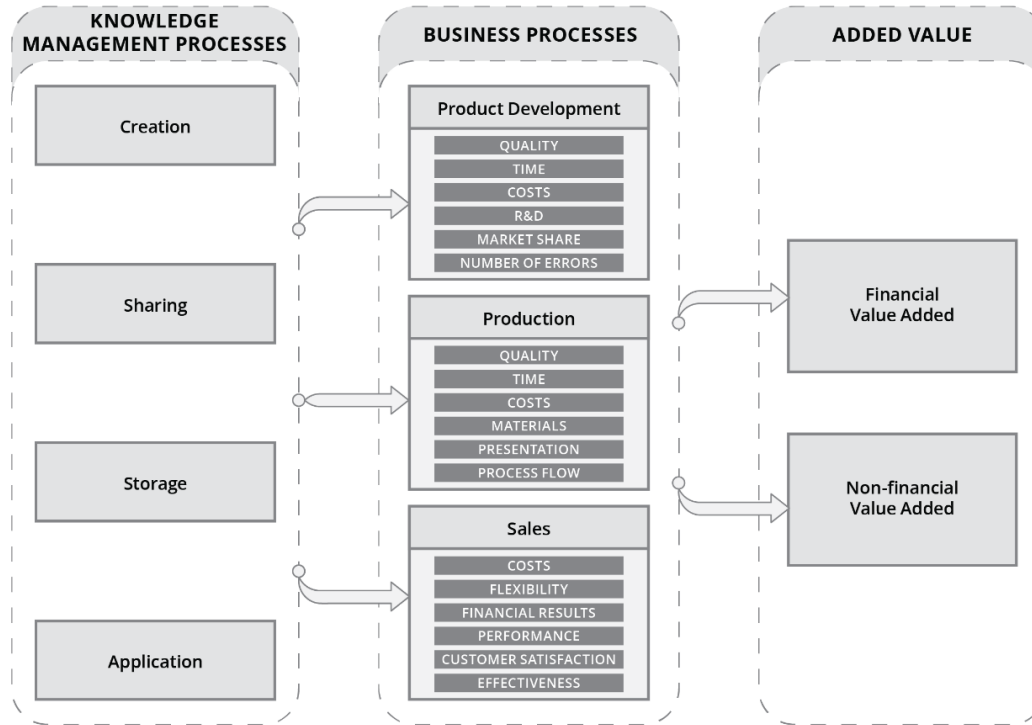
### **Summary of results**

On the basis of analysis presented in the theory part of the dissertation, a conceptual model of the influence of knowledge management on business processes was developed (see Figure 1). The

model can be used to measure value added in many process-based organizations, although it should be adapted for each different organization type, as the specific process dimensions and metrics depend on the type of economic activity, type of organization, its size, nature of product or service, and other characteristics, as well as factors determining them.

It is advisable to evaluate the influence of knowledge management processes over a certain period, and to relate the evaluation to organizational change, improvement of the situation, and increase in effectiveness. Knowledge management processes affect individual business processes through certain dimensions described in the literature analysis. Most often, effectiveness of business processes and its change is measured by the change in quality, production time, costs, R&D, market share, number of errors, effectiveness of the process flow, amount of raw materials, customer satisfaction, and other indicators. Improvement of these indicators defines the effectiveness of the business process itself, which, according to the conceptual model presented below, is a result of the increasing positive influence of knowledge management processes.

Value added created by business processes is analyzed through two dimensions: financial value and non-financial value. It is advisable to measure the value added not directly, but through changes in business processes, more specifically, through the change of each indicator associated with the process, included in its metrics. In this way, the conceptual model allows to evaluate business processes as a mediator between knowledge management processes and financial/non-financial value added.



**Figure 1.** The conceptual model of the influence of knowledge management processes on business processes (compiled by the author)



The empirical research in Lithuanian IT project and process-based organizations was carried out according to the presented research model. To avoid subjectivity of respondents' opinion and the potential influence of researcher, qualitative methods were rejected. However, in order to obtain a deeper insight and to build a base for more diverse mathematical calculations on different research aspects, the decision was made to implement a wide scale quantitative research in two parts (A and B). The aim of the A part was *to assess the change of knowledge management processes in organizations, the importance of knowledge management processes for business processes and to identify the interconnections between the individual knowledge management processes*. The aim of the B part was *to identify interconnections between individual business processes; to assess the influence of business processes on the value added created in organizations; to identify the influence of knowledge management processes on the value added created in organizations, when business processes are treated as a mediating variable; to identify peculiarities of knowledge management processes according to the criteria of organization size*.

The empirical study used a wide scale survey of middle level managers who in their organizations are owners of every business process addressed by the study. In the cases when a particular process was attributed to one managerial position, but most of the processes were managed by a person in another position (the actual process owner), the priority to answer the respective questions was given to the latter. The study was based on the main criteria of a good research: validity, reliability, objectivity, and representative sample (Bitinas et al., 2008). Validity was ensured by a careful choice of sampling criteria for organizations and respondents to be included in the study. Analysis of empirical data was approached with the strategy of the sequential research design. On the basis of the conceptual model of the influence of knowledge management on business processes, the following aspects were identified: the key knowledge management and business processes, their components, evaluation indicators, as

well as components of value added and its indicators. Results of theoretical analysis were used to design the quantitative instrument – the survey questionnaire presented to the managers. The aim of the questionnaire was to identify the effect of each of the knowledge management process on business processes through the defined metrics. Indicators for each metric were measured, then all indicators were recalculated into the value added created in organizations.

Methods of statistical analysis applied in the research:

- One-way analysis of variance (ANOVA);
- Pearson’s correlation analysis;
- Multiple regression analysis and mediation analysis;
- Cluster analysis and chi-square analysis.

According to the sampling criteria set in research design, the sample contained 72 IT companies operating in Lithuania, whose direct sphere of operation included development and sales of ITS products, development and provision of IT services, provision of IT infrastructure and other IT services to business (B2B sector). The organizations included into research had to be small, medium or large companies. The study included in total 105 managers or owners of business processes.

Empirical research, based on the application of the conceptual model of the influence of knowledge management on business processes presented above, was aimed at testing the following hypotheses:

H1: Every knowledge management process separately has a positive effect on individual business processes;

H2: Every knowledge management process has a positive effect on the value added created in the organization;

H3: Knowledge management processes as a whole have a positive effect on the key business processes;

H4: Change (improvement) of business processes increases the value added created in the organization;

H5: Business processes act as a mediator of the positive correlation between knowledge management processes and value added;

H6: Effectiveness of individual knowledge management processes depends on organization size.

Results of the presented empirical study revealed that in IT organizations the key knowledge management processes function together as one system. Positive correlations show that, among all knowledge management processes, knowledge sharing has a stronger relationship with other knowledge management processes.

Analysis of research data showed that knowledge management processes have a positive effect on the key business processes (H1). Calculation of causal relationships and assessment of the influence of every individual knowledge management process revealed that the process of *knowledge creation* has a positive effect on processes of *product development*, *production*, and *sales*. *Knowledge sharing* has a weaker effect on the processes of *product development* and *production*.

Analysis confirmed that *knowledge management processes* as a whole have a positive effect on the *value added* created in organizations by the key business processes (H2). Mediation analysis confirmed that *knowledge management processes* have a stronger effect on the *value added* when they are integrated into other business processes (H5). This leads to the conclusion that in the organizations included in the study integration of knowledge management processes can be seen; however, the integration is not sufficient, since the assessment of the influence of individual knowledge management processes shows that two from the analyzed four knowledge management processes – *knowledge creation* and *knowledge sharing* – make the strongest influence on value added. Although *all knowledge management processes* were found to be correlated with *value added*, the weakest link was between value added and *knowledge application*. It is likely that more attention given to *knowledge creation* and *knowledge sharing* is related to the features of organizations included in the study. Such conclusion confirms assumptions made in previous research that IT tools increase the effectiveness of knowledge sharing process. Analysis of correlations

between knowledge management processes and the dimensions of business processes (H3) indicates that *knowledge management processes* are positively linked to many *dimensions of business processes*. The conclusion can be made that knowledge management processes are most strongly linked with the dimensions of *quality, time* and *costs of the product development process*. Dimensions of *production* such as *quality, resources* and *delivery* have direct links with knowledge management processes, while the *sales* process was most strongly linked with the dimensions of *financial results* and *process efficiency*.

Analysis of value added created by knowledge management processes in organizations of different size and their grouping into clusters showed that middle-sized and small organizations pay more attention to the processes of *knowledge creation, sharing* and *storage*, while large companies are more focused on knowledge *application* (H6).

These results of the empirical research confirm the practical relevance of the conceptual model of the influence of knowledge management on business processes. Correlations of knowledge management processes with business processes and their influence on value added created in organizations justifies the need for integration of knowledge management processes into business processes.

## **Conclusions**

1. Analysis of previous research on the dissertation topic showed that taking into account the contemporary competitive environment and the quest for competitive advantage, research emphasizes the importance of knowledge management. In the global market, organizations regard knowledge management as an integral part of organizational activities and highlight not only its importance, but also its specific benefits. It is noted that in literature the previously widespread treatment of knowledge management as a supportive activity is increasingly replaced by its definition as one of the key organizational activities. Scientific research is mostly focused on the

key areas of knowledge management: knowledge management strategy, organizational culture, and knowledge management processes, which in contemporary organizations become particularly dependent from advances in IT – both from development of innovative information and knowledge management systems, as well as from new technologies for creating non-traditional “new knowledge”.

2. The presented theoretical research revealed certain gaps in research on application of knowledge management in pursuit of organizational performance. It was noted that both theoretical and empirical research on the effect of knowledge management and its measurement in pursuit of higher benefits and performance for organizations is limited and often not enough scientifically justified. Thus it can be claimed that, although scientific research emphasizes assessment of knowledge management processes as one of the most important aspects of knowledge management evaluation, the aim to develop a general approach to knowledge management in organizations allowing, at the same time, identification, assessment and stimulation of the key business processes lacks systematic analysis and scientifically grounded answer to the question on which knowledge management processes are most important for organizational efficiency. Systematic analysis of knowledge management processes allowed to identify the most important knowledge management processes: *knowledge creation, sharing, storage and application*, which constitute the theoretical basis for the empirical study on assessment of influence of knowledge management on business processes.

3. Literature review suggests that, although the schools of research on business processes were developed almost a century ago, up until now the definition of the groups of business processes and criteria for their evaluation is rather fragmentary. Wide prevalence of business processes, a lack of process-based approach, and abundance of indicators are the main aspects that are hindering application of universal methodologies for evaluation, measurement and improvement of business processes. On the basis of comparative

literature review, three main processes characteristic to process-based organizations were identified: *development*, *production* and *sales*; for each of the process, six most important dimensions were identified: *quality*, *time*, *costs*, *financial indicators*, *performance*, and *efficiency*. Development of a more process-based than functional approach in an organization opens the possibility for quantitative assessment of business processes, sub-processes and their steps, and, in turn, enables to relate measurement results to other organizational indicators.

4. The conducted empirical study showed that knowledge management processes are related with almost all organizational activities and significantly related with many business processes. This leads to a theoretical assumption that it is appropriate to evaluate knowledge management processes in relation with business processes, while methods that can be used for improvement of business processes can also be used to improve knowledge management processes.

5. The *conceptual model of the influence of knowledge management on business processes* compiled by the author of the dissertation expands the research on the topic. It confirms that knowledge management processes in organizations cannot be run separately and have to be integrated into business processes in view of maximizing the value added. The applied aspect of the model allows to assess the influence of knowledge management processes on the key business processes as a whole and individually, while examination of their influence on each individual dimension of business processes enables to relate knowledge management to the value added created by business processes. Significance of the theoretical model lies not only in its ability to identify the influence of knowledge management on the value added created in organization, but also the weight of each knowledge management process in this respect.

6. The results of the empirical study confirm the practical relevance of the conceptual model of the influence of knowledge management on business processes:

a) in IT organizations, the key knowledge management processes function together as one system, while *knowledge sharing*

has the strongest relationship with other knowledge management processes;

b) knowledge management processes have a positive effect on the key business processes: the process of *knowledge creation* has a positive effect on processes of *product development*, *production*, and *sales*. *Knowledge sharing* has positive, but weaker effect on the processes of *product development* and *production*;

c) *knowledge management processes* are positively related to many *dimensions of business processes*. The strongest relationship is with the dimensions of *quality*, *time* and *costs* of the *product development* process. Dimensions of *quality*, *resources* and *delivery* of *production* are directly related to knowledge management processes, while *sales* is most strongly correlated with dimensions of *financial results* and *process efficiency*;

d) *knowledge management processes* as a whole have a positive effect on the value added created in organizations;

e) *knowledge management processes* have a larger effect on the *creation of value added* when they are integrated into other business processes;

f) processes of *knowledge creation* and *knowledge sharing* have a direct positive influence on value added;

g) middle and small sized organizations pay more attention to *knowledge creation*, *knowledge sharing* and *storage*, while large organizations lay more emphasis on *knowledge application*.

### **Research limitations**

One of the limitations of the research presented in the dissertation is the fact that knowledge management practices are more often measured by subjective indicators than by objective, therefore the results of the study may reflect subjectivity of respondents' opinions. Thus replication of the study in other organizations could produce minor deviations in the results.

Another limitation of the study is related with the multiple applications of knowledge management practices. This research was

focused on four knowledge management processes: knowledge creation, storage, sharing and application. Different organizations within the same sector can place different importance on different knowledge management processes.

One more research limitation is related with the IT sector in Lithuania. The study was deliberately carried out in Lithuania and among organizations of one chosen sector; therefore the application of the results in other sectors is limited. Since IT sector companies are among the most advanced in Lithuania, the obtained results could be used in the future to make comparison among different studies and to evaluate them in the international context. Business processes included in the study were identified as the most important ones based on business contingency theory, which was drawn from already available context-sensitive research on process management and are relevant for project-based organizations in IT sector. However, further research should take into account differences in business processes in other sectors.

The lack of research and methodologies for identification of the knowledge management potential that could effectively guarantee high-quality business processes, as well as the novelty of the developed conceptual model, did not allow to conduct a comparative analysis of research results either nationally or internationally.

## **Suggestions and recommendations**

### Suggestions for organizations:

1. It is advisable that Lithuanian IT organizations that strive for effective management of knowledge and improvement of knowledge management integration, measure the relationship between knowledge management and business processes and its influence on value added. By optimizing their processes, organizations could at the same time maximize the value added created by knowledge management.



2. It is important to integrate knowledge management processes into business processes, thus increasing the integration (general interconnections) and its importance for creating value added. Identification of the weight of each knowledge management process makes possible to actively stimulate other knowledge management processes, in order to develop a unified knowledge management system.

3. It is advisable that every organization has systematized indicators used for evaluation of its business processes and identifies the most important knowledge management processes.

Recommendations for researchers on future research directions:

1. It is advisable to measure knowledge management processes not only by using indicators of business processes, but also by employing other mediators.

2. To expand the research field by measuring not only the influence of knowledge management processes, but also of other knowledge management activities.

3. To include into the measurement of knowledge management and organizational indicators more objective scores, and to check the obtained results by the method of triangulation.

## LIST OF PUBLICATIONS

### **In peer-reviewed scientific publications:**

1. ULBINAITĖ, Aurelija; GRIBOVSKIS, Justas. Žinių valdymo procesų ir verslo procesų integracijos sąveikos vertinimo modelis [Evaluation model of the integrational relationship between knowledge management processes and business processes]. *Informacijos mokslai*. Vilnius: Vilniaus universiteto leidykla. 2020, t. 88, p. 142–166. ISSN 1392-0561. eISSN 1392-1487. DOI: 10.15388/Im.2020.88.46.

2. GRIBOVSKIS, Justas. Su vartotoju susijusių žinių kūrimas, paremtas didžiųjų duomenų analitika [User knowledge based on big data analytics]. *Informacijos mokslai*. Vilnius: Vilniaus universiteto leidykla. 2018, t. 82, p. 161–179. ISSN 1392-0561. eISSN 1392-1487. DOI: 10.15388/Im.2018.82.10.

### **Conference presentations:**

#### International conferences

1. Didieji duomenys – šiuolaikinis žinių variklis [Big data as a contemporary driver of knowledge]. 9th conference of the student academic society “Challenges of Communication and Information”, May 9, 2017, Vilnius, Lithuania.

2. Informacijos ir žinių vadybos ypatumai nutolusiose darbo vietose [Peculiarities of information and knowledge management in distance working]. International conference “Communication and Information Sciences in a Network Society: Experiences and Insights. III“, June 10, 2016, Vilnius, Lithuania

#### National

3. Žinių blokų grandinės – blokų grandinės technologijos korporatyvinėse organizacijose [Knowledge blockchain – blockchain technologies in corporate organizations]. National scientific conference “Information and communication theory and practice 2018”, March 23, 2018, Vilnius, Lithuania.

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