St. Petersburg University

Graduate School of Management

Master in Management Program

Knowledge management practices and barriers to their implementation in third-party logistics service providers: case of Russian companies

Master's Thesis by the 2nd year student

Vera Borisova

Academic advisor:

Associate Professor, PhD

Professor Dmitry Kudryavtsev

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ЗАЯВЛЕНИЕ О САМОСТОЯТЕЛЬНОМ ХАРАКТЕРЕ ВЫПОЛНЕНИЯ
ВЫПУСКНОЙ КВАЛИФИКАЦИОННОЙ РАБОТЫ

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I, Borisova Vera Sergeevna, second year master student, program «Management», state that my master thesis on the topic « The impact of knowledge management on the provision of integrated logistics services », which is presented to the Master Office to be submitted to the Official Defense Committee for the public defense, does not contain any elements of plagiarism.

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АННОТАЦИЯ

Автор	Борисова Вера Сергеевна
Название магистерской диссертации	Воздействие управления знаниями на оказание комплексных логистических услуг и
Факультет	Высшая Школа Менеджмента
Направление подготовки	Менеджмент
Год	2022
Научный руководитель	Кудрявцев Дмитрий Вячеславович
Описание цели, задач и основных результатов	Целью данного исследования является выявление инструментов управления знаниями, используемые российскими логистическими компаниями для решения логистических проблем. Помимо этого, целью также является определение барьеров, которые стоят на пути внедрения инструментов и систем управления знаниями. Данные были получены в результате изучения нескольких компаний логистического рынка России, в том числе интервью с главами и представителями компаний, анализа данных с корпоративных вебсайтов и годовых отчётов. В результате были выявлены способы решения логистических проблем при помощи инструментов управления знаниями, а так же определены барьеры, мешающие их дальнейшему внедрению.
Ключевые слова	Управление знаниями, логистика, аутсорсинг логистики, получение знаний

ABSTRACT

Master Student's Name	Borisova Vera
Master Thesis Title	The impact of knowledge management on the provision of complex logistic services
Faculty	Graduate School of Management
Main field of study	General Management
Year	2022
Academic Advisor's Name	Dmitry V. Kudryavtsev
Description of the goal, tasks and main results	The goal of this research is to explore which knowledge management instruments and methods implemented by Russian third-party logistics (3PL) companies to solve logistic-specific problems. Another aim is identification of the main barriers slowing down the adoption of such practices. Data was obtained from a case study of multiple Russian 3PL companies, which included questionnaire, semi-structured interviews with CEOs and representatives of the companies and data analysis of web-sites and annual reports. As for results, instruments and practices of knowledge management that are used to solve logistic-specific problems were identified within the industry. Moreover, the main barriers interfering with the adoption of knowledge management practices were identified.
Keywords	knowledge management, logistics, third party logistics, knowledge capturing

Table of content

Introduction

In today's turbulent and changing environment it becomes crucial for logistic companies to use new technologies and techniques. And knowledge management can be adopted as strategic resource in third party logistic companies. Knowledge is widely recognized as a sustainable source of competitive advantage in the environment where responsiveness to the changes is extremely important.

As logistic industry is subject to the most changes, where well-established supply chains can become irrelevant knowledge assets have become particularly critical. To stay afloat in this conditions companies have to implement latest technologies and at the same time the competition in these sphere is growing and becoming more complex and knowledge-intensive.

3PL logistics companies are complex I their structure as they include multi-layer supply chain with multiple nodes. Their business model has shifted from asset-based to knowledge-base model. The services that they sell include not only the transportation facilities, but full spectrum of services, starting from packaging to the communications with the client's client.

To support the needs of the client the management of knowledge is starting to be considered an important strategic source that can help to improve the efficiency of the supply chain as well as enhance the communication inside and outside the supply chain.

The goal of this thesis is to explore knowledge management practices that are used to solve logistics-specific problems in Russian third party-logistic companies. The study focuses on describing the ways knowledge management instruments are used in logistics and inventory, warehousing, customer service and transportation and identifying most commonly used instruments in each sphere. Another goal of the research is identifying the main barriers that slow down the implementation of the knowledge management system in 3PL companies.

The topic is investigated through three Russian 3PL companies that operate in the Russian market as well as internationally. Although the topic focuses on the companies whose main activity is logistics it can be relevant to all industries in which companies organize their own supply chains.

First through literature review we identify main instruments of knowledge management (ISO 30401:2020) (appendix 1) and choose the framework of 3PL functions (Vaidyanathan,

2015) to identify main problems. These two frameworks were combined to create the guide for the interview (appendix 2) to answer the first research question.

Q1: How do third party logistics companies in Russia use knowledge management tools to tackle challenges in logistics?

Then we combine ISO 30401:2020 standard and classification of the barriers for implementation of the supply chain to create the guide for the interview (appendix 2) to answer the second research question:

Q2: What barriers prevent the companies from implementing these instruments?

The research structure:

Chapter 1 Theoretical finding that describe knowledge management, Russian specifics of the logistics and knowledge management in third party logistics.

Chapter 2 describes research methodology and justifies the choice of multiple case study as the research method. It also contains the description of the companies chosen for the case study.

Chapter 3 presents the findings of the research and summarizes them in cross-case analysis.

Chapter 1. Theoretical aspects of Knowledge Management and Third Party Logistics

1.1 What is knowledge?

In the modern world the importance of knowledge is rising due to the its ability to distinguish a company in the intense competition. While the means of production used in the companies are comparable, the scope of their knowledge is individual. And the success of enterprises depends on their ability to collect, process and use it.

Although the word "Knowledge" appears in our vocabulary at early age, it is a complex concept that has been discussed by many scientists in various fields (such as informatics, philosophy, management). First science, that attempted to define it, was Philosophy in ancient Greece. Plato explained knowledge as "justified true belief", which means that there are some evidence that the belief is true. This definition was discussed in the Theaeretus.

Later the static nature of the knowledge has become more agile. Nonaka, the well-known Japanese business expert have defined knowledge as a dynamic process of personal belief towards truth. (Nonaka & Konno 2005), (Nonaka et al. 2000).

Laura Empson, the professor from Cass business school have defined knowledge as a product built from data and information and that is a result of processing the experience. On the other side Ilkka Tuomi from Helsinki University claimed that knowledge comes before information. Davenport et al. (1996) stated that knowledge is a framed experience and values, that inn its own term provides a framework for incorporating new experiences. The knowledge by Davenport & Prusak is defined through organization, its routines, practices and norms.

As we can see, the word Knowledge is often used with Data and Information and, while they seem to present one category, these terms are still different. The classification, provided by R. Ackoff includes the following categories:
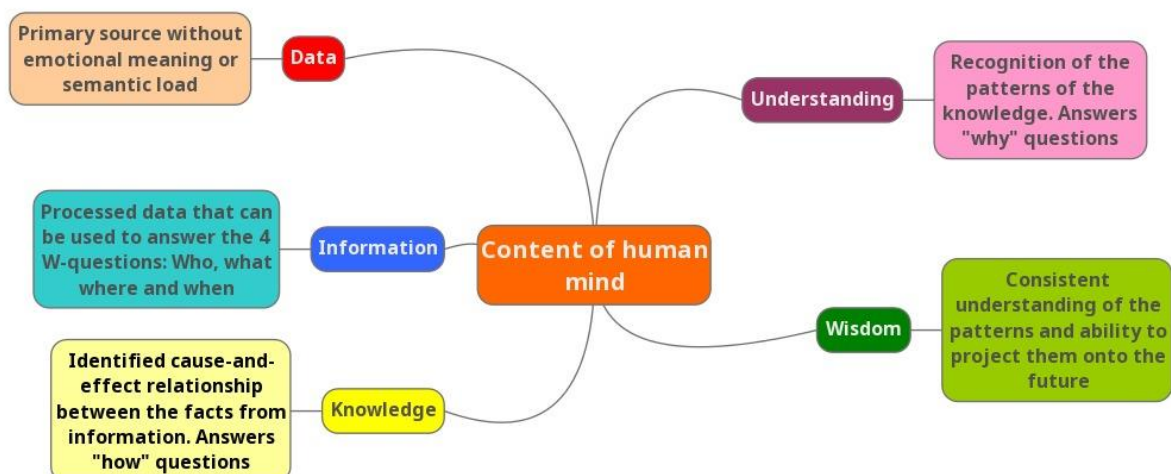
Figire 1. Content of human mind

Knowledge in organization exists and usually classified in two categories: explicit and tacit. The former can be articulated in language, transmitted among individuals, and documented. The latter, on the other hand, is personal knowledge, rooted in individual experience and laced with personal beliefs, perspectives and values (Nonaka 1994, Polanyi 2009, Tiwana 2000). Nonaka (1994) described tacit and explicit knowledge as complementary, not separate, entities. He presented their interaction in the four-stage conversion process: socialization, externalization, combination, and internalization (SECI). Similarly, Polanyi (2009) argued that explicit and tacit knowledge were not separate forms of knowledge, but rather iterative forms of intellectual and practical forms of knowing.

One of the most popular classification of knowledge is division between tacit and explicit knowledge. Helie and Sun (2010) characterized explicit knowledge as "knowledge that can be readily articulated, codified, accessed and verbalized"[1]. In other words, it can the description of the theories, methods, techniques, technologies, machines and mechanisms, structures, systems, etc. Explicit knowledge is stored in the actual physical media (books, paper documents, drawings, diagrams, movies, databases, etc. It means that this type of knowledge is storage and it is easier to process and use this knowledge.

As for tacit knowledge, Polanyi (1966) firstly introduced this term and it is type of knowledge, opposed to explicit. It is personal knowledge, inseparable from individual experience. It can be transmitted by direct contact - "face to face" or using special procedures of knowledge extraction. According to Nonaka and Toyama (2003), the tacit practical knowledge is the key for decision-making process and management purposes.

Nonaka and Takeuchi (1995) also offered a model that represents a continuous transformation and exchange between tacit and explicit knowledge. Conversion of knowledge within the same form or in the transitions between the forms is a result of the following processes:

Explicit and tacit knowledge can be envisioned as the components of an iceberg. Above the water is the explicit knowledge that is easy to transfer or has already been created in the form of data and information (e.g. documentation, check list, shared knowledge in wiki). Under the water is the tacit knowledge that is difficult to transfer (e.g. after action review, idea

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[1] Helie,S; Sun, R. (2010). "Incubation, Insight, and Creative Problem Solving: A Unified Theory and a Connectionist Model". *Psychology Review* 117 (3): 994–1024

management, expert yellow pages). More specifically, tacit knowledge has two different types. One type is the tacit knowledge that can be shared or transferred, e.g. an optional route for transport from location A to location B. The other type is the tacit knowledge that cannot be transferred, as when a person does not realize that he or she possesses the knowledge, or when the knowledge is too difficult to describe. For example, regarding selection of mode of transport, sometimes it is hard to describe the knowledge as there are many influencing factors.

In organizations, knowledge often becomes embedded in documents, repositories, routines, processes, practices and norms, so its transfer between people can be slow and uncertain. Platts & Yeung (2000) asserted that the subjective and intuitive nature of tacit knowledge makes it difficult to process in a logical manner. Much of what makes people use knowledge is the need for social, cultural, and communicational meaning that allows knowledge to be harnessed and shared.

The organizational context is essential for knowledge acquisition, sharing, transfer and reuse. A common context for knowledge sharing helps connect people who need the 2 Concepts and theoretical foundations knowledge (knowledge demand) with those who have it to share (knowledge supply), so that they can reach the same understanding (Davenport et al. 1998). Nonaka, Toyama, & Konno (2000) defined the knowledge place as *ba*. "*Ba is the context shared by those who interact with each other, and through such interactions, those who participate in ba and the context itself evolve through self transcendence to create knowledge. Participants of ba cannot be mere onlookers. Instead, they are committed to ba through action and interaction* (p.19)."

Allee (2000) proposed that knowledge has the feature of wave-particle duality. Knowledge has the attribute of both entity and process. Knowledge can be product as well as process, which is similar to light, which can be recognized as a particle or undulation. Knowledge is an organizational process rather than a static collection of data that can be stored in a database (Nonaka 1994).

Polanyi (2009) emphasized the dynamic properties of knowledge and suggested that it is an activity which would be better described as a process of knowing rather than a use of procedures. Moreover, stated that knowledge is dynamic, not only in individuals, but also at the organizational level where there must be movement for knowledge to be transferred or shared. "Knowledge" is not merely an object that can be "placed," nor should it be confused with representations of knowledge in documents, databases, etc., but it can be seen as a collection of processes that allow learning to occur and knowing to be internalized.

In a word, knowledge is the mix of data, information, experience, and context in the value creation process of organizational activities. It has the following characteristics: embeddedness (individual or organizational), combination of object and process, diversity, ambiguity, and a dynamic nature (Wang 2008).

1.2 Knowledge management
1.2.1 Definitions and terminology

The classic one-sentence definition was proposed by Davenport (1994) during his work in E&Y and it states: "Knowledge Management is the process of capturing, distributing, and effectively using knowledge."

First, the use of KM terminology started in the management consulting companies, when the mass implementation of informational technologies (internet, intranet) led to complication of knowledge used in the companies, at the same time making it more accessible and geographically and hierarchically. Consultants, that helped the organizations to implement systems (dashboards, databases) have gained expertize that they could provide to other companies. However, to market new product properly, it needed a name. And, according to McInerney and Koenig (2011), McKinsey in 1987 were the first to use the term "Knowledge management in their internal study on information handling and utilization. In 1993 E&Y organized a conference in Boston where the first reports on KM were made.

Several years after the definition provided by Davenport, the Gartner Group (Duhon, 1998) have created a new one, that is for the present moment is the most frequently cited one: "Knowledge management is a discipline that promotes an integrated approach to identifying, capturing, evaluating, retrieving, and sharing all of an enterprise's information assets. These assets may include databases, documents, policies, procedures, and previously un-captured expertise and experience in individual workers." In this case, the KM have been named a discipline, giving it breadth necessary for further investigation. At the same time it narrows down the use of the term, as it is only applicable to the knowledge of the organization, when it should include information from all relevant sources.

Since both of the major definitions have the organizational orientation, it is important to mention that KM have received much broader implementation and is now used in many different spheres.

KM describes everything from the application of new technology to the harnessing of intellectual capital within an organization. Early perspectives on KM focused on standardization or utilization of a particular process. Wiig (1993) described KM as the ability to acquire, create, organize, share, and transfer knowledge. Hedlund (2007) suggested that KM addresses the

generation, representation, storage, transfer, transformation and application of organizational knowledge.

A later perspective of KM views organizations as bodies of knowledge. Bhatt (2001) defined KM as the processes and procedures that govern the creation, dissemination and utilization of knowledge by merging organizational structures and people with technology and suggested that KM embodies organizational processes that seek a synergistic combination of data and information processing capacity within information technologies, and the creative and innovative capacity of human beings.

Another description of KM is

$$KM= (P+K)S$$

Here, "*P*" refers to people, "+" means technology, "*K*" refers to knowledge, and "*S*" means sharing, which are essential components of KM. Nowadays there are more perspectives from which to discuss the components of KM, e.g. process, people, technology, organization, society, government.

The main goal of knowledge management is to create an environment within the company that would allow rich, deep and open communication and information access. Since, the majority of big companies are deeply technological and the amounts of information they are processing is unprecedented, the employees of these organizations have become information workers. Fro example, it was stated by Peter Drucker, that the product of the pharmaceutical industry are not pills, but the information, meaning that the research plays the crucial role in creation of company's value. This requires deep, rich and open communication both within the company and its departments and with the environment. In this case, knowledge management is attempting to establish the system that would allow to achieve this level of information exchange.

KM supports achieving organizations' goals in many aspects, e.g. adaption to a competitive environment, goal attainment, pattern maintenance and organizational integration (Wijinhoven 2003). KM is critical to innovation and improvement of product and process, decision-making, and organizational adaptation.

Earl (2001) summarizes three main categories and seven KM strategies based on primary and secondary data. Systems, cartographic, and engineering strategies are based on information or management technologies that largely support and condition knowledge workers in their everyday tasks. Commercial strategy (labeled "economic") is creating revenue streams via the exploitation of knowledge and intellectual capital. Organizational, spatial, and strategic schools

are more behavioral, stimulating and directing management to be proactive in the creation, sharing and use of knowledge.

Other typical theories on KM strategy utilize the perspective of intellectual capital as well as dynamic capabilities. Knowledge in the strategic perspective is a valuable asset and form of capital for the organization. The Intellectual Capital Statement is a strategic KM instrument. Intellectual capital describes the intangible resources of an organization, and is divided into three categories: human capital, structural capital, and relational capital. Business processes cover a multitude of functions, which describe the interaction of people, knowledge and information, as well as operating resources in cohesive steps. They are chains of activities within network-like contexts and organizations. They provide the output that is useful to the customers (Alwert et al., 2004).

Dynamic capabilities are part of organizational capabilities or logistics capabilities at the strategic level. Dynamic capabilities enable organizations to exploit existing knowledge and explore new knowledge to form a competitive advantage. They are critical to knowledge creation, knowledge acquisition, knowledge integration and knowledge reconfiguration, because these KM processes are underpinned by the organizational dynamic capabilities (Verona & Ravasi 2003). Dynamic capabilities and KM share the recognition that knowledge change and adaptation is related to the concept of learning.

1.2.2 Knowledge management instruments

The organizations that want to adapt to the constantly changing environment need to adapt and develop a multi-level knowledge management system. Knowledge is a key resource that creates competitive advantage for these organizations.

To analyze the instruments of knowledge management the author has chosen the ISO 30401:2020 standard that has been issued in 2020. This is the first edition of the standard for knowledge management and the first time that all information about knowledge management has been consolidated in a single body of knowledge.

In the conceptualized model (Kudryavtsev, 2019) (Appendix 1) knowledge management system consists of four interconnected elements: knowledge transfer and transformation, knowledge creation and development, knowledge management culture and enablers of knowledge management system.
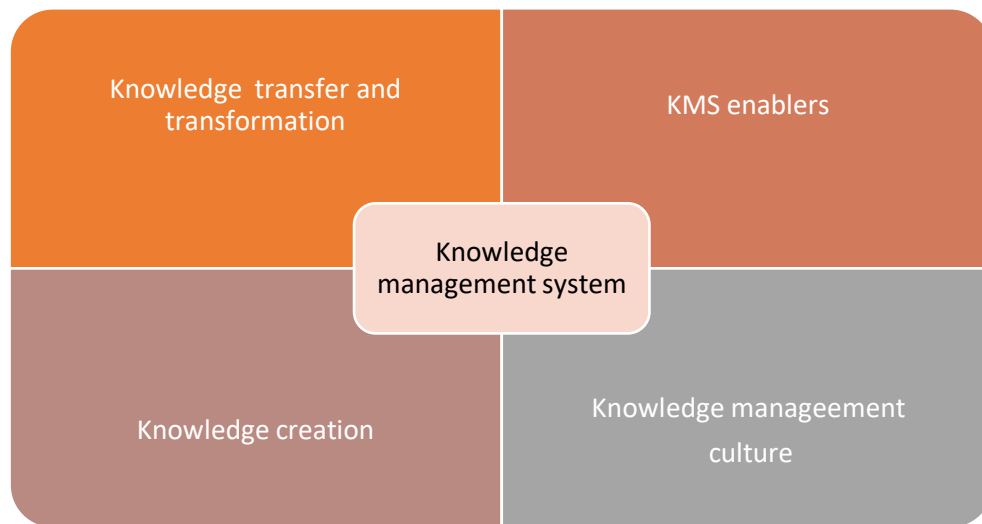
Figure 2. Knowledge management system (ISO 30401:2020)

Knowledge creation and development is acquiring new knowledge, applying current knowledge, retaining current knowledge and handling outdated and invalid knowledge. The main instrument for these purposes are presented in the table below.

Acquiring new knowledge	Applying current knowledge	Retaining current knowledge	Handling outdated and invalid knowledge
• Brainstorming • Innovations (collecting new ideas and suggestions) • Research • Lessons learned • Knowledge acquisition from external sources • Surveys	• Applying results of researches • Holding conferences and masterclasses inside the company • Learning from the previous experience • Creative problem solving (meet-ups, workshops)	• Digitalization of paper funds (libraries, documentation • Documentation and codification of knowledge • Protection of knowledge loss as a result of employees leaving • Fixation of lessons learned • Mentorship • Backup copy of information	• Disposal of knowledge • Monitoring of outdated knowledge • Clarification of knowledge in the changing environment • Archiving

Table 1. The instruments of KM. Knowledge creation and development (ISO 30401:2020)

Knowledge conveyance and transformation include human interaction, representation and combination of knowledge and internalization and learning.

Interpersonal interaction	Representation of knowledge	Combination of knowledge	Internalization and learning
• Community of practice • Brainstorming	• Development of procedures and guidelines	• Classification and taxonomy • Tagging and	• Search and selection of knowledge

• Cross-functional groups • Café of knowledge ("world café") • Implementation of personnel reserve measures • Employee development within the organization • Mentoring, coaching • Storytelling • Shift handover	• Registration of accumulated experience • Work Transmission • Following by examples	labeling • Summarizing and structuring content • Updating committed knowledge	• Review and testing knowledge before making decisions • Briefing • Using checklists • Use of simulation models • Adaptation of new employees • Training (including online training) • Job shadowing

Table 2. Knowledge conveyance and transformation (ISO 30401:2020)

KM enablers include human capital, interorganizational processes, governance, technologies and infrastructure. Since knowledge management culture is closely related to the KM enablers, it will be considered as one more segment of KME.

Human capital	Processes	Technologies and infrastructure	Governance
Fixing roles and responsibilities for knowledge management Programs for the development and assessment of competencies in the field of knowledge management Knowledge management is included in the annual assessment of employees Employee incentive system for the development of KMS	Identification and assessment of critical knowledge Discovering and extracting knowledge from data Fixing and storing knowledge Updating and updating knowledge Knowledge transfer KMS metrics	• Corporate portal • Corporate Wiki • Knowledge base • Electronic archive • Corporate social network • Second opinion systems • Corporate search engines • Mobile apps • Workspaces for collaboration • Recreation zones	Policy (concept, strategy) in the field of knowledge management Service Level Agreements (SLA) Standards for processes, methods for executing procedures in KM

Table 3. KM Enablers (ISO 30401:2020)

1.2.3 General barriers to the implementation of KM instruments

Barriers to the implementation of KM practices in 3PL companies can be classified into four main categories: technological, strategic, organizational and managerial.

Strategy	Organization	Management & Leadership	Technology
The short-term perspective is preferable	Lack of common professional language	Lack of initiatives from the management	Low quality of software solutions
Legal norms	Geographical distance	Lack of time to consider	Lack of suitable solutions
Process of optimization	High turnover rate	Lack of trust to knowledge codification	High costs of developing the solution for new industry
ROI is hard to calculate	High resistance to change	Lack of incentive to share the knowledge as a competitive advantage	Poor hardware
Lack of organizational capital to support KM	Organizational structure does not comply	Time necessary for finding information	Lack of IT literacy

Table 4 KMS barriers Herrmann (2011), Paulin & Sunneson (2012), Gavrilova&Kudryavtsev (2016)

1.3 Third party logistic services
1.3.1 3PL in the World

It is important to distinguish between the types of logistic companies and the ranges of services they provide. **1st party logistics** are organized by the producer. They perform every role in the supply chain, such as packaging, storage and delivery with their own transport. **2nd party logistics** includes outsourcing of different functions. For example they can rent warehouses, hire carriers, etc. However the producing company in still the main responsible party in organizing and controlling the logistic process. **3rd party logistics** involve the full spectrum of services that provider offers to the companies. Their services can include warehousing and storage, transportation, packaging, cross-docking, labeling, etc. Usually 3PL provider never hires contractor, as they have their own resources, vehicles, equipment. The employees of 3PL

companies possess specialized **knowledge base** which allows minimize delivery terms and ensure safe and efficient delivery.

The main difference between 2PL and 3PL provider is in the level of integration into the client's services. 2PL companies usually work on call and has no integration with the whole system.

Advantages of 3PL logistics for the clients:

Clients can rely on expertise and experience of the providers. Building an efficient system of logistics requires high investments and time. The equipment for transportation, storage, IT solutions are constantly updated and improved which allows them to adapt to the changing environment much faster and reduce costs.

The companies don't need to own their own equipment, vehicles, warehouses, etc. Some companies require a specific amount of storage for various elements of their manufacturing and purchasing of the whole warehouses would be extremely inefficient. 3PL providers usually have big capacities in terms of vehicles, warehouses, personnel and network, they can help ship goods nationally and internationally.

The services of 3PL companies allow their clients to focus on their main functions and not allocate their resources to creating a functioning logistic system. In most cases 3PL companies specialize in certain industries. They generate expertise and experience that they use to scale their client's businesses.

Disadvantages of 3PL providers include the loss of control in terms of communications with the final customers of the goods. If 3PL provider doesn't match the expected level of service it can effect customer satisfaction and further business relationship. The only way the client can control the level of service is SLA (service-level agreement).

The exchange of EDI can be problematic if the software of the companies do not match. Also, client need to provide information, which can be risky for many companies.

Another problem that arises when hiring a 3PL provider is choosing the one with the right services that match company's needs.

The logistics services provided by 3PL include basic service and value-added service (VAS). Basic service is usually a standard task (e.g. warehousing, transport, loading and unloading, packaging, distributing, etc.), while VAS is always innovative, individual and special. These services, for example final assembly, packaging, quality control, and information services,

are extended from basic services of warehousing and transport, in order to realize integrated logistics and supply chain management. The 3PL market can be divided into "consumer contract logistics and distribution", and "industrial contract logistics".

Typical services outsourced to 3PL providers are transport, warehousing, inventory, value- added services, information services and design, and reengineering of the chain. The first three are the most common 3PL services and also the most common services outsourced by industrial firms. Some other services provided by 3PL include logistics consultancy and e-logistics management, for example transportation, warehousing, freight consolidation and distribution, product marking, labeling and packaging, inventory management, cross docking, product returns, order management, and logistics information systems.

The features of 3PL include the provision of a broad range of services, a long-term duration, joint efforts to develop further cooperation, the customization of the logistics solution, and a fair sharing of benefits and risks Marasco (2008), Skjoett-Larsen (2000). Logistics services provided by 3PL are usually associated with the offering of multiple, bundled services, rather than just isolated transport or warehousing functions. They focus on the integrated management and execution of several logistical and (sometimes) non-logistical functions in a complex package of services. Moreover, 3PL is experiencing new value chains, and complex networks of collaboration (e.g. party logistics networks, geographical networks of branches, projects of functional networks, intermodal logistics networks). Additionally, they always offer local service that is better for face to face meeting and communication.

Some researchers have categorized 3PL providers as focusing on either VAS and/or solutions. Berglund et al. (2007), who made an extensive survey of Dutch, English, German, and Swedish 3PL firms and shippers, divided the 3PL industry into different segments based on the mission statements of 3PL firms. According to their capabilities in general problem solving and customer adaptation, Hertz and Alfredsson (2003) classified 3PL service providers into four types: standard 3PL providers, service developers, customer adapters, and customer developers.

SCOR model

Furthermore, the position of 3PL in the supply chain and basic service process can be described in the **Supply Chain Operations Reference (SCOR) model**. The SCOR model is an instrument used for deep diagnostic for supply chain management. It is used in all industries and it connects processes, performance, best practices, etc. Their processes include every party of the supply chain, from supplier's supplier to customer's customer. They include all customer

interactions from order entry through paid invoice; all product (physical material and service) transactions, including equipment, supplies, spare parts, software, etc.;

SCOR (supply chain operations reference) model was developed in 1996 by AMR Research and consulting firm Pitiglio. It has been successfully tested by Procter&Gamble, Intel, IBM and others. It was designed to unify the language and to categorize the supply chain management process. It breaks down the SC process into four processes: plan, source, make and deliver. It has been updated several times and the most recent version SCOR 12.0 was issued by the ACSM (association for supply chain management) in 2017. The last version includes two more stages: the return and enable.
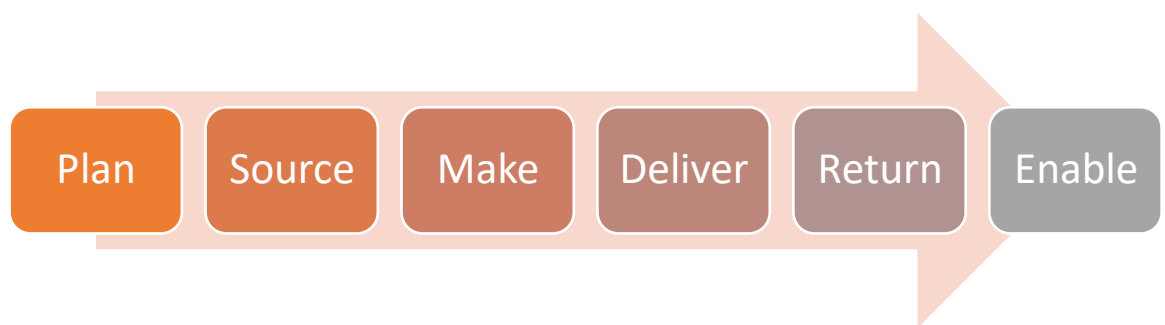
Figure 3. SCOR model (ACSM, 2017)

3Pl companies are involved at all stages of SC process except for "Make". At the "Plan" stage company is responsible for planning maintenance, storage, warehousing, creating transportation plan, calculating the need in resources. The "Source" stage includes receiving final goods from the client and receiving necessary resources from the suppliers. The "Deliver" stage is the primary activity of the 3PL company. It includes shipping the orders from the client to their customers through all transportation nods. The "Enable" phase includes managing information of the supply chain, contracts, compliance, risk management and **knowledge management**.

Framework of 3PL functions.

As it has been said before 3PL logistics provide basic functions, such as warehousing and transportation, as well as value-added services. For this thesis author has chosen the framework that breaks down 3PL logistics into 4 categories (Vaidyanathan, 2015).

Figure 4. Taxonomy of 3PL functions (Vaidyanathan, 2015)

1.3.2 3PL in Russia

The functioning of the Russian economy in modern market conditions is not possible without a well-established logistics system. An effective logistics system of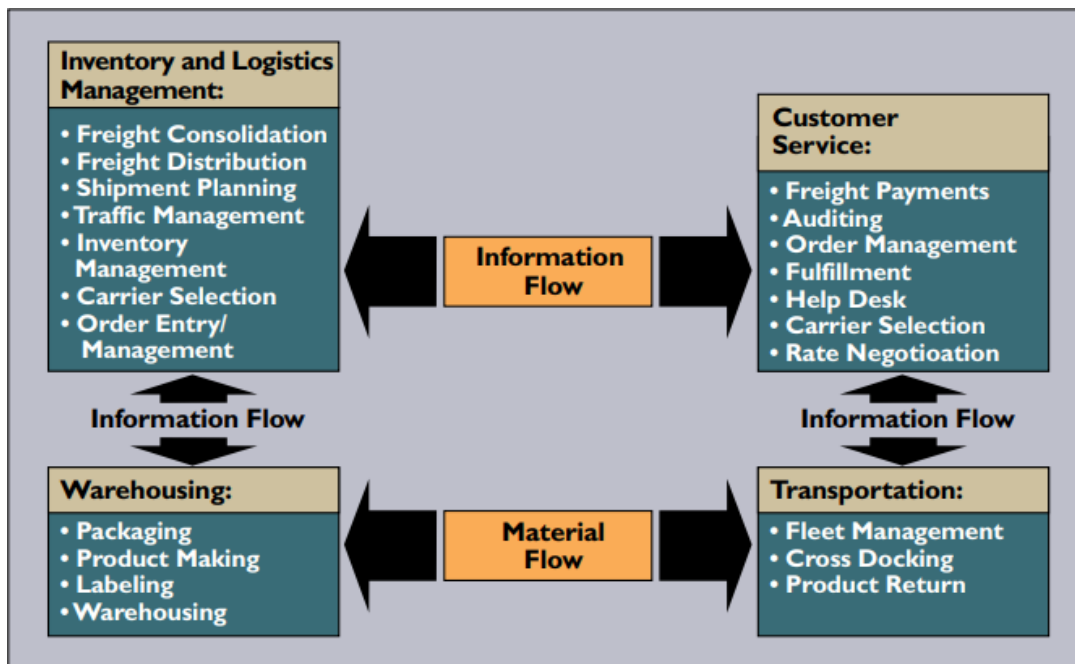 an economic entity ensures not only high quality and shorter delivery times for the end consumer, but also allows the enterprise to adapt to changes in the external environment with minimum costs. It is proved that the level of its competitiveness depends on the level of organization and management of the logistics system of the firm, however, at the present time in our country there are not so many firms that can increase their market advantages due to effective logistic activity. Logistic activity in the Russian Federation is at the stage of formation, which draws attention to its research, main problems and prospects.

According to the rating of the most objective international indicator of the level of logistics development - LPI (Logistics Performance Index), calculated by the World Bank, our country is ranked 90th out of 160 countries by the results of the first quarter of 2014. According to the World Bank, the activity of Russian customs on a 5-point scale is estimated at 2.69 points, infrastructure development 2.20 points, organization of international transportation 2.59 points, legal support and regulation of logistics activity 2.64 points, implementation transportation in 2.85 points, uninterrupted supply in 3.14 points. For comparison, the same parameters in Germany, the leader of the rating, are estimated at 4.12; 4.10; 4.32; 3.74; 4.12; 4.17; 4.36 points respectively. According to experts in the field of logistics, the gap in the levels of development

of the Russian market of logistics services with the market of Western Europe is 8 to 10 years, and in Eastern Europe 3 to 4 years.

The research of the state of the modern logistics system of the Russian Federation makes it possible to identify several reasons for this lag. First of all, this is the imperfection of the organization and management of the transport and logistics and warehouse complex. Until now, many Russian companies have been suffering significant losses because of independent transportation and storing of the goods. In modern business conditions, this business scheme is not always justified from the efficient point of view. Sometimes it is much more profitable for a company not to bear the costs of paying drivers, freight forwarders, storekeepers, loaders, warehouse security, maintenance of cars, gasoline, equipping garages and storage facilities, etc., but to use the services of professional forwarding companies or give their own logistic activity of a third-party organization under an outsourcing contract. Currently, the most popular logistics process, given by Russian enterprises for outsourcing, is the use of warehouses of third-party organizations. However, this service is still inaccessible in the Russian regions, as organizations that have the opportunity to provide a large range of logistics services are most often located in large cities without a developed branch network in the regions.

The problem of transportation of goods in our country is also complicated by the low level of quality of Russian motor vehicles, low throughput and lack of railways. However, there are positive prospects in this area. Implementing the plans of the federal target program "Development of the Russian transport system" (2010-2020) in 2018, Rosavtodor has constructed and reconstructed 84 sections of the federal public roads with a length of 534.2 km, costing 141.9 billion rubles. According to the Federal Target Program in 2020, the transport mobility of the population of the Russian Federation has reached 10,448 km per person per year, the increase in the number of rural settlements provided with constant year-round communication with the public road network on paved roads will be 2.7 thousand. units, the proportion of the length of public roads of federal significance that meet regulatory requirements will increase to 85.1%. The total amount of funding for the program's activities is 11,411.3 billion rubles. (in the prices of the relevant years), including: at the expense of the federal budget - 5429.5 billion rubles; at the expense of the budgets of the constituent entities of the Russian Federation - 59.5 billion rubles; at the expense of off-budget sources - 5922.3 billion rubles.

One of the main characteristics of the development of modern society and the economy in recent times is the ubiquitous integration of various processes into a single system, with the aim of increasing the effectiveness of interaction, including using the results of technical progress. This allows to improve the exchange of information between different departments and participants of the logistics chain, to increase the processing speed and, consequently, the

fulfillment of orders. To this end, a large number of programs and models for process management are being developed and improved in Russia every year.

However, to this day organizations face a number of problems related to the implementation of this principle. This is due to a number of problems. First, not all firms can afford the proper level of technical support. Secondly, many enterprises often have difficulties with the introduction of programs into the existing information system. Thirdly, the strength of the non-negligence of the work or not the high qualification of the staff, often there are various failures, distorting the results, and thus complicating the receipt of complete and reliable information, and also increasing the processing time. Realizing the principle of integration, more and more companies are beginning to devote considerable attention to the organization of interaction between logistics and marketing departments every year. Both these areas occupy an important place in the structure of the organization of work of the enterprise, since they are directly connected with the process of commodity circulation, and also with each other, but they have different goals and principles. Therefore conflicts of interests arise at the intersection of interests, which seriously affect the efficiency of the entire production process of the organization.

But, despite the considerable backlog of our country in terms of the level of development of logistics from the countries of the world, in this sphere, positive prospects have recently appeared. Logistics services in Russia are becoming more in demand, which stimulates the growth of the number of logistics companies, as well as the demand for the logistics profession. For customers of logistics companies, the quality and service characteristics, and not the cost of services, become more important. And this trend is typical even for regions where customers were previously very sensitive to the price. Now they need a set of additional services, such as tracking delivery, confirmation of delivery by SMS, packaging, online monitoring of the dispatch. More and more companies prefer to outsource the management of logistics. Particularly active growth can be observed in the segment of companies that provide integrated services for the delivery of goods, warehouse services, in the field of IT solutions, etc. Significant changes in recent years have occurred in the warehouse segment. One of the priorities for the development of logistics in our country is the construction of modern terminals, not only in the central part of the country, but also in the regions. And, it should be noted that these tasks are being effectively implemented. Both foreign and domestic large logistics companies operating in Russia are developing their own regional network of branches.

Thus, we can draw the following conclusions. The modern Russian logistics system is in the process of growth. The main positive trends in its development are the creation and reconstruction of transport infrastructure, the expansion of the branch network of logistics

companies, including those engaged in outsourcing, the increase in the construction of warehouse and transshipment terminals, the improvement of the quality of logistics services, the development of regional logistics, the formation of modern transport and logistics and warehouse complexes. The main problems faced by modern organizations operating in the territory of the Russian Federation are: lack of necessary transport, high cost of certain types of cargo transportation; poor quality of communication routes; non-conforming to international standards of storage and transportation; insufficient development of the level of information technology in our country and their low prevalence and applicability in practice; conflicts in the interaction of logistics with marketing. Given the high role of modern logistics in the development of modern production and services, the solution of these problems should be one of the priority tasks of modernization and development of the Russian economic system.

The main trends in Russian logistics:

- The losses in the first year of pandemic are estimated at 230 billion rubbles
- Government has implemented measures to support the industry: tax vacations, deferrals on loan repayments, temporary cancellation of rent
- Collaboration and communities for **unique complex services**
- High rise in **outsourcing of logistic services**
- Implementation of latest IT solutions ("IT-revolution") after COVID-19. Development of logistic apps
- Development of national and local supply chains
- Delivery to rural areas.
- Transfer of the majority of employees to remote work on a permanent basis
- Transfer of training and events to an online format

As the result of the pandemic the weaker players have left the market, while the stronger players tend to use latest IT and managerial solutions to stay competitive

1.4 Knowledge management in third party logistics

KM in logistics aims to help employees share, generate, transfer, apply, and innovate knowledge in business process, which will essentially increase an organization's competitiveness and advantages. Effective KM application can reduce times, achieve intelligent logistics, improve adaptability to the dynamic environment, support supply chain management, better distribute resources, and reduce logistics cost.

KM implementation includes KM process, activities, and KM approaches. Typical KM activities consist of combining available knowledge, distributing knowledge, generating

knowledge, and developing new knowledge (Nonaka et al. (1992). In order to analyze the business process and assure the involvement of process owners, Mertins, Heisig, & Vorbeck (2001) identified four core activities of KM in their survey.

KM systems (KMS) can be classified as:

- Integrative instruments (e.g. best practices, lessons learned, and content management)
- Interactive instruments (e.g. yellow pages, expert networks, skills directories, and communities)
- Integrative systems (e.g. knowledge repositories, meta-search systems, knowledge discovery and mapping)
- Interactive systems (e.g. collaboration, knowledge transfer and e-learning push-oriented systems, community builders) (Maier & Remus 2002)

Advances in information and communication technologies (ICT) allow knowledge-based systems to utilize the tacit and explicit knowledge within an organization and afford greater possibilities for individuals and organizations to create and to share that knowledge (Alavi & Leidner 2001). There have been various information system projects and approaches to KM application that placed emphasis on this process, e.g. discussion groups, presentations and shared workspaces (Amaravadi & Lee 2005). Information assets include explicit knowledge such as databases, documents, and tools, as seen in, and tacit knowledge which includes organizational members and their expertise, practical work experience and contributions.

Knowledge is a key strategic resource in complex and logistics supply chains. Today's logistics processes and systems are characterized by an increasing complexity and by the need for global networking to cope with the growing diversity of logistics problems. An enhanced ability to respond to a customer's needs, an increased learning capacity, as well as increased skills and knowledge in cutting-edge products and innovative solutions to problems, would ultimately improve the speed, quality, cost, and flexibility of logistics service.

Prof. Pawlowsky and his team have conducted a huge nationwide company survey (2010/11) on behalf of the Federal Ministry of Economics in order to capture the status quo of KM activities within the German economy. They acquired data from 3401 enterprises, with 225 (6.1%) samples being logistics service providers (Verkehr und Lagerei). The potential influencing factors of KM on business are company size, market dynamics and challenges, business strategy and competency, and management structure. They discussed possible measures

and the most often used approaches of knowledge identification, diffusion, storage and application in industry.

The essence of KM in logistics enterprises is to coordinate knowledge, market competition, management strategy, technology, organization, and people to serve organizational development. Enterprises participating in the supply chain must integrate and share not only general information, but also enterprise knowledge so as to realize the optimization of the supply chain in the network environment.

Neumann has studied on KM and logistics for years. Neumann and Tomé conducted a comparative study of German and Portuguese logistics companies to study the implementation (e.g. role, need, priority, investment) of KM in companies, as well as to evaluate the impact of KM investments on logistics performance. They found that there was still a gap between theory.

Moreover, Neumann (2006) applies a KM perspective to logistics simulation projects and introduced a method for continuous knowledge documentation. This approach aims to enable people in a simulation project to act properly as knowledge stakeholders and knowledge users. It is used for acquisition and storage of knowledge about the structure and organization of logistics systems as well as processes, i.e. running, maintaining or re-designing. The vision of an automatically generated simulation project report is developed at the end. Further, a conceptual framework for KM support in logistics and supply chain simulations was proposed. The study relates logistics and supply chain modeling and simulation to knowledge flow analysis and KM methodology.

Recently, Neumann studied KM within logistics problem-solving processes (logistics simulation projects), which requires a highly experienced problem-solving individual. An intelligent human-computer dialogue is required for accessing this knowledge that contributes to problem solving (Neumann, 2014).

In today's dynamic competitive environment, knowledge can be recognized and accepted as a strategic resource in logistics and supply chain management (SCM) (Autry and Griffis, 2008). Knowledge is a sustainable source of competitive advantage, in an environment where responsiveness is extremely important such as the logistics and the supply chain (Fugate et al., 2009). Knowledge assets have become particularly critical for third-party logistics service companies (3PLs) to achieve their performance goals as logistics services have become even more complex and knowledge-intensive (Neumann and Tomé, 2006). In fact, the role of 3PLs in the supply chain has evolved substantially over the last few decades due to an evolutionary process that has shifted the business model of these companies from an asset-based configuration

(e.g. mainly based on the management of physical assets such as vehicles, warehouses and facilities) toward a more information and knowledge-based model (e.g. providing supply chain information by using several ICT tools and systems) (Evangelista et al., 2013). The management of knowledge is increasingly considered a strategic resource for improving the performance of processes and services carried out by 3PLs (Lee and Song, 2010). In this scenario, the use of sophisticated and integrated knowledge management (KM) systems is essential to support the 3PLs' specific needs as well as collaboration with other supply chain actors and networks (e.g. customers and suppliers) (Rajesh et al., 2011). Thus, it is crucial to implement a KM approach for logistics service companies. Although KM research has grown rapidly in recent years, several disciplines have studied KM from their own perspectives and there are only limited efforts to study the interfaces of KM from an interdisciplinary perspective. This is the case of the interface between KM and logistics service businesses. Despite, the increasing interest in studying KM in logistics (Fugate et al., 2012), there is still a gap in understanding the role of KM in the logistics service industry. In addition, cross-country studies are lacking. As countries are characterized by different business practices, cultures, and logistics systems, the question of interest would be whether these differences do also lead to different KM practices.

3PL enterprises all have their own particular knowledge area, e.g. distribution, warehousing management, forms processing, logistics center planning or logistics operations. Such knowledge in all kinds of business processes is critical for their survival, development and sustainable competitive advantage. Business processes integrate various logistic functions, e.g. transportation, warehousing, VAS. Logisticians integrate a professional knowledge of each of these functions to coordinate resources in an organization. The explicit and tacit knowledge includes a complex combination of organizational processes, information technologies and creative human capacities.

Process	Sub-Process	Critical knowledge
Management process	Strategy	Vision Objective to achieve in 3 years Market dynamics Industry trend Market orientation Logistics resource planning Strategy choice
	Business development	Target business process Performance review Decision for future development of existing businesses Setting up new businesses Business process reengineering

	Performance evaluation	Key performance index (KPI) establishment Performance measurement Key data for evaluation (revenue, working days) Logistics system performance Personnel performance	
Business process	Transportation		
	Warehousing	Warehouse insurance information Consolidation process Facility security information Warehouse network design Warehouse requirements Packing information Storing system information Warehouse equipment and shipment tracking database	
	Tender	Best practices in tender Benchmarking in tender	
	Contracting (agreement)	Contractual issues Tender agreement parties Definition of agreement terms Object of agreement Liabilities and obligations estimates Terms of delivery and packaging Payment terms Ownership of goods in warehouse Early termination Liability for damages Product liability Applicable law and settlement of disputes Time of validity and termination Ownership of intellectual property rights and improvements	
Support	Quality control	Product audit Quality regulatory requirements Quality policies Quality performance indicators Quality process flows Quality control manuals and procedures Audit manuals Process audit	
	Customer service	Customer emergency orders Customer database Customer complaint and feedback system Customer performance indicators Customer satisfaction monitoring plans Customer related problems and solutions Quality deviations Customer database	
	Information and communication	Best practices in IT system Warranty information	

		Wireless and mobile solution information
		E-commerce information
		Global positioning system information
		License for information system
	Human resources	Time standards
		Work load planning and scheduling

Table 5. Critical knowledge components in 3PL organizational processes

Table describes the critical knowledge components in 3PL organizational processes. In management processes, knowledge includes the market, industry, and resources for formulating a logistics strategy, evaluating business performance and developing new business. In business processes, knowledge of freight bill information, transportation booking information and security of goods is essential for transportation practice; knowledge about handling of exceptions and failures in the warehouse, shipment problems and solutions, and warehouse requirements are critical for warehousing management; knowledge of payment terms, liability for damages, time of validity and termination, and ownership of goods in the warehouse of agreement are crucial for contracting (Rajesh et al. 2011). In support processes, workload planning and scheduling, and best practices in IT systems are the prime knowledge for logistics service; product audits, quality process flows, quality policies and audit manuals are important for quality control; a database of the customer's customers, customer performance indicators and customer emergency orders are significant for customer service.

Knowledge levels

Entity	Explicit knowledge	Tacit knowledge
Individual	Operation procedures Basic theories	Operational skills, experiences, lessons, methods
Group	Department regulations Business procedures Cooperation ways	Work skills Methods in the group Solutions from team work
Organization	Technology, patent, management standard	Organizational culture, competency, organizational capabilities
Inter-organization	Market, technology, data analysis of the industry	Customer knowledge Knowledge in inter-organizational project team

First, individual knowledge includes operating procedures and basic management theory (explicit knowledge), operational skills and experiences. Second, group knowledge contains both business departments (e.g. transport, storage, distribution, etc.) and knowledge teams in the organization. Group knowledge includes department regulations, business procedures, methods of cooperation, and basic knowledge of team work (explicit knowledge), as well as those work skills and methods in the group (tacit knowledge). Third, organizational knowledge includes technology, patent, and management standards (explicit knowledge) as well as organizational culture (tacit knowledge). Lastly, inter-organizational knowledge includes technology, market, and data analysis of the industry (explicit knowledge), and customer knowledge and knowledge in inter-organizational project teams.

Research gap

Last decade Knowledge management was a very popular research topic (Nemani, 2009) Literature review provided by (Nemani, 2009) shows that previously KM research papers were mostly devoted to definition of Knowledge Management and Knowledge itself. Nowadays more and more papers directed towards particular business areas. Current study is not an exception. However, the descriptive analysis that focus on the ways 3PL companies solve problems with knowledge management has never been researched.

Chapter 2. Empirical research

2.1 Framework

As the framework for analyzing the common problems the author has chosen Vaidyanathan's framework of 3PL Functions. Based on this framework we identified common challenges that arise in 3PL companies.

Logistics and inventory management	Customer service
Communication between the transportation nods	Effective and transparent communication
Cost planning	Adaptation to the customer's needs
High employee turnover	SLA (service level agreement)
Complying with government regulations	
Warehousing	**Transportation**
Warehouse management errors	Delivery delays
Mismatch of the goods and warehouse facilities	Turbulent environment

Table 4. Common problems in 3PL companies

The framework has been combined with the conceptualized version of KMS and the structure of the interview has been based on this. As for the questionnaire, it has been provided by the Postgraduate students of GSOM who are conducting the broad research on the same topic. The barriers for the implementation have been derived from the literature review. As the frameworks of knowledge barriers and enablers are similar, it has been decided to combine these questions in the interview.

2.2 Methodology

In purpose of choosing an appropriate methodology was conducted a literature review dedicated to determination of research methods were used by other authors. Article (Nemani, 2009) describes what type of research methodologies are used in conducting the research about knowledge management topics. Author claims that conducting KM research all the three major

research methods, such as qualitative, quantitative and mixed methods were used proportionally evenly.

On the basis of stated problem, a qualitative approach was chosen due to specifics of research topic. This approach gives the opportunity to provide in depth analysis of the Knowledge Management systems in chosen industry. The other reason of choosing the qualitative research is difficulty to measure effectiveness of Knowledge management, although there were many researches that prove its advantages (Bo Bernhard Nielsen, 2003; Foss, 2004). Case study research provide the deeper understanding of a complex issue, it provides flexibility for researcher to obtain additional information and focus on the issues that matter for the research. This type of study is also useful for testing whether developed scientific theories and models work in the real world. (Zainal, 2007)

The author uses multiple case study design for the research, because it allows to conduct detailed analysis of each case and compare the results for deep understanding of the topic. By comparing results, the common characteristics were identified. This fact prove that findings are applicable to other companies.

The existing research was conducted on the basis of 2 main sources of data – primary and secondary data. Primary data is provided in a way of a questionnaire and several semi-structured interviews. Whereas secondary represents case studies, companies' reports, information from companies web-sites, conferences materials and books.

To determine how existia semi-structured interview with directors and logistic specialists from different business units was conducted. A semi-structured interview is a qualitative method; it implies that interviewer has a conversation, guided with a set of specific questions, which covers specific topics. The semi-structured interview has the advantage of gain a broader understanding of the respondent's point of view in comparison with a structured interview. At the same time, this method is more precise than unstructured interview, it is definitely more focused and thus better for addressing specific research topics. (Bryman, et al., 2011)

Bryman and Bell (2003) have pointed out that in order to meet the goals of research, researchers should pay attention to the different frameworks for the collection of the analysis of the data. The framing problem is one of the cognitive traps that can influence the findings. The choice of the research design and method is determined by the goals and tasks. Basing on the research approach (quantitative or qualitative), one should choose the most suitable research design.

First, researchers distinguish between quantitative and qualitative research. The main difference is type of data used in the research. Quantitative research is a type of research strategy

that emphasizes quantification in the collection and analysis of data, while qualitative research is a type of research strategy that emphasizes words rather than quantification in the collection and analysis of data. What is more, quantitative research underlines a deductive approach to the relationship between theory and research, in which the accent is placed on the testing of theories, while qualitative research underlines an inductive approach to the relationship between theory and research, in which the accent is placed on the generation of theories (Bryman and Bell, 2003).

As this research is aimed on exploration of methods and instruments companies from third party logistics use, context influences, effecting the choice of instruments between industries, it was suggested to use qualitative research, because information that was collected and research results are purely qualitative and explain results not from the numbers` point of view.

There is a need in a short justification about industries choice. The reason was quite simple. First, the need to narrow the scope of this research and choose one industry allows to conduct a cross-case analysis. Second 3PL industry is knowledge-intensive and quite sensitive to customer requirements and feedback. Then, author`s field of studies during the exchange semester was supply chain management, which made it on one hand easier to study the topic and on the other hand more interesting. And finally, the author managed to find contacts from successful Russian 3PL companies. Of course, living and studying in Russia influenced the decision to contact the companies from the industry, that operate in Russia. However, it does not mean that companies have Russian origins, the only criteria is they are operating in Russia.

2.3 Data collection method

In order to address the research questions, a multiple case study analysis involving a set of logistics service providers has been carried out. The empirical analysis has explored a number of key issues concerning 3PLs' KM practices and barriers in Russia. The case study investigation focused on the analysis of four case companies. Given the scarcity of empirical studies in the field of KM in 3PLs, a case study approach appears to be a suitable research method. One of the main benefits associated with the use multiple case studies is that the comparison of two or more case studies provides concepts that are relevant to an emerging theory and support explorative investigations. Eisenhardt (1989) suggested that four to ten cases provide the necessary frame for evidence to support or reject propositions. The selection of four cases falls within this

recommended frame. The case companies are 3PLs operating in the Russian logistics service markets. In accordance with this approach, a specific methodology consisting of the following four phases has been adopted:

1) case study selection

2) questionnaire

3) interview

4) data description

5) analysis and interpretation

The data collection guide was sent out to the respondents in advance to allow them to familiarize with the topic. The respondents were interviewed by Skype meetings, while clarification and request of further information have been done during the second meeting. It was agreed that company names would remain anonymous to encourage openness of response. Each interview lasted for about one hour. When possible, interviews involved the general manager and the logistics/operations manager in order to obtain both the strategic and operational perspective in relation to the role of KM adoption in the company. Additional information about the companies was collected from a variety of information sources including company reports and company web-pages. In this way, data were triangulated across data sources, which means that data from different sources can complement and support the findings from each of them, and thus improve the validity of the research and increase the richness of the case studies (Yin, 2003). Such information has been integrated with information obtained from the interviews.

As it was implied by Saunders (2007), interviews are used to gather data that should later be analyzed qualitatively. Also it is stressed that the data should also answer "why" question, besides exploration of "what" and "how". Therefore, in the interview structure, the questions are also focused on reasons why this or that company uses this or that instruments.

2.4 Information about the companies

Three companies were involved in the study: all of them of Russian origin and. The selection process has been organized into two steps. Firstly, a range of companies was identified based on the research regarding Russian companies in logistic sectors. Based on this research was created a list of the companies, that were accessible for the interview and research. In the second step, the following specific criteria have been used to select the companies to include in the study:

1) The range of logistic services provided (Neumann and Tomé, 2009),

2) The geographical reach of operations (Fugate et al., 2012).

Thus, the sampling strategy applied was what Patton (2002) referred to as criterion sampling.

For confidentiality reasons, the names of the case companies have not been disclosed and each company has been referred using the letter A, B, or C.

The main characteristics of the case companies.

Company	Size	Geographical reach	Provided services
Company A	Large	National	Inbound service, warehousing, distribution, and outbound service, supply management.
Company B	Large	National and CIS + China	Wide range of services, that include avia transportation. The main service is combined cargos transportation.
Company C	Large	National and CIS	Transportation and warehousing are the core services. Works with supermarkets.

2.4 Data analysis description

The data collected were analyzed into two phases: case description and cross-case analysis. This approach requires that the analysis is done in an iterative manner, where the researchers reconsider the analysis and also the need for new literature to support the analysis (Yin, 2003). Eventually, the resulting patterns can describe simple commonalities.

Chapter 3. Findings of the case study analysis

3.1 Case description

Company A

A was founded in 1994 in Russia and it has started from one railway line Mocsow-Irkutsk. During the time the railway transportation was developing to Ural, Far East with branches in Omsk, Bratsk, Khabarovsk and Vladivostok. In 2008 company started digitalization – clients could see information about cargo online. By 2010 the shipping was organized all over Russia and by 2015 the network totaled at 150 cities. KM is becoming more and more important as well. According to the interviewee (the CEO of the company) KM is associated with the "dissemination of information within the organization" and the company is viewed as a knowledge-intensive company. In the company, a KM system is used and knowledge retention and KM strategies are adopted. The company applies a range of KM tools such as community of practices and sharing best practices.

Company B

B is one of the major Russian carriers, that specializes on the transportation of combined cargoes. It is known on the market of logistics services with optimal terms of transportation, wide branch network and high level of service. The company was established in 2001, it uses auto and air transport for transportation. B delivers cargo throughout the territory of the Russian Federation and the territory of Kazakhstan. Since 2014, the delivery of goods from the territory of China has been opened. For delivery are accepted as small correspondent items, and cargo weighing up to 20 tons. B services are used by more than 300 thousand customers every month: production and distribution companies, federal and regional retail chains, online shops and ordinary residents. The delivery service sends and collects goods from any point within a radius of 300 km from each branch: thus, the service area of B includes about 100,000 settlements. The interviewee, who is responsible for the office and the terminal, stated that KM is the application of knowledge in order to manage and lead an organization. KM was defined as a "tool to share information and knowledge in order to become a more effective and improved organization." According to the interviewee, the company is a knowledge-intensive company. The sharing of best practices is the KM tool used widely in the company.

Company C

The company was founded in 2001 and employs more than 20000 people. C provides services for the delivery of consolidated cargo by road and air transport, transportation of goods by eurofuries and low-tonnage cars, container transportation, as well as services for nomenclatural responsible storage. If necessary, clients are offered multimodal transportation of

goods. C provides transportation of cargo throughout Russia, as well as to Armenia, Belarus, Kazakhstan and Kyrgyzstan. The company develops and offers its customers individual logistics solutions for the transportation of bulky goods and goods that require special transportation conditions, as well as to ensure the regular supply of goods or materials to a large group of recipients, such as, supermarkets. The interview was carried out with the logistics and operations manager of the company and he defined KM as a "set of tools for better client service ", and considers the company as a knowledge-intensive company. Most of the company knowledge is produced internally and it is shared through formal mechanisms. In fact, a broad range of KM tools is used to do this including communities of practice, sharing best practices, after action review. The interviewee stated that in a service company KM is a critical resource to achieve the company objectives.

3.2 Data analysis

Company A

Logistics and inventory management

The knowledge transfer between the nods of the supply chain is executed through the knowledge base that is available to all employees in the organization. This knowledge base has been formed for over 20 years and first was presented in paper form in the main office and later digitalized. All employees have to take part in courses that company bases on the practices of the best, most efficient nods of transportation: warehouses, packaging facilities, transportation, etc. These best practices are taken as the base for the basic and refresher courses. Besides, the company holds weekly briefs between the managers where they discuss the general state of the supply chain, and changes in the company and in the environment. The results of these briefs are documented in the form of the short report and presented in the corporate portal page.

The problem of knowledge leaving the company with employees and transferring this knowledge to the new employees is solved in several steps. First, they have the standardized basic course that all new employees have to take regardless of their specialization. This course contains the general information about the company, its departments and all knowledge about the responsibilities of each of them and communications between the nods. Then, there are specialized courses for the specialists in each department that gives better outlook on the specific of the work. Mentorship programs are presented in several departments, such as warehousing and supply chain management, however they seem to be inconsistent and poorly regulated and are based more on personal initiative of the employees. The process of acquiring the knowledge

from the employees who leave the company is also unstandardized and depends on the initiatives of the employees.

Knowledge about governmental, environmental and other external regulations is collected in the knowledge based and transferred to the employees through it. Before these regulations are actualized, they are sent to the employees as the results of weekly briefs that were mentioned above. If the information is crucial for some of the workers, managers organize compulsory webinars.

While the information regarding the fuel prices and governmental regulations is updated semi-automatically in the knowledge base and on the corporate portal, some of the instructions can be outdated because company has no system of utilization of all used knowledge. This is the reason some of the documents that are no longer used are still store in the company.

Warehousing

In order to provide knowledge transfer between the employees of the warehousing facilities and to avoid error the company uses standardized equipment chosen from the best practices. All new employees who start their work take the online course on how to manage the facilities and how operational processes go. The course also includes the responsibilities of all members of the team and the instructions and processes for working with cargoes. The work itself includes check-lists, and each procedure has written instructions.

When new clients start working with the company it is important to check the compliance of the warehouse facilities with the requirements of the clients. The knowledge about all capacities, nuances and availability is stored in the knowledge base. If the company has worked with this client before, they make a revision of lessons learned from the previous projects. Cross-functional groups are created to provide the knowledge flow between the companies. The body of knowledge from the client containing the peculiarities of their requirements is transferred to this cross-functional group either in digital or physical form and then analyzed and checked for compatibility with the company's capacities that they take from the knowledge base.

Customer service

Before the company enters into a contract, it needs to make sure that employees have accurate knowledge about company's capacities. For these purposes they use knowledge base and create cross-functional groups. These groups combine knowledge in different spheres to get the full outlook.

As it has been said before, to create and capture new knowledge about client's system and peculiarities when start working with new clients, the cross-functional group is created. The knowledge received from the client is studied and then the group makes a conclusion whether the knowledge received is sufficient for the project. If some pieces of information are missing, the group sends the request to the client. All knowledge received is documented and added into the knowledge base. The group in most cases visits the customer's production and examines the goods for better understanding of the requirements. The communication with the client happens through e-mails, calls and in person. On the stages that precede the start of the project, the group and the client have regular meet-ups. When the goods are transferred to work, the client can track it online on the company's website.

Upon the work with the client, a detailed service level agreement is created. Then it is added into the knowledge base and transferred to the employees that have contact with the cargo. It includes warehouses, transport, packaging, etc. Each of these nods has a manager responsible for the execution of the SLA who regulates other employees.

Transportation

Transportation environment is subject to frequent changes. And, as it has been said by the representative of the company, it is crucial for the timely delivery that the employees receive the knowledge about these changes.

Manager follows the cargo online through the company's portal and liaises with the employees responsible for transportation, storage, packaging and delivery. In case of sudden changes, they coordinate with the client and make necessary decisions.

Online tracking of the cargo is available to the employees and to the clients.

Company B

Logistics and inventory management

The main communication and transfer of knowledge between the nods of the supply chain is implemented through the corporate e-mails and phones. There is a tracker for internal use that tracks the movement of cargo and its position at the warehouse. Information about changes in the capabilities of the transportation chain is stored in a common database and taken into account when building the supply chain.

To implement knowledge transfer between the employees who leave the company and the ones that replace them   Employees with expert knowledge are motivated to share this knowledge -

write articles, participate in trainings, conferences and master classes, replenish the knowledge base. When an employee leaves, he transfers all his affairs to the manager, and they, in their turn, transfer them to the employee who takes the place. In case that the leaving of an employee and the arrival of a candidate for his place do not coincide in time, the knowledge is stored in knowledge base and at the manager. The employees get acquainted with the regulations of the company and with instructions for their position.

As for external regulations, the database contains a collection of links to external sources that employees need to familiarize themselves with. A collection of all requirements for each of the divisions are collected in separate documents drawn up by lawyers. When changes are implemented by the government, lawyers change these documents and provide them for employees. Before starting work on the project, managers check these documents.

To support the obsolete knowledge monitoring and utilization with the changing fuel prices, regulations and other factors, company uses corporate website where fuel prices change in real time in calculators and knowledge base requirements are updated as they come in with the help of lawyers.

Warehousing

To manage knowledge transfer to and between the employees at the warehouses to avoid errors of placement, storage, labeling, etc. company B uses codification of knowledge. The company uses the system of QR codes that lead to the information about the cargo, such as the conditions of storage, SLA, etc.

All knowledge is stored in a common knowledge base; employees have the opportunity to find and use all the necessary knowledge using a search engine. Normally it is used by managers.

Customer service

It is important to make sure that employees have full knowledge of company's capacities and their compliance with client's needs before entering into a contract. This is why the procedure for working with a client is regulated by guidelines that were compiled on the basis of best practices. In particular, these procedures include verification and reconciliation with updated databases in terms of capacities and regulations.

To work with new clients, managers are appointed to get acquainted with the customer's needs. Clients make a list of requirements for the company, managers compare these requirements with the company's capabilities and make a commercial offer for clients. After the contract is signed, managers create the note in the knowledge base with all of the client's

requirements. Then, the QR code is created for this piece of knowledge for easier access for employees. During work, customers can track the movement of goods on the company's website; they also receive notifications about the status of the goods.

To transfer the knowledge of SLA between your employees at different levels, upon registration, the cargo receives a QR code that contains all the requirements for storage, packaging, and transportation. When the next node receives this cargo for work, employees read this code and process the order in accordance with the requirements.

Transportation

To transfer the knowledge about transport environment, changes can be reported by employees themselves. If they find that there have been changes in the transport system (unplanned road works, accidents), or there have been changes in the warehouse (system breakdowns etc.), they send the information about a change to the office and information about this is written into the main database.

Company C

Logistics and inventory management:

To manage transfer of knowledge between the nodes of the supply chain, company C has implemented several methods. The company has its own magazine, where the writing of articles is encouraged. Employees involved in various departments share their experience, best practices, studied materials. The corporate portal has the message board with topics made for proposals of improvements. If the topic gets enough support it can be implemented in the supply chain. The main office also has the places for informal communication, that is popular among the employees of different departments, for supply chain, to warehousing. The employee can also take parts in professional events organized inside and outside the company. The information about the company is stored in common knowledge base.

The knowledge capture from the leaving employees is solved through documentation of processes. Knowledge is formalized in documents and when new techniques and technologies are introduced, the expert group creates updates for instructions. Also, when selecting new employees, it is taken into account which systems they have worked with.

The knowledge necessary for operating the supply chain, such as governmental and environmental regulations is collected and combined in the regulatory department. When purchasing new equipment, certificates are checked for compliance with environmental and

other requirements of the CIS countries. Before making decisions, a specially qualified person checks that all safety requirements are taken into account in the planning of the supply chain.

To support the obsolete knowledge monitoring and utilization with the changing fuel prices, regulations and other factors, quality standards are stored in the common database and when the information becomes irrelevant, a team of experts updates the documents and obsolete information is erased. As for the price fluctuations, he company purchases fuel for the project in advance and this cost is included in the cost of services, which reduces the risk of cost changes.

Warehousing

The transfer of knowledge between the employees of the warehouses, all employees undergo general training, which consists of 2 parts:

1) Work with equipment and electronic systems
2) Regulation of processes in warehouses

Since employees study not only their function but the entire process, it is easier for them to navigate and avoid mistakes; they can observe not only their own work, but also the work of other employees. When the goods arrive at the warehouse, they are processed in accordance with the regulations.

All knowledge concerning warehouse facilities is stored in the shared knowledge base that is updated in real time. Information about warehouses is in the documents, but there is no way to check their workload from the office, for example, for this they need to contact warehouse managers.

Customer service

When the company starts working with new clients, it has to make sure that management has full knowledge about the capacities. To achieve this, company uses instructions and control, constant updating of infrastructure details and obligatory verification of data before signing the contract.

When entering a new contract it is important to create and capture new knowledge about their system and peculiarities. Since the company offers individual solutions for customers, that is, a choice of different services offered by the company, first the client specifies the general requirements, if they can be implemented by the company, then the manager goes to the client's place to evaluate the goods and the client transfers all the necessary knowledge that management

documents and adds to the knowledge base, creating the project. Further work with the client is carried out either in person or remotely.

To transfer knowledge of SLAs to the employees, company uses knowledge base. Employees who work with the project get access to it and verify service agreements.

Transportation

To keep in touch with sudden changes in the environment, all employees in the supply chain keep in touch with the dispatcher who has access to the knowledge base. It helps to regulate the delivery.

3.3 Cross-case findings

Logistics and inventory management

As it has been derived from the literature review the main problems in sphere of logistics and inventory management are the following:

- Communication between the transportation nods

These problems arise because of the big geographical distance and big amount of nodes in 3PL companies. In some cases they use simple communication methods, such as e-mails and phones. The main thing that all of the representatives commented on are detailed knowledge bases where they store knowledge about the project, facilities and clients. The access to the knowledge can be open or closed. Another instrument that was named is corporate portal/website. It can fulfil several functions, such as tracking cargoes, e-magazine, boars for proposals, etc. Some companies organize informal spaces where employees from different departments can socialize and exchange their ideas. Two of the companies named online courses as ways to unify knowledge and make it available for everyone. Another way to help exchange the knowledge in the company is professional conferences.

- High employee turnover

To save the knowledge that can leave the company together with employees companies can use codification and documentation of crucial knowledge. Most of the main processes in the companies have instructions. To transfer this knowledge to new employees some companies use online courses, some use mentorship programs. Experts are motivated to share their knowledge and write articles, participate in trainings, conferences and master-classes. In most of the cases

the process of acquiring the knowledge from the employees who leave the company is not standardized and left up to the managers.

- Complying with government regulations

In all of the cases knowledge about the regulations is stored in the knowledge base. Some include links to the external resources necessary for further studying; some have processed and combined information. These documents are regularly updated and are included into the instructions that regulate work with the clients, purchasing of new equipment, etc. Sometimes the information about new regulations is presented in form of webinars.

- Fluctuating costs due to Fuel price

In cases when knowledge becomes obsolete because of the changing environment, companies acquire different techniques to utilize it. In case of fuel prices and other external factors that affect the cost, some companies have calculators that have automatic update. Also, to avoid extra costs companies make contracts with suppliers in advanced with fixed rate that do not fluctuate.

Warehousing

- Warehouse management errors

One of the most common causes for errors at warehouses is underdeveloped knowledge transfer mechanism. To avoid it, companies use knowledge from the best practices, building the system of their warehouses. Most of the procedures at the warehouses are documented and apply check-list. To transfer this knowledge to employees of the warehouses companies use managers or specialized online courses. Some warehouses use system of QR codes that gives employees full information about the cargo, such as the conditions of storage, SLA, etc. The knowledge about the project is stored in knowledge base.

- Mismatch of the goods and warehouse facilities

To receive full information about the company's facilities all considered companies use knowledge base that contains capacities, nuances and availability (in some cases availability need to be checked via warehouse manager). The procedure for working with new clients always includes check of warehouse facilities.

Customer service

- Adaptation to the customer's needs

When companies start working with new clients in all cases they have a set procedure based on best practices that allows avoiding mistakes. In particular, these procedures include verification and reconciliation with updated databases in terms of capacities and regulations. They use instructions and control, constant updating of infrastructure details and obligatory verification of data before signing the contract. Some companies use single managers that lead the project, other have cross-functional groups that allow to estimate the compliance of company's facilities and client's need from different angles. During the work clients can track their goods on the web-sites, come companies also send the notifications about the changes.

- Providing effective and transparent communication with the client

As it has been said before entering into the new contract, companies either create a cross-functional group or appoint the manager to the client. Clients make a list of requirements for the company, managers compare these requirements with the company's capabilities and make a commercial offer for clients. After the contract is signed, managers create the note in the knowledge base with all of the client's requirements. Then the manager or the group goes to the client's place to evaluate the goods and the client transfers all the necessary knowledge that management documents and adds to the knowledge base, creating the project. Further work with the client is carried out either in person or remotely. When the goods are transferred to work, the client can track it online on the company's website.

- Keeping up with the SLA (service level agreement)

SLA is distributed through the knowledge base to the employees that have contact with the cargo. Companies that use QR-codes place the necessary knowledge into it. When the next node receives this cargo for work, employees read this code and process the order in accordance with the requirements. Usually each of these nodes has a manager responsible for the execution of the SLA who regulates other employees.

Transportation

- Turbulent environment

Companies use dispatchers, and employees to report, collect and transfer the information about sudden changes in the environment. If they find that there have been changes in the transport system (unplanned road works, accidents), or there have been changes in the warehouse (system breakdowns etc.), they send the information about a change to the office and information about this is written into the main database. Also, managers follow the cargo through tracking program and coordinate it. In case of changes, they contact with the client and make decisions.

3.4 Enablers and barriers

Strategy and management

The strategy of the companies does not include knowledge management goals. There are different instruments of knowledge management but they are presented as the efficiency improvement system. Top management is not familiar with the standards for KM, such as ISO, that's why they are not included into the system. It is also possible that the benefits from the implementation of the system are non-obvious for the management. However in the recent years due to the pandemic, it has become important for the companies to implement new systems and technologies that can increase the competitive advantage of the company. And for this reason, the management is more interested in implementing the full-fledged knowledge management system.

Organizational and human

The employees are motivated to take part in some of the knowledge management activities. For example, they have to take part in the online courses and get acquainted with the results of the weekly briefs. If there are changes in the systems, employees need to report them and they propose improvements for the regulations and systems. They are be rewarded for the articles in companies' magazines and for taking part in the conferences.

However, even though the online courses are compulsory, their implementation is not always followed up by managers. It can also be hard for employees to find the information they need because of the big amount of obsolete knowledge in some companies. Also large geographical extent of the companies is a barrier for new implementations.

Processes

Companies use a high range of processes, such as documentation of the instructions, knowledge transfer, etc. The main barrier that slows down the flow is the obsolete knowledge and inconsistency in management control.

Technology

The companies use several technologies, that provide knowledge management:

- Knowledge base
- Online courses for employees
- Search engines
- Corporate portal

- Electronic archive

- Collaboration zones

The main barriers regarding the implementation of the new technologies are high cost of development and purchase of the new system, as well as costs of implementation.

Implications and conclusion

In this paper, the knowledge management methods that help 3PL companies solve logistic-specific problems were identified and explained. In order to find out how exactly these instruments were applied semi-structured interviews were conducted as a part of multiple case studies. Three companies were chosen for the case studies, all of them are Russian-based and exist on the market for over 10 years. Each of the companies was interviewed according with the functions of 3PL companies. The research investigates different ways and approaches to the knowledge management in logistics. The finding were described in the chapter Cross-case findings.

The findings obtained show that even though some knowledge management techniques were adopted by the companies, there is still potential for implementation of a full-fledged knowledge management system. Neumann and Tomé's (2006) research on the reluctance of using knowledge management in logistics can still be relevant today. As the logistic industry in Russian is facing new challenges it is crucial for them to adopt new methods and technologies and KM could potentially help them to achieve competitive advantage and continue operations.

The main research question was to find out how logistic companies use knowledge management to solve logistic-specific problems. This question implied two main stages of research: preliminary questionnaire that showed what instruments companies use and interview, that showed how they use these instruments to solve them. The results of the questionnaire are presented in the appendix 3. It has shown that companies tend to use a wide range of instruments that are, however, not united in a knowledge management system. More advanced instruments, such as imitation models, job shadowing, taxonomy of information, storytelling are never used in these companies.

Companies effectively use knowledge bases that are involved on all stages of the supply chain. Cross-functional groups are used to provide quality knowledge capture and transfer between the client and the company. Online learning is adapted to transfer knowledge to employees and involve them in the company. Knowledge capture and creation in the companies mostly happens through documentation of the processes, as well as lessons learned and conferences/publications.

Even though the companies adopt elements of knowledge management none of them had a knowledge management system. The motivation for the employees is inconsistent and knowledge management is not included in the evaluation of the employees in any form. Another weak place for the companies is work with obsolete knowledge. In many cases management

utilization of knowledge can improve the efficiency of supply chains and reduce delays and errors in work. The technologies in the company have started to develop more after the pandemic, however the high cost of development is slowing it down.

Appendix 1. Concept map of required KM-oriented elements in organization according to ISO

Towards conceptualization of ISO standards for knowledge management in organizations (Kudryavtsev, 2019)
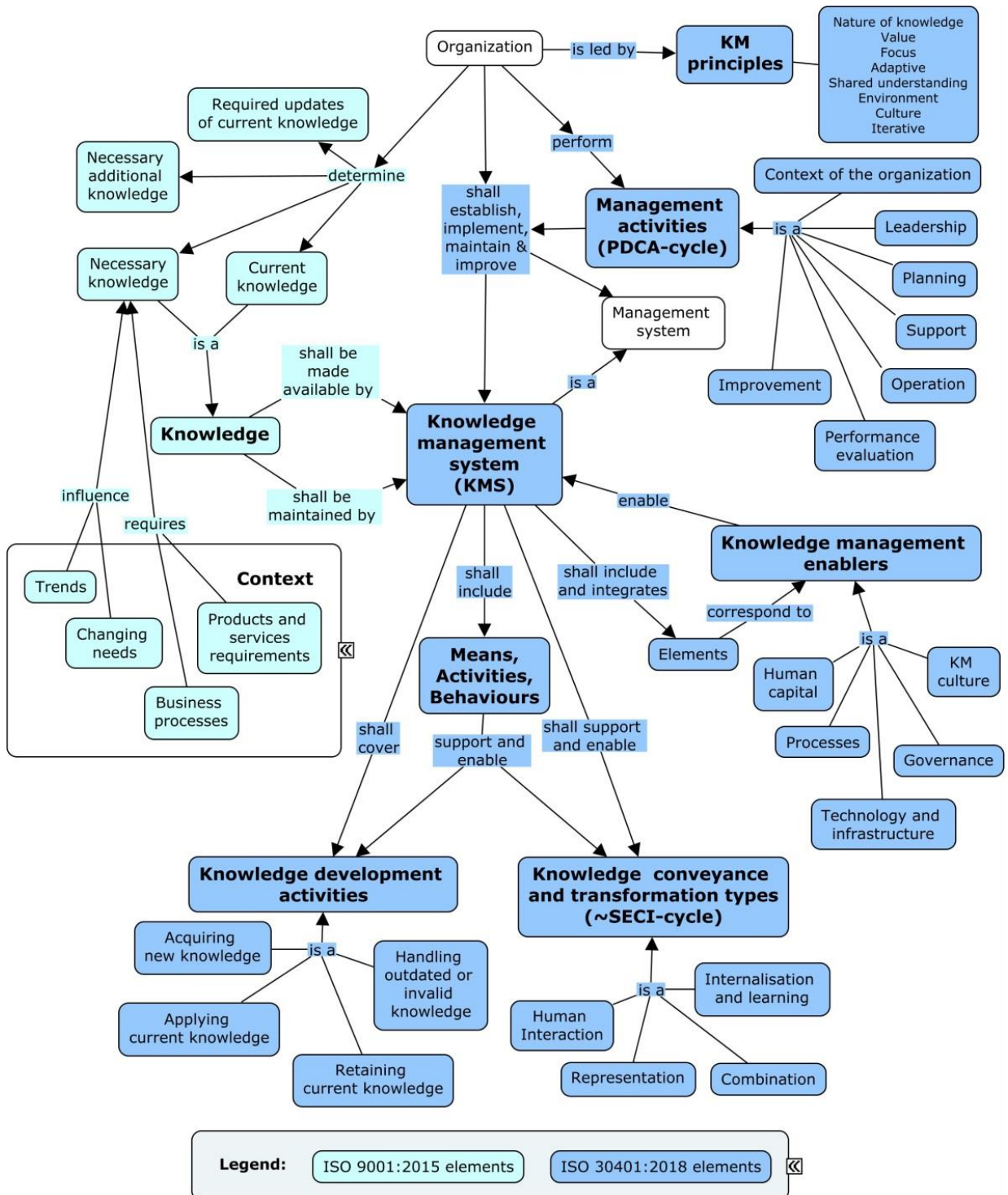
Instruments

Logistics and inventory management:

1. How do you manage knowledge transfer between the nods of SC?
2. How does your company implements knowledge transfer between from the employees who leave the company and the ones that replace them?
3. How do you combine and present knowledge about government and environmental regulations and transfer it to the employees?
4. How do you support the obsolete knowledge monitoring and utilization with the changing fuel prices, regulations and other factors?

Warehousing:

5. How do you manage knowledge transfer to and between the employees at the warehouses to avoid errors of placement, storage, labeling, etc.?
6. Where do you keep the knowledge of your warehousing facilities and processes to help the compliance with the types of goods?

Customer service:

7. How do you make sure that employees have full knowledge of your capacities and your client's needs when you enter into a contract?
8. How do you create and capture new knowledge about their system and peculiarities when you start working with new clients? How do you keep the flow of knowledge during the period of your cooperation?
9. How do you transfer the knowledge of SLA between your employees at different levels?

Transportation:

10. How do your employees receive the knowledge of recent changes in the transportation environment?

Barriers

11. Does the strategy of you company include goal connected with knowledge management? If not, what do you think is slowing the implementation of it?

12. Do you have special incentives that motivate people to use KM in their professional life? If yes, by your estimate, how effective are they? What are the obstacles for people in using KM?

13. What processes do you use to acquire, transfer and retain new knowledge? How do you keep it up-to-date? Do these processes flow effectively? What are the barriers for smooth flow of the processes?

14. What technologies does you company use to provide knowledge management? Why do you find it hard to implement new technologies and use the existing technologies to use knowledge management practices?

Appendix 3. The results of the questionnaire

	Company A	Company B	Company C
Acquiring new knowledge	Innovations (collecting new ideas and suggestions) Lessons learned Knowledge acquisition from external sources	Innovations (collecting new ideas and suggestions) Research Lessons learned Knowledge acquisition from external sources	Brainstorming Innovations (collecting new ideas and suggestions) Research Lessons learned Knowledge acquisition from external sources Surveys
Applying current knowledge	Applying results of researches Holding conferences and masterclasses inside the company Learning from the previous experience	Applying results of researches Holding conferences and masterclasses inside the company Learning from the previous experience	Applying results of researches Holding conferences and masterclasses inside the company Learning from the previous experience
Retaining current knowledge	Documentation and codification of knowledge Protection of knowledge loss as a result of employees leaving Fixation of lessons learned Mentorship Backup copy of information	Digitalization of paper funds (libraries, documentation Documentation and codification of knowledge Fixation of lessons learned Mentorship	Documentation and codification of knowledge Protection of knowledge loss as a result of employees leaving Fixation of lessons learned
Handling outdated and invalid knowledge	Clarification of knowledge in the changing environment Archiving	Clarification of knowledge in the changing environment Archiving	Disposal of knowledge Monitoring of outdated knowledge Clarification of knowledge in the changing environment Archiving

	Company A	Company B	Company C
Interpersonal interaction	• Community of practice • Brainstorming • Cross-functional groups • Employee development within the organization • Mentoring, coaching Shift handover	• Community of practice • Brainstorming • Cross-functional groups • Employee development within the organization • Mentoring, coaching Shift handover	• Community of practice • Brainstorming • Cross-functional groups • Employee development within the organization • Mentoring, coaching • Shift handover
Representation of knowledge	• Development of procedures and guidelines • Registration of accumulated experience • Work Transmission Following by examples	• Development of procedures and guidelines • Registration of accumulated experience • Work Transmission • Following by examples	• Development of procedures and guidelines • Registration of accumulated experience • Work Transmission • Following by examples
Combination of knowledge	• Tagging and labeling • Summarizing and structuring content	• Classification and taxonomy • Tagging and labeling • Summarizing and structuring content	• Classification and taxonomy • Tagging and labeling • Summarizing and structuring content Updating committed knowledge
Internalization and learning	• Search and selection of knowledge • Review and testing knowledge before making decisions • Briefing • Using checklists • Adaptation of new employees • Training (including online training)	• Search and selection of knowledge • Review and testing knowledge before making decisions • Briefing • Using checklists • Adaptation of new employees • Training (including online training) Job shadowing	• Search and selection of knowledge • Review and testing knowledge before making decisions • Briefing • Using checklists • Adaptation of new employees • Training (including online training) Job shadowing

	Company A	Company B	Company C
Human capital	None	None	Employee incentive system for the development of KMS
Processes	Identification and assessment of critical knowledge Discovering and extracting knowledge from data Fixing and storing knowledge Knowledge transfer	Identification and assessment of critical knowledge Discovering and extracting knowledge from data Fixing and storing knowledge Updating and updating knowledge Knowledge transfer	Identification and assessment of critical knowledge Discovering and extracting knowledge from data Fixing and storing knowledge Updating and updating knowledge Knowledge transfer
Technologies and infrastructure	Knowledge base Second opinion systems Corporate search engines Workspaces for collaboration Recreation zones Corporate portal	Knowledge base Electronic archive Second opinion systems Corporate search engines Workspaces for collaboration	Knowledge base Electronic archive Second opinion systems Corporate search engines Workspaces for collaboration Recreation zones
Governance	Service Level Agreements (SLA)	Service Level Agreements (SLA)	Service Level Agreements (SLA)

References

1. Ackoff, R. L. 1989. From Data to Wisdom, Journal of Applies Systems Analysis, Volume 16, p 3-9.

2. Bryman, A., Bell, E., Mills, A. J. & Yue, A. R., 2011. Business Research Methods. First Canadian Edition., Toronto: Oxford University Press.

3. Calder, B. 1977. Focus Groups and the Nature of Qualitative Marketing Research. Journal Of Marketing Research, 14(3), 353

4. Davies, J. & Duke, A., 2005. Next generation knowledge access. Journal of Knowledge Management, 5(4), pp. 64-84.

5. Eisenhardt, K. M. 1989. Building Theories from Case Study Research. Academy of Management Review, 14: 532–50.

6. Gavrilova, T. & Andreeva, T. 2012. Knowledge elicitation techniques in a knowledge management context. Journal Of Knowledge Management, 16(4), 523-537.

7. Geisler, E., Wickramasinghe, N. 2009. Principles of Knowledge Management

8. Hashem, A. 2008. Interview Manual. Ramesh Publishing House, Delhi.

9. Sudhindra L.S. Ganesh K. Arshinder S. 2014. Classification of supply chain knowledge: a morphological approach. Journal of Knowledge Management. 18, 812 – 823

10. Hosseini, M. R., 2014. The Impact of People, Process and Technology on Knowledge Management. European Journal of Business and Management

11. Herrmann, N., 2011. "Barriers for an efficient Management of Knowledge. Experiences from a Southern African Organization." Open Journal of Knowledge Management, Volume 3, pp. 1-15

12. Gan, G. R. C. a. G. R., 2007. The Effects of Culture on Knowledge Management Practice: a Qualitative Case Study of MSC Status Company. Kajian Malaysia, 24 , pp. 97-128.

13. Euzenat J., S. P., 2013. Ontology Matching. Springer, p. 511

14. Davenport, T. a. P. L., 2008. Working Knowledge. Harvard Business School Press.

15. Marra M., Ho W., Edwards J., 2012. Supply chain knowledge management: A literature review. Expert Systems with Applications, 39, 03-11.

16. Nonaka, I. and Toyama, R., 2003. The knowledge-creating theory revisited: knowledge creation as a synthesizing process. Knowledge Management Research & Practice, 1, 1, 2-10.

17. Cerchione R., Esposito E., 2016. A systematic review of supply chain knowledge management research: State of the art and research opportunities. Int. J. Production Economics, 182, 276-292

18. Neumann G. Tomé E. 2009. Empirical impact study on the role of knowledge management in logistics. Int. J. Electronic Customer Relationship Management 4 344-359

19. Neumann G. Tomé E. 2006. Knowledge management and logistics: where we are and where we might go to. Elektroniczne czasopismo naukowe z dziedziny logistyki. 2, 3 145-160

20. Durst S., Evangelista P. 2018. Exploring knowledge management practices in third-party logistics service providers. Journal of Information and Knowledge Management Systems, 5, 37-49.

21. Гаврилова, Т. & Кудрявцев, Д., 2016. Инженерия знаний. Можели и методы: Учебник. Санкт-Петербург: "Лань".

22. Sweeney E., Evangelista P., Passaro R. 2005. Putting supply-chain learning theory into practice: lessons from an Irish case. Int. J. Knowledge and Learning 4 357-372.

23. Moreira A. C. 2009. Knowledge capability flows in buyer-supplier relationships Challenges for small domestic suppliers in international contexts. JSBED, 16, 1, 93-114.

24. Alavi M., Leidner D., 2009. Knowledge Management and Knowledge management Systems: Conceptual Foundations and Research Issues. MIS Quarterly, 25, 1, 107-136.

25. Durst S., Evangelista P., 2015. Knowledge management in environmental sustainability practices of third-party logistics service providers. VINE, 45, 4, 509-529.

26. Bhosale V., Kant R., 2016. Metadata analysis of knowledge management in supply chain: Investigating the past and predicting the future. Business Process Management Journal, 22, 1, 140-172.

27. Schoenherr T. Speier-Pero Ch., 2015. Data science, predictive analytics, and big data in supply chain management: current state and future potential. Journal of Business Logistics, 36,1 120-132

28. Autry Ch., Griffis S., 2008. Supply chain capital: the impact of structural and relational linkages on firm execution and innovation. Journal of Business Logistics, 29, 1, 157-173

29. Lee E., Song D., 2015. The effect of shipping knowledge and absorptive capacity on organizational innovation and logistics value. The International Journal of Logistics Management, 26, 2, 218-237.

30. Radhika D., 2014. The Role of Knowledge Management as an innovative Strategy in Maritime Logistics Management. International Journal of Humanities Social Sciences and Education, 1, 9, 52-57

31. Göl H., Çatay B., 2007. Third-party logistics provider selection: insights from a Turkish automotive company. Supply Chain Management: An International Journal, 12, 6, 379-384

32. Daim T. Udbye A. 2012 Use of analytic hierarchy process (AHP) for selection of 3PL providers. Journal of Manufacturing Technology Management. 24, 1, 28-51

33. Yin, R. K. (2009), Case Study Research: Design and Methods (Beverly Hills, Calif.: Sage).

34. Дресвянников., В., 2016. Управление знаниями организации: учебное пособие. Москва: КНОРУС

35. Zainal, Z., 2007. "Case study as a research method". Jurnal Kemanusiaan, Volume 9

36. Tuomi, I., 2007. "Data is More than Knowledge: Implications of the Reversed knowledge Hierarchy for Knowledge Management and Organizational Memory.". Journal of Management Information Systems, 16(3), pp. 107-121

37. Paulin, D. & Sunneson, K., 2012. "Knowledge Transfer, Knowledge Sharing and Knowledge Barriers – Three Blurry Terms in KM.". The Electronic Journal of Knowledge Management, 10(1), pp. 81

38. McLaughli, S. P. R. a. M. D., 2008. "Barrier Impact on Organizational Learning with Complex Organization.". Journal of Knowledge Management, 12(2), pp. 107-123

39. Esper, T. L., Fugate, B. S. & Davis-Sramek, B. 2011, 'Logistics learning capability: sustaining the competitive advantage gained through logistics leverage', Journal of Business Logistics 28(2), 57–82

40. Hamdan, A. & Rogers, K. J. (2008), 'Evaluating the efficiency of 3pl logistics operations', International Journal of Production Economics 113(1), 235–244

41. Hao, Z. & Yanmei, F. (2009), Game analysis of knowledge sharing in the organization, in 'Management and Service Science, 2009. MASS'09. International Conference on', IEEE, pp. 1–4.

42. Klaus, P., Kille, C. & Schwemmer, M. (2011), TOP 100 in European Transport and Logistics Services - 2011/2012: Market Sizes, Market Segments and Market Leaders in the European Logistics Industry, 4th edn, DVV Media Group.

43. Liu, X. & Sun, Y. (2011), Information flow model of third-party logistics based on internet of things, in 'Computer Science and Automation Engineering (CSAE), 2011 IEEE International Conference on', Vol. 3, pp. 582 –586.

44. Mertins, K., Heisig, P. & Vorbeck, J. (2003), Knowledge Management: concepts and best practices, Springer.

45. Neumann, G. (2006), A methodological approach to improve knowledge explication from logistics simulation projects, in 'Proceedings 20th European Conference on Modelling and Simulation'.

46. Neumann, G. & Tomé, E. (2011), 'The changing role of knowledge in companies: How to improve business performance through knowledge', Electronic Journal of Knowledge Management 9(1), 57–72.

47. Wang, S. & Noe, R. A. (2010), 'Knowledge sharing: A review and directions for future research', Human Resource Management Review 20(2), 115-131.

48. Wiig, K. (1997), 'Knowledge management: an introduction and perspective', Journal of Knowledge Management 1(1), 6–14.

49. Solem O., Liyanage Sh., 2019. Managing firm's logistics and knowledge: the value concept, International journal of learning and change. pp. 239-256

50. Durst S. and Evangelista P., 2018, Logistics knowledge management: state of the art and future perspectives, Knowledge management Research & Practice vol. 16, 2018. pp. 427-434

51. Alberti-Alhtaybat L., Al-Htaybat K. Hutaibat K., 2019, A knowledge management and sharing business model for dealing with disruption: Tha case of Aramex, Journal of business research, vol. 94, 2019, pp. 400-407

52. Arduin P.E. Saidi-Kabeche D., 2022, Dignity in food aid logistics is also a knowledge management and digital matter: three inspiring initiatives in France, Sustainability 2022, vol. 14 (3), p. 1130

53. Pinto, C. A. S., 2020, Knowledge management as a support for supply chain logistics planning in pandemic cases, Brazilian journal of operations & production management 2020 vol. 17 (3) pp. 1-11

54. Wahab S. N. Bahar N. Radzi N. A. M., 2020, An inquiry on knowledge management in therd-party logistics companies, International journal of business innovation and research 2021, vol. 24 (1), pp. 124-146

55. Umar M., Wilson M. Heyl J., 2021, The structure of knowledge management in inter-organizational exchanges for resilient supply chains, Journal of knowledge management, 2021 vol. 25 (4) pp. 826-846

56. Ogulin R. Guzman G., Nuwangi S.M., 2020, Knowledge capabilities in supply chain networks: a taxonomy, Journal of knowledge management, 2020 vol. 24 (3), pp. 655-674

57. Dweiri M., Shahat A., 2021, The effect of knowledge management and advanced technologies on innovative capability, Management science letters 2021 vol. 11 (5) pp. 1451-1462