KNOWLEDGE PROCESSES IN A SUPPLY CHAIN AS THE DETERMINANTS OF AN EFFECTIVE CUSTOMER SERVICE OF A PRODUCTION COMPANY

DOHN Katarzyna, GUMIŃSKI Adam

Silesian University of Technology, Faculty of Organization and Management, Gliwice, Poland, EU,
kdohn@polsl.pl, aguminski@polsl.pl

Abstract

Organizational knowledge management is a very difficult issue for companies due to the fact that knowledge, unlike other organizational resources, is dispersed and requires the use of different approaches and tools. The authors, taking into account long-term research on issues of knowledge management, attempted to determine the validity of the network nature of knowledge flows in the functioning of a supply chain of mining machinery and equipment. The authors particularly emphasized the essence of building and developing stable relationships with mining industry recipients, the creation of flexible distribution channels in domestic and international markets, the exchange of knowledge in the field of mining and information technology and pointed out positive changes on the level of a customer service of a machine-building enterprise.

Keywords: Knowledge processes, customer service, supply chain, machine-building enterprise

1. INTRODUCTION

The dynamic development of a world economy imposed on companies the requirements for becoming a better adaptation to internal and external conditions of their activities. The key to a success in many branches is making appropriate decisions for or refrain from actions both operational and strategic. In manufacturing companies, especially those that perform make-to-order contracts for a small group of recipients, decisions about signing of specific contracts involve corporate resources for many months. Improper decisions in this area unable the full use of the existing potential of a company. Therefore, efficient knowledge processes management is the sine qua non for creating and developing of stable relationships with customers, both in the medium and long term. It is naturally connected with the necessity of knowledge exchange between different participators in a supply chain. The article presents results of the study concerning the implementation of knowledge processes within a supply chain of machinery and equipment provider for a coal mining industry and their impact on the effectiveness of customer service.

2. KNOWLEDGE PROCESSES - ESSENCE OF THE ISSUE

The first attempts to conceptualize knowledge processes undertook Cangelosi and Dill [1] and Guetzkow [2]. The contemporary literature reported a sharp increase in the publication concerning knowledge processes, particularly the functioning of each process individually. Therefore, the process of knowledge creation (knowledge acquisition) was discussed in great detail by Nonaka [3], Song, Van der Bij and Weggeman [4]. The research on knowledge dissemination (knowledge sharing) was conducted by Rindfleisch and Moorman [5], as well as Song, Van der Bij, and Weggeman [6]. On the other hand, integration processes, the knowledge use process can be found in publications by Grant [7], Sherman, Berkowitz, Souder [8], Subramaniam [9] Marsh and Stock [10] Stein and Zwass [11] and Walsh and Ungson [12]. All above-mentioned authors have created many conceptual and empirical ideas within the last decade.

Many researchers emphasize the importance of knowledge processes from the point of view of three concepts: knowledge management, organizational learning and organizational memory. Table 1 shows four most commonly knowledge processes referred to the literature.

Table 1 Four types of knowledge processes [13]

Process Type	Knowledge Creation	Knowledge Application	Knowledge Integration	Knowledge Retention
Definition	Creating and acquiring new knowledge	Deploying knowledge for the production of outputs	Developing and coordinating a cohesive organizational knowledge base	Developing and maintaining organizational patterns
Corresponding evolutionary stage	Variation	Selection	Replication	Retention
Corresponding function	Adaptation	Goal attainment	Integration	Pattern maintenance
Associated knowledge management (KM), organizational learning (OL), and organizational memory (OM) processes	Creation Acquisition Exploration Constructing	Application exploitation	Transfer Conversion Distribution Organizing	Storage Protection Organizational memory Retention maintenance

The first type of knowledge processes is knowledge acquisition, also referred to as the construction and testing of knowledge. The common feature of these terms is to implement new knowledge to the organization. It is realised by the creation of new knowledge within the organization (e.g. through research and development), as well as gaining knowledge from outside or co-create it with other partners. Knowledge creation corresponds to the variation stage of evolution and to what Parsons [14] has called the adaptive function of organizations. Particularly, it corresponds to Zollo and Winter [15] notion of generative variation, which stresses the active role of an organisation in generating variation compared with the random variation assumed in a classic evolutionary paradigm [13].

The second type of knowledge processes relates to the use or exploitation of knowledge. While knowledge creation is the process of a dispersed character, the application of knowledge is a process of convergence, which selects knowledge for specific customer needs. Accordingly, knowledge application is defined as a process by which organizations deploy knowledge for the production of outputs.

The third type of knowledge processes is knowledge integration, which can occur in several varieties, as the transmission, processing, distribution and organization of knowledge. Knowledge integration is defined as the process by which organizations develop and coordinate a coherent organizational knowledge base.

The fourth type of knowledge flows is the retention of knowledge. This corresponds to the process of storing and protecting of organizational memory, knowledge storage and maintenance. The role of knowledge retention process is the development of organizational models that maintain the stability and usability of knowledge at any given time.

Therefore, it can be concluded that the identification of key processes of knowledge management and relationships between these processes allows a company to systematic transformation of information, knowledge, experience, skills and competencies into an intellectual capital. It is difficult to identify and imitate by market rivals, and significantly affects the company's ability to compete and create competitive advantage [16].

3. SPECYFIC NATURE OF RELATIONSHIPS IN A SUPPLY CHAIN OF MINING MACHINERY AND EQUIPMENT ON THE EXAMPLE OF KOPEX MACHINERY

Kopex Machinery is specialised in manufacturing of mining machinery and equipment, rendering services and hire mining machinery. The company’s offer includes machines and equipment as follows: longwall shearers,

shearer cutting drums and roadheader cutter heads, bit blocks for cutting drums and cutter heads, filters for shearer spray, systems shearer. Company also offers welding works of steel structures, in compliance with customers' technical documentation as well as machining and thermal treatment. The company is capable of accomplishing overhaul works of shearer subassemblies as well as pumps and power hydraulics, authorised by Mannesmann Rexroth. Besides, the hire of shearers and shearer subassembies, together with around the clock service is also included in offer.

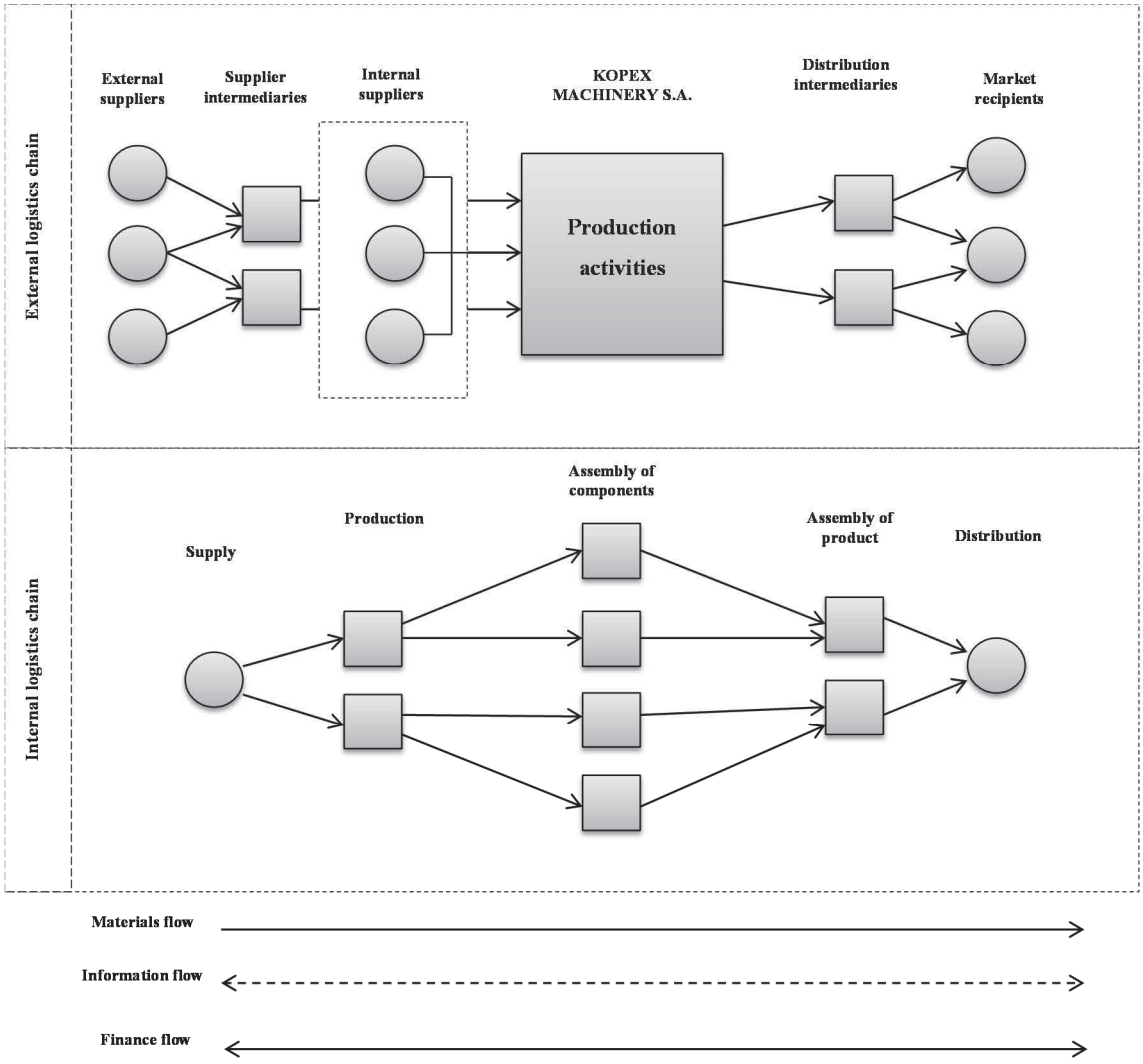

Fig. 1 The structure of a supply chain

Source: own preparation

Kopex Machinery activity is focused on make-to-order production. In relation to all assortment any order is independent and corresponds to the individual needs of a customer. Due to the international nature of the company (international contracts) the contract conforms to the conditions of a country.

Based on the market research, the firm realises a specific timetable for production and maintains the minimum number of standard parts/modules of each product. Depending on the type of product manufacturing, a standard production contribution is from 60% to 80%. Such an action is aimed at optimizing production costs and provide an opportunity to respond to shortening deadlines for deliveries of products. Regardless of this approach, due to the individual nature of the final product and the volatility of an environment, there are cases of interference into the form of a delivered product which are arranged with the client. These changes are most

often associated with so-called accessories (winning organs, guiding elements) and constitute from 5% to 15% of the delivery.

After-sales service, including the supply of maintenance services and ensuring the supply of spare parts, is the strategic activity of a company which creates its competitive advantage. Its character is dependent on the activity in a given market and it is realised through their subsidiaries in a foreign country, which is of particular importance in the configuration of a supply chain [17]. Due to the activity, there is the need of specific knowledge concerning both the product and the activity environment, and therefore there is the need of expert knowledge in the field of coal mining. The company participates in the selection of equipment, its implementation, the exploitation supervision, and in planning and carrying out renovation work. **Fig. 1** shows the structure of a supply chain of manufactured products customized to processes carried out in the analysed company.

4. KNOWLEDGE PROCESSES IN A SUPPLY CHAIN AS THE DETERMINANTS OF AN EFFECTIVE CUSTOMER SERVICE IN KOPEX MACHINERY

The identification of knowledge areas in a supply chain was made in the study in the form of targeted direct interviews with representatives of management board and with the personnel responsible for order processing in Kopex Machinery. The study included the identification of instruments supporting knowledge processes. They are divided, due to subsequent knowledge management processes, into knowledge location, its acquiring, codification and transfer. The respondents were asked about the desired future state of knowledge supporting activities carried out within the framework of an order implementation. On this basis, from the point of view of contract implementation, important knowledge areas were determined in knowledge management processes (**Table 2**), which affect efficient customer service.

Table 2 Key knowledge processes in a supply chain of KOPEX Machinery

Knowledge processes	**Participants of a supply chain /knowledge users/ knowledge creators**						
	External suppliers	Intermediaries of suppliers	Internal suppliers	Manufacturer (KOPEX)	Intermediaries of distribution	Market of recipients	Logistics operators
Knowledge Creation	✓		✓	✓		✓	
Knowledge Application				✓			
Knowledge Integration	✓	✓	✓	✓	✓	✓	✓
Knowledge Retention	✓	✓	✓	✓	✓	✓	✓

Source: own preparation

The study proved that the processes of knowledge acquisition, integration and its use were significantly important elements of all stages of an ordering process and affected the proper functioning of a supply chain. The key factor in efficient and effective execution of a contract is the knowledge of suppliers and customers. The presence of suppliers in a project team improves the access to information and knowledge in relation to new ideas and technologies. However, there are a number of barriers for such a cooperation, including reluctance to knowledge sharing, unwillingness to take responsibility, or the lack of trust between parties.

5. CONCLUSION

Taking into consideration the undertaken study, Kopex Machinery needs actions toward a permanent improvement in business relationships with partners in a supply chain due to the aspect of the importance of

knowledge for high-quality customer service. Storing and selecting technological and logistical knowledge will be increasingly important for customer service (good and bad practices, experience from accomplished make-to-order contracts, customer positioning, the creation of distribution channels, the choice of suppliers). Dynamic changes in technology enforce actions for the development of information systems supporting knowledge management. The authors are co-creators of an IT tool that supports the realization of key business processes in machine-building enterprises. The IT solution I based on the concept of knowledge objects management. The implementation of this tool allows to create the set of best practices containing useful information, necessary for a contract execution and supporting the achievement of expected result in the following areas:

- production planning,
- preparing the timetable of production operations,
- control of production flows,
- production capacity management,
- production control and reporting,
- improvement of material flow processes,
- control of the productivity of realised processes and manufactured goods [18, 19].

The knowledge deriving from above-mentioned areas may easily be transferred across the organization. This requires the development of mechanisms to encourage project team members to record their experience of the implementation of contracts. Codified knowledge has yet to be assessed, identified, compared to knowledge in other projects, and finally selected.

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