Knowledge Management background in Reverse Logistics

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Abstract:
Logistics in business processes is perceived as an efficiently organized system of activities through which a business ensures the flow of material and information from a particular point to a specified location. Final consumption is only seemingly the ultimate point of purposefully arranged activities in the logistics chain. Waste occurs in the process of material flow and is seen as a by-product for recycling and material disposal or liquidation. Final consumption utilizes the rules of complaints which are based on the principle of reverse logistics. The aim is to resolve a problematic issue and achieve customer satisfaction. This paper analyses specific approaches of businessmen to reverse logistics, which anticipate a certain percentage of irreparable production. Thus, paradoxically, the task of reverse logistics becomes the immediate removal of a product from the logistical chain. Its repair and return to the customer is pre-designated as uneconomical. A certain parallel between the flow of materials and reverse logistics of information flow is observed here. Waste, returnable containers, and returned merchandise are not considered as by-products of information. The act of overloading information flows with information that is not evaluated and integrated into already existing knowledge is perceived as a by-product. However, it should be immediately deleted from the system as a by-product. It could become a resource of knowledge for an individual and a business.

Keywords:
Reverse logistics, material flow, information, knowledge, collective knowledge.

Introduction

Logistics is generally understood as a coherently organized system of activities. "The role of business logistics is the overall optimization of material and product flows in a business. It is an integration of partial subsystems into a coherent system, in which material and information flows are coordinated and controlled." [8]. It is a flow that starts with suppliers, and passes through internal changes in the direction of customers, who are considered to be the final recipients of business production. Such a material flow is accompanied with an information flow, which may be an effective source of optimization.

The flow of materials and products is crucially significant in organizational processes of a business. The end result of any business endeavor is a product. A product is seen as a service paid for by a customer. Otherwise, it would not be a product that provides a reverse financial flow for a business, which in turn supports the cyclical and sustainable development of production. Furthermore, "a business can achieve significant cost savings, influence customer satisfaction and hence the volume of sales, and gain significant competitive advantages" [11]. Cost savings can be achieved through effective optimization. Reverse information flow provides information about customer satisfaction with business production, which needs to be reconciled with the needs of customers. If a business properly aligns business opportunities with customer needs, it can easily get ahead of competitors. Competitive advantage, however, is variable. It is an asset for a business. Knowledge assets need to be managed, and that is the role of knowledge management.

"As a result of world trade liberalization, globalization and the development of information technologies logistics has become increasingly focused on quality and customer satisfaction" [1]. Customers have the option to share information about the quality of business production, to express dissatisfaction and announce it via the Internet. The return of purchased goods and the related procedure of complaints must be logistically resolved. Reverse logistics can be a suitable tool to deal with potential customer problems in advance.

1. The importance of reverse logistics for a business

Reverse logistics is often associated with waste and recyclable materials. The environmental perspective of reverse logistics is connected with waste and returnable containers stored in the ground, or with reprocessing, and material recovery. Reverse logistics, however, has a different perspective, in which the environmental context does not play a decisive role. Typical examples of reverse logistics which are not associated with green logistics are as follows [10]:

- reclaimable products,
- the return of inappropriately purchased products,
- the sale of unsold seasonal goods in specialized stores.

The interpretation of reverse logistics is conceptually inconsistent. "Flows of goods returned by retailers due to complaints or unsold inventory fall under the category of logistical operations. There are authors who do not include these flows into the field of reverse logistics. Thus they restrict the scope of waste flows and analyses the options of recycling in the context of increasing environmental requirements "[2]. The process of handling returned goods includes reclaimable products and the sale of unsold seasonal goods, which are identified as typical examples of reverse logistics. Due to the fact that both examples refer to reverse material flows from customers to businessmen and from businessmen to suppliers, or directly to the manufacturer for repackaging, the category of reverse logistics is closely related to this type of material flow.

The last example refers to the return of inappropriately purchased goods. These are products that can be returned by a customer within a specified period of time. A reverse flow of materials brings products and their components to a business. They are not part of production; therefore, it is necessary to deal with them in a predetermined manner. "Returned products and components can be directly sold, repackaged or liquidated (incinerated or placed into the ground). There are alternatives for their recovery, such as repairing, reprocessing, cannibalization, recycling, dismantling "[4]. Returned goods can be sold without any change, or exchanged in the case of damaged or outdated packaging. They can also be liquidated with the aim to save costs. This happens if costs of liquidation are lower than the costs of resale, or the costs of repackaging. Financial efficiency is a key factor that influences the decisions on reverse material flows.

Another alternative option is to change products through repairing or recycling. The decision on product changes is also determined by financial efficiency. The reverse material flow is then linked to the flow of information from the customer. The return of goods is associated with information on customer satisfaction. This determines the choice of alternative options to change products. Product changes should also be economically justified.

Economic justification is an important factor which is taken into account by a business in making decisions about the direction of reverse material flows. "Reverse logistics aims at managing and implementing reflows of reclaimable and unsold goods, packaging, waste for recycling or disposal; it also aims at ensuring new utilization or material recovery in an environmentally and is economically friendly manner" [9]. Thus, management should take into account these two factors in decisions about reverse logistics.

Economic factors can be easily quantified in a business. It is enough to quantify the costs of implementing product changes and compare them with the reverse flows of information from customers which has been evaluated and integrated into the knowledge processes of a business. The role of managers is to reconcile the changes in the knowledge process caused by the reverse flow of information with the organizational processes of a business. The reconciliation of knowledge and organizational processes lies in the fact that a responsible person makes a decision which is based on the most accurate information available at a given time. Thus, costs of change should not exceed the costs which are economically affordable by customers. It is a knowledge management process which does not exist in isolation in any business. Similarly, a reverse flow of information cannot be seen in isolation. It needs to be understood in a broader context as part of knowledge processes of a business. The extent to which the reverse flow of information affects management is a matter of adequate managerial approaches to the management of business processes. Knowledge management offers a solution to the reconciliation of knowledge and organizational processes through the comparison of the costs of product change with the economic and environmental acceptability of change by customers. Moreover, in addition to economic and environmental aspects, knowledge processes of a business evaluate those aspects which may affect management decisions. This managerial approach is called knowledge management of business processes.

2. Process-based knowledge management in reverse logistics

Reverse logistics belongs to business logistics and business logistics is part of the organizational processes of a business. Knowledge management processes refer to knowledge management processes at all levels of management. "Knowledge management refers to knowledge-based management of any business" [6]. Reverse information flow cannot be seen in isolation, and should be evaluated and integrated into knowledge processes in a business, reverse logistics should also be seen as part of organizational processes of a business which does not exist in isolation. It affects both knowledge and organizational processes. Organizational processes require a knowledge-based management. Knowledge-based management is a foregoing form of management based on knowledge.

Knowledge management in reverse logistics ensures effective and efficient decision-making about organizational change, based on the evaluation and integration of reverse flows of information into knowledge processes of a business. In addition, knowledge management "gives space and directs the attention of managers to detect and guide the creation of new knowledge and skills" [7]. Process-based knowledge management introduces new knowledge and skills to a business. It is not limited to isolated flows of information designed for decision-making. It anticipates the future by revealing and directing the collection of data, which can be beneficial both for the solution of tasks and the resolution of problems. Figure 1 shows the structure of information and knowledge-based system of a business.

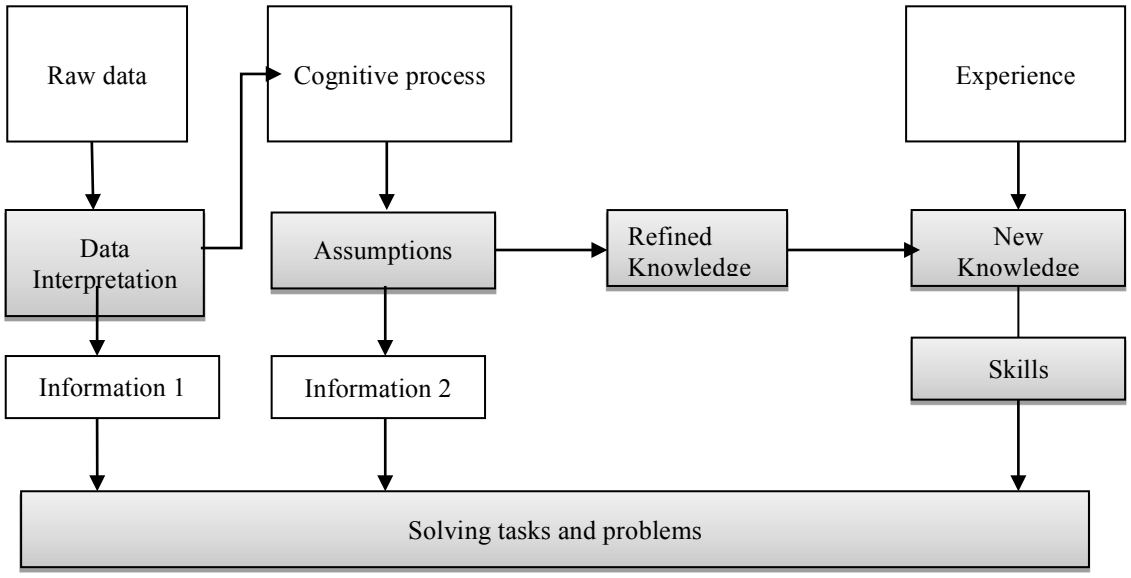

Figure 1 The structure of information and knowledge-based system [5]

Three paths lead to the resolution of tasks and problems. The first path labelled as information 1 is a relatively simple interpretation of data, which lead to the occurrence of information needed for managerial decisions. The second path labelled as information 2 does not interpret the data directly, but based on certain values and beliefs it creates knowledge, which is interpreted as information for managerial decisions. The third path marked as a skill is a continuation of knowledge creation. This knowledge is then evaluated and integrated into knowledge which creates knowledge based on experience. Knowledge is the foundation for skills which are needed by managers in decision-making.

3. Perspective of Knowledge Management in Reverse Logistics

The reverse flow of materials does not always go through the assessment process. Some goods of low quality produced in large quantities anticipate failure. In the case of complaints related to such goods the customer is offered to choose a new product, or a refund. A reverse flow of materials after a complaint is destined for disposal, without repairing. An example is offered to illustrate the scope of efficiency in reverse logistics. The competitive advantage of mass production of navigation lies in the low price of such products. For this reason, low quality production is realized from cheap components. The manufacturer anticipates a 10 percent return of the goods. The role of reverse material flow is material liquidation. The environmental aspect of the reverse process is suppressed. The economic aspect becomes a priority, but this is not consistent with the concept of sustainable development.

The critical advantage of the use of Knowledge Management in Reverse Logistics is that this provides tools for the management of diverse resources and shifting nature of the activities of Reverse Logistics [12].Usually, knowledge management focuses on understanding how knowledge is acquired, created, stored and used in an organization. Knowledge Management in Reverse Logistics integrates information from external and internal elements of the management process of the product returned, aid to allies in Reverse Logistics to make appropriate choices, supports the process, and manages partnerships [12]. The knowledge needed to be integrated in different phases is shown in Figure 2

Origin of knowledge	Type of knowledge	Application of knowledge
Collection Phase	Availability of the collection center Transport distance Transit time Transport costs Product Categories	Inspection / Separation specialized
Recovery Phase	inventory Inspection / Separation Product design knowledge and expertise Cost of remanufacturing knowledge of the time Knowledge of the availability	Product design and development Production planning and control of collection and distribution phase
Distribution	Distribution of cost and time Customer feedback and awareness of the availability of orders	retail customers Phase of recovery and collection

Figure 2: Phases of integration of knowledge in Reverse Logistics [12]

The reverse flow of materials is part of the organizational process of a business. The reverse flow of information should be part of the knowledge processes of a business, which influence organizational processes. The organizational process is influenced through knowledge management as "a managerial approach to business management, with the aim to achieve business objectives, through the alignment of organizational processes with knowledge processes" [3]. The reverse information flow forms the content of knowledge sources. After evaluating and selecting information, knowledge processes are enriched and they affect the organizational processes in a business. Knowledge management should be connected with the creation of a suitable environment for the achievement of goals. It is a managerial approach, which supports work in knowledge communities, communication through knowledge platforms, and the externalization of tacit knowledge with the aim to promote the transformation of individual knowledge into organizational knowledge. High degree of uncertainty being an important characteristic in reverse logistics, the role of knowledge management takes a great level of significance. Streamlining a plan for recollection , sorting and recovery can be challenging. Subsequent processing and decision making relies on the quality of input , knowledge and information which can at times be an unknown factor as well [12]

Conclusion

Reverse Logistics activities require an appropriated Knowledge Management at all stages of return of the product to solve problems that must be addressed in all these processes . Knowledge Management and Reverse Logistics are two areas of knowledge of great interest that grows continuously, but still have a lack of research concerning its interrelations. Reclaimable products, return of inappropriately purchased products and the sale of unsold seasonal goods in specialized shops are associated with reverse material and information flows. Logistics activities are quite complex and have a high uncertainty. By treating the information , the creation of logistics knowledge, especially through the creation of knowledge , plays a key role in value creation .Well interpreted information can be translated into knowledge , which in reverse logistics enables effective and efficient decision-making processes of organizational change, based on the evaluation and integration of reverse flows of information into knowledge processes of a business.

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