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KNOWLEDGE MANAGEMENT IN THE COMPETITIVE CONTROL OF FOOD MANUFACTURING

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ABSTRACT

Food industry is considered as one of the knowledge-intensive sectors explained by its considerable amount of knowledge input, short life cycles of product, high customized products demand and significant production value. Today, information has become more important. Even data, information and knowledge are often used as if they have the same meaning. This problem raises difficulties in engineering. It is necessary to exist a knowledge management system to avoid increased costs, waste of time and increased errors. Knowledge management is a comprehensive process of knowledge creation, knowledge validation, knowledge presentation, knowledge distribution and knowledge application. In this paper, knowledge management has been explained in general. The paper proposes a knowledge management to achieve a competitive control of food manufacturing systems. The model can be used by the manager for the choosing of competitive orders.

KEYWORDS: competitive control, information technology, knowledge management, marketing knowledge.

1. INTRODUCTION

The recognition of the Knowledge Management (KM) imperative will provide an impetus for food enterprise to understand and nurture their knowledge resources and activities.

KM has assumed a broad range of meanings from its inception; however, most of the published material remains ambiguous and provides little empirical evidence to support a specific definition for the knowledge management concept. KM has been acknowledged as being important to competitive advantage and organizational progress.

Thus, a clear understanding and agreement about KM should prove to be of great value for enterprises. As enterprises strive to create a competitive advantage with their products and services, they continue to contemplate the KM concept and the impact on organizational success.

In an effort to define KM, enterprises must determine which corporate knowledge should be harvested, organized, managed and shared.

A general definition has been 'getting the right information to the right people at the right time' in order for them to make better decisions.

Knowledge management implementation is an advantage for the enterprise from the viewpoint of the competitiveness. The new knowledge will be used both in the food enterprise management and to develop new products and new services or make important changes in the business decisions.

By means of learning, the enterprise which uses the knowledge are able to adapt and respond continuously to the changes of the business environment.

An important goal of KM is seen to be the sharing of best practice. So, by improving the flow of knowledge through the food enterprise can be obtained the following benefits:

- the sharing of the best practice concerning business processes;

- the ability to respond more effectively to customer demands.

Due to the fact that technology facilitates the rapid exchange of information, the pace of acquisition is growing exponentially in both large and small enterprises. The vast amounts of knowledge possessed by food enterprises are spread across countless structured and unstructured sources.

To improve processes and bring new products to the market faster and more cheaply, enterprises have to identify, make available and apply this knowledge.

It is necessary to exist a knowledge management system and coordination between disciplines to avoid increased costs, waste of time and increased errors. Thus, information must be understood, organized and transformed for problems solving.

Consequently, information transformed in product is knowledge and coordination of this kind of knowledge is made by means of knowledge management.

The food manufacturing industry faces the challenge of responding quickly to the ever-changing requirements of customers. It is necessary that in these high competitive environments, enterprises control production system dynamics of such as:

- change in the product types and variants;
- change in the production quantities.

International food industry and food supply chains are facing an ever increasing pressure to deliver safe, healthy and attractive food in a highly competitive environment.

Enterprises have to develop and implement more responsive and flexible food manufacturing systems based on knowledge. By this way, they can respond to outgoing and difficult to predict change in production requirements and make products with high quality, low cost and fast delivery.

The market dynamics is further passed to the mode of operation and management. In a knowledge-based society and economy, operations such as determining the relevant information and aggregating them into pieces of knowledge must be automated, because in such a complex and unpredictable environment, they are indispensable tools for creating, searching and structuring knowledge. The interaction between the economic environment and the food manufacturing system is a major source of knowledge about the economic environment and the food manufacturing systems themselves [1].
Defining data, information and knowledge is difficult. It is possible to distinguish between data, information and knowledge is based on external means or from the perspectives of the user.

In [2] it is shown that data are considered as raw facts, information is regarded as an organized set of data, and knowledge is perceived as meaningful information.

Data consists of symbols that represent objects, events, and their properties. Information is data that has been made useful. Information answers who, what, where, when, and how many questions. Information is helpful in deciding what to do, not how to do it.

Knowledge consists of instructions and know-how. Knowledge answers to "how" questions. Knowledge is more than information. Information is data organized into meaningful patterns. Information is transformed into knowledge when a person or an intelligence system reads, understands, interprets and applies the information to a specific work function.

One person's or one intelligence system's knowledge can be another person's or intelligence system's information. If the information can not be applied to anything, it remains just information.

However, a person can take that same information, understand it and interpret it in the context of previous experience, and apply to anything, it is transformed to knowledge [2].

The paper has the following structure: section II presents knowledge management in engineering, section III illustrates knowledge management of food manufacturing, and section IV summarizes the main conclusions achieved.

2. KNOWLEDGE MANAGEMENT IN ENGINEERING

Information is becoming ever more important in engineering. It is not suitable to use data, information and knowledge conventionally. That is there is conceptual confusion. Also, today's technological products need interaction between different disciplines. So the confusion increases more. At the multidisciplinary engineering system, any discipline contains some information peculiar is to the system. However, most of the information means essentially the same even if it is expressed in different terms in different disciplines. Therefore, the available information must be evaluated, simplified and

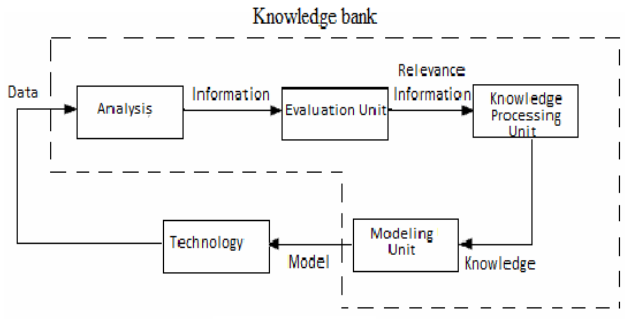

Fig. 1 KM model

transformed into usable form that is knowledge.

Next, the knowledge is coordinated and connected

to the system. So, a kind of know-how is acquired for the technological product. This case is generally based on a model, while it has special characteristics. An example of machining system has been analyzed in the following section. The model produced by technical knowledge which is acquired by the interaction of data, information and knowledge, by the coordination and the application of them on engineering system. KM model is presented in Fig. 1.

KM is a comprehensive process of knowledge creation, knowledge validation, knowledge presentation, knowledge distribution and knowledge application [2]. When KM model is applied by the enterprise into its production process it is obtained increasing competitiveness of the product in the market. That is KM model can be used for every stage of the engineering works such us design, manufacture, maintenance and repair.

3. APPLICATION OF THE KNOWLEDGE MANAGEMENT ON FOOD MANUFACTURING

Food industry is increasingly aware of the long-term benefits of precompetitive cooperation in research.

This type of collaborative research requires a proper knowledge management policy, implemented in organizational processes and supported by dedicated tools. State of the art information technology, referred to as e-science, can alleviate many of the associated problems. By food manufacturing system we understand all the technological systems that are used to produce a specific product.

The food manufacturing system performance depends on how it is run. Also, it is not known an algorithm for the management of the manufacturing system – market assembly, but only algorithms for the technical control of the technological systems and tools of economic management of the relationship between the technological system as a whole and the market.

The control is exclusively technical because there is no economic variable, although this is actually the ultimate goal of any food processing process.

The dynamic changes and the overall progress of society are reflected at company level by many orders in number, small in volume, very diverse, obtained through frequent auctions with short- term response, which leaves no time for a relevant analysis of said orders.

As a result, a long-term management is no longer possible. A sort of fluctuating (just like the market) on-line, fast responsive, prompt and rapid, however, ephemeral management is called for. For these goals we propose knowledge management model of manufacturing system.

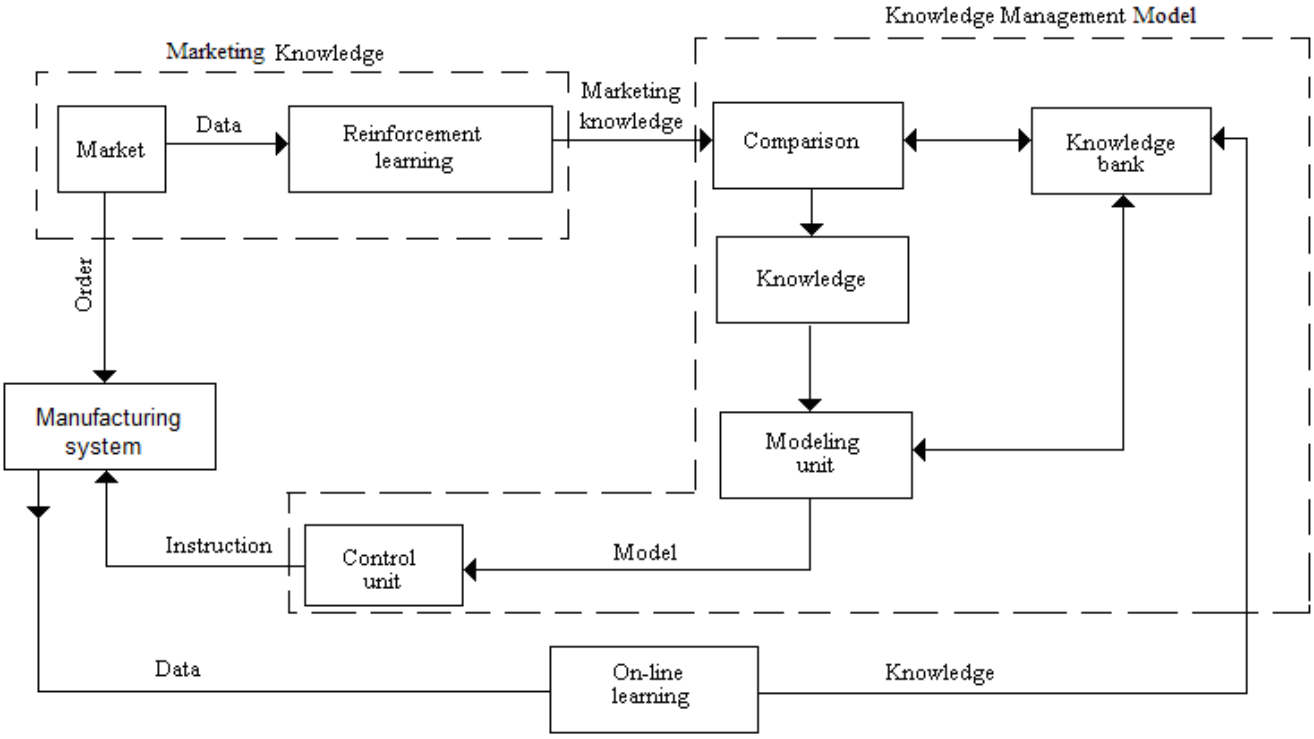

Fig. 2 Knowledge management arhitecture of food manufacturing system

The architecture of KM model of manufacturing system is presented in Fig. 2.

The system showed in Fig. 2 consists of KM model, Manufacturing system, Marketing Knowledge.

KM model contains very important features of the system.

KM model consists of knowledge bank, compare, modeling and control units. The knowledge bank is formed according to the characteristics of the system.

It is very important that information which concerns with subject, correct, update, concordant must be converted knowledge and they must be stored in this unit. It is necessary that this unit becomes a flexible structure because it can be updated depending on the market dynamics and technical characteristics of the new manufacturing products.

The information coming from the Marketing Knowledge-unit are diagnosed by the comparison unit. Also the comparison unit has information-receive ability from knowledge bank. The essential function of the comparison unit is to compare the information and knowledge with each other. The output information from the comparison units is a new knowledge. This new knowledge has been sent to modeling unit.

Not only does the modeling unit receive information from the comparison unit, it also interacts with the knowledge bank. The output of the modeling unit is the model which is analyzed in control unit. This unit sends the manufacturing instruction for to the Manufacturing System. Through on-line learning, the output information from Manufacturing System unit becomes the new knowledge and has been sent to knowledge bank.

The manufacturing system receives contracts after the tenders (competitions) generated by the market offer quatations.

The competitive control means competitiveness assessment, and based on it, an intervention on the manufacturing system through instructions regarding the progress of the food processing in order to obtain maximum competitiveness.

On the other hand, after assessing competitiveness, the management system should enable to develop competitive offer for the tenders. To achieve these two objectives, the competitive control uses the reinforcement learning to get to know the market and the non supervised on-line learning technique to get to know the manufacturing system.

4. CONCLUSION

This paper presents a method for knowledge management in (food) research, supported by advanced information technology. It is based on a generic model of the scientific workflow.

In this paper the architecture of the knowledge management of the machining system was achieved.

Using and comparing marketing knowledge with stored and updated ones the manufacturing model is carried out, analyzed and on its basis are generated instructions regarding the progress of the food processing in order to obtain maximum competitiveness.

By modeling and simulations, the manager can decide if the order is accepted and control the manufacturing system to satisfy the customer demands.

To achieve these objectives, the competitive control uses the reinforcement learning to get to know the market and the unsupervised on-line learning technique to get to know the manufacturing system.

Note that we propose to give managers a knowledge management model, so that they can interact with the economic environment (market).

This knowledge management model represents a technical-economic model that can be used for competitive control of the manufacturing process without requesting experiments and based on the extraction of the knowledge from the previous experience.

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