ECONOMIC AND ENVIRONMENTAL STUDIES No. 7 OPOLE 2005

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KNOWLEDGE AND KNOWLEDGE MANAGEMENT IN AGRO-FOOD SYSTEMS

Knowledge is a justified belief that increases an entity's capacity for effective action.

M. Alavi

1. Introduction

Agro-food system is not a frequently used term. A great majority of both researchers and practicians when talking about agriculture concentrate only on a part of an agro-food system, such as production or distribution of goods. This article presents recent changes that have occurred in agro-food systems, considered as complex networks of mutually interrelated players, and challenges with which they have to cope. Moreover, it also acquaints the reader with the concept of knowledge management and its applicability in agro-food systems. In a perpetually evolving world, where knowledge has become a primary resource [Pietruszka-Otryl, 2003] and a source of competitive advantage in organizations, the issues of knowledge management have been given greater attention.

2. Changes in agro-food systems and new challenges

An agro-food system is such a system within which the whole life cycle of an agro-product takes place, starting with its production, followed by its distribution and processing, until its consumption by the final consumer. Such a system, therefore, deals not only with primary agriculture, but also with all the related industries and services branching off with escalating diversity into other sectors and countries [Agribusiness,

1998]. A simplified agro-food system is depicted in Fig. 1. As can be observed, an agro-food system consists not only of final consumers, but also of buyers of intermediate products and semi-finished goods. Each of the elements of this system (production, processing, final consumption) is interlinked with other sub-systems, which are not illustrated here.

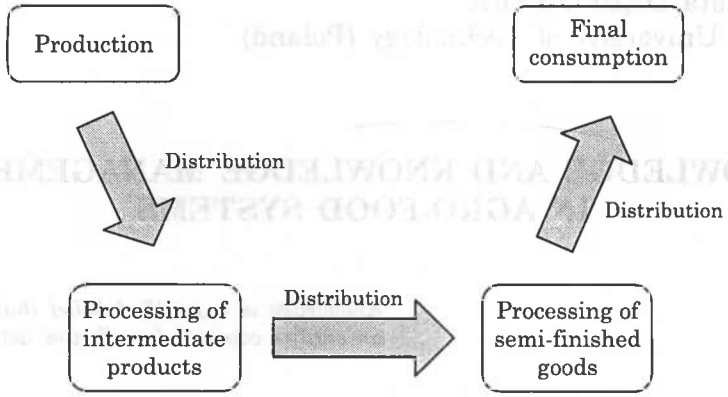

Fig. 1. A simplified agro-food system
Source: Author's own elaboration.

Over the last few years the world agro-food system has undergone several changes. First of all, the characteristics of the supply of commodities have changed from quantitative to qualitative. As a result of people taking greater care about their health and nutrition, the market for organic products has boomed. Secondly, market saturation, globally increasing competition, and the control of food safety have fostered and stimulated quality improvement [Pesagro, 2002].

Furthermore, the environment in which agro-food systems act has become complex, novel and continually changing. An agro-food system considered as a compact structure should posses several characteristic features. First of all, it should ensure sustainable natural resources and agricultural productivity. Secondly, it should have a minimal negative impact on the environment. Thirdly, it should bring sufficient revenue to farmers and farm workers. What is more, production in such an agro-system should be optimized with minimal external inputs. Last but not least, it should supply food and revenue to people [Pesagro, 2002].

Agro-food systems willing to handle these changes and challenges must convert themselves into responsive and flexible innovative systems and knowledge management is a crucial tool in achieving this task.

3. Knowledge and knowledge management in agro-food systems

For the better understanding of the concept of knowledge management, it is crucial to characterize knowledge and its types. There has been a great variety of definitions of knowledge; however, knowledge can be briefly described as "understanding gained through experience or study" [Awad and Ghaziri, 2004, 33]. The WordReference on-line dictionary defines knowledge as "the psychological result of perception and learning and reasoning."[1] Lundvall [1996] has proposed to separate four components of knowledge according to their content, form of communication, and scope of application. These are:

- know-what;
- know-why;
- know-how;
- know-who.[2]

Know-what knowledge is simply the knowledge of some basic facts "that can be broken down into bits and easily codified" [Blumentritt and Johnston, 1999], while know-why knowledge concentrates on scientific knowledge illustrating basic rules and laws of nature. This sort of knowledge fosters technological development and improvement. Know-how knowledge defines abilities and skills required for particular activities and, as such, is most often transferred by experts. Last but not least, know-who knowledge expresses who has adequate abilities and skills for a given task. This component is frequently regarded as essential for an organization's management. Millar et al. [1997] have categorized knowledge into five classes, also referring to Lundvall's approach:

- Catalogue knowledge – know-what;
- Explanatory knowledge – know-why;
- Process knowledge – know-how;
- Social knowledge – know-who;
- Experimental knowledge – what-was.

The last component, experimental knowledge concentrates on past experience and knowledge gained which might appear to be valuable in solving present problems. The aforementioned categories enhanced with another two – know-who and know-when – are depicted below with examples from the field of agriculture.

- **Know-what:** what kind of cultivation pattern is suitable for a farmer

[1] WordReference on-line dictionary, www.wordreference.com, accessed: 19.12.2004

[2] Compare Leja [2003] and Kondratowicz-Pozorksa [2003].

– **Know-how:** how to introduce this particular pattern
– **Know-why:** understanding why the pattern is efficient and profitable
– **Know-who:** who can provide his abilities and skills to help in pattern implementation
– **Know-when:** understanding when the pattern should be adapted
– **Know-with:** understanding how the pattern interacts with the environment.

When taking into consideration the whole agro-food system, not only food production on a farm, another classification may be introduced. According to Alavi and Leidner [2003], the following types of knowledge can be recognized:

– knowledge about customers;
– knowledge about products;[3]
– knowledge about processes;
– and knowledge about competitors and the external environment.

In the face of growing competition, all the participants of agro-food systems have to be aware of their consumers' needs. As consumers have become individualized and behave in an unpredictable way, it is not enough nowadays to collect statistics about customers and their purchases. What is in fact crucial is the hidden knowledge possessed by clients about their needs and desires. Together with changes in people's lifestyle, their wants also change. Only those players who are able to gain knowledge about their customers faster and better than others will succeed.

The second type of knowledge, knowledge about products, delivers information about the characteristics of products present in the market place, while knowledge about processes deals with procedures and interactions governing a farm or a company, as well as innovations. Innovations in agro-food systems involve not only scientific knowledge, but also practical experience and know-how. Innovation entails procedures assuring the mobilization and combination of explicit and tactical knowledge.[4]

The last type of knowledge provides players with knowledge about competitors and the external environment with which they interact. This type of knowledge is crucial for players as it allows quick and flexible reaction to changes in customers' demands and in the surroundings. Players should also possess some knowledge about other players within their system. Such knowledge might be helpful, for example, in negotiating better conditions in an agreement.

[3] As 'products' the author of this article considers not only goods, but also services.

[4] Agribusiness: Knowledge and Innovation Priorities. Aspirations for the 21st Century; http://www.agro.nl/nrlo/english/pdf/9820e.pdf

To conclude, there are several types of knowledge defined within agro-food systems. The classifications of knowledge mentioned above are combined and depicted in Fig. 2.

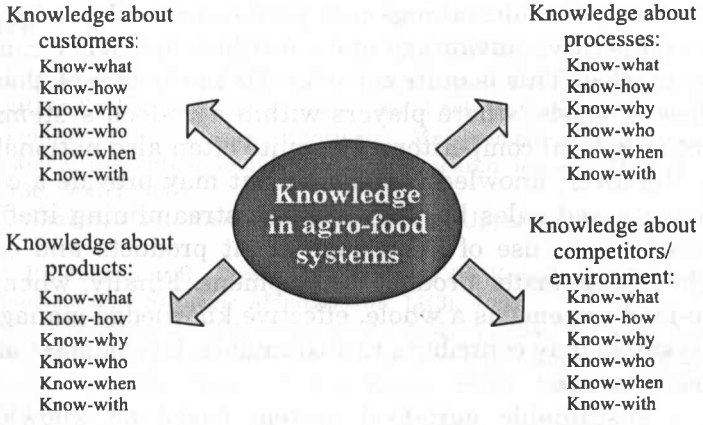

Fig. 2. Knowledge in agro-food systems

Source: Author's own elaboration.

After explaining what knowledge is and how knowledge can be classified, the concept of knowledge management will be discussed in brief. As knowledge has become a source of competitive advantage [see DeTienne and Jackson, 2001] and a vital resource of a company [see Gore, 1999], knowledge management should be of great significance, also in agro-food systems. According to Awad and Ghaziri [2004, 3] knowledge management involves the following processes:

1. implementing accessible knowledge from external sources;
2. employing knowledge in business processes, products, and services;
3. promoting knowledge expansion via the organization's culture and incentives;
4. transferring and sharing knowledge within the organization;
5. assessing knowledge assets/impacts regularly.

All the aforementioned processes should be implemented at each stage of an agro-food system by all its participants.

Here the following question occurs: Why should the players of agro-food systems introduce knowledge management? There are several ways in which agro-food players might benefit from knowledge management. Among such benefits are:

- greater efficiency and effectiveness of actions;
- higher competitiveness;

– streamlined inefficiencies;
– increased sales;
– faster product development.

Above all, knowledge management contributes to greater efficiency and effectiveness of undertakings and performance. Secondly, it might serve as a competitive advantage and contribute to higher competitiveness on the market. This is quite considerable in the face of globalization and free flow of goods, where players within agro-food systems have to conquer not only local competitors, but quite often also national and foreign ones. Moreover, knowledge management may provide a company/a farm with increased sales by, for example, streamlining inefficiencies. Furthermore, proper use of knowledge about products and customers' needs might enable faster product development. Finally, when one considers agro-food systems as a whole, effective knowledge management in agro-food systems may contribute to sustainable development of both rural and urban areas.

Indeed, a sustainable agro-food system based on knowledge and knowledge management might bring benefits not only to rural area, but also to urban communities. These benefits are as follows:

– a decrease in migration from the country to the city;
– reduced expenditure on health due to access to healthy food;
– reduced expenditure on farmers' and farm workers' health due to smaller health hazards connected with, for example, pesticide poisoning [Pesagro, 2002].

If people in rural areas are offered jobs, they are not willing to migrate to the city to search for employment. Additionally, healthy food delivered by rural communities contributes to a reduction in expenditure on health, both in rural and urban areas. Finally, farmers using environmentally-friendly methods based on efficient knowledge management cause a lower level of health hazards to themselves and the community.

4. Conclusions

To summarize, the role of knowledge and knowledge management has been increasing. This concept has been gaining more and more interest in various disciplines and sectors. Also, the agro-food sector has noticed the necessity to implement knowledge management, since it is faced with some major changes in its environment. The flux of customers' needs and expectations, together with a volatile environment, incline players of agro-food systems towards knowledge management. The major challenge which agro-food systems have to face is the implementation of knowledge and knowledge management into their structures. Only

those systems which manage to meet this challenge can benefit from competitive advantage and sustainable development of the whole community.

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