



## Knowledge management and communication in Brazilian agricultural research: An integrated procedural approach

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### ABSTRACT

The great contemporary organizational challenge for enterprises is to create a conceptual and methodological framework allows the management of knowledge by means of networks designed for social interaction. This statement is based on the premise that the competitive drive and sustainable success of the company depend on the introduction of new forms of production innovative processes, which can only be ensured through integrated approaches to knowledge management and the incorporation information technologies (IT). This is a reality that has already been accepted by the Brazilian Agricultural Research Corporation (Embrapa, its acronym in Portuguese), a Brazilian research, development, and innovation (RD&I) institution supporting agricultural sector. For some years now, Embrapa has been incorporating what it has learned about knowledge management into its strategic planning process. In this paper, we present a new approach to managing knowledge and information, and we analyze the need for research institutions to administer the knowledge they produce through an RD&I management model based multi- and inter-disciplinary teams, and multi-institutional research networks.

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### 1. Introduction

Since the beginning of the evolution of man, knowledge has been a driving force in the achievements of civilization. The development of knowledge now takes place largely in the organizational space, where its advancement and the incorporation of technologies are responsible for the introduction of new forms of production and of work organization. This new model has changed the industrial dynamic in the developed world and highlighted the central importance of innovative processes, which have become dependent on technological, organizational, and institutional evolution.

Moreover, the major economic, social, environmental, political, and cultural phenomena permeate all dimensions of human life, including the corporate world. Organizations, guided by new management paradigms, are attempting to survive in a highly competitive and globalized environment. It can be said that the XXIst century is being marked by profound changes in manufacturing processes, based on new models of human and inter-institutional relationships with a focus on innovation. In a context of uncertainty, worsened by a major international economic crisis with conse-

quences that have yet to be measured, there is a need for rapid and strategic adaptation of political, economic, and social organizations to ensure survival in an extremely vulnerable environment. What we are facing is a changing techno-economic paradigm requiring a new and integrated management approach. A relevant option that emerges in this scenario is knowledge management, because it enables the strategic use of information to build consensus and promote organizational learning, in turn creating new knowledge to facilitate decision-making (Choo, 1998).

A concrete way for companies to increase their competitiveness is to understand that all their knowledge, either embedded in their products and organizational processes or stored in the minds of their people, can be managed, because it is the result of a social interaction dynamic. Those companies that dominate in the field of knowledge management show greater capacity for technological innovation, which results from the creation of processes, products, new skills and technical expertise, infrastructures, and technologies that facilitate the creation, transformation, and dissemination of knowledge. The great contemporary business challenge is to create a conceptual and methodological framework that enables a company to manage its knowledge in a web of social interaction.

This paper is aimed at analyzing, from a theoretical and exploratory point of view, the way in which the conceptual ideas embodied in the current approaches to knowledge management

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and communication inter-relate. An approach encompassing these two concepts is essential, because, at the heart of the problem of defining and implementing models of knowledge management, communication has the role of making information flow in the network of relationships and social interactions.

We can say that, in a knowledge-based society in which the communication occurs in complex environments marked by uncertainty (Giddens, 1991), companies lack an effective process of communication.

For this analysis, the Brazilian Agricultural Research Corporation (Empresa Brasileira de Pesquisa Agropecuária—Embrapa) was used as a reference. It is a public company, linked to the Ministry of Agriculture, Livestock and Supply of the federal government of Brazil.

Our work here is divided into two sections, in addition to this introduction and our closing remarks. In the first of these, the general context of Embrapa is presented, highlighting its strategic need for knowledge management and the role of communication in this process. In the second, a conceptual discussion is developed about the interface between the knowledge management and communication approaches, to underscore the aspects that may contribute to the definition of a knowledge management model. In the closing remarks section, we offer some further thoughts and the outlook for information management in agricultural research companies.

## 2. Management system research at Embrapa

Today, the mission of Embrapa, founded in 1973, is to seek solutions to development and innovation issues in tropical agriculture. Technology transfer is also part of the innovation process, as it provides the opportunity for the technologies generated to be implemented (Embrapa, 2008). Over its 37 years, Embrapa has been guided by building the scientific knowledge that has revolutionized tropical agriculture. Its success is due in large part to understanding that both the marketplace and the society are sources of information that can help prioritize future actions.

In its Vth Master Plan for the period 2008–2011–2023 (Embrapa, 2008), new institutional policies for the planning of research and strategic management of the company were drawn up, based on new scenarios and future challenges that are currently envisaged. As a consequence, it has established a research model, the Embrapa Management System (SEG, its acronym in Portuguese), the orientation of which is the development of a process of technological innovation and the strengthening of sustainable development.

### 2.1. Embrapa Management System (SEG)

In addition to recognizing Embrapa's need to embrace the new economic, social, ecological, and environmental values, the SEG brings together the common interests of various social agents through converging of concatenated actions. These actions are executed through a macroprogram designed to meet the demands of the society and which comprises the strategic guidelines, specific objectives, resources, and forms of communication for innovation.

From the standpoint of an integrated, inter-disciplinary, and preferably multi-institutional network, the projects developed within the framework of the macroprogram combine various features, especially intangible ones, in order to produce new knowledge and technologies. Thus, the research model set out in the SEG focuses on the social interaction that occurs within research projects, in the learning processes that are developed, and in the generation of knowledge based on collaboration and cooperation among peers.

In establishing the SEG, the company confirmed its belief that knowledge management is a necessary management policy,

because it is concerned with the expansion of the capacity of both individuals and research projects. This shows that Embrapa's interest is not limited to managing the knowledge produced, but also to identifying how it is produced through research projects. In this context, communication at Embrapa has the strategic role of supporting the actions of competitive intelligence, which contributes to ensuring institutional sustainability. Among the strategic guidelines established to promote RD&I, the construction of tools and strategies focused on the use of new technologies and the organization of the knowledge management process are of prime importance.

In addition, the company proposes to adopt an innovative strategy for the transfer of knowledge and technology in order to create, maintain, and expand formal and informal spaces for dialog between the institution's internal public and its external public. This strategy will strengthen organizational intelligence and establish a policy of participatory management.

This view, related to knowledge management and the role of the communication process, is dynamic in nature and its premise is collaborative, on the one hand ensuring greater adherence to its mission and institutional objectives, and, on the other, the possibility of implementing policies and management practices that promote/increase the generation and dissemination of new knowledge.

Fig. 1 shows the general structure of the SEG, in which there are three levels of performance. At the strategic level, foresight actions aimed at seeking guidelines for RD&I, technology transfer, communication, and institutional development are organized and implemented.

At this level, the Embrapa Master Plan and the Institutional Research Agenda are produced, which list societal demands in broad strokes and set strategic directions, as well as identifying the resources and forms of communication that will enable the company to fulfill those needs. At the tactical level, the company's project portfolio is managed. The portfolio consists of six macroprograms, which must be implemented by sharing resources, both tangible and intangible, provided through its internal infrastructure and its partners. At the operational level, projects are carried out and RD&I processes are incorporated into the six macroprograms at the tactical level, to align them with the company's strategies and research units.

## 3. Knowledge management and communication: interfaces and dialogs

The literature has been steadily strengthening the interface between the process of knowledge management and business communication, the latter understood as one of the critical elements in the success of the former (Martensson, 2000; Sharp, 2003). Historically, forms of communication have always been associated with the socioeconomic model of progress and development in a society. The process of communication in companies has for a long time been regarded as having a merely instrumental and functional character, but is now considered to be an important and sophisticated practice that contributes to the achievement of organizational objectives. The need for greater transparency in the relationship with stakeholders means that companies have to plan, build, and strategically manage communication, maintaining a close relationship with all its audiences (Tapscott & Ticoll, 2003).

Because of the dynamic character of communication in the digital age, companies try to enter into intense and permanent communication process, and this effort should be guided by the concept of the social network. This concept adds a new communication pattern to the relationship among the members of a group, but it also makes that relationship more complex and dynamic, and prevents it from following a predetermined track.

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