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**KNOWLEDGE  
TRANSFER  
MECHANISMS:  
THE CASE OF THE  
MOZAMBIQUE  
AGRARIAN RESEARCH  
INSTITUTE FROM 2013  
TO 2015**

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**Abstract:** This paper entitled: “Knowledge Transfer Mechanisms: The Case of the Agraria Research Institute of Mozambique from 2013 to 2015”. The aim of the research was to study how the employees of the Institute of Agrarian Research of Mozambique (IIAM) carry out the transfer of knowledge between the institution to which they are assused and the entities interested in acquiring knowledge or technologies, within the framework of the Trilateral Project to Support Food and Nutrition Security Programs (PSAL), especially, turned to generation, testing and transfer of agrarian technologies applied in the professionalization of horticulture, as a pilot project resident in the southern region of the country. It is a qualitative research, having been carried out on the database, through an interview survey. Having been applied to three distinct groups: i) technicians and researchers of iiam; (ii) extensionists and; (iii) farmers or growers of vegetables assisted by IIAM. Twenty-two interviews were conducted with iiam technicians and researchers; 7 extension ists and 5 farmers. The research showed that IIAM uses tacit and explicit knowledge in the mechanisms of knowledge transfer, both with greater prominence, between Embrapa and IIAM. Farmers are aware of the role of Research and extension in the transformation of their production systems, still quite eager for technologies to increase production and productivity.

**Keywords:** Knowledge transfer; transfer mechanisms; knowledge; technology.

## INTRODUCTION

The level of development of countries these days depends heavily on the knowledge produced not only at home but also at international level. Mozambique belongs to the group of developing countries with

<sup>1</sup> The role of agrarian research is to study, research and generate technological solutions that are applied not only in the context of food security but also in the context of agribusiness (Schmink et al., 2017).

<sup>2</sup> Bulletin of the Republic, 2004.

enormous difficulties in producing knowledge to overcome their social, economic and food difficulties.

To overcome such difficulties, Mozambique has been making strong investment bets in the research area, through the creation of research institutions and knowledge development, such as universities and institutes, on the one hand, and the strengthening of bilateral and multilateral partnerships with the purpose of bringing what the country needs most in order to be able to create valuable knowledge that facilitates the generation of knowledge, on the other, and consequently enters the so-called “Knowledge Economy”.

Research and extension fell to disuse soon after independence, especially when the 16-year war broke out (1976-1992), where the country imported everything it needed to ensure the survival of its populations (food). During this war, yield crops (cotton, cashewnuts, sugarcane) and other food crops (corn, beans, rice) were given greater primacy, but it was forgotten that the health of the population also depends on fruits and vegetables.

This is probably the reason that right after the war, when the partners come to help Mozambique remake the agrarian research programs.<sup>1</sup>

This is how in the 1990s, the IIAM – Institute of Agrarian Research of Mozambique, an institution subordinated to the Ministry of Agriculture and Food Security (MASA), was created by decree 47/2004 of 27 October of the Council of Ministers.<sup>2</sup>

In this context, and with the objective of developing agrarian and agribusiness policies, a portfolio of investment in horticulture is created, the feed the future component, through USAID, USAID Brazil, a trilateral project - The PSAL Project.

As a social phenomenon, it was necessary to identify and analyze the main mechanisms of CT at the level of the IIAM. In this case, mechanisms most used by IIAM in the dissemination of its technologies were identified, not only to farmers and extensionists, but also to their own technicians, the result of discussions, document analysis, bibliography and fieldwork.

Mozambique and other developing countries, although with millions of arable land, produces little as a result of the application of rudimentary and ancestral knowledge or technologies (axe, machete, hoe, burned).

The adoption or production of knowledge can be internal or external, provided that there are conditions of dissemination or spread of it to those who can multiply and replicate or even apply them in machambas to produce food.

One of the challenges to which IIAM is subject is to develop and implement appropriate processes to acquire, transfer and adapt the technological solutions and knowledge generated by partner institutions and researchers in the UAE, taking into account the specific contexts of the communities, in particular that of horticulture and the diversity of horticultural holdings in Mozambique, which is the focus of this work.

It is in this context that this research analyzed the mechanisms of knowledge transfer (TC) of a public research institution. Thus, an empirical contribution of this study is to give greater understanding of a transfer process, as well as the factors that affect it, which can contribute to subsidies for the organization to improve its transfer capacities, since the difficulties present in this process are evident.

We understand that CT are important among institutions, and not only, but also allows a greater understanding of how the

institute's employees perform CT between IIAM, a public research institution, and entities interested in acquiring knowledge or technologies.

In this tuning path, according to Vergara (2009), the objective, if achieved, answers the problem or question of the research. Therefore, this research consists of studying how IIAM employees perform CT between the institution to which they are assigned and entities interested in acquiring knowledge or technologies. With the present study we intend to bring approaches related to the contextualization of the institution under study (IIAM); check the instruments or mechanisms most used by IIAM to transfer knowledge; identify the difficulties encountered in CT among IIAM employees and between them and stakeholders; to identify the facilities found in the CT among IIAM employees and between them and those interested, in particular, based on a methodology of bibliographic consultation and fieldwork (assisted with interviews).

For our research we choose the following theoretical propositions: a) In what context are IIAM employees inserted? b) What instruments and/or mechanisms are used by officials to expatriate the knowledge produced? c) What barriers and facilities are found in the CT process?

## **A) TYPE OF STUDY AND RESEARCH DESIGN**

This is a case study (field research) that sought to understand in depth the CT mechanisms of IIAM. Godoy (2007) says that there is a multiparadigmatic character in organizational studies, which implies the coexistence of various methods to access and conceptualize reality. This is a qualitative research because it is influenced by the communicative character of the mediator and trainer of social experiences and needs.

The quantitative aspect seeks to find the logic of discovery (Stake, 1999). The adoption of the research method offers a specific guide to the procedures of a research group and methodological choices format the research project.

According to Creswell's perspectives (2010), our study has a conception of interpretation, characterized by understanding, multiple meanings of the participant, social and historical construction.

The method to which we proposed to use in this research divides the collection and analysis of data into two stages. Data collection is based on individual and in-depth interviews. To ensure greater confidence and validity of the results of our study, data collection was done in two phases and addressed three groups (IIAM technicians linked to the PSAL project, extensionists and farmers), because according to Martins and Teóphilo (2009) a greater convergence of different sources brings confidence and validity, convince and are accurate.<sup>3</sup>

In the first stage, the collection of data related to the organizational and relational context, with the technicians of IIAM. In the second, the data collection focused on understanding how CT between the IIAM/ técnicos with extension ists and farmers. It is from the perceptions of these three audiences that we sought to understand the phenomenon under study.

## B) POPULATION AND SAMPLE

The definition of data collection tools is an important tool to validate the progress of our research work. We use the following types of research: bibliographic, field and internet. With regard to bibliographic research, it consisted of the collection and selection of works with content that address our theme, the exploitation of some content available

on some websites. Regarding field research, all data were collected through direct observations and interviews.

Stage	Group of interviewees	Quantity	Location
Step 1	IIAM Technicians	12	UAE Office Building
	Extension	7	MASA and DMA
Step 2	Farmers	5	Moamba and Mbuzine Massacre

Table 1: Group of interviewees from April to June 2017, depending on the number and location.

The analyzed data are in descriptive narrative form, which is the result of in-depth interviews not only with IIAM technicians linked to the PSAL project, but also with extension technicians and farmers.

## LITERATURE REVIEW

Knowledge, according to Nanaka & Takeuchi (1997), is understood as a dynamic process of justifying personal beliefs that mirror the personal truth perceived by the individual, because it has some specific purpose. Knowledge and technology are behind the processes of obtaining, assimilating and improving the technological knowledge acquired (Kim, 2005).

The so-called information age is the revolution of knowledge, because it is through knowledge that modernity has arrived (Drucker, 2000). For Kim (2005) technological change is responsible for generating development in countries' economies and still suggests long-term economic growth.

Information and knowledge go hand in hand. When codified, they can add positive results in the process of creating technology, through a specialized information service, organized and well structured to take, filter and concatenate scientific, technical, economic,

<sup>3</sup> PSAL - Technical Support Project to the Nutrition and Food Safety Program

cultural, technological, market knowledge, among others, to make the information available in the form of effective knowledge. It can also make CT and technology easy to use and absorb (Tomaél et al., 2005; Cysne, 1996).

Drucker (2000) explains that many organizations already depend entirely on knowledge professionals, because markets are tied to the knowledge and benefits that this knowledge can provide in financial terms. The greatest success will depend on an administration that values its employees so that they feel attracted, retained, motivated to work to generate better results. Knowledge management comprises a set of technologies and processes whose objective is to support the creation, transfer and application of knowledge of organizations.

Nonaka & Takeuchi (1997) consider that knowledge is a dynamic process to justify personal beliefs that mirror the personal truth perceived by the individual, since knowledge is closely related to something specific.

Technology and knowledge influence the processes of acquisition, assimilation, improvement of acquired knowledge, which can contribute to innovation within the organization (Kim, 2005). In turn Cysne (1996), clarifies that CT is the process by which some properly structured and articulated knowledge is transferred from one individual to another, or from one location to another, ending with the generation of solutions necessary for the organization.

Cysne (1996) in his work elucidates the idea that the transfer of information is contained in CT, which in turn is contained in technology transfer (TT) and gives a more consistent basis in the analysis of the role of a specialized information service for innovation through TT, the main theme is CT, and when it comes to CT, it refers to the transfer of information. Technological CT is another form of knowledge acquisition.

For Gupta & Govindarajan (2000), CT can take place in two ways: coded or explicit (manuals or technical guides) and personified (tacit and/or unstructured knowledge) that is not always codifiable. The transfer of employees to other locations is also a tacit TC way that generates economic value. However, in order to have CT, there must be a social relationship between a knowledge-transmitting agent and a knowledge receiving agent. Sometimes, although tacit knowledge is more valuable to the company, it is also the most difficult to transfer and encode.

## **A) KNOWLEDGE TRANSFER MECHANISMS**

Knowledge and management have been studied for a long time within the management area. However, in the 1990s, with changes in the fundamentals of economies – it emphasized tangible resources for intellectual assets – it was realized that more than a unstructured approach to corporate knowledge management was needed to compete within this new context (Davenport & Prusak, 2003).

In the international component, CT usually requires the establishment of long-term relationships, which presuppose trust and a common code learned and shared by the companies involved (Bresman et al., 1999). Lyles (2001), argues that the management of subsidiaries acquired abroad requires some TC of the foreign headquarters in terms of management experiences, technological activities and/or administrative activities. Tacit CT is highly dependent on social relationships and requires extensive interaction between those who hold the knowledge and desires to internite. In this sense, employee expatriation policies are important vehicles for tacit CT and also of the culture of companies due to the relationships created (Lyles, 2001).

The relational context refers to the

relationship between the donor firm and the recipient. In view of the relevance of the relationship to CT, a critical factor is the connection and integration between the parties, which includes attributes such as: *intensity of bonds; trust between the parties; and cultural proximity* (Argote et al., 2003; Esterby-Smith et al., 2008). These attributes may individually or collectively indicate a smaller or greater connection and integration between the parties and may influence the results of CT (Vinding, 2004). Briefly, we can present the following: *Intensity of bonds* is an attribute that translates closer and frequent interactions and even close links; *Confidence* shows a sense of security between the parties; *Cultural proximity* evidences the existence of common meanings and systems of similar values between the parties (Argote et al., 2003; Esterby-Smith et al., 2008).

In the CT process, some factors are common: the fact that the conditions under which knowledge should be used are not clearly defined; the lack of proven experience of acquired knowledge; the lack of motivation of the source in sharing knowledge; the resistance of the recipient to receive the knowledge from outside; and the lack of absorption capacity combined with the lack of communication, experience and previous knowledge (Szulanski, 1996). Thus, to mitigate internal resistance and promote transfer success, incentive systems should be used, promoting closer relationships between organizational units and systematizing the understanding and communication of practices (Szulanski, 1996; Muramoto et al., 2009). However, the biggest challenge to CT is cultural and non-technical, and to transfer effective knowledge it is necessary to prepare the organizational culture to accept, approve and use new knowledge and promote exchange in the organization.

The discussion on CT is still to be desired

by presenting a predominantly technological vision that does not include some elements, components and/or facilitators of the transfer. We can list as examples: the communication process, the differences in cultural processes and capabilities between providers and receivers, the information explained in patents, scientific and manual documents and service infrastructures, technological adequacy, among others (Cysne, 2005; Davenport & Prusak, 2003).

The organizational context of TC comprises organizational factors, both for the receiving entity and for the issuing entity, which can facilitate or prevent the flow of knowledge between the parties (Reagans & McEvily, 2003; Argote et al., 2003). They are pointed out as factors that influence the CT process on the side of the issuing entity: the motivation to teach (Szulanski, 1996, 2000; Easterby-Smith et al.; 2008); the capacity for CT (Hansen et al., 1999; Sun & Scott, 2005) and, the possession of valuable knowledge (Perez-Nordtvedt et al., 2008). On the receiving entity side, the most relevant factors are: absorptive capacity (CA) (Cohen & Levinthal, 1990; Zahra & George, 2002) and, the motivation to learn (Szulanski, 1996, 2000; Perez-Nordtvedt et al., 2008). CA can be understood as the organization's ability to identify, assimilate, explore and use external knowledge (Cohen & Levinthal, 1990; Zahra & George, 2002).

Knowledge needs to be transformed, developed and worked within organizations, otherwise it will be just a cluster of unimportant information. Therefore, creating an organization capable of sharing knowledge is the greatest challenge of the information age (Tomaél et al., 2005). For the recipient, THE is critical, because the simple acquisition of external knowledge does not ensure its use effectively, and such knowledge can be misused or simply not used. The receiving firm must, in particular, have organizational

aptitude to assimilate, transform and use external knowledge, incorporating it in the improvement of products and processes (Cohen & Levinthal, 1990; Zahra & George, 2002). The level of CA can be influenced by several organizational aspects or attributes, such as a relevant and responsive cultural, institutional, personal, informational and market infrastructure (Cysne, 2005).

The level of qualification of employees is one of the supports, since the CA of organizations depends heavily on the CA of individuals (Cohen & Levinthal, 1990). An organization that has qualified personnel increases its potential to exploit knowledge and promotes innovation. The quality of employees implies that learning tends to be easier and opens spaces for new domains (Szulanski, 1996; Vinding, 2004).

Another factor is related to the level of investment in research and development (R&D) in organizations, as they contribute to stimulate learning, as this activity of innovation contributes to generate new knowledge, expand the diversity of organizational skills, thus consolidating the absorption of new external knowledge (Zahra & George, 2002; Jansen et al., 2005). High levels of AC facilitate the acquisition, assimilation and use of external knowledge, which suggests a direct and positive relationship between AC and CT performance. Therefore, the higher the AC, the easier the exchange between the recipient and the source of external knowledge (Van Wijik et al., 2008). However, the TC of research institutions for commercial companies faces barriers arising from the nature of technology, on the one hand, and the behavior of actors, on the other (Cysne, 2005; Cribb et al., 2006).

Some variables may indicate whether a company has a culture of innovation, among which, the organizational structure deserves to be highlighted; the internal sharing of knowledge and; alignment of organizational

strategy transfer projects (Disterer, 2001; Smith & McKeen, 2002). Companies that innovate are considered horizontal, flexible and decentralized structures and facilitate wide internal circulation of knowledge and autonomy in decision making and activities. Rigid and inflexible organizational structures discourage the fluidity of external and internal knowledge, compromising transference (Davenport & Prusak, 2003; Disterer, 2001).

The internal sharing of knowledge that the company cultivates is associated with innovation, innovation projects (DeTienne et al., 2004). Without an internal flow of knowledge, the acquired knowledge will hardly be transformed and exploited, compromising the transference (Bresman et al., 1999; Jansen et al., 2005).

The motivation to learn is another factor on the recipient's side. The perception, on the part of the recipient, that the source has valuable knowledge increases the motivation to absorb this knowledge and to overcome potential difficulties inherent to the transfer (Perez-Nordvedt et al., 2008). Thus, the motivation of the recipient is the attractiveness of the source (Gupta & Govindarajan, 2000; Perez-Nordvedt et al., 2008). Or on the other hand, if knowledge is understood as valuable and if the source is perceived as possessing experience and reputation in creation and CT, the recipient tends to be more motivated to absorb external knowledge, which favors the transfer process (Perez-Nordevedt et al., 2008; Castro et al., 2013).

Despite its relevance, the sharing of intrafirm knowledge is not yet part of the daily life of various organizations. The differences in languages and behaviors between individuals and the absence of a climate of solidarity are some factors that can inhibit the flow of internal knowledge. There are also political reasons that hinder this process, that is, people believe that they may *lose status by transferring their*

*know-how* to other employees (Goh; Smith & McKeen, 2002). For this reason, it calls for the promotion of socialization activities that must be characterized by high levels of solidarity and informality and foster personal interactions between individuals (Smith & McKeen, 2002; Bock et al., 2005). However, to minimize internal resistance and promote transfer success, incentive systems should be used, promoting closer relationships between organizational units and systematizing the understanding and communication of practices, since sharing does not occur spontaneously and needs to be encouraged (Szulanski, 1996; Smith & McKeen, 2002). The use of technological resources to enable communication between individuals and enable the registration, dissemination and re-use of knowledge can also boost the internal sharing of knowledge (Davenport & Prusak, 1998; Hansen et al., 1999).

In addition to the organizational structure and knowledge sharing, another factor that indicates whether the firm has a culture of innovation is the importance given to innovation and TC projects. When these projects are considered priorities and are aligned with the organizational strategy, there will certainly be greater investment of time, resources and efforts in these activities, favoring the transfer (Muramoto et al., 2009; DeTienne et al., 2004).

The organizational structure, the sharing of knowledge, the importance given to innovation projects and technological transfer, are peculiar characteristics of an organization with a culture of innovation and that contribute to the generation and sharing of knowledge inter and intraorganizations, so they are fundamental requirements in the process of technology transfer (Gupta & Govindarajan, 2000; Goh, 2002).

In the CT process, motivation is also a key element, because it concerns the

interest or willingness to teach and CT to other organizations, to the source side, and or else the interest of learning and using external knowledge, on the recipient's side (Szulanski, 1996; Lin, 2003). An attribute of this motivation is whether creation and CT are part of the organization's strategy (Smilor & Gibson, 1991 Apud Castro et al., 2013).

The motivation of the recipient concerns the degree of willingness of this firm to acquire external knowledge. The lack of motivation is due to the resistance of individuals to use knowledge from external sources because they were not created within the organization or because they are not compatible with the domain of knowledge of the firm, which may result in passivity or false acceptance, ultimately compromising the transfer (Szulanski, 1996; 2000; Yakhlef, 2007).

The motivation of the source can be perceived in two perspectives: on the one hand, it can be negatively influenced by the perception that the transfer of knowledge, the basis of its competitiveness, is risky and, thus, it would be less willing to transfer its knowledge (Sun & Scott, 2005; Easterby-Smith et al., 2008); on the other hand, when the source company is perceived as attractive, that is, holder of relevant knowledge and/or with extensive experience in transfer projects, there will be a greater predisposition of the receiving firm to participate in the process, as well as to use the new knowledge in organizational routines (Argote et al., 2003; Becerra et al., 2008).

Castro et al., (2013) realize that a perception of low AC of the receiver can also negatively affect the motivation of the source for the transfer. However, some factors may moderate this motivation, promoting, for example, a closer and reliable relationship with the recipient can minimize the fear of the source in sharing their knowledge (Becerra et al., 2008). An incentive system can also



be an appropriate alternative for individuals in the source organization to share their experiences. Otherwise, transfer costs can become an obstacle in the process (Goh, 2002; Kharabsheh, 2007).

Motivation is a factor that affects both the recipient and the source (Argote et al., 2003; Easterby-Smith et al., 2008). This organizational factor indicates the willingness of the home company to share its critical knowledge in the transfer process. Some factors can reduce this motivation when, for example, an environment of secrecy and competition is created in the partnership or when there is fear on the part of the source that the recipient company will misuse the transferred technology. There is also the fear of the source losing mastery of valuable knowledge and, thereby losing a competitive position, can also inhibit the exchange of knowledge between the parties (Szulanski, 1996; Easterby-Smith et al., 2008).

Another factor related to the source is its capacity for CT, because, although the parts are motivated, the source may be unable to transfer it (Hansen et al., 1999). The ability to transfer knowledge depends, among other things, on the presence of qualified human resources, technological infrastructure, a reward system and, also, the appropriate choice of mechanisms to carry out the transfer. Among which are: (a) training of the receiving firm; (b) socialization activities such as visits, meetings, meetings; (c) exchange of experienced individuals to disseminate knowledge and; (d) preparation of manuals, models, and use of information systems (Smith & McKeen, 2002; DeTienne et al., 2004). It should also be noted that the choice of appropriate mechanisms for CT depends on the nature of knowledge. If knowledge is tacit, socialization activities may be more effective (Cummings & Tseng, 2003; Bresman et al., 1999).

These organizational conditions are related to the ease of communication, interaction and learning and a flexible and decentralized structure that enables a broad internal sharing of knowledge (Cummings & Tseng, 2003; Lin, 2003).

## **B) KNOWLEDGE AND TRANSFER MECHANISMS**

Knowledge is an epistemological dimension, it exists in two forms: *the tacit and the explicit* (Nonaka & Takeuchi, 1997; Shenkel, 2008). The tacit is restricted to the individual, that is, internal to the individual and refers to individual abilities and is present in the human brain and is difficult to be passed on to others. It is a combination of personal experiences, values and perspectives of individuals, developed in a particular context of work and is related to the “how to” certain task. In addition to the technical side of tacit knowledge, it contains an important cognitive dimension consisting of mental models and beliefs that shape the way people perceive the reality around them (Grant, 1996; Nonaka & Takeuchi, 1997; Shenkel, 2008). The explicit is one that can be stored outside the human brain, that is, it can be documented and recorded. It can be expressed in words, and is easy to communicate and share in the form of concepts, formulas, data repositories, procedures and principles. It is one that can be articulated in formal language and, because it is not associated with personal experiences, it has few ambiguities, and can be registered, shared and disseminated with relative ease. (Kogut & Zander, 1993; Shenkel, 2008).

Generally the knowledge produced by universities and research institutes is recorded in a format and difficult languages for companies to decode in order to absorb and use. Thus, the receiver’s ability to make use of the transferred information can be a serious limitation for CT. This requires a more vertical

analysis of the receiving environment, which needs a relevant and responsive cultural, institutional, personal and informational infrastructure and market (Cysne, 2005; Kogut & Zander, 1993).

Thus, several studies draw attention to the influence of knowledge characteristics on the results of the transfer process (Szulanski, 1996; Bresman et al, 1999). While some organizational knowledge can be easily codified and materialized, others are rooted in people, the company and their culture, making it difficult to articulate and use. Thus, there are two forms of knowledge that complement each other and interact in the various organizational activities, the tacit and the explicit (Grant, 1996; Nonaka & Takeuchi, 1997).

With regard to explicit knowledge, its transfer can occur through more structured technological and process systems, since it can be transformed into artifacts such as rules, procedures, routines, objects and manuals (Kogut & Zander, 1993; Nonaka & Takeuchi, 1997). Although there are differences between both knowledge, they can be constantly transformed, depending on the activities conducted within the organization. Moreover, innovation depends on this continuous conversion of tacit knowledge into explicit and vice versa (Nonaka & Takeuchi, 1997).

The type of knowledge is a very preponderant variable in the choice of CT mechanisms that are dynamic activities that integrate companies in the process. Examples of TC mechanisms are personal and informal conversations, communication, visits, corporate portals and intranet, technical meetings, committees, practical communities, interfirm teams, personnel exchange, knowledge coding, creation of manuals and procedures (Argote & Ingram, 2000; Earth & Rock, 2008).

The choice of an organizational CT

mechanism depends on the type of knowledge (Kogut & Zander, 1993; Bresman et al., 1999). When it comes to tacit knowledge, the mechanisms of personalization are the most appropriate since knowledge is passed from one person to another. In this case, knowledge storage systems are less robust than in the later strategy. The tools used are those that prioritize personal contacts, so that the difficulties, solutions, methods, costs, etc., of the work first performed, can be discussed to help those employees who will perform similar work later. In coding all knowledge is standardized, structured and stored in information systems. In these systems, knowledge can be located through efficient indexing and can be distributed to all branches through data networks. Thus, the reuse of explicit knowledge is the main objective of the company, giving little incentive to customization for the adequacy of products and services to the particularities of customers (Kim, 1993; Sanchez & Heen, 1997), as illustrated in the following figure.

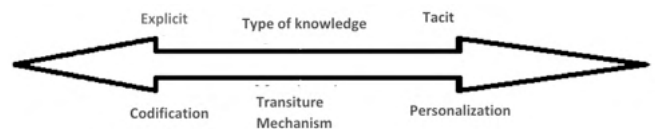


Figure 1: Type of knowledge or knowledge transfer mechanisms

Source: Diniz, 2011.

One of the recurring points, when we approach knowledge management, is the issue of collaboration necessary for the flow of knowledge to occur in the organization, since the original repository of knowledge is the human brain. Organizations need the collaboration of individuals so that their knowledge becomes “Organizational Knowledge”. The collaboration of the individual can occur in two ways: making explicit his knowledge (through written records, videos,

recordings, recording of discussions and other means already mentioned) or by CT for other individuals, generating tacit knowledge in a group (brainstorming, in which the individual shares experiences with others and puts himself in the position of the one who performs the activity, able to learn, *on site* from a real experience) (Nonaka & Takeuchi, 1997).

For Nonaka & Konno (1998), socialization involves sharing tacit knowledge among individuals, when that knowledge is exchanged in joint activities, such as: spending time together and living in the same place, rather than written instructions or communities verbally. Knowledge capture occurs in a context of physical proximity. When describing the importance of the narration “field stories” among the technicians of copier machines, when they are in the coffee room and exchange experiences related to the repair of equipment. Duguid & Brown (2001) reinforce that, despite having detailed manuals and having received intense training in the execution of repair machines, the success of such professionals is strongly associated with the exchange of experiences and experiences in everyday life, tacit CT learned to harsh penalties, often over hours of work to solve a defect that is not included in manuals or in training. While explicit CT can be obtained through procedures, standards, specifications and manuals, supported by the use of communication and interaction technology, tacit knowledge requires the establishment of transfer processes involving physical contact (Dixon, 2000).

In the CT from the perspective of the network, the participation of the actors focusing on activities that relate to socialization, such as visits to other units recognized as “experience centers”, meetings of functional teams and medium-term training periods (a few weeks). Activities

in this case are important to strengthen the sharing of information between different units and socialization activities further reinforce explicit CT, unlike the other three models (Duguid & Brown, 2001).

In the case of barriers, work overload constitutes a barrier to CT, especially in the case of tacit knowledge, which requires additional time, dedication and tasks of the professionals involved in the process. Participation in such processes can burden professionals and have consequences on the achievement of knowledge transfer objectives (Al-Gassani et al., 2006).

The issue of professional language is also a barrier to CT, especially when knowledge is transferred between different functional groups, such as R&D and production (Kogut & Zander, 1993).

The nature of knowledge, tacit or explicit, and its successful conversion in one way to another are essential aspects related to the success of the transference and, on the other hand, are also pointed out as barriers to the process, since, depending on the nature of knowledge, different elements of success need to be guaranteed and limitations need to be minimized. Each type of knowledge requires appropriate management systems that ensure codification, transfer and assimilation (Al-Gassan et al., 2006; Subramanian & Venkatraman, 2001).

The type of knowledge determines the choice of mechanisms, but these mechanisms can also act as moderators in ct interfirm. Organizations are unlikely to exchange knowledge of this nature in the absence of mechanisms that enable intense personal interaction and the sharing of experiences between individuals (Nonaka & Takeuchi, 1997; Disterer, 2001; Goh, 2002). As in the relationship of mechanisms, the type of knowledge is a decisive variable in the choice of transfer modes. Mode is the structure

or type of agreement that can be formal or informal, established between companies to enable CT among them, such as *licensing*, *spin-off*, strategic alliance, consulting, and each structure implies different levels of commitment and interaction between organizations (Takahashi, 2001; Cunningham & Harney, 2006). The choice of transfer mode should consider the type of knowledge you want to transfer (Kogut & Zander, 1993; Takahashi, 2001; Cunningham & Harney, 2006).

## **PRESENTATION, READING AND INTERPRETATION OF RESULTS**

The analyzed data are in the form of descriptive narrative, which is the result of in-depth interviews with IIAM technicians, extensionists and producers: a) IIAM technicians, assising central CT services, in number of 12; (b) agrarian extensionists assalto the MASA and the Office of the Green Areas of Maputo; c) Farmers in two producer associations: Massacre de Mbuzini (Mahotas) in maputo city and Block I in Moamba district.

The discourse analysis technique was chosen to evaluate the content of the interviews.

### **a) Collected Data**

It is possible to observe that most of the employees interviewed have been participating in CT programs for a long time, considering their years of work experience.

We found that all extensionists have the domain of knowledge, a strong indicator for confidence in the collected data. Most of them have about 10 years of work experience.

Regarding the data regarding farmers, almost all have experience in the area of making machamba, more than 10 years. Your experience promises reliable and secure information.

### **b) Analysis of Interviews**

At this stage, we tried to explore the

organizational and relational context component within the institution under study. To do so, employees were asked to answer all questions in the script addressed to them. The following are the summaries of the most relevant points of the interviews with employees working with production and CT, separated by themes.

## **RESULTS DISCUSSION**

The following is an overview focused on answering questions related to the organizational and relational context in this case study (step 1).

In our interviews in the area of research and CT, we noticed that IIAM has been very concerned with the production, import and dissemination of knowledge. This concern has resulted in the growth of management and CT programs. Frequent activities have been carried out, such as training, employee expatriation, study trips, and a number of other measures. This shows that organizations grow when, on the one hand, it struggles internally and, on the other, seeks to learn from others.

In this research we start by highlighting some questions that are at the origin for CT. The first, of the set of interviews, has to do with the context in which the employees are inserted. According to the officials, the growth of IIAM is due to the facilities of joining training courses on account of various memoranda and understandings with various countries and partner organizations.

Employees are inserted in an organizational environment in which weaknesses are the focus of IIAM's action for improvement and self-overcoming, in order to become able to respond adequately to the demands imposed on it. The weaknesses are also related to IIAM's infrastructure, human resources, performance and operation, financial resources and the r&d planning, monitoring and evaluation

process. institutional and relevant market market that gives the expected responses. This means that the company must make necessary investments, develop education programs and skills development to achieve success in its main objectives.

“...Most employees have deserved regular training and training, which improves the status in the company... the company also creates decent working conditions in almost all representations in the national territory.”  
T1 (technical 1)

The outputs for training have another strong component that relates to an added value in terms of skills and delivery at work.

The co-members are conductive wires for tacit CT and also in culture and relationships (Lyles, 2001). For Nonaka and Takeuchi (1995), socializing means sharing experiences, in other words, the conversion that arises from the conversion of the interaction of tacit knowledge between people, using language, observation, imitation and practice. With socialization, shared knowledge is born, such as cognitive references or shared technical skills.

As for the movement of employees, IIAM is conservative in terms of human resources because it is state-owned. So there is a disparity in stability and salary that is low compared to the rest of the market. Employee movement processes help align existing knowledge within the organization, transferring knowledge and best practices in the regions most provided with infrastructure and trained personnel to others still growing rapidly. This position goes according to the opinion of Diniz (2011) who says that companies that innovate are considered horizontal, flexible and decentralized structures, conditions that provide frequent social interaction, a wide internal circulation of knowledge and autonomy of individuals to give themselves up in the decision-making

process and in innovation activities. In more rigid and inflexible organizational structures, they discourage the circulation of knowledge of external and internal nature of the firm, being inadequate when the desiderate is par excellence in transfer.

“I’ve been working at IIAM for almost 5 years and I’ve known almost the whole country. The trips helped me not only to know the country, but because I had the opportunity to learn from other colleagues how to produce corn and sweet potatoes...”  
T2

On the same subject, it should be noted that the organization has equipped its employees with updates in terms of information technologies and not only. Our research also showed that the organization under study strongly encourages the use of information and communication technologies to support the horizontalization of the organization, such as computerized systems. In this aspect of the use of computerized systems, it is possible that this concept is in line with the opinion of Lee et al., (2007) who point out that the age of information and knowledge is characterized by constant changes in society and the market, in this context, the Internet emerges as a valuable tool to distribute knowledge and to enable people worldwide to communicate.

“... In our offices, I remember that to go to a hierarchical superior it is not necessary to schedule audience, ... because we have internet tools that we use to interact in a timely manner...” T5

Within the scope of the CT, the IIAM sets in motion a series of transfer mechanisms, among which stand out, as examples: meetings, personal conversations, among many others.

“... As the case of meetings, personal conversations, teamwork, creation of procedures, technologies materialized in products, training, personal exchange, computational tools, brainstormings, benchmarkings, workshops, field days”.

Another interviewee adds:

“Training of IIAM technicians, formulation, implementation and evaluation of joint projects involving technology transfers, joint production of publications, supply of publications to IIAM, work visits to Embrapa, joint technical meetings, support in the formulation of iiam strategic documents. (...)”. Researcher1

Of these, the most remembered and preferred are the days of the field, personal conversation and teamwork. However, with regard to the positioning of Nonaka & Takeuchi (1997), it is possible to understand that tacit knowledge is restricted to the individual, that is, internal of the individual and refers to individual abilities and is present in the human brain and is difficult to be passed on to others. It is a combination of personal experiences, individual values and perspectives, developed in a particular context of work and is related to the “how to” certain task. In addition to the technical side of tacit knowledge, it contains an important cognitive dimension consisting of mental models and beliefs that shape the way people perceive the reality around them.

R&D activity has greatly contributed to the institution's grandevation. Employees, after updating their knowledge, seek to set up TC activities, by promoting coaching organized by different departments, whether extension or research, not only with employees, but also with farmers.

“... Once participated, in training and knowledge acquisition we seek to operationalize knowledge and results are visible: we support extensionists and entities interested in improving their production...”.  
T3

The interviewees (6) as results of the formations still remember the simplest forms of knowledge acquisition, such as *networkig*

or *websites, skills*, trust and cultural exchange, among others, as vinding (2004), Cysne (1996) and advocate; Hansen et al., 1999).

“... I believe that the success we have demonstrated today is the result of the delivery of all employees who praise the most diverse ways of acquiring knowledge...”.  
Researcher3

With regard to the difficulties and facilities encountered in CT, employees, extensionists and farmers elected as facilities, the use of coaching methods where the employee competently carries out his work of CT, he needs to establish bonds of trust and cultural proximity with his colleagues around him. This moment constitutes the socialization component (Vinding, 2004).

“The existence of a network of contacts not only between officials, but also between them and extensionists and farmers tends to facilitate the use of other resources that may help in their mission.” Farmer1

For THE CT to flow very naturally and more easily it is necessary that the employee conquers the trust and respect of his direct employees and, to strengthen an integrative environment, open and healthy to conversations, with ideas, culture and promoting experiences and opinions so that each one strives to be part of the day-to-day organization. This idea is corroborated by the authors Smith & McKeen (2002) and Bock et al., (2005) when they say that it is essential that organizations create a culture of sharing that permeates the day-to-day behavior of individuals in the firm. It is therefore call for the promotion of socialization activities which must be characterised by high levels of solidarity and informality and foster personal interactions between individuals.

Another integrating element in the facilitation of transfers has to do with the approximation between the sender and the receiver, the responsibility is both, because

only then will there be respect and trust and hence a frank and open dialogue, free of judgments. So an opportunity to create new ideas, best practices and experiences, which facilitates CT.

“One of the difficult things at the time of CT has to do with trust... there are many doubts whether what is being taught is true or whether it will work... we don't know if the new seed that they say is improved can guarantee good production.” Farmer4

This stage (2) brings together questions that have been asked to extensionists and farmers, with the desiderata of facilitating the understanding of the context in which farmers and extensionists are inserted in the process of absorption and CT.

To understand this chapter we seek to contemplate the understanding of the context in which they are inserted. They recognize that IIAM has assumed its role at the forefront of CT and has therefore received various technologies and knowledge related to horticultural production, soil and water management techniques to preserve the environment. The interviewees point out that the CT programs that involve them are properly aligned with the needs of the recipient. It should be noted, for example, the nature of the technologies that are transferred because they are merely sensitive to the experiences of those involved. An option advocated by Nonaka & Takeuchi (1997) because it is a combination of personal experiences, values and perspectives of individuals and is related to “know-how”. A farmer said,

“ I, for example, am from the Block I Association, I have no training but I have experience of making machamba, just like other producers I know...”. Farmer5

Another farmer sharpened,

“The success of introducing new agrarian technologies in a given area depends on several factors, so the new technology can

be adapted or not to local conditions, so this requires that you follow up in order to be able to correct any problems that may exist in time and in time.” Farmer2

This shows in fact that IIAM is concerned about the entities requesting its services, motivated by trust and cultural proximity between the parties involved in this transfer. And the results are very well visible as production and productivity have been greatly increasing.

When interviewed, our interlocutors said that the most used mechanisms to receive the knowledge produced by IIAM are workshops (workshops) and field days (Technological Showcase or Pedagogical Garden); which corroborates Vinding's idea (2004) when it is the socialization component, experiences experienced *on site*.

“Everything we learned in training with the help of the institute's technicians, later is demonstrated in practice at the Umbeluzi Agrarian Station, where we see the growth and beauty that plants translate...”. Farmer2, extensionists)

Regarding the difficulties, the farmers referred to the advantages of socialization in CT (workshops and field days), a component highlighted by Nonaka and Takeuchi (1997).

“When we're all in the field, we even talk about some secrets to be successful.” Farmer4

## CONCLUSIONS

Regarding the organizational and relational context in which IIAM employees are inserted, it is concluded that the Institute is an organization of great reference in the country in terms of production and agrarian TC. In this context, all our data confirmed that the organization is well structured and aligned with the organization's strategy. The Institute presents a horizontal and vertical structure that facilitates the operationalization of various R&D projects. Employees are

inserted in an environment in which weaknesses are the focus of IIAM's action for the improvement and self-overcoming, in order to become able to respond adequately to the demands imposed on it. Weaknesses also relate to IIAM's infrastructure, human resources, performance and operation, financial resources and the R&D planning, monitoring and evaluation process.

Employee movement processes help align existing knowledge within the organization, transferring knowledge and best practices from the regions most provided with infrastructure and trained personnel to others still in rapid growth, avoiding asymmetries within the organization.

It was possible to observe, on the one hand, that the institute's employees perform not only intraorganizational, but also extraorganizational (extension workers and farmers) CT. On the other hand, they are considered as issuers and receivers in transfers, facilitators. Many of them gather skills to assume their duties.

The interviewees remembered different mechanisms or instruments to perform the IIAM CT, such as meetings, personal conversations, teamwork, creation of procedures, technologies materialized in products, training, personal exchange (USAID, Embrapa, IIAM and farmers), computational tools, brainstormings, benchmarkings, workshops (workshops), field days (Technological Showcase and Pedagogical Garden). Of these, the most remembered and preferred are the days of the field, personal conversation and teamwork.

The research pointed out that tacit knowledge of the employee involved in the CT process can only be transferred in a personalized way, by direct exposure between the receiver and the transmitter of this knowledge.

According to the interviewees, in to achieve

success, the employees involved in CT need to create credibility in the environment in which they find themselves.

With regard to CT facilities, the coaching method (workshops, meetings, workshops, field work and teamwork) are often used by the institute's employees because they facilitate the CT process. Therefore, personal conversations function as small targeted training sessions and help the employee establish a bond with other employees or even with extensionists and farmers, an opportunity to strengthen a drain of respect, intensity of bonds, cultural *proximity, trust and maintain their status quo*, therefore a component of socialization, open communication and free of judgments.

One of the problems affecting CT is the motivation component, a major factor in the difficulties or facilities of CT, such as the presence of qualified human resources, technological infrastructures, a reward system and the appropriate choice of mechanisms to carry out the transfer.

With regard to the organizational and relational aspect with extensionists and producers, it is pleased to say that they recognize that they have received various technologies and knowledge, related to the production of vegetables and techniques of soil and water management to preserve the environment, Aspects merely sensitive to the experiences of those involved, which deserve a periodic and systematic monitoring and evaluation of the contents transferred.



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