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Technologies transmission between micro and small phytocosmetic companies in the Amazon State and developing knowledge institutions

Heleny Ponciano Alves[1], Niomar Lins Pimenta[2], Rogério Eiji Hanada[3], Karol de Souza Barbosa[4], Elba Vieira Mustafa[5], Alexandra Amaro de Lima [6]

[1]Multi-Institutional Program of Post-Graduation in Biotechnology (PPGBIOTEC), Federal University of Amazonas (UFAM), Brazil
[2]Multi-Institutional Program of Post-Graduation in Biotechnology (PPGBIOTEC), Foundation Center for Analysis, Research and Technological Innovation (FUCAPI), Brazil
[3]Coordination of Technology and Innovation (CoTI), National Research Institute of the Amazon (INPA), Brazil
[4,5,6] Research Department, Institute of Technology and Education Galileo of Amazon (ITEGAM), Brazil

Abstract *— The phytocosmetics market requires that companies have the capacity to develop new technologies with lower costs and time to launch, which demands skills that often small and medium sized companies do not have, requiring a process of transferring knowledge and technology. It has historically been noted that innovation is not merely an external technological shock, but a process within companies, which includes endogenous learning, feedback, and incremental modifications over a period of time. This article aimed to understand the mechanisms used by Amazonian phytocosmetics companies to transfer knowledge and technology that contribute to their productive, management and marketing processes. The research was carried out in companies, installed in Amazonas State, producing phytocosmetics such as cosmetics, personal hygiene products and perfumes, which have in their composition some ingredient derived from the Amazonian biodiversity, except handling pharmacies. It had a qualitative and exploratory character. The Multiple Case Study was used as a method to understand the nature and complexity of a given phenomenon, which occurred simultaneously in several institutions. It was found that companies in the phytocosmetics segment develop relatively simple knowledge related to marketing, technical activities and scientific knowledge. The companies prefer to establish partnerships with chosen suppliers according to their reputation in the market. There is no defined channel of transferring technology and the main mechanism of knowledge transfer used are the training that are generally well assimilated, but little incorporated work practices.*

Keywords *— **Phytocosmetics, research and development, knowledge, Amazon State, enterprises.***

I. INTRODUCTION

Technological development is considered as a determining factor for global competitiveness. Therefore, developing countries need to build mechanisms to increase capacity for development and / or application of new technologies to improve profitability, make better use of natural resources, and be more markets competitive [1,2,3,4]. The increasingly market demanding reflects the growing complexity of product development. The advances of new technologies and the need for constant innovations, linked to their costs, are factors that contribute to the competitiveness of organizations. To operate in these environments, companies need to be able to develop new technologies with lower costs and time to launch, which demands skills that often small and medium business do not have. The process of transferring knowledge is related to product, or process, or applications. It is usually a complex process composed of innumerable variables. Technology means technical knowledge related to engineering, production, organizational structures, skill and behavior patterns that reflect the product or process and tools (procedures, equipment and facilities) used to provide products and services to the market. Technology is not static, but implies continuous innovation to increase profitability, growth, sustainability and competitiveness. Transfer does not only mean a movement from one entity to the next, but also encompasses exchange, cooperation, partnerships and collaboration [3].

It is becoming increasingly important that micro and small businesses interact with agents from different segments that can foster innovation, enabling them to

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share complementary knowledge and skills, thereby improving their performance in technology transfer [5].

It has historically been observed that innovation is not merely an external technological shock, but a process within companies, which includes endogenous learning, feedback, and incremental modifications over a period of time. Innovation and diffusion of technology are, therefore, not easily separable. It is not only influenced by intellectual property rights, licensing and imports /or acquisitions, but also depends on capabilities to improve technologies, participation in networks of producers, suppliers, users and research institutions, which are necessary to enable continuous learning [4].

Like any micro, small and medium-sized enterprises, phytocosmetics producers in the Amazon State have management, financial, technical and scientific limitations and need strategies that allow them to remain competitive in the market. They are family-run businesses with traditional management. Most of them use manual production techniques with a low degree of technological aggregation and have partnerships with several agents, but public or non-profit institutions have played a prominent role, mainly in the provision of physical spaces and funding for research and development. Even in the face of Amazon State efforts, many bottlenecks need to be overcome so that bio-business, more specifically phytocosmetics, gain market prominence and promote the socioeconomic and environmental development in the State.

For all the facts presented, this article aimed to understand how the mechanisms are involved to carry out technology transfer and to contribute to the technology transmission literature of micro, small and medium sized phytocosmetics companies in the State of Amazonas, Brazil.

II. TRANSFERRING TECHNOLOGY IN MICRO AND SMALL COMPANIES

Last survey conducted by SEBRAE (2014) indicates that small enterprises (micro, small and medium sized enterprises and individual entrepreneur) have their own importance in brazilian economy. In trade, small enterprises represent 53.4% of brazilian GDP (Gross domestic product). In industry GDP, the participation of micro and small enterprises (22.5%) is already close to medium-sized enterprises (24.5%). In the services sector, more than a third of national production (36.3%) originates in small businesses. These data demonstrate the importance of stimulating and improving smaller enterprises in the country that, despite the economic relevance, have their competitiveness compromised by the increase of international competition, environmental, technical and organizational constraints, focusing their efforts to meet the demands of local markets [6]. Competitive markets require increasing complexity of product development, breakthroughs in technology and constant innovations linked to their costs, and to operate in these environments, companies require skills that often small and medium-sized enterprises do not have [4].

Technology can be understood from a implicit or codified perspective. It can be a product, a process, applications, or skills. Technology means knowledge (ideas, engineering and technical know-how), skills (competence, organizational structures, and behavior patterns) and tools (procedures, equipment and facilities) used to provide products and services to the market. Technology is not static, but rather implies continuous innovation to increase profitability, growth, sustainability and competitiveness [3, 7, 8, 9].

Transferring technology indicates the movement of technology from one place to another - that is, between people, organizations, or even countries. Transfer consists of (1) materials, end products, components, equipment and plants; (2) projects, models, and know-how to create the desired capacity; and (3) know-why and information to innovate and adapt existing technology. Transfer does not only mean a movement from one entity to the next, but also encompasses exchange, cooperation, partnerships and collaboration. It is often a complex, dynamic process and success is not always guaranteed [3, 9]. The complexity of transferring technology process is aggravated by economic, political, technological, cultural, social, and organizational factors [9]. They seek efficient channels and make case assessments in different countries and segments [10, 11,12, 13, 14, 15, 16, 17], reflecting the economic and social growth of countries, especially developing countries [4, 7].

Studying the process of transferring technology in micro, small and medium-sized enterprises can be a complex challenge considering that each company has its own style, influenced by social, economic, cultural and technological factors. The style of business management is characterized by strategic priorities of the owners or managers that can conduct the administration of the business in different ways and, consequently, to different relationships and interests within a business environment [6].

Human factors are fundamental for the generation and transmission of expertise. Personal motivation, opportunity to learn, confidence, commitment, persistence, and ability to absorb and receptivity are significant variables in the process, in addition, the

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organization must develop skills and abilities in technology and management through training and mentoring; establish links with other government programs and departments to obtain funding and additional support; provide access to information and markets; establish infrastructure; negotiate contracts with suppliers and customers; monitor and evaluate the progress of the process, work in networks [3, 11, 12, 15].

Still referring to human factors that influence the transferring technology process, Lee e Win (2004), show that informal relations between colleagues provide for the free exchange of information and consists of a first link between research and development institutions and industry. It can be a mechanism to create the confidence needed for the transferring technology process [14]. Informal relationships are essential for the generation of knowledge, present and necessary for the effective process of technology transfer. Perry *et al* (2010), stresses the importance of channeling the relations of groups, or informal relations, that can stimulate the process of innovation in the organization.

Among external factors that may influence the process of technology transfer include government infrastructure and financing policies, translated by science, technology and innovation policies; technology transfer services available, standards, testing, certification; patenting; strategic business alliances; development of entrepreneurship; financing and risk capital, trade barriers [3, 4, 7, 9, 11].

Beukman (2011), adds that the success of a technology transfer process encompasses pre-implementation studies and post-implementation support. This event could be observed in reports of technology transfer for testing of validation for cosmetics performed in Europe. After all the planning, training and after the process, follow-ups were done to validate the results, observing if the standard developed by the process's laboratory was maintained in laboratories that received the technology [18, 19, 20]. There are vast channels through which technology is transferred. The technology transfer channel is the connection between two or more social entities, in which the various mechanisms can be activated. International channels include: foreign direct investment; technical licensing agreements between foreigners and local companies; imports of intermediate goods and capital; education and training in advanced technology; project contract; technical consulting services by foreign companies, joint development [8, 11, 14].

Vasconcelos (2008), mentioned that transferring technology mechanism is any specific form of interaction between two or more social entities during which the technology is transferred. When the interaction has a continuous character, the mechanism can be treated as a channel [21]. Judging the performance of a transferring technology process is another challenge. There is a multitude of actors involved in the process and depending on who will judge the performance and results according to criteria, they are often antagonistic with traditional efficiency measures. The problem, then, is the complexity associated with the various levels of interest, involvement and intervention of the individuals or groups affected and connected to the transference [7]. Not only is judgment complex, the implementation of transferring technology projects in micro and small enterprises has been challenging, but essential to promote business innovation [11, 14].

Innovative companies must anticipate the market must be customer focused, enrich the product in terms of different characteristics compared to competing products, in order to obtain a superior product in terms of quality. Innovation results from being part of your business strategy and relying more on developing new forms of work - incremental innovation, rather than radical innovation [15]. Innovative companies do not always have resource and development structures, but through transferring technology with knowledge-building institutions they achieve innovation.

Tidd*et al*., (2005), describe the innovation process is composed of the following phases: 1. Research - search for relevant signs about risks and opportunities for change, both in the internal and external environment; 2. Selection - based on the strategic vision of the company's development, decide which signals should be answered; 3.Implementation - translation of the potential of the idea to produce a novelty and launch of this in the internal and external market. This item requires attention to several aspects such as: Acquire knowledge resources with other institutions; 4. Execute the project in conditions of uncertainty that require constant resolution of unforeseen problems; 5. Maintain long-term adoption and use, or analyze the original idea and modify it; 6. Learning.

III. INDENTATIONS AND EQUATIONS

Innovation can be developed by companies based on the generation of expertise or "in cooperation with other companies or public research organizations [22]. In this respect, technical institutes and universities play an essential role not only as creators of knowledge, innovation and technologies, but also as training and qualification of staff and promoter in economic and social changes [23, 24, 25].

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The process of transferring technology from the academic *milieu* to the companies can occur from the following situations: (a) By means of the creation of companies of technological base by the researchers, using their scientific knowledge developed and improved in the academic institution; (b) By collaborative research, through which research projects are defined and conducted together; (c) By the contracted research and by means of consultancy based on knowhow, ordered by the industry next to the academy; (d) For the development and exploitation of intellectual property rights; (e) By transferring through human resources such as cooperation in undergraduate and graduate programs, training.

The cooperation between universities and companies is a phenomenon that occurs at several levels, since it is determined by the characteristics of the individuals that are part of these actors, as well as by the organizational and institutional context in which they work and increasingly it has had relevance [26]. Despite the gains, cooperation between universities and companies is not so common, but should be stimulated as companies can reduce their research and development risks, diversify their products, reduce time to market, rate project costs, acquire new skills , introduce technological changes. Universities can offer more streamlined supports for long-term research; aid for the production of useful new knowledge; expansion of educational experience and employment opportunity for students; possibility of interaction with industry engineers; access to specialized equipment of companies and dissemination of research work developed by the university [27, 28].

Lima (2004), developed a study that aimed to identify, characterize and propose elements that made up the process of technology transfer between university and company in Florianópolis, state of Santa Catarina (Brazil). In this study, the members of the reference structure were: Human Talents - Profile of the cooperation agents, conceptual characteristics of cooperation, institutional mechanisms of Interface with the community, structural elements of cooperation and, as a complementary issue, management skills for the cooperation Agents and can be classified within the four categories [29]: (1) The nature and characteristics of knowledge necessary for the transfer of technology; (2) The absorptive capacity of partners; (3) Partner behavior; (4) The type of alliance between the partners.

In the first, the nature and characteristics of expertise required for the transfer of technology include indicators such as the type of knowledge used by the organization (technical / scientific / traditional), the level of codification of company knowledge (tacit or codified) and the level complexity of knowledge. In the second category, absorption capacity, are aspects related to the ability of companies to assess the utility of knowledge, assimilate and put into practice. This process, as Saad (2002), Tambunan (2007) and Jogada (2010), is not an easy process, taking into account those involved in the process and under which perspective the process can be analyzed. The higher the level of interaction, the more the transferring process is facilitated. The company's information sharing policies, where the higher the level of restriction of information sharing, the more difficult the process becomes. Level of interest shown by partners, intensity of contact and trust. The higher these indicators, the easier the process.

The types of alliances, fourth category, refer to the perceived advantage gained by the organization in the transfer process, as well as its ability to innovate. A positive perception tends to create the capacity of the organization to repeat the partnership, as well as allows it to make incremental innovations to the process, according to its necessity. Closs*et al*. (2012), reflecting on the process of transferring technology from universities and research institutions to companies, having as a specific case the PUCRS (Pontifícia Universidade Católica do Rio Grande do Sul), presented that in Brazil, in addition to the factors conditioning the transfer of technology in general, there are facts related to the low maturity of the national policy to encourage cooperation between universities and companies, institutional policies and procedures for transfer management.

The main difficulties in the process of interaction between university and business are: the present bureaucracy, the researchers' lack of knowledge about the structure of the university, the unavailability of time, the focus on article production, lack of knowledge about intellectual property, lack of knowledge about the process of interaction, lack of culture and lack of conversation [30].

In this context, the present study aimed to understand the mechanisms used by the involved actors to carry out transferring technology and to contribute to the literature of this matter in micro, small and medium sized phytocosmetics companies in the State of Amazonas.

IV. METHODOLOGY

The research was qualitative and exploratory. The Multiple Case Study was used as a method to understand the nature and complexity of a given phenomenon, which occurred simultaneously in several institutions. Multiple case studies were chosen because they allow for more dense research, increase external validity and contribute

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to more realistic results [31]. The case studies were carried out in companies that produce phytocosmetics (cosmetics, personal hygiene products and perfumes, which have in their composition some ingredient derived from the amazonian biodiversity) installed in Amazonas, except handling pharmacies (TABLE 1).

Initially, a survey was carried out on the scientific, technological and market bases of companies producing cosmetics, personal hygiene products and perfumery with active components / principles from the region, where a population of 15 companies was identified.

Table 1 - Phytocosmetics companies participating in the study.

Seq.	Companies	Participant
1	Amazon Ervas	Yes
2	Amazon Green	Yes
3	Anna Morena Fitocosmeticos da Amazônia	Yes
4	Aroma Ativo	Yes
5	Beleza da Floresta	Yes
6	Bella Cabocla Produtos Naturais Da Amazônia	Yes
7	Bioessencia - Anauá	No
8	Cheiro Amazônico	Yes
9	Emporio& Aromas da Amazônia	No
10	Gotas da Amazônia	Yes
11	Harmonia Nativa	Yes
12	Amazon Biocare - N. L. Mayer	Yes
13	Natus - Esponjas Vegetais da Amazônia	Yes
14	Pharmakos d´Amazonia	Yes
15	Pronatus do Amazonas	Yes

All companies were invited to participate in the study. Of the 13 (thirteen) companies that participated only 03 (three) companies did not mention a partnership with some institution that promotes knowledge.

Methods of data collection

Based on the existing literature on the transferring technology process, a semi-structured interview script was developed with open and closed questions that could answer aspects related to the categories identified according to Khamseh e Jolly (2008), according to Table 2. The application of the instrument had an average duration of 50 minutes.

Table 2 - Categories and Indicators that influence the transferring technology process raised.

CATEGORIES	INDICATORS
Nature and knowledge characteristics	Code Level (shape)
	Type
	Complexity
Capacity of knowledge absorption	Assimilation
	Evaluation
	Use
Behavior of partners	Interaction
	Attitudes
	Level Of Protection
	Contact
	Information Sharing
	Confidence
Alliance type	Got Advantage

E-mail and telephone conversations were also used as a means to clarify doubts and supplement data. Data collection was performed between March 2014 and February 2015.

Personal interviews, considered as a vital source of information in case studies, were structured with key informants within each organization (managers), were recorded in order not to lose any information that might be relevant to the work and later transcribed for text editor and spreadsheets.

Tabulation and data analysis

The recorded interviews were transcribed and analyzed with the help of text editors and their analysis was through the content. Attention was paid to the aspects related to the categories, indicators and mechanisms used for technology transfer. Analyzing the content of the interviews, key words were identified and tabulation was repeated in electronic spreadsheets to better understand the results.

V. RESULTS AND DISCUSSIONS

Nature and characteristics of knowledge

Through this research it was verified that the companies of the phytocosmetics segment develop expertise in this types of knowledge: marketing, technicians and scientists. Figure 1 shows that among the marketing knowledge mentioned, we found two companies, one of the organizations declared to work in the development of packaging that aggregate the concept of sustainability and maintenance of the quality of its products, as well as the marketing differentiation. The

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other organization that mentioned marketing knowledge, referred to knowledge related to its public and the square (where it makes its products available for commercialization).

As for technical knowledge, they mentioned the improvement of products and processes and adaptation of machines and equipment to meet their production lines. Product improvement activities usually consist of replacing inputs in production, seeking better stability and product quality. As for the scientific knowledge, they mentioned the search for new techniques of raw material production, development and use of natural dyes.

The development of new products is also mentioned by eight companies, however, some have as a starting point similar products available in the market.

Only one company claimed not to develop any kind of knowledge. He said that the company, located in the DIMPE (Distrito Industrial de Microempresas e Empresas de Pequeno Porte) belongs to a Mexican group, that all processes are developed by the matrix, only produce according to protocols sent to the organization.

Fig.1: Developments by organizations

The technical procedures related to production are mostly in the coded form. This means that there are production procedures formally elaborated through protocols, a requirement of ANVISA (AGÊNCIA NACIONAL DE VIGILÂNCIA SANITÁRIA). Figure 2 below represents the percentage of companies that reported registering their work knowledge. It was also verified that 62% of the companies declared to have a formal policy of secrecy about their production processes with their employees.

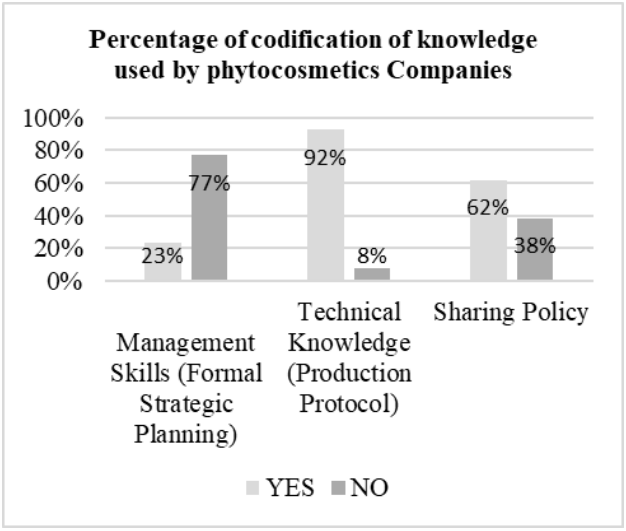

Fig.2: Percentage of codification of knowledge used by phytocosmetics Companies

Regarding the complexity of the knowledge used in the process of production and management of phytocosmetics, only 15% of the companies interviewed declared to be complex. Although its production process is simple, requiring low production technology, approximately five managers mentioned the difficulty encountered in the process of obtaining ANVISA licenses for installation and production of their companies, referring mainly to the bureaucratic process. Still considering the complexity of knowledge required for the production of phytocosmetics, only 23% of the companies interviewed reported on the importance of Biotechnological processes for their production processes, although a greater number recognize the importance of Biotechnology for the "tip" cosmetic segment.

Ability to absorb knowledge

The ability to absorb knowledge is related to the capacity for evaluation that consists of identifying which types of knowledge can be sources of improvement for the organization, how the organization can assimilate the knowledge that is passed on and what is learned, how effectively can apply in the organization. According to the managers' statement, the new knowledge enters their organizations through the process of training the human resource's organization, through the contracting of technical consultancies, through research in partnership with institutions that promote knowledge and in some cases through the acquisition of equipment properly adapted to their needs. Generally receive reports via email about opportunities and if they have interest, seek participation. Almost all cases, the interest came from the managers who went in search of partners to obtain knowledge. Regarding the level of assimilation of

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knowledge, managers stated that in most cases the level of assimilation is very good, but, not always the acquired knowledge is employed in the organization as shown in Figure 3.

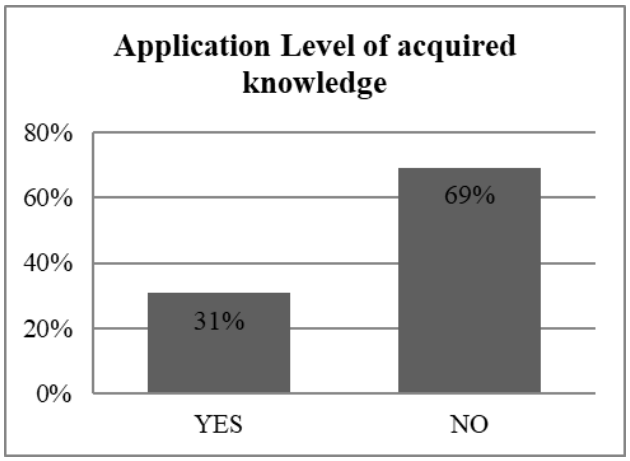

Fig.3: Level of application of knowledge acquired by phytocosmetics companies.

When asked as to the reasons why the rate of full application of knowledge was low, corresponding to only 31% of companies that fully apply the foreground, they replied "the training was far beyond my reality"; "The training was very generalized, could not apply everything"; "Our reality is still very different from the theoretical models presented"; "We do not have sufficient resources for the implementation of the knowledge". These observations may have occurred due to the absence of partners who have exclusive proposals for the phytocosmetics segments or the level of most of the projects currently installed in the State. These observations may have occurred due to the absence of partners who have exclusive proposals for the phytocosmetics segments or the level of most of the projects currently installed in the state.

Partner Behavior

Figure 4 presents aspects related to the perception, behavior of the managers in relation to the partners that the companies have or already possessed. The level of secrecy in the process of sharing information is high in 69% of the companies interviewed. In addition, 62% of them have formal policies for sharing their employees' information with employees of other organizations or third parties.

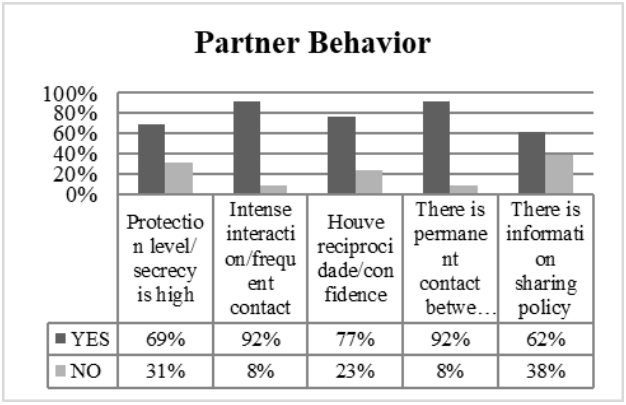

Fig.4: Partner Behavior

During the process implementation, the object development in the partnership, interaction and contact were frequent in 82% of respondents. Reciprocity and trust were high for 77% of the companies interviewed. It was found that managers prefer to develop partnerships with suppliers to companies in the same segment. These partners, in almost all of the interviewees, are chosen according to their reputation in the market.

Types of alliances to transfer knowledge / technologies

It was verified through the interviews with the managers of the phytocosmetics companies that the knowledge-building institutions with which they possessed, or had already owned, a partnership were: Fundação Centro de Análise, Pesquisa e Inovação Tecnológica – FUCAPI; Universidade Federal do Amazonas – UFAM; Instituto Nacional de Pesquisas da Amazônia – INPA e Centro de Biotecnologia da Amazônia – CBA and as shown in Figure 5.

Fundação Centro de Análise, Pesquisa e Inovação Tecnológica – FUCAPI was established in 1982, based on a joint initiative of the Federação das Indústrias do Estado do Amazonas - FIEAM, Centro da Indústria do Estado do Amazonas - CIEAM and Executive Group Interministerial of Components and Materials - Grupo Executivo Interministerial de Componentes e Materiais, linked to the Federal Government. Private institution, non-profit, is focused on the development of research and technological services and increase the competitiveness of companies and organizations in the Amazon region.

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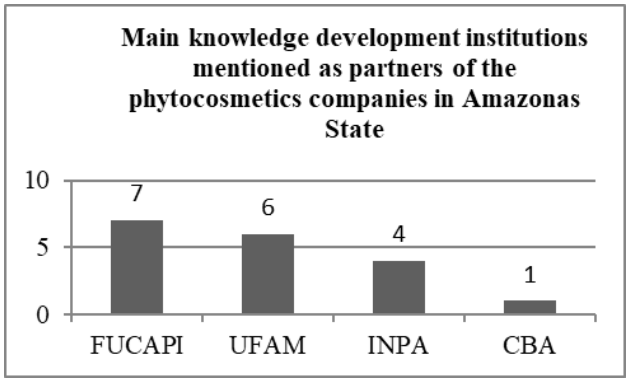

Fig.5: Main knowledge development institutions mentioned as partners of the phytocosmetics companies in Amazonas State.

Develops activities in the educational and technological dimensions, working in the areas of information technology and communication, environmental technologies, basic industrial technology, product technology and management technologies [32]. The managers of the phytocosmetics companies mentioned their partnerships with FUCAPI through technical courses in the cosmetics segment, contracting technical services for laboratory analysis and in the physical and technical support through the Institution's Incubator. According to the interviewees the institution already has a recognition in the market and, faced with the needs found in the market, seek the support of the institution. As for the manager who attended the technical course offered by the institution, he declared that maintains contacts with classmates and some teachers, but no formal contact with the institution. The groundwork process at FUCAPI, according to another manager, was preceded by several phases, to adapt the profile of the enterprise to the services that the incubator would offer.

Universidade Federal do Amazonas – UFAM created in 1909 under the name of Free University School of Manáos, currently has 18 teaching units, between institutes and colleges. It currently offers 96 undergraduate and 39 undergraduate courses accredited by Capes. There are a total of 31 Masters and 8 Doctorate courses. At the *Lato Sensu* postgraduate level, there are more than 30 courses offered annually [33]. Some managers of phytocosmetics companies installed in Amazonas participated in undergraduate and graduate programs at the University. One of the managers is a retired professor and researcher at the institution. It was mentioned as a partner because two companies are looking for improvements in their packaging and in their formulations. The two research cases mentioned by the managers of the phytocosmetics companies together the university were agreed directly with the researchers, where what weighed for the partnership process was the friendship with the researchers. Some managers interviewed recognize the importance of the institution in their business segment, however, they claimed they did not have time to go after partners at the University, besides not knowing who they should or could look for.

Instituto Nacional de Pesquisas da Amazônia – INPA - since its implementation in 1954, INPA has been conducting scientific studies of the physical environment and living conditions of the Amazon region to promote human well-being and regional socioeconomic development. Currently, INPA is a world reference in Tropical Biology [34]. INPA was mentioned as a possible partner by a phytocosmetics company manager who would be interested in non-exclusive licensing of patents that the institute possesses. Due to the change in administration of INPA's technological extension and innovation coordination, the process would be undergoing revision. Another manager mentioned personal contact with an institute researcher who, according to him, gave him guidance on plant species that could be used as a cosmetic.

Centro de Biotecnologia da Amazônia – CBA is a technological center, which was created in 2002, within the scope of the Programa Brasileiro de Ecologia Molecular para o Uso Sustentável da Biodiversidade - PROBEM, with objective of implementing, through technological innovation, conditions for the development or improvement of amazonian biodiversity processes and products, including: Integrated action with the university and public and private sector research centers (Rede de Laboratórios Associados – RLA), Increased technological density in the industrial sector (Parque Bioindustrial na Região Amazônica), Promoting environment favorable to innovation (supply of technological services); development and dissemination of value-added biotechnological products and processes throughout the production chain [35]. The partnership was at an informal level, where there was an exchange of solvent analyzes, items for maintenance of equipment, since the CBA had no legal personality or means for formal agreements.

Informal relations between colleagues facilitate the free exchange of information and consists of a first step of linking institutions to create the confidence necessary for the transferring technology process [14, 21, 36].

Regarding the perception of the interviewees respecting the partnerships held with the institutions that develop knowledge / technologies, only 1 declared dissatisfaction and reported the distrust with the staff of the development institution. Regarding the concern with

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innovation, the managers of the companies surveyed presented as favorable aspects the market demand for products from the Amazon region, as well as the diversity of products that can be offered due to the local biodiversity. The main obstacles mentioned are the dysfunctions of bureaucracy, lack of specific resources for investments and lack of applied research. It was found that the main reasons that led companies to innovate are the need to differentiate products, increase process efficiency and improve sales. They are more concerned with incremental innovation than radical innovation [15, 37]. Despite obstacles and opportunities and different levels of engagement in the innovation process, entrepreneurs consider themselves innovative because they are always in search of "news" to serve their consumers. All the small innovations implemented in the process, in the product, in the management or in the marketing implemented by the managers brought gains of production and productivity, reflecting in increased sales. The greater engagement of managers and / or owners in the development of new products, processes and working methods, the more innovative the company will be [15].

Mechanisms of technology transfer

Table 3, summarizes the main knowledge-development institutions mentioned in the study, the main channels and mechanisms of technology transfer identified and the situation of the partnership.

Table 3 - Partners of phytocosmetics companies and transferring technology mechanisms.

INSTITUTION	CHANNELS	MECHANISMS OF TRANSFERRING TECHNOLOGY	SITUATION OF THE PARTNERSHIP
FUCAPI	Education and training	Qualification of human resources	Formal
	Consultancy / technical services	Analysis services	Formal
	Incubation Center / Parks	Incubation	Formal
UFAM	Joint development contributions of innovations	Research and development	Informal
	Consultancy / Services Technical	Analysis services	Informal
	Education and training	Qualification of human resources	Formal
INPA	Licensing	Non-exclusive patent license	In Analysis
	Contratos de desenvolvimento conjunto de inovações	Research and development	Informal
CBA	Consultancy / Technical Services	Analysis services	Informal

It was verified through the interviews that all the participating companies have some concern regarding the process of qualification of the employees and of the managers themselves. Figure 6 graphically shows the main points addressed by the interviewees. In 10 of the companies interviewed, the main way to remain qualified is through external courses and events (held outside the company). Lectures, fairs and courses of different hours were mentioned. Two managers emphasized that they only participate in courses outside the state, considering them to be of better quality. On-the-job training is the practice adopted by 69% of the companies interviewed. In this modality the training are carried out within the companies themselves, often in the production line itself. As responsible for the application of the training were mentioned that the instructors are the managers themselves, the responsible pharmacists and the more experienced colleagues. It is important to note that only one company uses only the on-the-job training, the others work with a combination of internal and external training techniques.

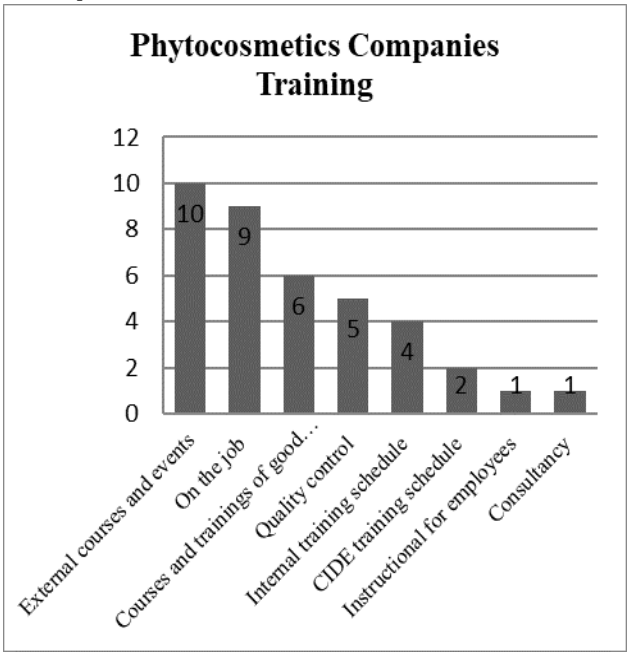

Fig.6: Training in Phytocosmetics Companies

For 46% of the companies interviewed, the training focus is directed to the ANVISA courses of good practices (related to production protocols and manipulation of inputs) and 38% of them reported on the importance of this process for the quality control of their products. Only 6 companies reported having a defined training schedule for the year, the others carry out the process according to the need. Of these companies, 4 have their own schedules and 2 are included in the training schedule of the hatchery to which they are linked. Of the companies interviewed only one declared to carry out training through specialized consultancies and only one declared to encourage employees to seek external courses in the area to qualify, offering as a counterpart the release of the employee to carry out the course. During the interviews, entrepreneurs were asked why they did not strengthen their relations with research and development

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institutions in order to improve their products and make them more competitive in the market. Figure 7 represents the key words mentioned by the managers. It is observed that 07 companies (54% of respondents) stated that research and development are not organizational priorities at this time.

Companies are worried about staying in the market unstable and competitive. The research and development of new products meet the market demand (38% of companies). The contact network of 31% of the interviewed managers are fundamental for the development of their products. They seek partners / acquaintances in the segments required to develop or improve products to obtain information and establish formal partnerships, including hiring laboratories that can develop formulas, test and validate protocols.

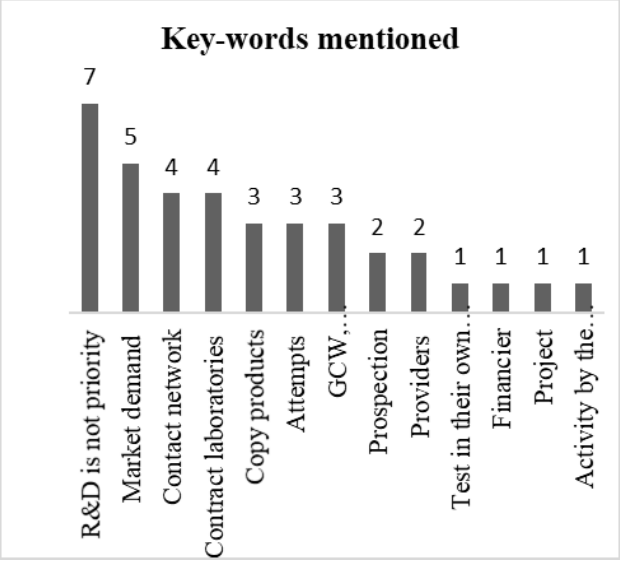

Fig.7 - Main key words mentioned - R & D

For 3 respondents, their organizations search the market for products that have high demand and "copy" them, developing the products through successive attempts until they find a combination that propitiates the commercialization of the product. The technical and scientific prospecting was mentioned by two managers who use a technical and scientific database to seek information that supports the process of developing new products. Two other managers mentioned the role of raw material suppliers in product development. According to them, suppliers inform them of the inputs they have developed or are using and the companies, from there, through trial or hiring laboratories develop or adapt their products. Only one company declared that they design projects, seek funders, and test their products in their own laboratories before sending ANVISA accredited laboratories as a way to reduce costs. One company stated that all research and development activity occurs in the matrix. One of the main factors that the companies researched presented for an investment decision-making process in R & D is capital, as verified by Cribb, (2009). They are concerned with the marketing issues of their products, including looking for new and varied ways of doing business, from traditional practices to e-business via social networks [38].

VI. CONCLUSION

It was found that, in general, there is no defined channel of technology transfer between the knowledge producing institutions and the micro, small and medium sized phytocosmetics companies of the State. Some transferring technology mechanisms used by them have been identified, which are mainly the training of human resources, the provision of technical services, research and development of products or processes that are underway and incubation of companies. It is important to note that most of these mechanisms are still at the level of informality. The relationship is mainly based on the friendship between researchers and entrepreneurs.

Research and development is not a priority issue in the companies studied, but they recognize FUCAPI, UFAM, INPA and CBA as the main research and development institutions in their segments. The companies surveyed carry out partnerships mainly with suppliers that are chosen according to their reputation in the market. The main mechanism for obtaining knowledge is training which is generally assimilated but not incorporated into productive practices. The major knowledge developed by the phytocosmetics companies are in the marketing, technical and scientific areas, which are not always formalized.

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