

## THE DEVELOPMENT OF KNOWLEDGE ABSORPTION CAPACITY FROM ENVIRONMENTAL UNCERTAINTY

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### Abstract

**Objective:** Understand the process of knowledge absorption (ACAP) from the dimensions of PACAP and RACAP in a large company in the furniture sector.

**Methodology / approach:** This research used a qualitative, descriptive approach through a single case study. Data were collected in documents and through semi-structured interviews. The analysis was developed using the content analysis technique with the support of Atlas / TI software.

**Originality / Relevance:** In the extant literature on absorptive capacity, few studies understand the influence of the external environment subject to environmental uncertainty for constructing organizational routines of PACAP and RACAP.

**Main results:** The company Rudnick developed routines to monitor and acquire information from the external environment, combining previous knowledge and experiences to assimilate it internally and competence to transform learning by disseminating with existing knowledge from employees, social integration mechanisms, organizational memory, and inter and intra-organizational interaction.

**Theoretical /managerial contributions:** This research contributed to the study of absorptive capacity under a multidimensional nature, from environmental uncertainties, and added a qualitative, longitudinal approach to identify the different knowledge absorption routines in PACAP and RACAP.

**Social contributions for management:** In the empirical field, the results will contribute to managers' understanding of the importance of developing routines to absorb knowledge and survive in an environment of uncertainty. It will also help managers reflect on what and how to implement their companies' practices to increase competitiveness. As for social contributions, it strengthens scientific research and optimizes industrial sectors' technological capabilities, particularly in developing countries.

**Keywords:** Absorptive capacity. Environmental uncertainty. Furniture sector. Knowledge. Routines.

### O DESENVOLVIMENTO DA CAPACIDADE ABSORTIVA DE CONHECIMENTO A PARTIR DA INCERTEZA AMBIENTAL

#### Resumo

**Objetivo:** Analisar o processo de absorção de conhecimento (ACAP) a partir das rotinas implementadas nas dimensões da PACAP e RACAP em uma empresa de grande porte do setor moveleiro imersa em ambiente de incerteza.

**Metodologia/abordagem:** Utilizou-se da abordagem qualitativa, exploratória e descritiva por meio do estudo de caso único. Os dados foram coletados em documentos e por entrevistas semiestruturadas. As análises foram desenvolvidas com a técnica de análise de conteúdo com apoio do software Atlas/TI.

**Originalidade/Relevância:** Na literatura de capacidade absorptiva se observam poucos estudos que compreendam a influência do ambiente externo sujeito a incerteza ambiental para a construção de rotinas organizacionais da PACAP e RACAP.

**Principais resultados:** A Rudnick desenvolveu rotinas para absorver informações do ambiente externo. Foram agregados o conhecimento prévio e as experiências existentes, facilitando a assimilação, transformação e aplicação em produtos. Este processo foi desenvolvido a partir dos colaboradores, mecanismos de integração social, memória organizacional e interação inter e intraorganizacional.

#### Cite as / Como citar

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**Contribuições teóricas/metodológicas:** A pesquisa contribui estudando a capacidade absorptiva sob a natureza multidimensional a partir de incertezas ambientais, acrescentando a abordagem qualitativa e longitudinal para identificar as diferentes rotinas de absorção do conhecimento na PACAP e RACAP.

**Contribuições Sociais / Gerenciais:** Os resultados contribuirão com os gestores por destacarem a importância de desenvolver rotinas para absorver conhecimento em ambientes de incertezas. Também contribui sobre o que e como implementá-las para aumentar a competitividade. Quanto às contribuições sociais, fortalece a pesquisa científica e se otimizam as capacidades tecnológicas de setores industriais em todos os países, particularmente os países em desenvolvimento.

**Palavras-Chave:** Capacidade absorptiva. Incerteza ambiental. Setor moveleiro. Conhecimento. Rotinas.

### EL DESARROLLO DE LA CAPACIDAD DE ABSORCIÓN DEL CONOCIMIENTO DESDE LA INCERTIDUMBRE AMBIENTAL

#### Resumen

**Objetivo:** Comprender el proceso de absorción de conocimiento (ACAP) a partir de las dimensiones de PACAP y RACAP en una gran empresa del sector del mueble.

**Metodología / enfoque:** Utilizamos el enfoque cualitativo y descriptivo a través de un único estudio de caso. Los datos se recopilaron en documentos y mediante entrevistas semiestructuradas. Los análisis se desarrollaron utilizando la técnica de análisis de contenido con el soporte del software Atlas / TI.

**Originalidad / Relevancia:** En la literatura sobre capacidad de absorción existen pocos estudios que comprendan la influencia del ambiente externo sujeto a la incertidumbre ambiental, para la construcción de rutinas organizacionales de PACAP y RACAP.

**Resultados principales:** Rudnick desarrolló habilidades para monitorear y adquirir información del entorno externo, combinando conocimientos y experiencias previas para asimilarlo internamente y competencia para transformar el conocimiento mediante la difusión del conocimiento existente, de los colaboradores, mecanismos de integración, memoria social, organizacional e interacción inter e intraorganizacional.

**Contribuciones teóricas / metodológicas:** La investigación contribuye a estudiar la capacidad de absorción bajo una naturaleza multidimensional, a partir de incertidumbres ambientales, y agrega un enfoque cualitativo y longitudinal para identificar las diferentes rotinas de absorción de conocimiento en PACAP y RACAP.

**Contribuciones sociales / de gestión:** En el campo empírico, los resultados contribuirán a la comprensión de los gerentes de la importancia de desarrollar rutinas para absorber el conocimiento y sobrevivir a un entorno de incertidumbre. También contribuye a qué y cómo implementarlos para aumentar la competitividad. En cuanto a las contribuciones sociales, fortalece la investigación científica y se optimizan las capacidades tecnológicas de los sectores industriales en todos los países, particularmente en los países en desarrollo.

**Palabras clave:** Capacidad de absorción. Incertidumbre ambiental. Sector del mueble. Conocimiento. Rutinas.

## Introduction

In increasingly dynamic markets, when competition increases, organizations develop and enhance their resources and capabilities through social integration routines and mechanisms, collecting information about changes and adopting strategies/structures to respond to them and become competitive (Todorova & Durisin, 2007).

The aggregation of knowledge seeks to change the organizational logic and strengthens competitive advantages (Tece, Pisano & Shuen, 1997). Absorptive capacity (ACAP) translates as one of the organizations' critical learning processes about creating routines for identifying, assimilation, and exploiting environmental knowledge (Lane, Koka, & Pathak, 2006). There is a need to develop organizational habits to build absorptive capacity from information collected externally (Easterby-Smith & Lyles, 2005).

From the introduction of the construct of knowledge absorptive capacity (ACAP) made by Cohen and Levinthal (1989; 1990), Zahra and George (2002) added new components, which stimulated new research in the area. As a result of Zahra and George's (2002) proposal, there was an increase in studies on ACAP, these addressing their background and effects (Lane, Koka, & Pathak, 2006).

According to Zahra and George (2002), ACAP is composed of two subsets: potential absorptive capacity (PACAP) and realized absorptive capacity (RACAP). The first comprises the acquisition and assimilation of knowledge. It is related to the effort spent on identifying and acquiring new external knowledge. The second is about transforming, combining, and finally applying this acquired knowledge. Zahra and George (2002) theorized that the link between PACAP and RACAP is moderated by a series of routines expressed through social integration mechanisms.

This study investigates the process of knowledge absorption in an uncertainty context, based on the dimensions of PACAP and RACAP, according to the model of Zahra and George (2002). The research has as object of study Rudnick S / A. This company's choice was due to its importance in the Santa Catarina economy and the Brazilian furniture sector. Nevertheless, mainly because it is a representative case that can contribute to studies on ACAP.

Rudnick S/A faced uncertainties in the environment that put the business at risk, requiring it to seek external information and implement the process of absorbing new knowledge. For this reason, the case is representative because it allows capturing circumstances and conditions of the development of routines of this process through a retrospective case study (Eisenhardt & Graebner, 2007).

The uncertainty generated by the market turbulence and the lack of forecasts about the exchange rate's future caused the need for a new strategy by Rudnick. Thus, as a means of surviving the exchange rate fluctuation, Rudnick developed the institutional line to meet companies' specific demands, offering them innovative solutions and specialized technical support that guarantee the beauty and success of their stores. At this moment, the importance of building routines that incorporate new skills and abilities to absorb external information and develop the process of absorbing knowledge comes into play.

Eisenhardt and Martin (2000) argue that, although the routines for developing absorptive capacity have some similarities between different companies and achieve similar results, they are peculiar in how they are developed and implemented. And these idiosyncrasies can also be associated with periods of uncertainty that affect the decision-making process and, consequently, the routines for developing absorptive capacity (Kale et al., 2019). Reinforcing the above authors, Parida, Westerberg and Frishammar (2012), Fuchs, Rossetto and Carvalho (2016), and Rossetto et al. (2019) encourage future research that addresses how companies create routines in their ACAP processes considering the four dimensions of its two capacities (PACAP and RACAP) of the model proposed by Zahra and George (2002).

Versiani, Cruz, Ferreira, and Guimarães (2010) reinforce the research gaps that address environmental uncertainty, environmental turbulence, and absorptive capacity. In the literature on absorptive capacity, several studies have addressed environmental uncertainty only as an external factor, limiting the understanding of the external environment's influence on the construction of organizational routines that characterize the internal environment (Kale et al., 2019).

The need to address the ACAP theme from a qualitative perspective is another gap defended by D'Souza and Kulkarni (2015), Versiani et al. (2010), Carvalho, Rossetto, and Piekas, 2021. Zahra and George (2002) stated that few empirical studies have addressed the absorptive capacity under a multidimensional nature and add that the qualitative approach has been neglected in these studies. Apriliyanti and Alon (2017) claim that recent studies should use the longitudinal direction to understand how organizations respond to specific internal and external conditions and make decisions that help develop ACAP. Finally, Horvat (2015) states that one must have a deeper understanding of the knowledge absorption process and how it is designed so that this "black box" is revealed, corroborating the need for multidimensional, qualitative, and longitudinal studies.

The justifications cited to confirm the existence of theoretical gaps, such as: studying how organizations actively seek and acquire external knowledge in environments of uncertainty, which could clarify how they process this information; the urgency of research to understand the decision processes, that is, how routines are created and determine the organizations' investments in absorptive capacity; the need to address the ACAP theme from a qualitative perspective; and, finally, few empirical studies have addressed the absorptive capacity under a multidimensional nature and add that the qualitative approach has been neglected. Therefore, the article's objective is to investigate the knowledge absorption process (ACAP) from the routines implemented in the dimensions of PACAP and RACAP in a large company in the furniture sector immersed in an uncertain environment.

This research contributes to the advancement of studies on the absorptive capacity process, especially by detailing the main routines of PACAP and RACAP, implemented by the company to respond to environmental uncertainty, and the use of qualitative research with a longitudinal approach. In the managerial field, the results will contribute to small and medium-sized companies' managers

understanding the importance of developing routines to absorb knowledge and survive an uncertain environment. It also helps managers to reflect on how to implement routines to increase competitiveness.

### **Absorptive Knowledge Capacity (AKCAP)**

Investigations on ACAP focused primarily on the work of Cohen and Levinthal (1989; 1990). The initial concept of absorptive capacity was defined as the “firm’s ability to recognize the value of new external information, assimilate it and apply it for commercial purposes” (Cohen & Levinthal, 1990, p. 128). Zahra and George (2002, pp. 186-188) reconceptualized it, stating that ACAP is “a set of organizational routines and processes by which companies acquire, assimilate, transform and explore knowledge to produce dynamic organizational capacity”.

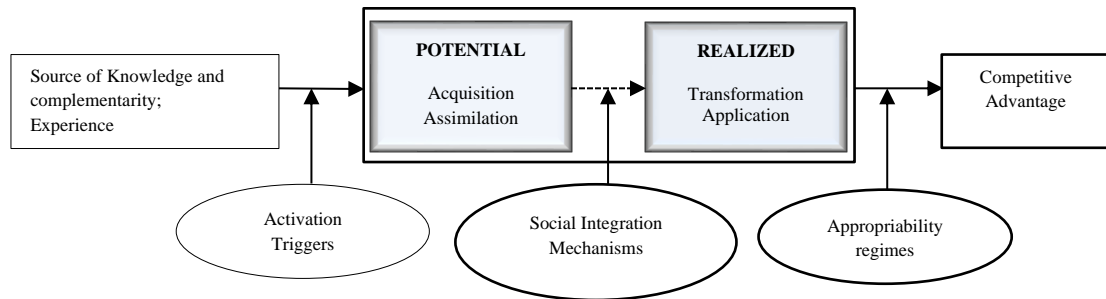
Lane et al. (2006) claim that ACAP is one of the most important constructs in research on the organization in recent decades. They found that absorptive capacity as a literature theme was due to its studies’ great perspective.

Wang and Ahmed (2007) explain that the absorptive capacity is a set of skills of a company to recognize the value of new external information, assimilate it and apply it commercially. In addition to the authors above, others have significantly contributed to the understanding and increase of research on ACAP, among them the works of Lane and Lubatkin, (1998), Jansen, Van Den Bosch and Volberda (2005), Tsai (2001), and Flatten, Greve and Brettel (2011). Zahra and George (2002) recognize ACAP as a set of routines and organizational processes through which the organization acquires, assimilates, transforms, and applies knowledge to generate dynamic organizational capacity.

In this article, we will use the model proposed by Zahra and George (2002) for the option of investigating the routines arising from the knowledge absorption process. The authors presented ACAP divided into two capacities: Potential (PACAP) and Accomplished (RACAP). PACAP encompasses two dimensions, Acquisition and Assimilation, and RACAP, another two, Transformation and Application.

Zahra and George (2002) claim that the potential absorptive capacity is an antecedent of the realized absorptive capacity and makes organizations enjoy the benefits of ACAP (Fosfuri & Tribó, 2008; Vega-Jurado, Gracia-Gutiérrez, & Fernández -De-Lucio, 2008). According to Figure 01, the model originated from the dynamic capacity, which uses resources available to generate a competitive advantage, adapting the internal environment as the main component for the successful development of ACAP.

**Figure 01** – Absorptive capacity model according to Zahra e George (2002)



**Source:** Zahra e George (2002, p. 192).

Zahra and George (2002) suggested distinguishing four dimensions of absorptive capacity, each playing different but complementary roles, explaining that routines and processes can influence the absorptive capacity of knowledge. Expanding the explanation about the dimensions belonging to PACAP and RACAP, we can say that the **Acquisition** dimension is defined as the ability of a company to identify and acquire knowledge generated externally and that is fundamental for its operations” (Zahra & George, 2002).

It is related to the process perceived by Cohen and Levinthal (1990, p. 128) as a recognition of the value that serves to identify and evaluate new external knowledge. They theorize as follows: “The ability to access and use external knowledge is largely a function of the previous level of related knowledge. [...] Prior knowledge gives the ability to recognize the value of new information, assimilate it and apply it for commercial purposes”.

For Zahra and George (2002), the **Assimilation** dimension refers to the ability to interpret and understand knowledge with the cognitive structures existing in the organization and is directly related to their prior experience. The information captured from the external environment must be transferred to the organization’s interior and then assimilated and disseminated. Assimilation is composed of the company’s routines and processes that allow it to analyze, process, interpret and understand the information obtained from external sources (Szubanski, 1996). This second dimension of ACAP deals with the interpretation and understanding of individual’s knowledge. This phase of ACAP is closer to the individual than to the collective level. Indeed, knowledge assimilation describes the ability to understand new external knowledge and link it with the previous knowledge base.

The **Transformation** dimension initiates the RACAP process and is considered the consequence of the assimilation process (Zahra & George, 2002). For the authors, it is the internalization and conversion of new knowledge acquired and assimilated and is related to the ability to transform knowledge into business opportunities. In this stage, knowledge, and insights are produced and facilitate the search for new opportunities and modify the competitive scenario.

Zahra and George (2002, p. 190) consider that this dimension “denotes a company’s ability to develop and refine the routines that facilitate the combination of existing knowledge and newly acquired

and assimilated knowledge.” This process is done by adding or deleting knowledge or simply interpreting the same expertise differently.

The **Application** dimension is recognized by Zahra and George (2002) as routines that allow companies to expand and enhance existing and new knowledge to combine them, generating valuable knowledge for the organization. It creates habits for the use and implementation of experience that will lead the organization to develop products, systems, processes, new organizational forms, or improve existing skills.

Zahra and George (2002, p. 190) define the application “as an organizational capacity based on routines that allow companies to refine, expand and leverage existing skills or create new ones by incorporating acquired and transformed knowledge into their operations.”

Traditionally, this phase is critical. If we pay attention to Cohen and Levinthal (1990, p. 128), “employees must be able to apply new external knowledge for commercial purposes,” this suggests that all other phases are essential to the extent that they reach the application of knowledge. According to this view, the absorptive capacity is a dynamic capacity formed by a set of organizational routines implemented in the potential and realized ACAP.

### **Methodological procedures**

A qualitative approach was chosen most appropriate from the ontological and epistemological perspectives to the research problem in the present study. It starts from the subject-object interaction ontology (Saccol, 2009), understanding that the routines implemented for the knowledge absorption process result from an interaction between objective reality (factors that generate uncertainty) and interpretation and action from them by the subjects (knowledge absorption routines).

We opted for the single case study research strategy. According to Eisenhardt (1989), case studies are adequate for understanding the dynamics present in singular environments. The theoretical sampling must excel in cases susceptible to replicating or increasing the existing literature. The unique characteristics of the present case meet these criteria. When verifying elements present in the previous theory, the objectives of the study are descriptive. However, considering the possibility of finding evidence that inspires new ways of thinking on the subject (Paiva Júnior, Leão & Mello, 2007), this research is also exploratory. Its results will not generalize but will allow recontextualization for research in other environments close to the one studied and the relationship between the recent developments and existing knowledge, contributing to the theme's advancement (Godoy, Brunstein, Brito & Arruda Filho, 2020).

As to the objective, the research seeks to investigate the knowledge absorption process (ACAP) from the routines implemented in the dimensions of PACAP and RACAP in a large company in the furniture sector immersed in an environment of uncertainty.

This research has as object of study Rudnick S / A, one of the largest furniture complexes in the country and operates in São Bento's municipality do Sul (SC). Founded in 1938, the family company, currently with around 600 employees, reaches 82 years old as a brand nationally recognized for the high-quality standard and reference in innovation. This image's construction goes back to the 1970s when the company started importing machinery from Germany, standing out as the first furniture industry to use laminates in its products. Differentiation, combined with a robust commercial policy, elevated it to a market leadership position.

In 2002, the company started to operate in the foreign market, allocating 40% of its production to export. However, in 2006, Brazil faced a severe financial crisis, reflected in the exchange rate fluctuation, which caused Rudnick to suspend exports. In this moment of great uncertainty, the company needed to redefine its market positioning, seeking competitiveness in the domestic market.

As a result, in 2008, Rudnick decided to invest in the institutional line, a decision supported by the experience acquired in a partnership with Boticário, which was still partial. The collaboration conditions were because it represents Rudnick's survival in the face of fluctuations in the exchange rate to increase business reliability and return to the domestic market by developing the institutional line. As Boticário was already an eventual partnership, Mr. Ingomar, owner of the company, contacted Mr. Miguel, former owner of Boticário, knowing that he was interested in expanding the stores and offered a partnership for the production of planned furniture. Due to this combination of interests, the partnership made Rudnick firm in the market. This decision would be the peak moment for its executives to decide to start the process of developing the company's absorptive capacity for survival.

Boticário today represents one of the ten largest retailers in Brazil, with more than 13,000 direct employees and 40,000 in its franchise network with capillarity throughout the national territory. According to data from the Brazilian Association of the Personal Hygiene, Perfumery and Cosmetics Industry (ABIHPEC), Boticário is the second in sales in 2019 in the ranking of manufacturers sector. This sector is in the fourth position in the world ranking of Personal Hygiene, Perfumery and Cosmetics, which is led by the United States, followed by China and Japan.

The present research focuses on the period of uncertainty (2008/2011) generated by the exchange rate fluctuation and the consequent suspension of exports, which can be called, according to several models proposed in theory, an activation trigger.

Concerning the justification for this single case study, Eisenhardt (1989) and Yin (2010) recommend it. The choice is appropriate to test a well-formulated theory because it represents a peculiar, revealing, representative or typical case. That is, one can capture the circumstances and conditions of a situation that the company passed on. Given the look at a previously occurred event, the study is configured as a retrospective case (Eisenhardt & Graebner, 2007). The interviews and documents allow portraying the event efficiently and in-depth.

To achieve the study's objective, employees were interviewed, according to Table 01, appointed by the Board of Directors. The interviewees were selected because they are the main actors in developing absorptive capacity in the episode studied.

**Table 01** – List of respondents

Interviewee	Time in the company	Job title
Entrevistado 1	45	Member Administrative Council
Entrevistado 2	20	Managing Director
Entrevistado 3	41	Production Manager
Entrevistado 4	24	Design Director
Entrevistado 5	27	Production Director
Entrevistado 6	19	Market Director
Entrevistado 7	10	Sales Manager

**Source:** Elaborated by the authors.

For the elaboration of the interview script that captured how the absorptive capacity development process occurred (PACAP and RACAP), research by Zahra and George (2002), Camisón and Forés (2010), Flatten et al. (2011), Todorova and Durisin (2007), Costa Junior, Rossetto and Lenzi (2018) and Versiani et al. (2010). The first version of the instrument was based on an extensive bibliographic review, seeking theoretical validity regarding the legitimacy of the research procedures established by Kirk and Miller (1986). As for reliability, we sought to ensure that any other researcher could replicate the research and reach similar results.

When it comes to qualitative research, the methodology criteria must be as rigorous as possible. Various sources and researchers were used for triangulation, as is proclaimed by Denzin (1978). Creswell (2002) endorses that we need multiple sources of information. Following Merriam (1998), this research made use of interviews with several managers of various positions in the hierarchical structure of the organization, and of secondary data, both reports of the managerial areas and minutes of meetings of the board of directors, that allowed the researchers to understand the context faced by the company. These reports show sharp declines in financial results in the period studied and confirm the uncertainty in subsequent years.

This triangulation was carried out through the interviews' data by checking the interviewees and the reports of the areas involved in the phenomenon studied and endorsed by Whitemore, Chase, and Mandle (2001). It served to assess whether the other two sources confirmed the data obtained in the interviews. This process was validated during the research and is shown in the presentation of the results.



In this approach, Creswell (2002) indicates the allocation of a different person, together with the researcher, to follow the reports and ask questions to the interviewees, while Merriam (1998) suggests that various analysts be used, as colleagues of the researcher performing the recoding of the interview transcripts. The interviews were followed by three researchers, the master's students, the advisor, and the co-supervisor, due to these two indications.

Regarding several analysts' possibilities, we were cautious about asking colleagues from other educational institutions studying ACAP to analyze and give their opinion on how the material accumulated in the interviews was coded. In the meantime, research group meetings were also used so that researchers, master's, and doctoral students could assess how the interviews' analysis process was developed.

The research was concluded when it was noticed that recent interviews were about to repeat information that other interviewees had already spoken, establishing the research corpus's superior construction. Minayo (2000) states that, with the absence of recent reports in the research data collection process, the criterion for completing this collection through the saturation of interview responses is recommended.

When analyzing the results, we tried to describe the context studied by a rich and detailed description. Merriam (1998) states that the researcher must provide the reader with a description sufficient to describe the context of the research and the interviewees to perceive the relationship between what he seeks to research and the reported scenario.

The informants' feedback was another criterion of validity and corresponded to the confrontation with sources and obtaining their agreement or consent, being called the participants' communicative validation criterion (Paiva, Leão, & Mello, 2007).

A pre-test divided into three stages was performed to implement the research instrument,

1. Research script, seeking various models proposed by authors with research already validated
2. Construction of the questionnaire proposal based on the first stage
3. Internal validation through a pre-test with three elements that were not directly linked to the research

These elements were: managers of companies similar to the studied company; master's and doctoral students researching the ACAP theme; and, finally, senior researchers with studies on the subject. With the completion of these steps, it was possible to make the adjustments, removing redundant issues, modifying the content of others, and, finally, including some.

To support the analysis of the transcripts' content, categories and elements of analysis that refers to each dimension studied were previously used, as shown in Table 02. The categories constructed refer to each of the dimensions of PACAP and RACAP of the Zahra model and George (2002). Within each established category, elements of analysis were defined by an open grid. These elements were previously defined from the theoretical basis but open to developing new elements if identified during the research.

To increase the data's reliability and validity, the Atlas / TI software was used to analyze and interpret them. The purpose of the software was to assist and manage the data to understand, visualize, integrate, and exploit the results. With the visual analysis, it was possible to visualize the interviewees' expressions that belong to each category, contributing to the interview analysis and interpretation of the results.

**Table 02** – Analysis categories and elements

Categories		Analysis elements
PACAP	<i>Acquisition</i>	Knowledge monitoring, prior knowledge, benchmarking, networking, search for consultants, market research, <b>internet</b> , consultants, seminars, database, professional magazines, personal networks, academic publications, <b>participation in fairs, workshops, events abroad, transfer of knowledge, knowledge stock, new features, external professional, supplier experience, customer expectations, trends, news, monitoring of innovations, external prospecting, RADAR, identifying and interpreting new knowledge, gatekeepers, culture, inter-organizational sharing.</b>
	<i>Assimilation</i>	Exchange of knowledge between employees, brief exchange of functions between sectors, non-routine mechanisms, flexible internal and interdepartmental communication, periodic meetings, integration between employees, informational data, reports, prior knowledge of employees. <b>Inter-organizational integration, continuous improvement groups, learning culture, dissemination mechanisms, intranet, unity of all, flexibility in the exchange of knowledge, understanding, interpretation of new information, meeting of cells, cross-functional interfaces, communication structure. Base authors for the definition of PACAP analysis categories.</b> Cohen e Levinthal (1990), Zahra e George (2002), Liao, Welsch e Stoica (2003), Jansen <i>et al.</i> (2005), Todorova e Durisin (2007), Vega-Jurado <i>et al.</i> (2008), Versiani <i>et al.</i> (2010), Flatten <i>et al.</i> (2011), Zahra e George (2002), Liao <i>et al.</i> (2003), Jansen <i>et al.</i> (2005), Todorova e Durisin (2007), Versiani <i>et al.</i> (2010) e Flatten <i>et al.</i> (2011).
Categories		Analysis elements
RACAP	<i>Transformation</i>	Training, incentives for the development of new ideas, courses, technical development of employees, sharing of practical experiences in a formal and informal way. Connectivity between individuals, degree of trust, cooperation and integration among employees that encourage the exchange of ideas and interpretation of knowledge in the organizational context. Change in learning routines. <b>Flexible structure, cooperation, trust, construction, organizational memory, organizational learning, internal cognitive processes, culture of learning, processing and dissemination, management style, bisection, maturation, diffusion, feedforward.</b>
	<i>Application</i>	Improvement of business processes, incentives in R&D, creation of prototypes, incentives for innovation, <b>spreading knowledge, innovation management, leveraging new opportunities, disseminating capacity, breaking paradigms, results, decision-making processes, launching, differences for the market, new competences, creation of new products / services, innovation, market conquest, implementation, organizational forms, expanding to other lines, proposing new ideas. Base authors for the definition of the RACAP analysis categories</b> Zahra and George (2002), Van Den Bosch and Volberda (2005), Todorova and Durisin (2007). Zahra and George (2002), Jansen <i>et al.</i> (2005), Todorova and Durisin (2007), Murovec and Prodan (2009), Flatten <i>et al.</i> (2011). Cohen and Levinthal (1990), Zahra and George (2002), Todorova and Durisin (2007), Vega-Jurado <i>et al.</i> (2008), Flatten <i>et al.</i> (2011), Zahra and George (2002), Todorova and Durisin (2007). Cohen and Levinthal (1990), Zahra and George (2002), Todorova and Durisin (2007).

**Note:** The elements of analysis that appeared during the interviews stand out in bold.

**Source:** Adapted from Costa Junior, Rossetto e Lenzi, F C. (2018).

## Presentation and discussion of results

This item initially presents a brief context of Rudnick's environment and the activation trigger (environmental uncertainty - exchange rate crisis) that generated the process of developing the absorptive capacity for knowledge. Afterward, it was described how the dimensions of acquisition and assimilation (PACAP) and the dimensions of transformation and application (RACAP) were constructed, according to Zahra and George (2002). The theoretical discussion was carried out concurrently with this description.

### *The environmental context focus of the analysis*

In the 90s, the company operated to sell the conventional line that comprised office and kitchen items, with production in scale to meet the retail market. In 1994, the company decided to invest in opening its stores under the Rudnick brand and directly meet retail demand, increasing efficiency in the flow of production and profitability on the manufactured product. The period covering the years 1998-2004 benefited from the rise in the dollar, which increased profitability on products sold abroad.

In 2005, the Brazilian economy suffered a strong recession, and the fall of the dollar brought uncertainty to the furniture hub of São Bento do Sul. The environmental uncertainty and the lack of predictability about what would happen affected the future of exports. The company suffered from the currency crisis that caused its strategies to become unpredictable. Between 2006-2010, negative revenue had a strong impact and was the beginning of the biggest crisis identified in its history.

In 2008, the company decided to invest in the institutional line (special projects), supported by the experience of a partnership with Boticário. From this approach, a new phase of repositioning of the company in the market began. Even though the company had built up the know-how to serve the Boticário company, it was necessary to know its requirements and act in this segment. For the managers, the partnership in the negotiations between Rudnick and Boticário was why the company survived the fluctuation of the exchange rate. The decision to invest in the institutional line arose from the activation trigger originated by uncertainty. In this way, the absorptive capacity for knowledge to operate in this new market segment began.

### *Absorptive Capacity (ACAP) of Knowledge*

The process of developing absorptive capacity was analyzed using Zahra and George (2002) model, highlighting the PACAP and RACAP dimensions. The objective was to analyze the knowledge absorption process (ACAP) from the routines implemented in PACAP and RACAP in a large company in the furniture sector immersed in an uncertain environment when the company decides to invest in the partnership Boticário.

### *Potential absorptive capacity (PACAP)*

The PACAP component covers two dimensions of absorptive capacity, which are acquisition and assimilation.

#### *Acquisition dimension*

The first stage, acquisition, initiates the PACAP process and refers to a company's ability to identify and acquire externally generated knowledge, which is fundamental for its functioning (Zahra and George, 2002). External information is detected, captured, and transmitted to the company's interior to be selected and interpreted.

After investing in the institutional line, the company returned its look to the market in search of information about this segment. The search for information was aimed at better meeting customer expectations, with new designs on products, trends, new tools, process technologies, and material resources, in addition to mapping out prospecting for new customers to add to the institutional line.

For interviewee 4, responsible for the innovation area, the search for external information was intensified in the organization based on the partnership with Boticário

The company always sends one or two people to fairs abroad. I went to Germany and saw that they were using much copper in 2012. [...] We always look at the most famous designs, the one that draws Armani, too he designs the kitchen and if he puts on copper handles, very shiny and they start making shiny kitchen it seems crazy, but it is fashionable (Interviewee 4).

Participation in fairs, events abroad, and monitoring the main trends of experts in the sector or associated sectors contributed to the absorption of new knowledge. Industry trends have brought knowledge about how to operate in this segment. The innovations observed at fairs and events result in the recombination of existing knowledge in a new context and, many times, are not based on new knowledge (Hargadon, 2002).

Upon being aware of recent trends from another industry, Rudnick, by monitoring innovation in other booming sectors, exhibits high potential absorptive capacity, improving its competence to understand and evaluate the value of new knowledge acquired. When the company applies knowledge from experts in other sectors, an effective means for creating inventive recombination is seen using analogy when applying knowledge from an existing domain to another domain.

The ability to foresee a future need has generated competencies for the organization to anticipate its strategies and create organizational mechanisms to prepare for the changes. Tu, Wang, Arbeitman, Chen, and Sun (2006) stress the importance of knowledge monitoring, considering an organizational mechanism that promotes the identification, acquisition of knowledge and new technologies from external sources that generate a competitive differential concerning the competition.

Todorova and Durisin (2007) warn of the need to increase attention based on individuals' cognitive structures and combine new knowledge with previous knowledge to generate the ability to evaluate new information and absorb it.

For the General Director, the company developed a vital routine to search for information in the external environment and allowed access to the sources of knowledge that contributed to identifying new knowledge. By creating the conditions for external prospecting, the company collaborated to develop new skills to identify knowledge and a new opportunity.

We have a RADAR with some 200 franchises that we are approaching two hundred different customers. On top of this RADAR, we are contacting the company. Mapping was carried out, which can be done in any report on the Francap website to get the companies' list. We contact you, hand to hand, we schedule with the supply sector, go to the franchise, and present the first idea (Interviewee 2).

The company also made available an employee to monitor the market and be responsible for acquiring new information. The employee responsible for monitoring and assimilating external knowledge is recognized as a gatekeeper, whose function is to identify new information, interpret new knowledge, bring it to the organization, monitor changes, and new opportunities. Through the gatekeeper, external information enters the company. It is essential that he is qualified and has experience in business analysis, and knows its specific resources to use external knowledge (Yao & Chang, 2017).

There are other key factors that companies use to improve ACAP. Of course, the key is the ability to create internal knowledge from external data. However, information management systems and social integration practices that can bring external knowledge closer to gatekeepers are also essential (Roberts, Galluch, Dinger & Grover, 2012).

Another mechanism identified by the company to seek external knowledge was generated from the relationship with suppliers. As interviewee three reports:

When there is a difficulty, get together and discuss how to do it and contact the suppliers: I need to develop a technique for bending apart, so I contact the supplier. What material? Which color will match? So, I am going to bring in specialized personnel. With the laminate will curve, how to make the curvature and not break? (Interviewee 3).

Interviewee 7 also confirms the influence of the partnership with suppliers on the internal improvements obtained. It is the information absorption channel that results in benefits for the organization.

We have a challenge, and we go with our supplier: let us build together, I have the freedom to call you [...] he uses energy, he measures, he brings reports, he brings calculations that we can pass on to Boticário. [...] we always try to use the most current possible, then we have to update ourselves. The knowledge of the outside professional comes in: I have another supplier. Let us see his solution. (Interviewee 7).

The construction of knowledge with suppliers made by Rudnick corroborates the statement of Najafi-Tavani, Sharifi, Soleimanof, and Najmi (2013). They defend the collaboration with external partners (customers, suppliers, competitors, universities, research centers, and government) to improve an organization's knowledge sharing. In the presence of absorptive capacity, it can result in innovation.

Through the transfer of knowledge and experience from suppliers, the company increased its internal knowledge base. In terms of new features, the search for information in the market is rooted in its culture. The relationship between organizational culture and the absorption of external knowledge was evident, not comprehensively observed in the existing literature.

The potential absorptive capacity facilitates identifying new knowledge and its value, influencing the inter-organizational sharing of knowledge. On the other hand, inter-organizational knowledge sharing increases the knowledge stock, facilitating the absorptive capacity performed (Mennens, Van Gils, Odekerken-Schröder & Letterie, 2018).

#### *Assimilation dimension*

Assimilation refers to the company's routines that allow it to analyze, process, interpret and understand the information obtained from external sources (Zahra and George, 2002).

In the perception of interviewee 6, the challenges and the relationship with Boticário generated the need for an organizational learning culture. By uniting the experiences, experiences, and personal knowledge of specialized people working in this segment, it was built with the dissemination of information acquired externally. He reports that learning is associated with the construction and reproduction of knowledge, resulting in the absorption of external information and dissemination internally to generate new knowledge.

[...] whatever Boticário sends, we learn, learn by doing, and we learn, we grow. This learning is spread to the entire company through disclosure mechanisms, either on our intranet or internal communications via management documents, message boards, and websites. (Interviewee 6).

The learning culture was necessary and had an impact on Rudnick's ACAP. Weissenberger-Eibl and Spieth (2006) corroborate when describing organizational culture as a critical success factor for knowledge management and transfer.

When asked about Rudnick's partnership with Boticário, interviewee six reported that, in addition to the challenge of meeting the demand for a different product than the one the company was producing, Boticário demanded excellence in the delivery of products. This demand required everyone's participation, interaction, and the union of all employees so that, with ideas and suggestions, they could create the solution that the company expected.

When Boticário saw that we managed to do that first project and the second that came out better than the first, you put all this knowledge, all the people, all the experiences already done, and it started to take shape it worked (Interviewee 6).

The flexibility in the exchange of knowledge between Rudnick and Boticário occurred dynamically, promoting greater understanding and interpretation to understand new information, and this corroborates with Zahra and George (2002). They affirmed that the flexibility and the exchange of experiences of involved individuals allow the understanding and understanding of the information generated outside the company.

Every day there is a meeting of the cells, the planning. People get together to plan the next day. It is not the monitor, it's the factory people, we've already managed to bring not only the monitor but the cell level, the drill level, the glue level, the administration level, the level of the packaging, they will plan the next day, depending on the packaging, what do I have to do for the next day? (Interviewee 4).

Cross-functional interfaces also make it possible to process non-routine information and contribute to a unit's ability to overcome differences, interpret problems and improve understanding of new external knowledge. Thus, cross-functional interfaces improve the acquisition and assimilation of implicit knowledge leading to a unity of potential absorptive capacity (Egelhoff, 1991).

When asked about the exchange of intraorganizational experiences, interviewee 2 confirmed the need to maintain the approach to generate knowledge exchange.

[...] this dynamic and the interaction with the people inside is robust growth for all areas of the company. It starts in engineering, exchanging ideas between their people there. The exchange of information with the company is powerful and very dynamic. Alex is in direct contact with them in the business line, so communication is almost daily with the staff, and ideas come up (Interviewee 2).

Harvey, Jas, and Walshe (2015) state that internal contextual factors such as the organizational culture of learning and communication within the organization are essential for absorbing information. At Rudnick, contextual factors can be identified by the transfer of knowledge between and within units and sectors, the communication structure between the external environment and the company, and interpersonal relationships. For interviewee 1, this is a priority for company management.

Yes, the company has always encouraged training with courses and offers subsidies to employees who want to take a course that interests the company (Interviewee 1).

This integration between departments and individuals, addressed in the studies by Liao et al. (2003), explains assimilation from the knowledge flows that ensure that the knowledge reaches the interested people. For practical knowledge integration, companies need to establish an integrative culture that denotes shared norms, values, and beliefs that promote collaboration and knowledge exchange. Goals are clearly stated and understood by all organization members (Gold, Malhotra & Segars 2001).

Interviewees 1 and 3 talked about knowledge exchange between Rudnick and Boticário and the importance of this inter-organizational integration to disseminate information throughout the company.

With Continuous Improvement Groups, employees have the opportunity to participate in day-to-day management at Rudnick. Together, they carry out activities, debate possible improvements in the work environment, and seek joint solutions to increase the quality of life and productivity in their respective sectors (Interviewee 1).

[...] the learning absorbed by the partnership with Boticário dissipated through all the lines, interacting with suppliers, the importance of always having continuous improvement [...]. So, there is a great deal of interaction with Boticário. They come here, or people go there to exchange ideas or bring knowledge here, so it happens, and it is strong (Interviewee 3).

In addition to providing employees with growth and development, the program is an open channel, where they can express their opinions regarding its activities. It also makes the relationship with supervisors and managers much closer, as they start to share and discuss problems and the best ways to solve them. Jansen et al. (2005) affirm that the teams' assimilation reflects a receiving team's capacity to understand the information they have acquired to generate new ideas and promote a given inter-organizational project.

For Vega-Jurado et al. (2008), in highly dynamic environments, PACAP steps facilitate adapting to the changes that occur in order for companies to renew their knowledge base. It is observed that the development of the potential absorptive capacity made it possible for Rudnick not to be attached to a specific area of specialization, looking for alternative technologies through visits to fairs and events and prospecting trends from experts from other industries. This flexibility provides strategic flexibility to adapt to various contexts and to integrate external knowledge.

#### *Realized Absorptive Capacity (RACAP)*

The RACAP component covers two dimensions of absorptive capacity: transformation and application.

#### *Transformation dimension*

The transformation of knowledge is directly linked to the assimilation of information, a subsequent step of internalization that awakens new learning and will give rise to new knowledge. The transformation denotes a company's ability to develop and refine the routines that facilitate the combination of existing knowledge and newly acquired and assimilated knowledge (Zahra & George, 2002).

The challenges generated by the partnership with Boticário and the requirement to produce the most modern products required a management structure that could share knowledge and experiences and continuously seek new knowledge in the foreign market.

The integration between Rudnick and Boticário employees generated a stimulus for new learning in the company's culture. Interviewee 5 reports that, since the beginning of the Boticário's products, there was a need to change the flow of information via a flexible organizational structure.



If I am going to produce this within the projected line, I will bring all the mastery of that line, and they will present the project, and the critical points will come up. How are we going to do that? It is in our culture to discuss how to do it: that furniture, that curve, that glow. Several doubts are arising and already give direction with style. So, they have already come up with an idea because the areas communicate fast (Interviewee 5).

Upon receiving a new project, the company, due to its innovation culture, organized itself internally and disseminated information to all areas, generating a significant interaction between them, making the structure extremely flexible. Ali and Parke (2016) and Martinkenaite and Breunig (2016) reinforce the findings by stating that the organizational structure influences the ACAP, shaping patterns and frequency of communication between members of the organization, using formal and explicit coordination mechanisms, and communication in carrying out organizational activities related to ACAP.

Interviewee 2 points out that the cooperation and connectivity of employees directly resulted in the product's final quality and, therefore, was prioritized in all processes in the company. Von Briel, Schneider, and Lowry (2019) claim that integration mechanisms help employees and managers to integrate and transform external knowledge. He reports how the interaction was significant for the project completion and the construction of knowledge

[...] when he will manufacture each piece of furniture, he will again bring it to a discussion. The same people participating, the engineering, the cabinetmaker, the machining conductor, the pre-cut monitor, the packaging monitor, and everyone are already thinking about how I will drill, how I will cut, how am I going to the machine. So, we have already started a union of discussions on the project. (Interviewee 2).

As interviewee two reports, one of the benefits of the connectivity is the development of trust, cooperation, fostering, and convergence of knowledge. The one found at Rudnick corroborates the findings of Ebers and Maurer (2014). The authors found that internal and external connectivity affects an organization's absorptive capacity, comprising complementary combinations and must be performed together. Thus, connectivity and socialization increase the combination of newly acquired knowledge with existing knowledge and develop its absorptive capacity, increasing the likelihood of successful collaboration (Enkel, Groemminger & Heil, 2017).

Everyone's involvement has always been a culture rooted in the organization, generating the construction of knowledge that is stored in organizational memory. Interviewee 3 exposes the actions developed for the transformation of knowledge.

Transforming this idea into practice is trial and error because it is a challenge. The information is there, now to put it into practice is to transform. This is something that if there are some people in the team that accompany it is very important. It is laborious because it needs everyone's interaction, and after the fifth, sixth, seventh time, people are willing to give up, which is an excellent learning experience. Let us try it this way, then it starts to work, things start to be stored in each person, and people get excited, which is cool (Interviewee 3).

As observed in the interviewee's speech 3, Rudnick defends what Sun and Anderson (2010) defended when examining the nature of the relationships between absorptive capacity and organizational

learning and argues that absorptive capacity and organizational learning concepts share a conceptual affinity.

Rudnick's organizational memory is a critical point in the knowledge absorption process. In the company's memory, all previously accumulated knowledge is stored that, from the interaction between those involved in the process, the transformation takes place. Absorptive capacity depends on the path (path dependence) resulting from the cumulative nature of knowledge (Cohen & Levinthal, 1990) and, therefore, is influenced by the contribution of experience to organizational memory (Zahra & George, 2002).

Nevo and Wand (2005) also point out that the sharing and practical application of organizational knowledge depends a lot on the organization's ability to create and manage its collective memory. Through the institutionalization of individual and group learning, knowledge is incorporated into the institution's systems, structures, routines, practices, and rules.

Interviewee 2 recalls the learning and skills developed due to the partnership with Boticário and reports an event that changed the internal cognitive processes and gave rise to a contemporary organizational learning culture dissipated throughout the company.

To make a drawer for Boticário, they require everything at 45 degrees, but the seam cannot appear, so how do you go about assembling a piece of furniture at 45 degrees at the end without the seam appearing? We know that the plate works. It will have its temperature fluctuation. The staff here, breaking their heads to make the seam not visible in this product can be disseminated to all company products. [...] The engineering staff said: let us study the project and see if the seam does not appear, and they came up with the formula for making the drawer (Interviewee 2).

It is important to note that internal cognitive processes create a learning culture at Rudnick. The theory of managerial cognition suggests that managers understand information through their cognitive lenses. Thus, managers can be considered as those who carry information through the organizational structure, directly influencing the organizational form, the learning processes, and, indirectly, the level of absorptive capacity (Van Den Bosch et al., 1999).

Rudnick's management style is straightforward. Managers facilitate the implementation of ideas, acquiring and maintaining resources needed for innovation projects and improvements, especially when senior managers or shareholders need to be convinced to allocate scarce resources necessary for the effective integration of ACAP.

Interviewee 7 reports that it was necessary to break some paradigms of pre-existing thoughts and deconstruct a previously ingrained mentality in the company. This breakdown of paradigms facilitated the process of bisecting knowledge. In this sense, Todorova and Durisin (2007) defend the bisection process to develop a new cognitive perception scheme that alters the existing models about understanding a given situation. That is a new understanding of the existing reality. This capacity, which arises from the bisection process, forms the entrepreneurial mindset (McGrath & MacMillan, 2000).

In the interviews, connectivity and interaction between employees can be understood as outstanding features in the company. Bissociation provided the incentive for the exchange of knowledge

and the construction of new knowledge with all. The existing knowledge with the latest knowledge caused the transformation of knowledge into evident results.

When asked about the changes that occurred internally from the relationship with Boticário, interviewee 7 mentions the main change that occurred in the company.

Breaking paradigms is the main thing [...] The second point was incorporating and solving problems for customers. They wanted a table, this size, this height, this width, and how you stand up? Then there started to be more demand from engineering, analyzing structures, looking for solutions, looking for materials in the market, hardware, what the client demanded of solutions led Rudnick to pursue this path. Until then, everything was impossible (Interviewee 7).

The effectiveness of these managerial actions depends on the degree to which other information sources are available to the company's members. McEvily and Chakravarthy (2002) emphasize the importance of the individual's prior knowledge (education and skills) and his motivation to absorb external knowledge. Interviewee 3 states that a new learning model was incorporated into the employees' mental models based on these disseminated challenges throughout the organization. The results obtained were also dissipating to other sectors.

Now it is prevalent thanks to Boticário, who wanted it that way, and we went on working, working, working, and we managed to do it that way. We managed to do well, and today it has migrated a lot to other products and other products of other customers (Interviewee 3).

It appears that in Rudnick, the new learning model established a feedforward learning flow. According to Crossan, Maurer, and White (2011), the organization acquires new knowledge, incorporating the new knowledge created by individuals in systems, routines, procedures, or any other organizational element. This learning process allows individual learning to grow to an organizational or group level, fueling organizational memory.

Rudnick recognized each person's skills in the process and indicated the skills that needed to be developed. Thus, the process sought to accelerate professional development, leveraging essential and transversal skills for the market.

Organizational knowledge assets influence how groups maintain their shared understanding and how individuals interpret their environment, develop new ideas, make decisions and solve problems in influencing and transmitting institutionalized knowledge to members of the organization (Lehner & Maier, 2000).

### *Application Dimension*

In the studies of Zahra and George (2002), this step gives rise to the implementation of new products, systems, processes, and organizational forms, which bring improvements to organizational management. Interviewee 3 reports that the partnership with Boticário allowed that the knowledge already developed to serve them could expand to other lines. According to his words, this new

knowledge generated new production processes and new products, resulting from the construction of prototypes.

Boticário opened several doors [...] to the concept of working with curves, doing rounded things, not a corner because we already did it that way. However, the concept of working with curves, the table foot, for example, made things much more complex than we even thought about doing. We started to develop other products with these new technologies (Interviewee 3).

Interviewee 4, responsible for the design and innovation department, also recalls that recent improvements were emerging with implementing new processes in the productive sector. In addition to providing productive improvements, the processes resulted in product quality. Interviewee 5 reports that the culture of innovation is part of the organizational culture. Being a product made daily, new pilot tests and prototypes are essential to developing new products.

It improved a lot [...], for example, we inserted many new processes in the cells of the drawers, there is a cell that only makes drawers, drawers were standardized, which makes drawers, holes, everything, always at the same height. It starts and ends there, it goes to the box, before it went to every factory, everyone moved it, and there it does and puts it in the box, and it is over (Interviewee 4).

Engineering, the responsible for the project who usually made a direct contact, was a direct link with Boticário [...] you make a prototype, go there, you sit and change. Come back here, so the communication link is engineering (Interviewee 5).

The culture of encouraging innovation started with the partnership with Boticário. Engineering made contact between companies and had the need to propose new ideas and new products and continuously innovating constantly to offer the most modern features. Rudnick's actions align with the concept of innovative culture, which refers to a set of assumptions, values, beliefs, attitudes, and behaviors of the organization's members, facilitating the creation and development of new products, services, or innovation. Zheng, Yang, and McLean (2010) claim that innovative culture is crucial to understanding the multidimensional nature of ACAP.

Interviewee 3 relates a new idea to explore it, be worked on, and generate results. He said the company applies knowledge to create new products, such as the coffee table example.

So, in that sense, we work and explore a lot. The idea is explored with a new product, a prototype, or even an improvement. Moreover, we do that a lot. We made a coffee table that gave engineering much work and was precisely the result of this business (Interviewee 3).

Interviewee 4 also recalls that, after the partnership with Boticário, new challenges were emerging, and the company was applying the knowledge it had acquired over time. The application of knowledge also resulted in the conquest of new markets and the expansion of the business. He mentions that the learning built from the partnership with Boticário, opened doors for new business with franchises. The interviewee highlights the challenge of serving Boticário and the knowledge base stored in organizational memory that generated new opportunities and results.

We would never convince anyone that we were going to glue the tile on the wood and say that it would work. From our part, it would be difficult and it has been in the market for 4 years and has been selling superbly. Therefore, with Boticário's own assertiveness, we gained other franchises as clients (Interviewee 4).

The company focuses on selling a solution that goes beyond a product. The company applied the acquired knowledge, increased sales, generated new business opportunities, and created processes and routines developed to meet the institutional line. Interviewees 5 and 7 reported that disseminating this knowledge has generated new internal skills that have positively impacted the foreign market.

We have several new processes that come with this line. For example, at 45 degrees, today we have furniture inside the factory that originated from the institutional market to the conventional market. It is a competence that we had to bring. It is already spreading in the other lines, which is a differential in the market. Few can do it. Hence, this competence was created at home (Interviewee 5).

We understand the client's project, understand what he wants, what the client looks for in us. It is a consultancy. The client wants to know if it is possible to do and how much they will spend. What can you do? We consult and deliver the product. Nevertheless, the client's first approach is to transfer the knowledge that we have, whether it is done this way or not, of this curvature or not, of this material or other, use metal or not, use led or not? That is what we sell today (Interviewee 7).

The dissemination of knowledge was crucial for Rudnick because it could transfer knowledge to different areas, which culminated in differentiation for the market and even made it possible to provide consulting services. Cross-functional interfaces offer an effective way to generate commitment and facilitate the implementation of decisions and increase the transformation and exploitation, implicit in the absorption capacity performed by a unit (Bahrami & Evans, 1987).

Transferring external knowledge back to the organization, applying it to knowledge creation activities is vital for the effectiveness of external ACAP routines (Lewin, Massini & Peeters, 2011). Whereas the transformation helps companies to develop new perceptions, schemes, or changes in existing processes, the application converts knowledge into new products (Kogut & Zander, 1992).

When asked about the improvements applied from the partnership with Boticário, interviewee three reported that one of the improvements was to provide a culture of participation in the company's projects. The ideas obtained from the opinion of those involved could be applied to generate new insights.

A solution is essential for many things when the organization can start a project, open to other company lines, and generate new products [...]. For example, we only have curve cuts, and at the time, it was even patented. It was a requirement of the institutional line, it developed from there, and today it generates results across the company (Interviewee 3).

Participation in decision-making indicates that employees are involved in decision-making processes within Rudnick. Besides, participation led to an internal network that supported the application of new external and internal knowledge. Interviewee 4 recalls how knowledge was transformed and applied but has continued to generate results today. In the search to interact with the news and launch inputs in the market, the company identified an acrylic mirror that imitates a glass

mirror. However, with higher cost versus benefit and that does not break, it is easier to handle and perfectly imitate the original.

[...] mirror, we never thought about using it, we never imagined that it had, I mean, I do not even imagine that there was an acrylic mirror. [...] so we learned to work with acrylic. Even a company came and settled here because there was no acrylic company around. We begged for the acrylic company to set up a base here. The person came and set up, which resulted from the institutional line of the partnership with Boticário. Acrylic was the result of production for Boticário's institutional line, and today we use it in other lines, and the result is surprising (Interviewee 4).

This fact revealed Rudnick's ability to absorb external knowledge, assimilate it and transform it into valuable knowledge that generates results for the organization. It can be understood that, at first, the information on using acrylic to make a mirror would not be applicable, even if the company recognized the value of this information. In other words, it was not possible to apply reality to the company's perception. Based on a new learning model that the company developed, it caused a paradigm break of what was being done for a new look that allowed to unite previous knowledge with new knowledge. It is characterized that much knowledge acquired from the inter-organizational relationship was not part of the previous basis. The company did not discard them; incorporated, transformed, and applied them to develop new products or new processes.

Efficient knowledge transfer required a strong knowledge dissemination capacity by Rudnick. In this way, one can perceive the company's knowledge dissemination capacity as people's ability to articulate effectively and convincingly and communicate, disseminate knowledge in a way that other people can understand with precision, and, finally, put learning into practice. Interviewee 2 explains that the relationship with the company Boticário gave Rudnick support to apply the knowledge commercially, analyzing the store configuration and the customer interaction in accessing the available products. The discussion allowed us to check if the customer was interacting with the products in the store or creating the possibility of generating a purchase.

This discussion takes place, and we start to ask ourselves: if we changed the module from x to y, won't it encourage the customer to access the product more? This discussion is in Rudnick's meetings with Boticário. We are trying to find the means and the solution to this problem (Interviewee 2).

The application is evident, for example, in new ventures that capture the knowledge of their market, competition, and customers, and also when knowledge is used to create competencies. In this way, the company applies the knowledge built internally and transfers it to Boticário to generate sales results. It is applying knowledge based on the partnership with Boticário that generates positive effects on sales and leverages new opportunities for Rudnick, as stated by interviewee 4.

I'll give you an example, we will launch the color we call natural color, we are doing a lot of tests, we are working with jequitibá wood, we had to look for the wood [...], we saw this abroad, from a possible supplier and ah, it will sell in Brazil! Just like what happened with the off white. It is the ice white which is no longer white like a sheet, it is a grayish white. By going abroad, we saw this and we anticipated ourselves (Interviewee 4).

Rudnick's innovation management focused on collaborative and networking activities, especially collaborations with customers and users, to increase creativity and innovation, thus increasing the company's competitiveness. Rudnick's results are associated with what Enkel and Gassmann (2010) state: developing partnerships with suppliers maintain that companies form collaborations to combine their knowledge with that of partners as a potential source of exploratory innovation.

West and Bogers (2014) state that companies that wish to successfully exploit external sources' potential, especially sources that are distant from knowledge from a cognitive point of view, need to develop internal capacities to absorb and incorporate external knowledge resources. This fact can be interpreted as heterogeneous sources or as "cognitive distance" in terms of technological knowledge differences between company employees and customers or suppliers (Vrontis, Thrassou, Santoro & Papa, 2017).

Although PACAP is necessary to identify, filter, and internalize relevant external knowledge, a competitive advantage in innovation only materializes if it also has RACAP performed (Fosfuri & Tribó, 2008). Organizational culture as a factor influencing the absorption of external knowledge, particularly the acquisition, assimilation, transformation, and exploration skills, was an important finding that is neglected in the ACAP literature.

From the analyzes carried out, resulting from the interviews, evidence was identified that led Rudinik to develop the knowledge absorption process, reflected in the dimensions that make up PACAP and RACAP. These pieces of evidence are described in Table 03.

## Conclusion

This research aimed to investigate the knowledge absorption process (ACAP) from the routines implemented in the dimensions of PACAP and RACAP in a large company in the furniture sector immersed in an uncertain environment. This process started with environmental uncertainty, the 2008 exchange rate crisis, and extended until 2011.

Among the routines for acquiring information, identified at Rudnick, the following stand out: the partnership with other companies; participation in fairs; workshops; transfer of suppliers' knowledge and experience; monitoring the trends of experts in the sector or associated sectors; prospecting for new customers; implementation of the Radar system; creation of engineering department; and definition of a gatekeeper.

In the assimilation stage, the main routines were directly linked to intra-organizational and inter-organizational information exchange. In the intra-organizational, through periodic meetings; dissemination and exchange of knowledge among employees; flexible communication; internal communication via management documents, message board, internet, and website; creating an open channel for continuous improvement groups; cross-functional interfaces; and integrative culture. In inter-organizational exchange, for investment in courses and training; structures that enabled interaction

between Rudnick and Boticário teams; meetings to obtain new knowledge; and flexibility in exchanging knowledge.

For the transformation dimension, the main routines identified showed the cooperation and connectivity of employees; socialization and the combination of knowledge; organizational learning culture; adoption of a new management style; building an organizational memory; diffusion and migration of new processes to other products; flexible organizational structure; constant interaction between engineering and design departments; and establishing a feedforward learning flow.

In the application of knowledge, the main routines identified were the creation of a culture of innovation; creation of prototypes; implementation of an engineering department; consultancies; culture of the participation of all employees in the company's projects; prospection of novelties and launches of inputs on the market; and collaborative and networking activities.

This research offers several contributions to theory and researchers. First, the qualitative approach is used with a longitudinal design. In the extant literature, several quantitative studies are researching ACAP. Nevertheless, few studies focus on ACAP procedurally and contextually. The findings contribute to research on absorptive capacity when identifying the different knowledge absorption routines in PACAP and RACAP. Besides, the results make it possible to expand the knowledge of the theory about ACAP when they demonstrate theoretically and empirically how the capacity to absorb knowledge from environmental uncertainties develops.

Moreover, contributions are offered to managers interested in knowing how their organizations can respond to environmental uncertainties to increase competitiveness. Another contribution was to present that absorptive capacity converts knowledge, from PACAP to RACAP, and describes, from the creation of routines, how absorption capacity influences the development of the company's capacities.

The results suggest that the absorptive capacity positively influences its resources (operational, customer, and innovation resources). The study contributes by showing the influence of zero-order capacities on the absorptive capacity of knowledge. Another theoretical contribution is that the company's resources were both tangible and intangible to develop absorption capacity.



**Table 03** – PACAP and RACAP routines in the knowledge absorption process at Rudnick

POTENTIAL ABSORPTIVE CAPACITY		REALIZED ABSORPTIVE CAPACITY	
<p><b>ACQUISITION</b></p> <ul style="list-style-type: none"> <li>• Build partnership with other companies</li> <li>• Participate in international fairs and events</li> <li>• Create supplier partnership</li> <li>• Systematize the transfer of suppliers' knowledge and experience</li> <li>• Prospect new clients</li> <li>• Track key trends from experts in the industry or associated sectors</li> <li>• Deploy the Radar system to monitor the Market</li> <li>• Monitor external knowledge in other successful sectors</li> <li>• Create engineering department to encourage R&amp;D</li> <li>• Define a responsible employee to monitor the market (gatekeeper)</li> <li>• Hire an external professional with knowledge and skills that add to the company's current knowledge</li> <li>• Create an information absorption channel</li> </ul>	<p><b>ASSIMILATION</b></p> <ul style="list-style-type: none"> <li>• Hold daily meetings</li> <li>• Stimulate the exchange of information between employees and teams</li> <li>• Structure a relationship that favors the exchange of knowledge between Rudnick and Boticário</li> <li>• Encourage the exchange of knowledge between employees in solving problems</li> <li>• Support the participation of everyone involved in each process</li> <li>• Enable fast information flow in the company</li> <li>• Daily gather all those involved in the cell</li> <li>• Unite experiences, experiences and individual knowledge of specialized people</li> <li>• Communicate internally via management documents, message board, internet and website</li> <li>• Disseminate information to the entire company through stakeholder meetings</li> <li>• Enable interaction from the experiences already made</li> <li>• Enable intra-organizational experiences                             <ul style="list-style-type: none"> <li>• Encourage training in courses</li> <li>• Provide an open channel through Continuous Improvement Groups</li> </ul> </li> </ul>	<p><b>TRANSFORMATION</b></p> <ul style="list-style-type: none"> <li>• Encourage employee cooperation and connectivity</li> <li>• Socialize the combination of acquired knowledge and existing knowledge</li> <li>• Create an organizational learning culture</li> <li>• Implement management style where managers facilitate the implementation of ideas</li> <li>• build knowledge and store it in organizational memory.</li> <li>• incorporate and solve problems for customers</li> <li>• Disseminate and migrate to other products, new ideas</li> <li>• Change the flow of information via flexible organizational structure</li> <li>• Provide participation in training courses for employees</li> <li>• Enable constant interaction between engineering and design department</li> <li>• Provide cooperation between collaborators to build knowledge;</li> <li>• Share knowledge between all sectors.</li> </ul>	<p><b>APPLICATION</b></p> <ul style="list-style-type: none"> <li>• Encourage the creation of prototypes</li> <li>• conducts pilot test to develop new products</li> <li>• Develop new processes</li> <li>• Create exclusive innovation department</li> <li>• implement productive processes that aim at efficiency</li> <li>• Conquer new markets and expand business</li> <li>• Facilitate the implementation of decisions</li> <li>• Encourage collaborative and networking activities designed to increase creativity and innovation</li> <li>• Develop consultancies</li> <li>• Encourage a culture of participation by all employees in company projects</li> <li>• Generates patents</li> <li>• Build a new knowledge base based on interorganizational relationships</li> <li>• Launch new products</li> </ul>

Source: Elaborated by the authors.

Recognizing some limitations of the study can be helpful in the development of future research. The first limitation was the use of a single company to analyze the proposed model. Using a multiple case study could generate a comparison to understand how the process of knowledge absorption occurred among companies in the sector in the same period of environmental uncertainty. Second, on the possibility of generalizing the findings. While the results are expected to remain authentic in similar contexts, more research is needed in various sectors, including non-profit organizations.

As a suggestion for future research, it is recommended to identify a more significant number of uncertainties to verify how the ACAP process occurred due to them. This study can be reapplied in other sectors, such as service companies and industries, from other activity branches. It is suggested to use other authors proposed by other authors, such as Todorova and Durisin (2007), which develop reconceptualizations and contribute to Zahra and George's model (2002). It would also be opportune to use the methodological procedures developed in this study in future research, contributing to the method's validity.

The findings of this study suggest that the relationships between dimensions are linear. This finding is in line with the theoretical foundations and initial literature on absorptive capacity. However, contrary to current concepts, it is suggested that further studies can be developed to test the recursion in the relationships between the dimensions of ACAP. The relationship between organizational structure and the absorption of external knowledge also deserves further studies because it was realized that many results obtained by Rudnick in the ACAP process depended on its flexible structure.

Another research that could be developed in qualitative studies with a longitudinal approach is to understand a different historical process that addresses path dependence and how it affects the development of ACAP in turbulent environments. Finally, studying culture and its relationship with ACAP would be another research to be carried out, as stated by Flatten et al. (2011) when they highlight that the effects of organizational culture on absorptive capacity, especially in the context of SMEs, were not adequately addressed by investigations on ACAP. Finally, research involving the routines found in the study and its relationship with the dimensions of ACAP can bring insights into how social integration mechanisms influence the organizational and individual absorptive capacity.

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