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Individual absorptive capacity: A confirmatory study based on structural equation modeling

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ABSTRACT
A confirmatory study was carried out to investigate the relationships between the four dimensions of the Individual Absorptive Capacity (IAC) construct, integrating the models by Cohen and Levanthal (1990) and Zahra and George (2002). The quantitative, non-probabilistic approach was used, with a convenience sample of 62 respondents. The instrument used, validated by Lowik et al (2012), was analyzed through Structural Equation Modeling (SEM). The locus of the research was the company RedFox Fiber, in the telecommunications industry. The model proposed by the study validated the relationship between the acquire, assimilate, transform, and apply dimensions as proposed by Zahra and George (2002); however, it invalidated the relationship between assimilate and apply dimensions as proposed by Cohen and Levinthal (1990).

Keywords: Individual Absorptive Capacity. Structural Equation Modeling. Confirmatory Study.

1 INTRODUCTION

Higher education organizations and institutions develop learning processes in different formats but with the same responsibility to implement the absorptive capacity in their employees.

Based on that, the present study proposes to analyze the factors that compose the Individual Absorptive Capacity (IAC) aimed at the construction of knowledge, which is one of the epistemological aspects of organizational learning.

A problem present in the corporate environment is the development of skills in a volatile and highly competitive environment, which requires constant improvement of employees based on market trends, making it relevant to analyze the results between the four dimensions that make up the IAC.

The aim of the study was to analyze the influences between the dimensions that make up the IAC process in a telecommunications organization, according to Cohen and Levinthal (1990) and Zahra and George (2002) models. The study locus was RedFox Fiber, a Brazilian company that offers fiber-optic Internet services in the State of Sao Paulo; it has 300 employees, of whom 62 responded to the survey. Thus, the validation of the model is relevant to understanding and

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measuring the absorptive capabilities of the company's employees, contributing to the understanding of the ability to meet the demands of the organization regarding the company's survival in this scenario.

This study validated the proposed models using a quantitative cross-sectional approach and a descriptive correlational survey. Two steps were adopted for the research, a descriptive stage that aimed to conduct a sociodemographic survey of the respondents; and a correlational stage, with multifactorial analysis to establish the relationships between the dimensions of the phenomenon studied (Sampieri *et al*, 2013).

The structure of the article is composed of: theoretical reference, methodology, analysis, discussion, and conclusion, presented in this order.

2 THEORETICAL REFERENCE

2.1 ORGANIZATIONS THAT LEARN

Organizations need to define strategies for their own survival since they exist in a dynamic, complex, and expansion context, where knowledge increases rapidly and it is necessary to gain competitive advantage (Lane *et al*., 2006; Yildiz *et al*., 2020; Zahra and George, 2002.

An area of study that started growing in the 1990s, which corroborates organizational strategies to achieve such survival, is Organizational Learning (OL), in the organizational and individual spheres (Easterby-Smith *et al*., 2008; Lane *et al*., 2006; Martinkenaite & Breunig, 2016).

OL encompasses several subjects that investigate, as the name indicates, learning within organizations. Among these subjects, there is a construct, the Individual Absorptive Capacity (IAC), which deals specifically with the capacities that people have to acquire and assimilate knowledge external to the organization, transform and apply such knowledge in the internal environment of the organization (Zahra & George, 2002).

Thus, for Nakamura and Almeida (2020) organizations that understand and invest in IAC will increase their capacity for innovation since they recognize the value of new knowledge and information, which will add value to their business, becoming a differential. According to Malvestiti *et al* (2020), IAC is an important instrument for leveraging better performances in an organization.

In the study, the concepts of IAC were investigated according to the perspectives of Cohen and Levinthal (1990), precursors of the concept, and Zahra and George (2002).

2.2 MODELS OF INDIVIDUAL ABSORPTIVE CAPACITY (IAC)

The studies on the concept of Absorptive Capacity at the Individual Level (IAC) start at the organizational level, with the Organizational Absorptive Capacity (OAC) and the precursors Cohen

and Levinthal in 1989, using 3 dimensions, namely, the ability of an organization to “acquire” external knowledge, “assimilate it” and “apply it” commercially (Cohen & Levinthal, 1990; *Lane et al*., 2006). The authors explain that the OAC predicts market trends allowing the exploration of new knowledge that is outside the organization.

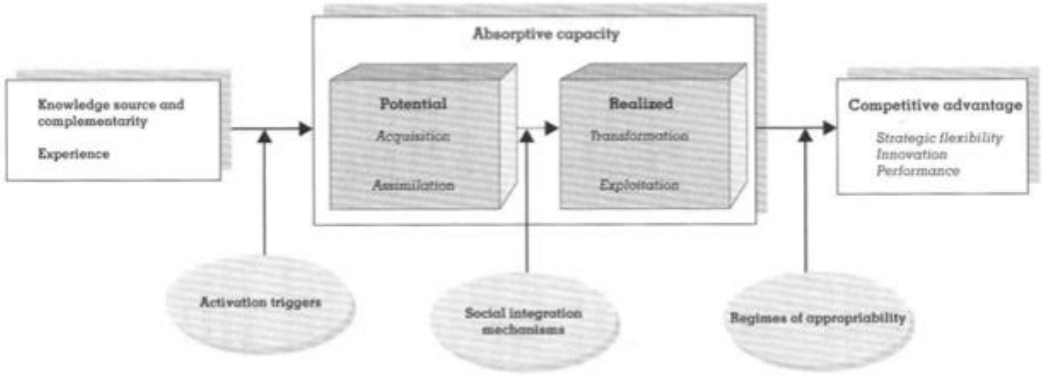
However, for an organization to achieve competitive results and ultimately survive, it is essentially necessary to study at the individual or people level: companies are composed of individuals, who are the primary players in the creation and replacement of knowledge (Cohen & Levinthal, 1990; George & Zhou, 2001; *Lane et al*., 2006; Majhi *et al*., 2020; Nonaka, 1994; Tian & Soo, 2018).

This differentiation between OAC and IAC is considered important because some studies are mentioned only at the organizational level, overlooking that “capabilities” refer to people’s abilities, or rather, to cognitive processes inherent to human beings. According to Yildiz *et al*. (2020) an organization itself does not have the capability for these skills, only its members can have them.

Following this same line of reasoning, the authors Zahra and George (2002) developed the concept of IAC, subdivided it into two sets, and added 1 dimension. The first set is called “Potential Capacity” (CAP-ind) that is, the potential capacity people have to “acquire” and “assimilate” external knowledge; the second set is called “Capacity of Realization” (CAR-ind) that is, the ability to “transform” and “apply” the knowledge of the first set in the internal environment of the organization. The authors' model is shown in Figure 1:

Figure 1

IAC model by Zahra and George (2002).



Source: Zahra, S. A. and George, G. (2002)

According to these authors, the proposition of study is an interdependence between these two groups, that is, the capacities of realization are only possible from the potential capacities.

The capacity of realization has particularities, such as improving routines that facilitate existing knowledge with new, acquired, and assimilated knowledge.

According to the studies of Majhi *et al*. (2020) and Ojo *et al*. (2017), the capacities of realization are driven by the first group to generate positive results for the company. In the research by Majhi *et al.* (2020), managers increased their CAR-ind when the CAP-ind was higher too. One of the results of the Tian and Soo study (2018) was that employees increased creativity when the CAP-ind positively impacted the CAR-ind.

Ojo *et al*. (2017) also established an interdependence of the first group (CAP-ind) to the second (CAR-ind), claiming that there is a cumulative effect of past learnings, what is learned, and the influence on the ability to learn new things. That is, past learnings influence the potential to learn new things.

Lowik *et al*. (2012, 2016, 2017) treat CAR-ind as dependent on CAP-ind because the results of the studies indicate that the apply dimension is influenced by the acquire, assimilate, and transform dimensions in the daily operations or routines of individuals at work, or even for the creation of new products, services, and processes (Lowik *et al*., 2012, 2016, 2017; Mahji *et al*., 2020).

Lane *et al*. (2006) also collaborated with the original concept, analyzing the “acquire” and “assimilate” knowledge dimensions, but contributing to the studies of exploratory learning for the first dimension and transformative learning for the second dimension.

In this sense, corporations are the consequence of the skills and attitudes of their members or they are impacted by the synergy of the individual actions of their members (Nonaka,1994; Lowik *et al*., 2016). According to Ojo and Raman (2016), external knowledge is a source to individuals, who, when engaged in obtaining it, generate learning outcomes (acquire and assimilate). Therefore, this result may or may not impact organizational performance, depending on the commitment of these members to transform and apply it internally.

According to Shane (2000), when observing the IACs of employees of an organization, it is possible to see the formation of a constant cycle of learning and, consequently, changes for these individuals, which develops them since it allows them to follow the technological transformations in the context of the organization, thus boosting the creation of new processes, products, and types of management.

2.3 THE DIMENSIONS OF INDIVIDUAL ABSORPTIVE CAPACITY (IAC)

In order to broaden the understanding of the IAC construct, we sought to understand the representation of the dimensions (acquire, assimilate, transform, and apply) that make up the

models by Cohen and Levinthal (1990) and Zahra and George (2002) in order to contribute to the understanding of the learning process.

2.3.1 Acquire

Acquiring knowledge is the ability to seek, identify, assess, and recognize new knowledge generated outside the organization, from suppliers, customers, markets, cultures, and new technologies or opportunities that may have potential or be relevant to the organization (Lowik *et al*., 2016 and 2017; Majhi *et al*., 2020). For Easterby-Smith *et al.* (2008), acquiring knowledge from an external environment may also mean knowledge from organizations that go through acquisition processes and other inter-organizational relationships.

According to Lowik *et al*. (2012), acquiring or recognizing is also an individual activity of association and assessment of the new knowledge, focused on the potential for beneficial use in the organization. If this is one of the roles that individuals play in their organizations, the company is paid back for its contribution to the promotion of CAP-ind in positive results.

Crespi *et al* 2020 define that in the “acquire” dimension we find actions by the employees, including: contacts and consultations with partners; involvement of employees in national and international networks for the Research & Development of the organization; participation of employees in technical visits, lectures, specific meetings of field practices, and training programs in their industry (farmers, technicians, and industry professionals).

Jacossi and Feldmann (2020) believe that the acquisition dimension represents the search for new information through partnerships with suppliers, universities, clients, business networks, and relationships with branches in their headquarters, in the case of multinationals.

2.3.2 Assimilate

Assimilating means to analyze, interpret, and understand external information, process the knowledge acquired, and assess whether it fits or adapts to the given organizational context(Flatten *et al*., 2011; Lowik *et al*., 2016 and 2017; Zahra & George, 2002). In this dimension, it is also possible to see if the knowledge is transferable and understandable to the other members of the organization (Lowik *et al*., 2012 and 2017). Furthermore, as described by Majhi *et al*. (2020), this step may be the time when the individual stores the information in their memory and retrieves it when necessary.

According to Ojo *et al*. (2014), not all members necessarily need to have the skills of the acquire and assimilate dimensions. The authors stress the role of “gatekeepers”, i.e., individuals who authorize and decide on the entry of knowledge into the internal environment of the

organization, and perhaps few individuals are capable of doing that.

Crespi *et al* (2020) mention that it is during the assimilation that the interpretation and classification of the acquired knowledge occurs, and it is later transformed and applied in the internal environment. Thus, the authors define some actions of the assimilate dimension, that is: after interpretation, the employees execute preliminary negotiations and participate in meetings and decisions sharing the use of the new knowledge in their routines.

2.3.3 Transform

The transformation dimension of knowledge means to combine or integrate new knowledge with existing knowledge of the individual or other people to create new ideas, products, services, and processes (Lowik *et al*., 2012, 2016 and 2017; Zahra & George, 2002). For Jacomossi and Feldmann (2020), it is in this dimension that the new knowledge is harmonized with the routines. According to Flatten *et al*. (2011), this means developing possibilities to facilitate the adjustment between existing and new knowledge.

From the perspective of Zahra and George (2002), transforming is part of the CAR-ind set, which means leveraging new knowledge learned in CAP-ind for purposes beneficial to the organization, remembering that the CAR-ind dimensions are internal processes of learning, such as past experiences and current actions (Easterby-Smith *et al*.;2008).

Crespi *et al* (2020) define some actions for this dimension, such as: reviewing the existing routines and processes to adapt the new knowledge; and conducting meetings to research with other employees.

Cajuela and Galina (2020) consider that it is at this stage that all technological knowledge of the organization goes through changes, thus creating products or services related to the demands of the customers so that they can be supported competitively in the corporate context.

2.3.4 Apply

The apply dimension is the incorporation or internalization of knowledge acquired, assimilated, and transformed into the daily operations or routines of the individual at work, or for the creation of new products, services, and processes (Lowik *et al*., 2012, 2016 and 2017; Mahji *et al*., 2020; Zahra & George, 2002). According to Flatten *et al*. (2011) and Jacossi and Feldmann (2020), this dimension refers to the ability to optimize or transform existing knowledge and turn it into something new, such as a new routine, based on transformed knowledge, bringing new technologies to the organization.

For Crespi *et al*. (2020), some actions that define this dimension are: meetings, tests, and

lectures on new work technologies and new products; assessment of the results of a new project or work tools; assessment and identification of employees' skills with the new tools implemented; partner feedback on new projects or products/services.

2.4 THE RELATIONSHIPS OF THE DIMENSIONS OF INDIVIDUAL ABSORPTIVE CAPACITY (IAC)

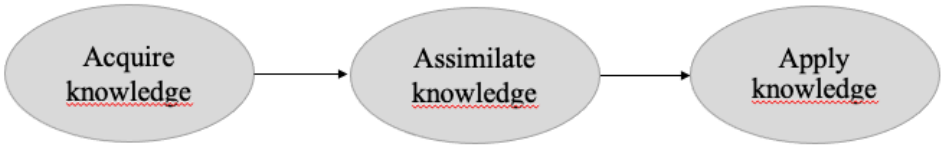
The dimensions of IAC previously presented have the same meaning for Cohen and Levinthal (1990) and Zahra and George (2002); however, the first authors do not consider the "transform" dimension.

Lowik *et al* (2012) presented a quantitative study with this construct, developing a measurement scale for the four dimensions, generating numerous subsequent studies also with a quantitative method, leveraging research on this topic, including measurements of other constructs in the studies.

Cohen and Levinthal (1990) mention 3 dimensions in a sequence, as shown in Figure 2, which begins with the dimension to acquire knowledge external to the organization, assimilate it, and apply it to the organization.

Figure 2

Process of the IAC dimensions according to Cohen and Levinthal (1990)



Source: Adapted from Cohen and Levinthal (1990)

Figure 2 presents a process of dependence of one dimension in relation to another. Thus, this study is necessary to confirm the premises of the authors using a quantitative method, in the scenario and context presented in the Methodology session. Based on this model proposal, the following hypotheses were created:

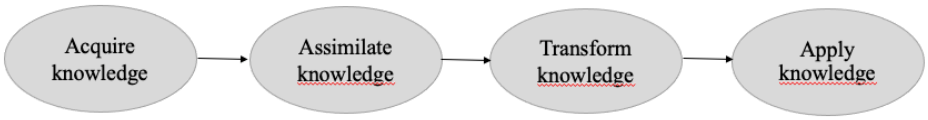
H1: The "Acquire" dimension positively influences the "Assimilate" dimension

H4: The "Assimilate" dimension positively influences the "Apply" dimension

In the understanding of Zahra and George (2002), there is an expansion of dimensions, characterizing the "Transform" dimension, that is, the process begins when the individual acquires knowledge external to the organization, assimilates it, transforms it, and applies it in the internal environment of the organization, as shown in Figure 3.

Figure 3

Process of the IAC dimensions according to Zahra and George (2002)



Source: Adapted from Zahra and George (2002)

Thus, Figure 3 presents an additional dimension, “transform the knowledge”, leading to the formulation of hypotheses for the present study:

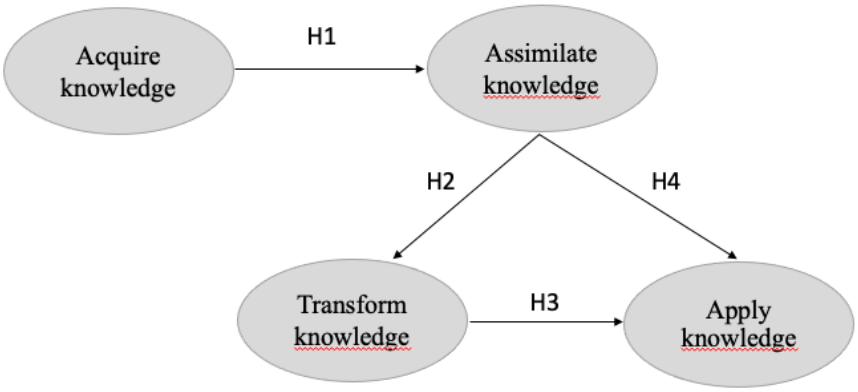
H2: The “Assimilate” dimension positively influences the “Transform” dimension

H3: The Transform dimension positively influences the dimension to apply

Thus this study was motivated to identify the relationships between the dimensions of IAC, integrating the models by Cohen and Levinthal (1990) and Zahra and George (2002) in a single study proposal.

Figure 4

Process of the dimensions of IAC proposed in this study



Source: Prepared by the authors (2024)

The model in Figure 4 brings together both models, by Cohen and Levinthal (1990) and by Zahra and George (2002), to confirm the relationships between the dimensions proposed in IAC, according to the scope of the study.

3 METHODOLOGICAL PROCEDURE

The present study adopted a cross-sectional quantitative approach, using the instrument validated by Lowik *et al* (2012) for data collection, with descriptive and correlational character, respectively.

In the correlational approach, multifactorial analysis was used to measure the relationships

between the dimensions of the studied phenomenon (Sampieri *et al*, 2013). Based on the objective of the research: to analyze the influence between the dimensions of the latent variables of the individual absorptive capacity process (acquire, assimilate, transform, and apply) of the employees of the company Fox Telecommunications using a convenience sample.

3.1 SAMPLE AND DATA COLLECTION

The survey included a sample of 62 respondents, characterized as employees of the company in the following departments: Commercial, Technical Support, Information Technology - IT, Financial, Human Resources (HR), and Customer Service - SAC.

The sample size was validated using G-power software version 3.1, as indicated by Ringle *et al*. (2014), considering the levels of relationships between the dimensions, according to the standard procedure of the method. The instrument of collection applied was a questionnaire with a total of 14 questions to analyze the model of individual absorptive capacity.

3.2 MEASURES

To analyze the influences between the dimensions that make up the IAC process in a telecommunications organization, according to Cohen and Levinthal (1990) and Zahra and George's (2002) models, the relationships between the latent variables that approach the process of individual absorptive capacity were raised, based on to the research objective.

Box 1

Description of Variables and Indicators

Latent Variables	Indicators
Acquire (CAIA)	CAIA1.I always look for new knowledge for my work.
	CAIA2. Purposefully, I seek knowledge from several different sources.
	CAIA3.I am good at recognizing profitable opportunities.
	CAIA4.I easily identify which new knowledge is most valuable to everyone on the team.
Assimilate (CAIAS)	CAIAS5. I often share my new knowledge with colleagues to establish a common understanding.
	CAIAS6. I interpret new knowledge in such a way that my colleagues understand what I mean.
	CAIAS7. I communicate the new knowledge acquired that may be of interest to our team.
Transform (CAIT)	CAIT8.I usually meet with colleagues to have new ideas.
	CAIT9. I attend meetings with people from different departments to have new ideas.

	CAIT10. I develop new ideas from the knowledge that is available in our company.
	CAIT11. I can transform existing knowledge into new ideas.
Apply (CAIAP)	CAIAP12. I often apply recently acquired knowledge to my work.
	CAIAP13. I apply new knowledge to create products, services or work methods.
	CAIAP14. I always consider how I can apply new knowledge to improve my work.

Source: Adaptation of the model by Lowik *et al* (2012)

The questionnaire was structured using the indicators as shown in Box 1, based on the 5-point Likert scale, with an interval between totally disagree (1) and totally agree (5), to raise the latent variables that compose the individual absorptive capacity through self-assessment with the employees. Using this structure, data collection and processing were performed.

3.3 ANALYTICAL RESEARCH TECHNIQUE

Based on the answers obtained using the Likert scale and considering the hypotheses of the present study, the Structural Equation Modeling technique (SEM) was applied, using the Partial Least Squares method with confirmatory analysis of the theoretical model applied, with the support of the SmartPLS® software (version 4.0), to simultaneously estimate the degree of dependency relations between the latent variables of the reflective model applied, combining multiple regression and factorial analysis (*Hair et al*, 2005).

3.4 ANALYSIS AND DISCUSSIONS

After the data collection, the analysis was performed through SEM to highlight the degree of simultaneous relationships between latent variables, by assessing the measurement model, considering the convergent validity, reliability (internal consistency), discriminant validity, and assessment of the structural model (Negri *et al*, 2021).

In the analysis of the structural model, we considered the verification of multicollinearity, relative importance of predictors, structural coefficients, and explained variance of endogenous variables.

The structural model was constructed and analyzed from the measurement model, considering the proposed modifications, using the indicators present in the final measurement model (Figure 4).

3.5 STRUCTURAL EQUATIONS MODELING (SEM) - INDIVIDUAL ABSORPTIVE CAPACITY PROCESS

In the analysis using the SEM method, two approaches were presented: Confirmatory Factor Analysis (CFA) and path analysis, enabling simultaneous analysis of the measurement and structural models (*Lee et al*, 2011). For this analysis, SmartPLS software version 4.0 was used, considering the parameters for statistical analysis, according to Table 1.

Table 1

Criteria for Model Validation

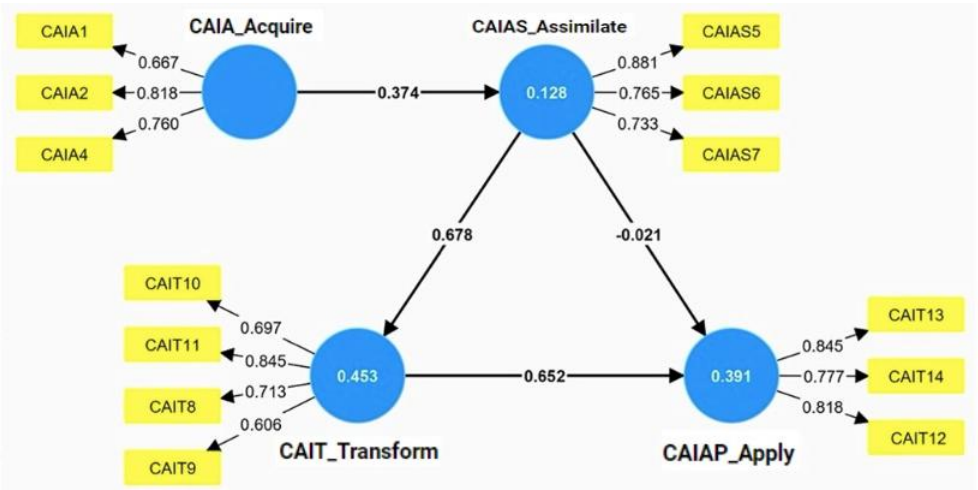
Statistical analysis	Criterion	Reference
Cronbach's Alpha	< 0.60	Bido and Silva (2019); Faria, Burnquist and Pestana, (2011)
Reliability Coefficient (rho_A)	>0.70	Dijkstra and Henseler (2015)
Composite Reliability (CR)	< 0.70	Bido and Silva (2019): Hulland, J. (1999).
Mean-variance extracted from indicators (AVE)	>0.50	Bido and Silva (2019)
Reliability of factors	Factorial load > 0.50	Hair Jr. *et al*. (2014);
Discriminant validity	Fornell-Larcker criterion < 0.85	Bido and Silva (2019); Hair Jr. *et al*. (2016);
Effect size (f^2)	0.02, 0.15, and 0.35 indicate small, medium and large effects	Hair Jr. *et al*. (2014); Chin, Marcolin, and Newsted (1996); Cohen, 1988.
Variance Inflation Factor (VIF)	< 3.00	Hair Jr. *et al*. (2016);
t-value	>1.96 (significance level of 5%)	Hair Jr. *et al*. (2014)
p-value	0.05 = validated hypothesis	Hair Jr. *et al*. (2014)
Adjusted R2	R^2 at 25% = small; R^2 at 50% = medium; R^2 at 75% = substantial	Negri, Santos and Moraes (2021); Hair Jr. *et al*. (2014)

Source: Prepared by the authors (2024)

In the model assessment, we considered the dependency relationships between the latent variables of ICA (acquire, assimilate, transform, and apply), focusing first on the measurement model and later on the structural model, based on the statistics presented in Table 1.

Figure 5

Measurement Model



Source: Prepared by the authors (2024)

In Figure 5, the indicator CAIA3 was eliminated because it presented a factor load of less than 0.50 (reliability = 0.483) after running the Smart PLS software (Ringle *et al*., 2015) to optimize the model and make it more robust.

From the final measurement model (Figure 5), the reports processed by the PLS algorithm and Bootstraping outputs were obtained for the assessment of convergent validity, reliability (internal consistency), and discriminant validity, shown in Tables 2 and 3.

Table 2

Matrix of Correlations Between Latent Variables (n = 62)

Construct	CAIA_ Acquire	CAIAP_ Apply	CAIAS_ Assimilate	CAIT_ Transform
CAIA_Acquire	**0.751**			
CAIAP_Apply	0.529	**0.814**		
CAIAS_Assimilate	**0.374**	**0.421**	**0.796**	
CAIT_Transform	**0.463**	0.638	0.678	**0.720**
Cronbach's alpha	0.625	0.745	0.706	0.694
Reliability Coefficient (rho_A)	0.649	0.751	0.721	0.727
Composite Reliability (CR)	0.794	0.854	0.837	0.810
Mean Variance Extracted (AVE)	0.563	0.662	0.633	0.519

Source: Prepared by the authors (2024)

Table 3

Matrix of Factorial Loads (Crossloadings)

	CAIA_Acquire	CAIAS_Assimilate	CAIT_Transform	CAIAP_Apply
CAIA1	**0667**	0175	0325	0332
CAIA2	**0818**	0328	0283	0275
CAIA4	**0760**	0302	0447	0586
CAIAS5	0381	**0881**	0577	0371
CAIAS6	0383	**0765**	0450	0307
CAIAS7	0116	**0733**	0590	0324
CAIT8	0484	0579	**0713**	0465
CAIT9	0144	0366	**0606**	0240
CAIT10	0154	0369	**0697**	0456
CAIT11	0443	0585	**0845**	0597
CAIT12	0320	0417	0478	**0818**
CAIT13	0509	0302	0603	**0845**
CAIT14	0465	0311	0467	**0777**

Source: Prepared by the authors (2024)

Analyzing the convergent validity, Table 2 shows the levels of AVE> 0.50 and a CR> 0.70; the factor loads of indicators show levels> 0.70 (Table 3 with red highlighted cell).

As for the discriminant validity, it is observed that the correlations between the latent variables demonstrate an √ AVE> rVL Table 2, cell highlighted in red) and the factorial loads > cross loads, as shown in Table 3. This situation is evidenced by comparing the diagonal (highlighted cell in red) with the cross loads outside the diagonal. However, it is important to note that the correlation between the latent variables CAIA_Acquire and CAIAS_Assimilate < 0.50 is low (Table 2).

Regarding the relationship between CAIT_Transform, CAIAP_Apply, and CAIAS_Assimilate, a low level of factorial loads < 0.50 was found (Table 2).

In the reliability of the model, Table 2 shows Cronbach Alpha levels > 0.60 and a Reliability Coefficient (rho_A) > 0.70 (Table 2), indicating no problem with the reliability of the instrument and scales applied, according to the instrument validated by Lowik *et al* (2012).

Therefore, according to the assessment references (Table 1), the measurement model presents adequate convergent, discriminant validity, and reliability, according to established references (Table 1), enabling the next analysis that consists of the validation of the structural model, with its respective hypotheses.

For the analysis of the structural model using path analysis, the reports processed in the PLS algorithm and Bootstraping outputs were obtained, having as references the measures of partial coefficients, regarding the size of the effect *(f^2)*, multicollinearity (Variance Inflation Factor - VIF), structural coefficient, t-value, p-value, and adjusted R^2, as shown in Table 4.

Table 4

Structural Model Results

Structural Relationships	***Hypotheses***	***Partial Coefficient***	***f²***	***VIF***	***Structural Coefficient***	***t-value***	***p-value***	***Adjusted R^2***
Acquire (CAIA) => Assimilate (CAIAS)	H1	0.374	0.162	1.000	0.374	3.384	0.001	n.a.
Assimilate (CAIAS) => Transform (CAIT)	H2	0.678	0.852	1.000	0.678	6.979	0.000	0.128
Transform (CAIT)=> Apply (CAIAP)	H3	0.666	0.407	1.851	0.652	4.900	0.000	0.453
Assimilate (CAIAS)=> Apply (CAIAP)	H4	-0.036	0.001	1.851	-0.021	0.118	0.906	0.391

Source: Prepared by the authors (2024)

Based on the analysis of Table 4, we verified the size and significance of the path coefficients, regarding the partial and structural coefficients, which are positive in the order between 0.37 and 0.66, indicating that the correlation between the latent variables is important, except for the correlation between the ability to assimilate (CAIAS)=> apply (CAIAP), which has a negative and low correlation.

After analyzing the effect size (f^2) in endogenous and exogenous variables, we found the levels to be between medium and large, except for the correlation between the ability to assimilate (CAIAS)=> apply (CAIAP), with f^2 <0.02, indicating how much of the variance of the latent variable is explained by the other latent variables of the structural model.

In the analysis of multicollinearity between endogenous and exogenous variables, the results indicate that there is no multicollinearity, with VIF< 3.0.

In the student's t-statistic, with a significance level of 5%, for the model's significance test, Table 4 indicates the value of t student > 1.96, except for the correlation of individual absorptive capacity (CAIAS)=> apply (CAIAP), with a value of t student = 0.118, indicating the rejection of H4 proposed by the study.

In the validation of the structural model hypotheses, the p-values of the H1, H2, and H3 hypotheses were also considered, and they were accepted with a significance level of 5%, indicating significant paths. However, hypothesis 4 (H4: in the individual absorptive capacity process, the ability to assimilate positively influences the ability to apply) was rejected since it had a p-value = 0.906 0.05 (p-value > 0.05).

The premise was to measure the predictive power of the model, in this study the adjusted R^2 < 0.50 was classified between small and medium, explaining the combined effect of the

exogenous and endogenous latent variables.

For the purpose of the structural model validation, the correlation between the absorptive capacity Assimilate (CAIAS) => Apply (CAIAP) had the hypothesis H4 rejected with a small effect size (f^2<0.02) and a negative and low correlation of partial and structural coefficients. The suppression of this correlation in the final model was not accepted as an alternative because the multicollinearity problem was not evidenced (VIF < 3.0) and there was medium prediction power (adjusted R^2 = 0.391).

In the preliminary studies by Cohen and Levinthal (1990), the relationship (H4) is justified; however, later Zahra and George (2002), because they did not recognize this relationship, developed the analyses, including the relationship between Assimilate and Transform (H3), thus reducing the impact of the relationship between Assimilate and Apply (H4). The other relationships, H1 and H2, are significant and in theoretical agreement between both models, confirming the influences between the dimensions.

4 FINAL CONSIDERATIONS

In order to analyze the relationships between the dimensions that make up the IAC process in a telecommunications organization, based on the models by Cohen and Levinthal (1990) and Zahra and George (2002), the proposal to integrate the models was partially validated, since we confirmed the sequence proposed in the model by Zahra and George (2002) for the relationship between the dimensions Acquire, Assimilate, Transform, and Apply (H1, H2, and H3); however, the proposal for the relationship between the dimensions Assimilate and Apply, as presented by Cohen and Levanthal (1990), was not validated (H4).

In the relationship between Assimilate and the new dimension Transform, a complete IAC process was evidenced, different from the Cohen and Levinthal model (1990), which did not consider this relationship.

The Transform dimension is an important step, as already highlighted in the theoretical framework, characterized by the combination or integration of new knowledge to the existing one, or the creation of new ideas, products, services, and processes (Lowik *et*. al, 2012, 2016 and 2017; Zahra & George, 2002). For Jacoussi and Feldmann (2020) and Flatten *et al*., (2011), it is in this dimension that the new knowledge is harmonized with the existing one, with the incorporation of new practices into the organizational culture by the employees.

The relationship between Assimilate and Transform implied a low coefficient of determination (R_2=0.128); although it was validated in the integrated model, it indicates little predisposition of the individual to transpose the new knowledge for application, leading us to

assume that there are internal environmental forces or even individual cognitive issues that influence this.

IAC is fundamental to understanding individuals regarding learning and becomes a guide for success for organizations because if there are employees with the capacity to establish the relationships between: Acquire, Assimilate, Transform, and Apply, consequently the internal environment will benefit from it. However, the organization itself can be a barrier to the practice of new knowledge, making it impossible to acquire new knowledge.

New studies should consider the relationships proposed in the model by Zahra and George (2002), its application in other segments, and the planning of a probabilistic sample, and this was the limitation for the generalization of the present study.

This research contributed to the understanding not only of future scientific studies but also focused on people management practices in organizations, from the selection process to the full development of the individual in the context of IAC.

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