Internal Communication and Organizational Climate: A Structural Equation Model*

Comunicación interna y clima organizacional: un modelo de ecuaciones estructurales

María Fernanda Gualtero Mira
ma.gualtero@pascualbravo.edu.co
https://orcid.org/0000-0003-1238-0963

Industrial Engineer, Institución Universitaria Pascual Bravo. Master's in Organizational Management, Institución Universitaria ITM. Full-time faculty member, Institución Universitaria Pascal Bravo (Colombia).

Laura Cristina Henao Colorado
jaianes.azevedo@gmail.com
https://orcid.org/0000-0002-6644-7273

Economist, Universidad de Antioquia. Master of Business Administration (MBA), Universidad de Antioquia. Professor, Universidad de Antioquia (Colombia).

Iván Darío Rojas Arenas
ivan.rojasar@pascualbravo.edu.co
https://orcid.org/0000-0002-9300-3176

Industrial Engineer, Universidad Nacional de Colombia. Master's Degree in Management of Technological Innovation, Cooperation, and Regional Development, Institución Universitaria ITM. Ph.D. in Complex Thought, Multiversidad Mundo Real Edgar Morin. Professor, Institución Universitaria Pascal Bravo (Colombia).

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Abstract

This study presents an analysis of the influence of internal communication on the organizational climate of a university, based on an examination of several variables identified through the validation of theoretical models. To achieve this, a mixed-approach methodology was used, with a correlational and descriptive scope, employing the partial least squares structural equation modeling PLS-SEM technique to obtain a structural equation model that allowed for the validation of research hypothesis. The study utilized a semi-structured interview applied to 22 managers of the institution, and a questionnaire applied to 114 employees. Similarly, the variables defining the proposed influence were identified using 139 articles from academic databases as references. The main finding was that the hypothesis regarding the significant influence of internal communication on the organizational climate was confirmed; furthermore, a knowledge gap regarding similar studies conducted at universities was identified. The research concluded that understanding the relationship between internal communication and the organizational climate allows for effective action on the variables that determine them, thereby enabling the development of potential improvement plans.

Keywords*: internal communication, organizational climate, structural equation, complexity, organizational management.*

Resumen

En este estudio se presenta un análisis de la influencia de la comunicación interna en el clima organizacional de una universidad, a través del estudio de diferentes variables definidas por una validación de modelos teóricos. Se empleó una metodología de enfoque mixto, con alcance correlacional y descriptivo, utilizando la técnica PLS-SEM por mínimos cuadrados parciales, para obtener un modelo de ecuaciones estructurales que permitió validar la hipótesis de investigación, empleando como herramienta una entrevista semiestructurada, aplicada a 22 directivos de la institución, y un cuestionario aplicado a 114 colaboradores. De igual manera, se determinaron las variables que definen la influencia planteada, tomando como referentes, 139 artículos de bases de datos académicas. Como principal resultado, se demostró la hipótesis sobre la influencia significativa de la comunicación interna en el clima organizacional; asimismo, se evidenció un vacío de conocimiento sobre estudios similares aplicados en universidades. Se concluyó con la investigación que el conocimiento de la relación entre comunicación interna y clima organizacional permite actuar eficazmente sobre las variables que los determinan, y, por tanto, estableciendo, de esta manera, posibles planes de mejora.

Palabras clave*: comunicación interna, clima organizacional, ecuación estructural, complejidad, gestión organizacional.*

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1. INTRODUCTION

The communicative process is related to the way individuals express ideas through the use of a specific code, framed within a particular paradigm. In this sense, communication requires routes defined by the conceptions of the outside world or a specific context, which are based on a system of beliefs and values that make up a behavioral model (Rincón, 2014). This model conditions the way individuals act regarding a particular event, as well as the way they interpret the world, thus constituting a mental model (Giraldo et al., 2022; Martínez et al., 2020).

Likewise, communication is inherently a complex process; therefore, it depends on the number of variables involved. Furthermore, in the specific case of human beings, it defines to a large extent the constructs that condition the functioning of society. This implies that any analysis of communication as an object of study must be carried out within the field of complexity as an emerging paradigm (Rojas, 2018; Arias & Ramírez, 2019). In this sense, communication is not understood as the mere fact of expressing ideas or feelings between people, but is analyzed as a way in which structures are established, codes and institutions are generated, or ties are created. That is, communicating as a complex act explains the behavioral patterns of a group of people who make up a community or the paradigms regarding what is considered as a community.

Along this lines, internal communication is understood as the process of interaction (complex, moreover) between the agents that make up the different hierarchical levels of an organization. Within its analysis, it is relevant to examine not only the way in which these agents communicate, but also about the causes that generate inconveniences or barriers to communication, and how these influence the organizational climate. For example, De Castro (2014), mentions that there is a tendency not to communicate important aspects related to the operation of organizations, since there is a somewhat generalized idea that withholding information generates a position of power, and this affects the flow of this process from management to the operational areas. Concurrently, Rincón (2014) states that poor communication impacts both the organizational culture and the organizational climate.

The above raises concerns about how internal communication and organizational climate are related, when analyzed from the complexity of both the communicative process and the dynamics of relationships between individuals, and how this impacts the achievement of the missional objectives. Now, the educational sector, and specifically higher education institutions (HEI), are also immersed in the dynamics of culture and organizational climate as determining factors within their organizational scheme, particularly when recent works show the existence of organizational mental models as barriers to the transfer of knowledge (Giraldo et al., 2022; Fandiño & Herrera, 2021).

In this regard, it is considered appropriate to ask: what is the influence of internal communication on the organizational climate at the Pascual Bravo University in Medellín? This inquiry is addressed using structural equation modeling as a statistical analysis tool based on three specific objectives: to identify the main components of organizational climate and internal communication; to characterize these elements; and, finally, to define the influence of internal communication on the organizational climate of the selected higher education institution. The resulting model establishes a relevant relationship between the organizational climate and internal communication, which makes a significant contribution to the academic context by explaining complex variables through appropriate statistical techniques. Moreover, the research findings can be applied to the organization under study to improve information flow, the work environment, and decision-making.

The first part of the article presents the theoretical concepts that define the scope of the study; it outlines various methodological stages and presents the results obtained using the applied techniques and tools. Finally, the results are discussed, and the conclusions of the research are presented.

This article is based on a research project and was translated using a methodological framework for academic translation and conceptual validation. To this end, an initial direct translation was performed, followed by a review and stylistic editing by a language expert. Regarding the terms used in the statistical analysis, international terminology standardization criteria were applied.

2. THEORETICAL FRAMEWORK

Communication

Communicating involves the exchange of information through a system of symbols and codes that make up a specific language; this process involves at least two agents who transmit ideas and concepts framed in a particular context. In organizations, communication works in the same way, given that the data and information transmitted are permeated by the characteristics of the organization, that is, by the paradigms and mental models that give rise to organizational culture and climate. Thus, mental models act as a determinants in the way communication is established between individuals, obeying both organizational paradigms and personality traits (Diaz et al., 2022). In the case of organizational communication, it is understood that work groups share paradigms based on a system of beliefs and values that make up the culture, thereby impacting the organizational climate (Quiroga, 2007).

Internal Communication

Internal communication comprises communication methods and communication flows between people, including formal and informal communication at all levels within the organization, additionally, its concept can also be described as the strategic management of interactions and relationships between the people who make up the organization (Viñarás, 2020; Mateus, 2014; Gomes et al., 2021). Pološki et al. (2021) identify four dimensions within internal communication: line manager internal communication, internal team peer-to-peer communication, internal project peer-to-peer communication, and internal corporate communication.

Communication can be classified into verbal and non-verbal; verbal communication takes place when the spoken or written word is used to convey a message, while non-verbal communication is developed through gestures and body language (Segarra, 2019; Ober & Kochmańska, 2022).

Regarding the flow, communication can be vertical (ascending and descending) when it is developed through hierarchical levels: it is ascending

when the information is directed from a lower level to a higher one, and descending when it is directed from a higher level to a lower one. It can also be horizontal between members of the organization with the same hierarchical level, which can be carried out between members of the same area or different areas.

Likewise, it can be generated diagonally between members of different levels and areas of the organization, considering that interpersonal communication occurs between two or more individuals in the organization, whereas intragroup communication takes place between people who make up the same work team: intergroup communication that takes place between members of different teams, and institutional communication is the communication that which is established within the organization as a unit using the formal channels defined (Rodríguez, 2016; Rožman & Štrukelj, 2021). Additionally, communication channels can be classified into formal and informal: a channel is formal when it is carried out through official means defined by the organization, while informal communication uses the unofficial network of interpersonal relationships that are created between members of the organization (Don et al., 2021; Garrido et al., 2022).

Položki et al. (2021), Vilca et al. (2021) and Marín (1997) contribute to the above, based on the concept of internal communication satisfaction, which is the socioemotional result derived from the perception of communicative interactions at interpersonal, group, and organizational levels, consisting of eight dimensions: communicative climate, communication with superiors, organizational integration, media quality, horizontal informal communication, general organizational perspective, communication with subordinates and personal feedback.

Organizational Climate

Chiavenato (2011), Juárez (2012), and Torres et al. (2018) define organizational climate as the sum of the perceptions of the members of an organization regarding the entity and their specific work, which is determined by various factors, including internal communication. The organizational climate is generated from the relationship between individuals, who assume different positions and behaviors based on individual and collective

learning, as well as shared behaviors and values (Flores & Ochoa, 2016; Beltrán et al., 2021; Charry, 2018).

Brito et al. (2020), for example, analyze the organizational climate taking as a reference four variables: leadership, decision-making, motivation and control; the authors affirm that a positive work environment influences the performance of people to the extent that they feel more involved in the operational and decision-making processes of the companies, generating an emotional connection with the work performed and, by extension, with the organization.

Authors such as Torres et al. (2018), Macias and Vanga (2021) , and Rivera et al. (2017) affirm that there is a direct relationship between the work climate and the perceptions of the individuals who make up the different work areas. This, according the authors, has an impact on aspects related to productivity and organizational efficiency; this presupposes that company managers require knowledge not only of the technical issues related to their functions, but also of the management of aspects related to the relationship between people, so that they can interpret and optimize internal communication systems.

Regarding the evaluation of the organizational climate, Méndez (2005), proposes the use of the IMOC methodology, with which the satisfaction and efficiency of the members of an organization can be analyzed, based on the measurement of the work climate in the different areas and departments by means of defined variables. The instrument is composed of 45 questions and seven variables defined by Elton Mayo and other representatives of human relations and behavior, which are: objectives, cooperation, leadership, interpersonal relations, motivation, decision making and control (Méndez, 2005, Rezaee et al., 2020).

Internal Communication and Organizational Climate

The relationship between internal communication and organizational climate has been examined in studies that employ various statistical tools, such as correlation, descriptive or inferential statistics, or variable categorization techniques; however, few studies employ techniques such as structural

equation modeling, and in those cases, they have focused on studying different aspects, such as job satisfaction, productivity and performance, or corporate social responsibility (Manosalva et al., 2015; Lopez & Meneghel, 2016; Reyes et al., 2023). It should be noted that the use of SEM allows for the complex analysis of variables in a flexible manner and without the need for very large samples, which is ideal for a case study. For this study, the hypothesis is that internal communication influences the organizational climate, and vice versa; this is demonstrated using the structural equation model obtained along with an analysis of its various components.

3. METHOD

Design

The present study seeks to evaluate the influence of internal communication on the organizational climate of a higher education institution, using a university institution in the city of Medellin as a case study. The type of research is a case study with correlational elements, utilizing a mixed approach since qualitative dimensions measured through quantitative scales are analyzed. This setup allows for the identification of the correlation between variables and, ultimately, the measurement of their influence on the organization. Likewise, the scope of the study is descriptive. The collection of secondary information for the construction of the theoretical framework was based on a systematic literature review employing a meta-analysis matrix. A total of 139 articles were analyzed from databases such as Scopus.

Statistical Analysis

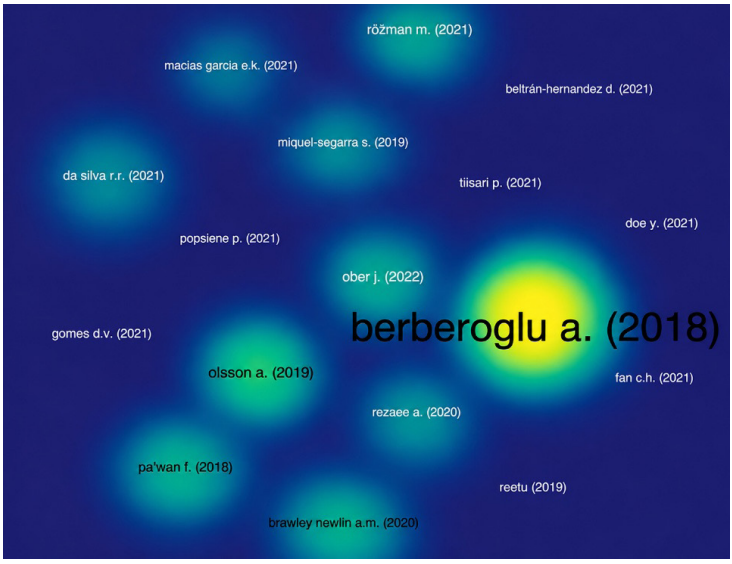
Subsequently, the information was analyzed via the statistical software SPSS, using a simple descriptive cross-sectional conclusive quantitative methodology. Next, the results were modeled through structural equations, using the PLS-SEM technique, with the purpose of determining the relationship between internal communication and organizational climate. This technique is based on multivariate statistical tools, combining factor analysis and linear regression, which allows for the analysis of qualitative

and unobservable variables, based on measurable indicators (Leyva & Olague, 2014; Chin,1998). The study was divided into the following stages:

Stage 1. Identification of the main components of organizational climate and internal communication

The Scopus database was used as a tool for the literature review on organizational climate and internal communication, since it offers broader coverage than other databases and provides access to a large number of open-access articles compared to other databases (Cañedo Andalia et al., 2011). Additionally, the following search query was used for the literature review process: TITLE ("INTERNAL COMMUNICATION" OR "ORGANIZATIONAL CLIMATE") AND (LIMIT TO (PUBYEAR, 2022) OR LIMIT-TO (PUBYEAR, 2021) OR LIMIT-TO (PUBYEAR, 2020) OR LIMIT-TO (PUBYEAR, 2019) OR LIMIT-TO (PUBYEAR, 2018)) AND (LIMIT-TO (DOCTYPE, "ar")) AND (LIMIT-TO (OA, "all")).

This allowed for a more precise filtering of the information to be analyzed. To this end, the following criteria were considered: the documents had to be published between 2018 and 2022; only research articles were processed, and they had to be freely accessible. As a result, 139 articles were identified, which were then analyzed to verify whether they met the aforementioned selection criteria for inclusion in this study. Ultimately, 17 documents were selected, as illustrated in the following heat map (Figure 1):



Note. The graph was created using Vos Viewer software, based on a database of articles selected from Scopus.

Source: Own elaboration.

Figure 1. Heat Map of Citation Counts

As a result of the theoretical review, the components, variables, dimensions, models and constructs of internal communication and organizational climate were established, and with this, the questions for the application of semi-structured interviews were designed; subsequently, based on the institutional organization chart, the areas and their leaders were identified in order to conduct the respective interviews, each with an average duration of 30 minutes each. To define the variables related to internal communication and organizational climate, various theoretical models and their respective variables were analyzed, as shown in Table 1.

Table 1. Validated Models of Organizational Climate and Internal Communication

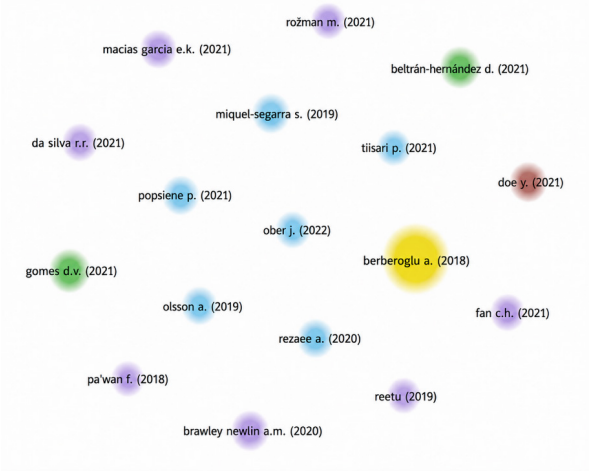
	References	Variables
Internal communication	Richmond, V. P., & McCroskey, J. C. (2009). Organizational Communication for Survival: Making Work, Work. (10th ed.).	Tell, Sell, Consult, Join
	Barrantes Rivera, M. G. (2018). Influencia de la comunicación interna en el clima organizacional de la empresa COSAPI DATA. Año 2016.	Estrategia de Comunicación, Herramientas de comunicación, Publico Interno
	de Nobile, J. (2020). Development and confirmatory factor analysis of the organizational communication in primary schools' questionnaire. Education Sciences, 10(12), 1–29. https://doi.org/10.3390/educsci10120372	Vertical openness, Horizontal supportive communication, Access, Overload, Directive communication, Downward supportive communication, upward supportive communication, Democratic communication, Cultural communication, Adequacy
	Korkosz, M. (2011). Exploring a relationship between organizational communication and job satisfaction. A study of internal communication within Irish-owned pharmaceutical contract packaging company.	Organizational communication, Policy implementation, Communication channels,
	Reyes Escalante, C. B., & Ayarza Rojas, A. J. (2018). La comunicación organizacional y su influencia en el clima organizacional de los operarios de industrias San Miguel en el 2017. https://doi.org/10.19083/tesis/624207	Comunicación Interna, Canal Informal, Canal Formal, Credibilidad, Orgullo
	Worley, J. A., Bailey-Richard, L. L., Thompson, C., Joseph, K. M., & Williams, C. A. (1999). Organizational Communication and Trust in the Context of Technology Change.	Communication, Supervisory Leadership Style, Actual Influence of Work Activities, Acceptance of Change, Organizational Trust, Cohesion, Satisfaction with Social Rewards, Satisfaction with Internal Reward, Active Participation in the Change Process, Openness to Change

Continue...

Organizational Climate	García Ramírez, M. G., & Ibarra Velazquez, L. A. (n.d.). Diagnóstico de clima organizacional del Departamento de Educación de la Universidad de Guanajuato.	Planeación, Autonomía, Remuneración, Relaciones personales, Conflicto. Compromiso organizacional, Liderazgo, Comunicación, Motivación, Formación profesional
	Patterson, M. G. (2004). Development & validation of an organizational climate measure. Aston Business University.	Autonomy, Clarity of Organizational Goals, Efficiency, Effort, Formalization
	Patterson, M. G., West, M. A., Shackleton, V. J., Dawson, J. F., Lawthom, R., Maitlis, S., Robinson, D. L., & Wallace, A. M. (2005). Validating the organizational climate measure: Links to managerial practices, productivity and innovation. Journal of Organizational Behavior, 26(4), 379–408. https://doi.org/10.1002/job.312	Integration, Involvement, Supervisory Support, Training, Welfare, Tradition, Innovation & Flexibility, Outward Focus, Reflexivity, Performance Feedback, Pressure to Produce, Quality

Source: Own elaboration.

To define the variables of internal communication and organizational climate, this study drew on a literature review of the most authoritative authors in these fields, as summarized in the document review in Figure 2.



Note. The graph was created using VosViewer software, based on a database of articles retrieved from Scopus.

Source: Own elaboration.

Figure 2. Literature Review

A total of 22 semi-structured interviews were conducted with individuals who hold leadership positions overseeing specific support and mission-related functions within the university; subsequently, these sessions were audio-recorded and digitized. They were the analyzed via the hermeneutic phenomenological method, as a way to approach an object of study such as the one concerning this research, which is not easily accessible from other research approaches. Moreover, this method consists of three phases (Fuster, 2019):

First phase: Classification of assumptions.

Second phase: Collecting the lived experience.

Third phase: Structural stage.

As a result, the components of organizational climate and internal communication that apply to the analyzed HEI were identified.

Stage 2. Characterization of organizational climate and internal communication

In this stage, the different validated models on internal communication and organizational climate were investigated (Table 1). Based on the analysis of the interviews conducted in the previous stage, the dimensions that apply to the HEI were identified and the questions were constructed considering the organizational language, for this case, a non-probabilistic convenience sample was applied (Hernandez & Carpio, 2019). The questionnaire was developed in Google Forms and was sent through the staff's institutional email, targeting both employees and contractors of the organization. A total of 114 responses were obtained on the perception of internal communication and organizational climate, along with a section of general responses that allowed for characterizing the perception of the personnel.

Stage 3. Modeling the influence of internal communication on organizational climate

Considering the results obtained in the two previous phases, a structural model was proposed to show the relationship between internal

communication and organizational climate via structural equations, using PLSC-SEM. To this end, the constructs (observed and latent variables) were defined, the measurement model was developed, the structural model was specified, the correlations were identified, and the results were interpreted.

4. RESULTS AND ANALYSIS

The variables of internal communication resulting from the application of the semi-structured interviews are presented below (Table 2).

Table 2. Internal Communication Variables

Variable	Result
Instructions	The process leader communicates top management's decisions to the work group.
Decision-making	The freedom to make decisions depends on the activities assigned to each employee.
Cultural communication	Contractors handle cultural language.
Work assignment	The workload is greater for employees.
Horizontal communication	In practice, a horizontal structure is identified.
Motivational communication	Satisfaction in the contribution to the development of institutional projects.
Vertical communication	The figure of process leader only determines the level of responsibility for compliance with the processes.
Supportive communication	Support among the work groups for the fulfillment of the institution's mission.
Trust communication	There is more confidence to communicate those aspects that can be an opportunity for improvement for the institution.
Informal communication	The precedents of the decisions made by the different levels are kept on record.
Formal communication	Frequency of standardized formal communication.
Change participation	The areas constantly identify opportunities for improvement.

Source: Own elaboration.

The variables resulting from the organizational climate assessment during the semi-structured interviews were as follows (Table 3):

Table 3. Organizational Climate Variables

Variable	Result
Work motivation	Creation of a sense of belonging through "I love my Pascual".
Productivity	Employees are more productive when they are satisfied with their work environment.
Trust	Cooperation among colleagues to achieve objectives.
Formalization	Knowledge of the rules allows for efficient management of resources.
Innovation and flexibility	Innovation in technological processes for mission fulfillment.
Service quality	Quality of life of employees has an effect on the quality of service.
Leadership	Decentralized areas and easy assignment of responsibilities.
Training	Training of employees to improve their professional profile.
Physical environment	Environmental and ergonomic conditions improve the performance of activities.
Organizational culture	Historical background for objectives and goals.
Job satisfaction	Wellness activities create a sense of happiness in service delivery.
Job performance	Objectives and goals arise from work group proposals.
Participation	Pride and motivation for participation in the construction of the development plan.
Autonomy	Limitations in decisión-making.

Source: Own elaboration.

The following are some of the statements used to diagnose internal communication and organizational climate (Tables 4 and 5):

Table 4. Diagnostic Statements on Internal Communication

Variable	Affirmation
Decision-making	My manager only makes final decisions after discussing them with the work group.
	My manager always makes sure that decisions made by top management or by himself/herself preserve the well-being of the work group.
	The work team can make decisions without the presence of my manager.
Cultural communication	The members of the working group give new staff with information about how things should be done in the institution.
	Members of the working group tell new staff stories about people or past events in the institution.
	The manager actively participates in the induction of new staff.
Horizontal communication	Staff in the institution support each other.
	Staff members do not withhold personal information when speaking socially.
	Work-group members receive sufficient information from each other.
	Work-group members have ample opportunity to meet and discuss work issues with each other.
	Communicating with co-workers is easy.

Source: Own elaboration.

Table 5. Organizational Climate Diagnostic Statements

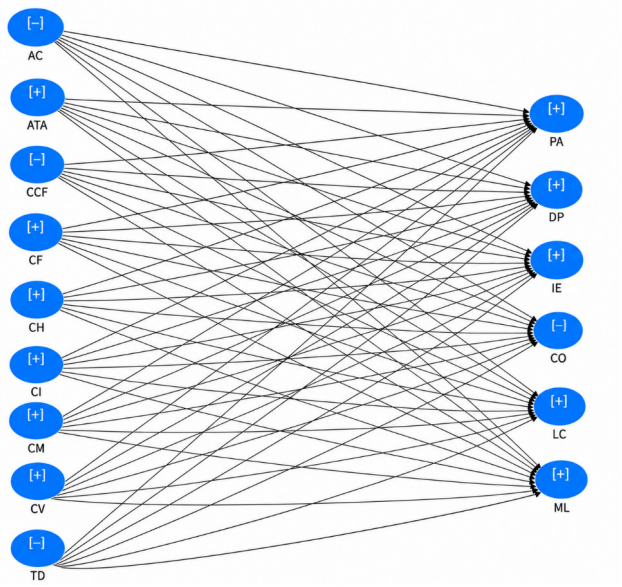
Variable	Affirmation
Organizational culture	Staff in all units have a good understanding of the institution's goals.
	Staff in all units are aware of the objectives of the development plan.
	Everyone who works here is well aware of the institution's development plan.
Leadership	The managers here are really good at understanding the problems of the work group.
	Managers demonstrate that they have confidence in the work group.
	Managers can be trusted to give good guidance to people.

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Work motivation	The work assigned to you is of great importance to the Institution.
	Here, people are encouraged to balance their work and personal lives.
	I feel that my participation is important and that it makes a difference in the organization.
	People like to come to work at the institution.
	I'm proud to tell others that I work here.

Source: Own elaboration.

After the qualitative and descriptive analysis of Objectives 1 and 2, a structural model is proposed with dimensions obtained from these analyses that converge into the two factors that are the object of this research. Thus, in order to address Objective 3, a structural model is proposed that contains formative constructs, the Internal Communication of the HEI and the Organizational Climate of the HEI, which is presented as a second-order factor, and its analysis was carried out by means of PLS-SEM (Aldás, 2017). Consequently, this construct was treated as a non-observable factor; that is, without directly associated elements or variables, with the indicators of the dimensions that comprise it (Attitude toward change [AC], Assignment of work and activities [ATA], Communication of trust [CCF], Formal communication [CF], Informal communication [CI], Horizontal communication [CH], Vertical communication [CV], Motivational communication [CM], and Decision-making [TD]), being those that cause said the factor rather than the factor being reflected in its variables. This implies the use of latent variables, which are variables not directly observed but must be inferred, in this case statistically from the observable variables of the dimensions of the Internal Communication construct (Figure 3).



Source: Own elaboration.

Figure 3. Structural Model for the Inference of Latent Variables

The latent variables, therefore, were found by omitting the Internal Communication construct, this was represented by the nine dimensions inferred from the previous objectives. These dimensions were then structurally related in PLS to the Organizational Climate construct (Participation and Autonomy [PA], Organizational Commitment [CO], Performance and Productivity [DP], Leadership and Trust [LC], Labor Motivation [ML], and Infrastructure and Ergonomics [IE]), to which it is related, but which also requires latent variables, since it is a formative construct (Hair et al., 2017; Aldás, 2017). Then, the model was estimated without such second-order constructs, whose structural relationship was preserved by maintaining the factorial values of the dimensions (hence the latent variables), and then using them as elements that build that construct. Following this, the final model was analyzed by PLS-SEM. The baseline criteria for the analysis of the results are listed below (Table 6).

Table 6. Criteria for the Analysis of Results in PL-SSEM

Stages of validation	Indicator	Criteria	Source
Criteria for reflective constructs	Cronbach's alpha (AC)	=> 0.7	(Nunnally & Bernstein, 1994)
	Composite Reliability (FC)	=>0.7	(Fornell & Larcker, 1981)
	Convergent validity: mean variance extracted (AVE)	=>0.5	
	Convergent validity: Size of loadings and significance level	=>0.6; p<0.001	(Bagozzi and Yi, 1988)
	Discriminant validity: square roots of the extracted variance (AVE), and the Heterotrait-Monotrait relationship (HT/MT)	=< 0.9	(Chin, 1998)
Criteria for formative constructs	Diagnosis of multicollinearity: factor variance inflation (VIF) and tolerance index (TOL)	=<5 (VIF); => 0.20 (TOL)	(Hair et al., 2017)
	Weight and load analysis: significant weight, loads, standardized coefficients or significant load	p<0.001	
Criteria for the Structural Model	Coefficient of determination (value)	=<0.75 y => 0.51 relevant, =< 0.50 y => 0.26, moderate, y < 0.25 weak	(Hair et al., 2017)
	Significance level of structural relationships	p<0.001	
	Predictive relevance (): to ensure normality of the data	> 0	(Stone, 1974; Geisser, 1975; Tenenhaus et al., 2005)

Source: Own elaboration.

Measurement of the Model

Table 6 shows the internal consistency and reliability of the instrument for measuring the constructs with Cronbach's alpha (CA) and composite reliability (CR). Also, the values of convergent validity with the average

variance extracted are presented, demonstrating that the model complies with these criteria, which means that the items of the instrument allowed for an adequate measurement of the constructs (Table 7).

Table 7. Internal Consistency, Reliability, Collinearity, AVE, and Coefficients

Constructs	Ítems	Loads	Sig. Loads	Weights	Sig. weights	AC	FC	AVE	Collinearity statistics	
									TOL	VIF
Internal Communication HEI	AC	0.904	0.000	0.137	0.000	0.962	0.968	0.769	0.20	4.961
	ATA	0.894	0.000	0.127	0.000				0.22	4.501
	CCF	0.857	0.000	0.131	0.000				0.22	4.596
	CF	0.900	0.000	0.138	0.000				0.19	5.357
	CH	0.835	0.000	0.120	0.000				0.29	3.419
	CI	0.868	0.000	0.115	0.000				0.26	3.804
	CM	0.894	0.000	0.125	0.000				0.18	5.555
	CV	0.892	0.000	0.123	0.000				0.19	5.301
	TD	0.846	0.000	0.123	0.000				0.24	4.084
Organizational Climate HEI	CO	0.936	0.000	0.173	0.000	0.966	0.973	0.856	0.16	6.262
	DP	0.914	0.000	0.185	0.000				0.23	4.285
	IE	0.884	0.000	0.164	0.000				0.30	3.380
	LC	0.938	0.000	0.184	0.000				0.16	6.079
	ML	0.934	0.000	0.194	0.000				0.18	5.610
	PA	0.945		0.180					0.14	7.054

Source: Own elaboration.

For discriminant validity, the square root of the average extracted variance (AVE) was calculated (see values on the diagonal), followed by the squared correlation (below the diagonal) and, finally, the HTMT ratio (above the diagonal), demonstrating that the diagonal values were higher to confirm discriminant validity (Table 8).

Table 8. Discriminant Validity

	1	2
Internal Communication HEI (1)	0.925	0.893
Organizational Climate HEI (2)	0.865	0.877

Source: Own elaboration.

The relative weight-loading relevance of the dimensions was validated by means of the weights of the latent measurement variables obtained from the dimensions of both formative constructs. It is evident that the dimensions are significant (p> 0.001), and that the most important are Formal Communication and attitude toward change in the case of Internal Communication of the IES (CF: ß=0.382; AC: ß=0. 260), without detracting from the weight that the others contribute to this factor; and, in the case of the Organizational Climate of the HEI, the most important dimensions were Participation and Autonomy, Leadership and Trust, Organizational Commitment, Work Motivation and Performance and Productivity (PA: ß=0. 382, LC: ß=0.382, CO: ß=0.382, ML: ß=0.382, and DP: ß=0.382). On the other hand, for the formative dimensions, the VIF was checked to evaluate the multicollinearity of the model to be estimated, whose values must be below 5 with a TOL above 0.20 (Hair et al., 2017). Not all dimensions met the aforementioned criteria. Although it is suggested that the collinearity indicator should not exceed 5 for the VIF and 2 for the TOL, because it may indicate that two or more predictors of the model are correlated and provide redundant information, some studies suggest that values not exceeding 10 are acceptable:

Motivational Communication -> Assignment of work and activities, Vertical Communication, Work Motivation (Climate), and Decision-making.

Formal Communication -> Attitude to change, Communication of Confidence, and Communication of Trust

Organizational Commitment -> Performance and Productivity, Leadership and Trust, Work Motivation, and Participation and Autonomy.

Vertical Communication -> Assignment of work and activities and Motivational Communication.

Leadership and Trust -> Participation and Autonomy, Work Motivation, Performance and Productivity, and Organizational Engagement.

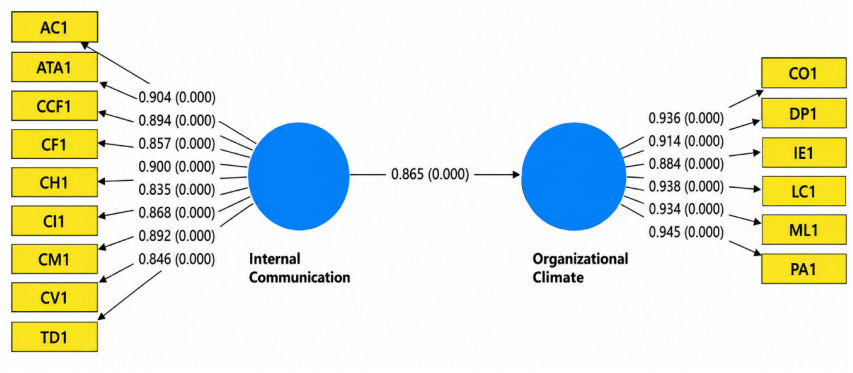
Work Motivation-> Participation and Autonomy, Leadership and Trust, Organizational Commitment, Motivational Communication, and Attitude to Change.

Participation and Autonomy-> Organizational commitment, Performance and productivity, Infrastructure and ergonomics, Leadership and trust, and Work motivation.

As can be seen, these are variables that may be closely related by their nature and by what the literature shows. Therefore, it is accepted that there is no multicollinearity. Additionally, discriminant validity, which indicates that the constructs should not have an overlapping, was met, as was convergent validity, which suggests that the same latent variables that reflect both constructs measure what they are intended to measure.

Structural Model. Hypothesis Testing

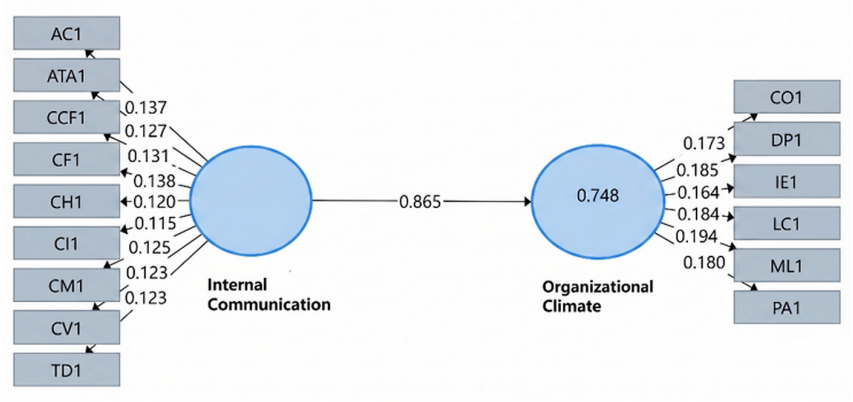
The results of the hypothesis testing for the model and its predictive capacity show that the of R^2 value is statistically significant for HEI Organizational Climate (R^2= 0.748). To evaluate the predictive relevance Q^2, the blindfolding resampling procedure was implemented. Notably, this analysis reveals that the dependent factor, organizational climate, possesses predictive relevance (Q^2 = 0.788), as shown in Figure 4**.**



Source: Own elaboration.

Figure 4. Predictive Capacity of the Proposed Structural Model

Subsequently, the hypothesis testing via bootstrapping was conducted to obtain the path coefficient and its t-value. The hypothesis regarding the influence of communication on the organizational climate of the HEI was significant ($p < 0.001$). This result aligns with studies in other industries, thereby providing a meaningful contribution to the public education sector (e.g., Berberoglu, 2018; Reetu and Yadav, 2019; Brawley et al., 2020; Titisari et al., 2021; Papsiene et al., 2021; Bagozzi and Yi, 1988), as evidenced in Figure 5. Also, Table 9 shows the results of the structural model:



Source: Own elaboration.

Figure 5. Bootstrapping

Table 9. Structural Model Results

Hypothesis	Relations	Coefficients	t -Value	P-Value	Conclusión
H1	COMMUNICATION IES -> CLIMATE IES	0.857	18.252	0.000	Supported

Source: Own elaboration.

With all of the above, it can be demonstrated that the internal communication that takes place in an HEI has a direct impact on the organizational climate that is generated there, since, as supported by the same literature, everything starts with how what is transmitted between the sender and the receiver flows, which in this case involves work teams that must be in synergy to operate all the internal processes required by the education sector, specifically the HEIs in the city of Medellin. In addition, and as information to highlight, the same infrastructure (physical remoteness between work teams), can contribute to hindering fluid communication, and this affects the psychological part of any organization, such as as the organizational climate.

5. DISCUSSION AND IMPLICATIONS

Internal communication is a fundamental element within organizations and is to a large extent defined by the organizational culture and by the way in which codes and norms are established, that is, the way in which the functioning of a company is understood based on its principles and values. This implies that, as demonstrated in this article, internal communication and organizational climate are related, establishing a bidirectional influence, since both are immersed within a mental model or the same organizational paradigm (Giraldo et al., 2022; García, 2009; Segredo et al., 2017; Tan et al., 2021). In this regard, it is important to note that the analysis carried out should have been done from a complex approach, understanding that all the variables and the relationships between them determine the phenomenon studied; hence, the more variables and relationships that are established, the greater the value that can be given to these results, as they explain the object of study more effectively (Rojas, 2018; Torres, 2020).

The aforementioned complexity also allows the results obtained to be read from different directions, rather than only in a linear way, as is usually the case within a simplistic framework; therefore, the conclusions can be approached from different perspectives and are open to different interpretations. This presupposes that the methodological scheme could be replicated in other studies and in other types of companies, in order to establish the relationship between the different variables that make up the organizational climate and internal communication, with the possibility of obtaining similar results that could validate the hypothesis in other contexts.

In line with this, other studies have shown results related to those shown in this text (Berberoglu, 2018; Brawley et al., 2020; Brito et al., 2020; Flores & Ochoa, 2016; Papsiene et al., 2021; Fornell & Larcker, 1981); however, no specific works were found regarding the relationship between climate and internal communication, since in most of them this relationship was taken for granted; hence the importance of raising the concern about the object of study and giving it a rigorous statistical treatment that allows the validation of the hypothesis generated.

It is clear that this type of study related to the measurement of qualitative variables in organizational environments has great potential, given the importance of understanding how individuals function in work environments, the way they relate to each other and establish codes of conduct, as well as create languages that are implicit in the specific way they communicate (Diaz et al., 2021). In addition, understanding this type of phenomena, such as communication within a company, can provide managers and decision-makers in general, with the tools to establish strategies to improve the organizational climate, and therefore, the performance and competitiveness of an organization. In this way, it is hoped that this article will be a significant contribution to future work in the line of organizational studies (Rodrigues et al., 2021; Rodríguez, 2005).

Regarding the theoretical implications of the research, it is possible to establish a relationship between organizational climate and internal communication, based on a rigorous statistical model, which allows for the validation of the hypothesis put forward in this regard.

It should be noted that other lines of inquiry could be explored to further examine similar topics, such as internal communication and mental models as barriers to innovation processes in organizations (Giraldo et al., 2022; De Araujo, 2020; Olsson et al., 2019), knowledge management and human talent management as determinants of business success (Titisari et al., 2021; Torres et al., 2018), or, more specifically, the analysis of factors affecting organizational climate in educational settings (Rivera et al., 2017; Niebles et al., 2019).

On the other hand, an important practical component lies in the possible use of the methodological strategy proposed in the article, as a tool for obtaining and analyzing information related to internal communication and organizational climate, in any type of organization, given that such a methodology is based on theoretical references that speak of such objects of study as elements present in any company, beyond their purposes or the productive or economic sector to which they belong. Likewise, both the systematic literature review, the structural equation model developed and the discussion of the results obtained constitute a feasible road map to understand the relationship between the variables in question.

To complement the above, it is pertinent to note that, although the methodology is considered replicable in other research projects, it must be adjusted to the requirements of such projects, that is, applied based on the specific context, given the particularities present in each situation. This aspect part is important, since it is common to find in the scientific literature, theoretical or practical approaches where existing methodologies are copied from previous studies, which do not necessarily reflect or fit the needs of the study being addressed.

6. CONCLUSIONS

Beyond the proven relationship between internal communication and organizational climate, it is important to note that both concepts are complex, and therefore, their study requires the analysis of the various variables that determine them, as well as the interactions between them. Thus, in the field of organizational studies it becomes relevant to establish relationships between the variables that condition the behavior of people who make up

a particular institution, and the way in which this behavior generates internal paradigms regarding the way things are done, that is, organizational mental models constituted by routines, tasks and institutions that are automatically developed in a business environment.

These mental models constitute a vision of the organizational environment, which delimits the way people act within a company, based not only on this model, but also on their own models that are built as a way of adapting their thinking and behavior to the routines and paradigms mentioned above. In this sense, an organization can be interpreted as a living being that learns, and, therefore, is constantly evolving.

The above highlights the importance of understanding the relationships between aspects such as climate, culture, and communication within organizations in order to explain how they adapt to competitive environments in a dynamic market. In this way, it can be stated that the aforementioned aspects are determinants of the success of organizations as well as their failure. Precisely, one of the strengths of this research is the contribution it makes within organizational studies to the analysis of intangible factors within companies and how they act either as barriers or as facilitators for the improvement of competitiveness.

Furthermore, it is clear that as markets have changed, so have organizations and the way they establish communication aspects within them, which implies that studies on their behavior should focus on the new forms of communication among people, which, in turn, are mediated by the accelerated pace of innovations that occur in the field of telecommunications. These new forms of organizational culture differ greatly from previous organizational structures, featuring different leadership styles or being simply adjusted to the times. The current landscape competitive markets calls for studies focused on this reality.

Finally, it is pertinent to mention some possible limitations of the present research, as well as to offer some recommendations to be considered in future projects that address objects of study similar to the one presented. First, it should be noted that the study is focused on a public university located in a specific city; therefore, future research addressing a similar object

of study could focus on both public and private higher education institutions, while also considering a comparative analysis with other cities either in the same country or in another. Similarly, it is considered relevant to develop similar research in other types of organizations in order to validate both the theoretical constructs and the statistical model proposed. In addition to the above, and as expressed in previous paragraphs, organizations are objects of study in constant change, given that the markets in which they interact are very dynamic, which makes these environments more competitive and, therefore, requires a high capacity for adaptation; thus, studies focused on the analysis of intangible factors such as those discussed in this article, must be aligned with the new trends that are explained in the literature on organizational management. Consequently, it is vital to carry out systematic literature reviews that provide a deeper understanding of the state of the art of the study in question.

As for future research, it is recommended to develop analyses that take into account other variables that affect organizational performance, such as the adequate definition of roles, leadership styles, the culture, and external environments of the organization, the specification of tasks, and the type of competencies required for certain functions, all within the framework of organizational management in order to improve the performance of companies.

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