UNDERSTANDING BUSINESS CENTRALIZATION STRATEGY FROM A STRUCTURAL EQUATION MODEL

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Abstract

The present investigation was oriented to validate the existing relationship between individual, organizational, and environmental variables, in terms of the presence of centralization or decentralization levels, in line with important results of previous investigations and various hypotheses formulated by Mintzberg (2001) regarding organizational design. For its development, measurement instruments were designed (Robbins & Judge, 2017), validated, and applied for the variables identified in the research to managers of 382 organizations, ensuring the representation of organizations of different sizes and productive sectors. Initially, an initial characterization of the variables under study was carried out, to later carry out an exploratory factor analysis that allowed identify the existence of six dimensions that corresponded to the variables established in the initially proposed model to subsequently corroborate it, using structural equations. It can be stated that the main finding of this research is to verify, through the construction of the structural equation model, the validity of several hypotheses formulated by Mintzberg (2001) related to centralization. Based on the above, it can be stated that the level of centralization in an organization is the result of the conditioning of multiple variables related to the individual characteristics of the managers, the level of maturity of the organizational forms present in the organization, and the characteristics of the environment.

Keywords: Organizational Design, Administration, Centralization, Structural Equation Model

Authors' individual contribution: Conceptualization — R.P.-C.; Methodology — R.P.-C., G.G.-V., and M.d.M.-G.; Validation — R.P.-C. and M.d.M.-G.; Formal Analysis — R.P.-C. and A.S.-R.; Investigation — R.P.-C., A.S.-R., G.G.-V., R.M.-V., and M.d.M.-G.; Data Curation — R.P.-C.; Writing — Original Draft — R.P.-C.; Writing — Review & Editing — R.P.-C. and A.S.-R.; Visualization — A.S.-R., G.G.-V., and M.d.M.-G.; Supervision — R.M.-V.; Project Administration — G.G.-V.

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1. INTRODUCTION

Centralization, as an organizational structure, has been the subject of study and debate in the academic and business spheres. It is a crucial topic for understanding how decisions are made, responsibilities are distributed and resources are managed. Its impact on the efficiency, communication, decision-making, and adaptability of organizations is undeniable. Understanding how roles and power are distributed within an entity is essential to designing effective strategies and achieving institutional objectives. By exploring this topic, effective strategies can be designed and institutional objectives achieved (Zapata Rotundo, 2016; Cabanillas Díaz et al., 2021).

The state of the art in this field has evolved over time. Researchers have explored different dimensions of centralization in companies, from its influence on productivity to its relationship with job satisfaction. Some studies have shown that a proper balance between centralization and decentralization can improve organizational agility and adaptation to the changing environment (Zapata Rotundo, 2016; Jaramillo Cardona, 2010).

Despite progress, there are still gaps in knowledge on this topic. Some areas that require further research include: 1) the impact on innovation or how centralization affects an organization's ability to innovate and adapt to new circumstances; 2) the analysis of the cultural and geographical context or how cultural and geographical factors influence the preference for centralized or decentralized structures, new technologies or how centralization is related to the adoption of emerging technologies and digital transformation; or 3) what is the relationship between individual, organizational and environmental variables at the levels of centralization existing in organizations. This research will focus on this last point (Balachandran & Eklund, 2024).

Centralization is investigated in both private and public administration, deepening the relationship between national and territorial governments (Delgado et al., 2022; Pechenskaya & Uskova, 2016). Regarding the variables that are analyzed in this context, we can mention those related to environmental management (Jin et al., 2023), public investment and financing policies (Randjelovic & Vukanovic, 2021), the impact on innovation social and economic development (Chi et al., 2021), cultural development (Rius-Ulldemolins et al., 2021), sports development (Fang et al., 2023), and public purchases (Patrucco et al., 2021), among others aspects.

Similarly, in the field of business administration, centralization is valued from different perspectives: 1) coordination for the optimization of resources and the operation of the supply chain (Li et al., 2023), 2) resource management (Rahaman, 2022), 3) leadership and work teams (Jiang et al., 2022), 4) production management and the quality of decisions (Schuh et al., 2022), organizational performance (Away et al., 2021), and 5) the levels of centralization or decentralization in entities such as small and medium-sized enterprises (SMEs) (Martin et al., 2016).

A key aspect, object of investigation, in relation to research on the subject matter under study, is to be able to establish which variables condition or determine the level of centralization that occurs in organizations. In this sense, multiple attempts to identify and evaluate them are reported, and within this, the studies developed by Mintzberg (2001) stand out, in a set of research on organizational design that proposes a group of variables typical of the field of administration business, which directly or indirectly condition or impact the levels of centralization that are manifested in the various organizations.

Considering what was analyzed above, the fundamental objective of this research is to validate, through a structural equations model, the existence of a statistically significant relationship between individual, organizational, and environmental variables, in terms of the presence of certain levels of centralization or decentralization, in line with results of previous research and various hypotheses formulated by Mintzberg (2001) on organizational design. In this study, in particular, the following Mitzberger's hypotheses are considered:

H1: The more formalized the structure, the greater the possibilities of decentralization.

H2: The more dynamic the environment, the more decentralized the structure.

H3: The instability of the environment leads to centralizing the structure.

H4: The greater the external control, the more centralized and decentralized the structure.

H5: The power needs tend to generate centralized structures.

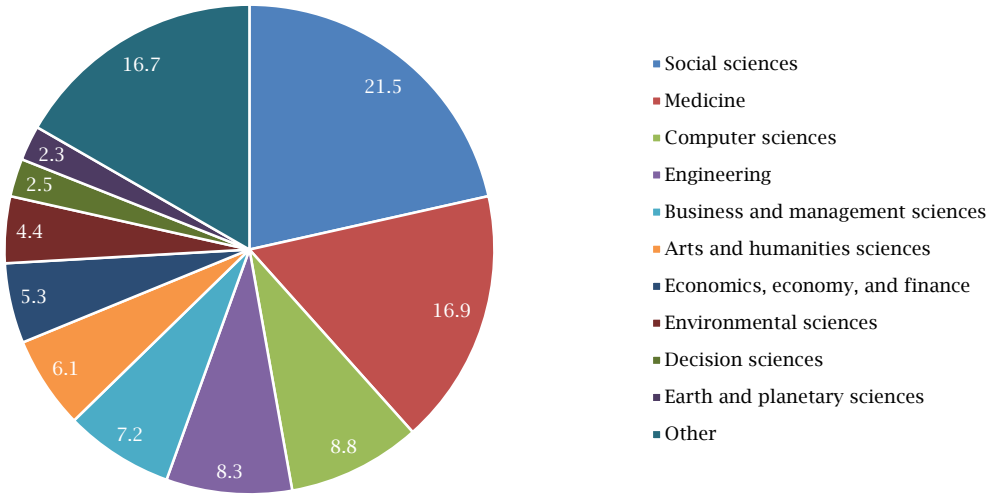
The structure of this paper is as follows. Section 2 presents a review of the literature on the topic, where the variables that influence or condition the presence of centralization or decentralization in organizations are analyzed, emphasizing Mintzberg's hypotheses as essential contributions in this sense. Section 3 shows the research steps established based on the design of the instruments for collecting information and where structural equations are used to process the results. Section 4 provides the structural equation model with the characterized variables and the corresponding evaluation. Finally, Sections 5 and 6 delve into the discussion and conclusions of the study, analyzing previous research and establishing limitations and future lines of investigation.

2. LITERATURE REVIEW

Centralization as a practice is not a subject studied by a specific science but can be analyzed and applied in different fields. In fact, the first research on this subject for which information can be found, in the publications registered in Scopus, is developed from the physical sciences and dates back to the year 1877. In total, 19,015 publications on the subject are reported, as was the case. As expected, within the social sciences the highest percentage of publications is reported, within the administrative sciences a total of 2,088 publications on the subject are reported. The first publication within the administrative sciences, of those reported in Scopus, that addressed the issue was from 1926 and was oriented towards the analysis of the centralization of electricity generation.

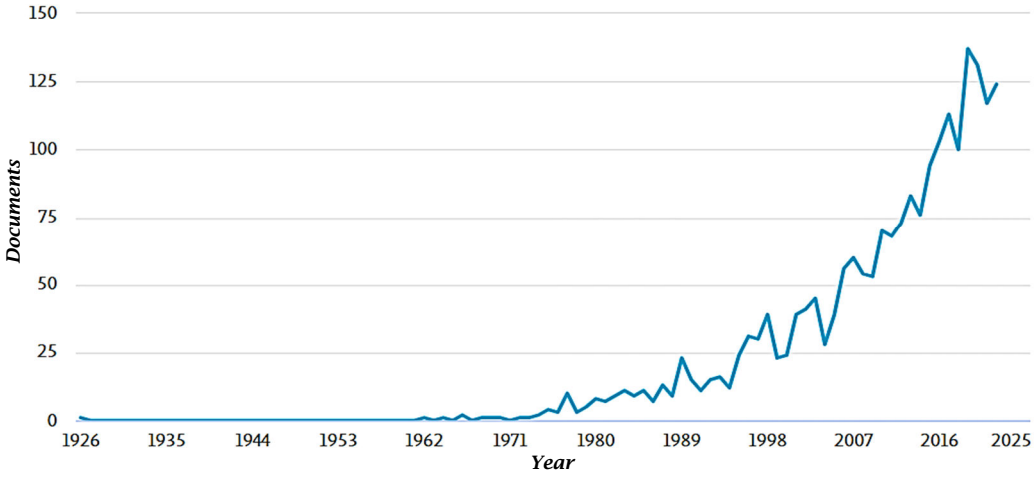
Figures 1a and 1b show the distribution by area of knowledge of the publications in Scopus and the sustained growth that these have shown from 1921 to date.

Figure 1a. Evolution of research on organization: Documents per science area



Source: Retrieved from the Scopus database.

Figure 1b. Evolution of research on organization: Documents per year



Source: Retrieved from the Scopus database (https://shorturl.at/4fReX).

The analysis of the variables that influence or condition the presence of centralization or decentralization in organizations is diverse (Matherne & Roth, 2024). The level of centralization in an organization is manifested through variables such as the degree of autonomy that is manifested (Fontes et al., 2022; Santana & Albareda, 2022), worker participation, whether at the level of teams, the work group or the entire organization (Bunderson & van der Vegt, 2018), as well as the implementation of successful communication and information mechanisms (Choi et al., 1996; Sinkula & Hampton, 1988) that are implemented in the organization.

Multiple authors recognize the influence that variables typical of the individuality of the administrators can have and that condition the existence of a greater or lesser level of centralization, such as the leadership style that the manager adopts or characterizes (Bani-Melhem et al., 2022; Eva et al., 2021; Mumtaz et al., 2023) and the needs for power Mintzberg (2001) that psychologically conditions the leadership style.

In the organizational order, the incidence of the level of formalization (Dominguez Gonzalez, 2023; Quester & Conduit, 1996), flexibility, or standardization (Cabri & Fioretti, 2022; Dunford et al., 2013; Güttel et al., 2015) in organizations where the methods, competencies or results to be used or achieved are regulated, decision-making can be decentralized based on what these documents establish. The choice of which aspect to normalize is, in Mintzberg's (2001) criteria, conditioned by the type of process that is carried out, giving rise to a mechanistic or professional bureaucracy.

In correspondence with the above, the existence of control mechanisms constitutes another of the organizational or external conditioning aspects that influence centralization. To the extent that the organization has internal control mechanisms, it may allow a higher level of centralization (Zoller & Muldoon, 2020), the development of the staff (Livijn, 2019; Wilkinson & Calvo-Amodio, 2022), in the same way and in the opposite direction, the greater the conditions of controls external to the organization, the lower the possibilities of decentralizing decision-making (Dong et al., 2022; Gorelov & Ereshko, 2017; Lehtovaara et al., 2022), since managers will show greater propensity for centralization.

Finally, it is recognized that not only organizational aspects favor or limit a greater or

lesser level of centralization. The dynamics of the environment and the probable incidence of these changes in the organization (Caruana et al., 2015; Moreno et al., 2016), also condition the degree of centralization that occurs in the organization. If the environments are highly dynamic and the changes that occur in them can cause significant impacts on the performance of the organization, on the one hand, it requires greater participation from the members of the organization, and on the other, it stimulates a greater role of senior managers.

Mintzberg (2001), as part of his research, integrates and correlates the above variables, among others, through the formulation of 16 hypotheses where he considers variables both internal and external to the organization, among which stand out: 1) age and size of the organization, 2) the level of formalization and elaboration of the organizational design, 3) the degree of internal and external control that is manifested in the organization, 4) the dynamics and diversification of the environment and 5) the personal characteristics that the leaders can impose.

3. RESEARCH METHODOLOGY

The following steps were followed for the development of the investigation.

3.1. Step 1: Identification of the variables to be measured

The selection of the variables was initially made from the variables related to centralization, based on the hypotheses formulated by Mintzberg (2001), the following is selected: *formalization of the structure, dynamics,* and *stability of the environment, external control, the power needs,* and *centralization*, as a dependent variable. The variables *power needs* and *leadership styles* are considered to affect the latent variable *managerial influence*.

Subsequently, a group of 17 experts were consulted, all PhD in the business administration area, with more than ten years of experience in research and teaching. The experts consulted recommended adding the leadership style variable to the study.

Additionally, the experts initially suggested considering the resource availability variable as part of the analysis, but the possibility of incorporating it into the study was ruled out, considering that it presents a very wide and changing range of variation from one company to another, even in companies of one size, same size, and their status may or may not favor centralization differently depending on multiple factors, despite the fact that they are companies of similar sizes. In the same way, the related variables *age* and *size* of the organization were not considered, because according to the criteria of the experts and in accordance with Mintzberg's (2001) own hypotheses, both variables are subsumed in the level of formalization that the design shows. Organizational, a similar criterion was applied to rule out the information and internal control system within organizations, since in Mintzberg's hypotheses no direct relationship is established between these variables and the level of centralization.

3.2. Step 2: Design or selection of measuring instruments

For the measurement of the variables, three instruments were applied: 1) a general one aimed at characterizing the state of each of the previously established variables, 2) an additional instrument proposed by Lussier (1990) to measure the need for power, and 3) the instrument presented by Robbins and Judge (2017) applied to measure the leadership variable.

In the general instrument (see Appendix), an evaluation scale of 1 to 10 is applied to statements related to the level of recognition of the variable in the organization. A total of 23 items are assessed: 1) five aimed at characterizing the level of formalization, 2) another five to analyze centralization, 3) two to characterize the dynamics of the environment, 4) six to evaluate the stability of the environment; 5) two for external control, and 6) two for managerial influence, which are listed below.

- *Formalization*: 1) existence of function manuals; 2) existence of job descriptors; 3) existence of work procedures; 4) existence of work instructions; 5) existence of activity records.
- *Centralization*: 1) authority to decide; 2) need to inform; 3) need for feedback; 4) organizational participation; 5) departmental participation.
- *Environment dynamics*: 1) frequency of environmental changes; 2) impact of environmental changes.
- *Environment stability*: 1) economic stability; 2) social stability; 3) technological stability; 4) supplier stability; 5) customer stability; 6) competitive stability.
- *External control:* 1) existence of external audits; 2) existence of external control organizations.
- *Managerial influence*: 1) leadership; 2) need for power.

For the validation of the instruments, a group of experts were consulted again, and 100% of the experts admitted the apparent and content validity of the questionnaire. To evaluate the construct validity, the designed instrument was applied in a pilot test to 382 companies, with the information obtained, the data matrices were created, which were then processed using the statistical package SPSS.IBM (version 25.0, 2017).

Lussier's (1990) instrument presents 15 statements, which allow for identifying the predominance in managers of three types of needs: 1) power, 2) affiliation, and 3) self-realization. The existence of these needs is evaluated through the application of a Likert scale, in this investigation it is established in what percentage of the companies the managers show a predominance of the need for power.

In the Robbins and Judge (2017) instrument, the presence of four leadership styles is characterized: 1) autocratic, 2) facilitative, 3) situational, and 4) democratic. For this purpose, 16 questions are used, with statements to be evaluated through the Likert scale. In this research, democratic and autocratic leadership styles are assumed as extreme values of a continuum, and the percentage of leaders in the companies under study that show autocratic leadership is determined.

3.3. Step 3: Defining the population and sample

In Ecuador, a total of 725,395 companies are reported (based on the National Institute of Statistics and Census in Ecuador (INEC) database), divided by type based on the number of personnel that comprise them. The micros have less than 10, the small ones from 10 to 49, medium "A" from 50 to 9, medium "B" from 100 to 199, and large ones with more than 200 workers. The distribution by type and sector are shown in Table 1.

Table 1. Composition of the population by size and sector

Company type	*Agriculture, forestry, and fishing*	*Commerce*	*Construction*	*Exploitation of mines and quarries*	*Industries*	*Services*	*Total*
Large	526	1,936	109	62	765	1,383	4,781
Medium "B"	702	1,776	181	50	414	1,358	4,481
Medium "A"	821	1,997	266	49	508	2,980	6,621
Small	3,291	11,101	2,366	295	2,816	21,263	41,132
Micro	63,986	233,514	19,463	1,304	55,262	294,851	668,380
Total	69,326	250,324	22,385	1,760	59,765	321,835	**725,395**

Source: INEC database (https://www.ecuadorencifras.gob.ec/registro-estadistico-base-de-poblacion-del-ecuador/).

To establish the sample size, it was decided to apply stratified probabilistic sampling. Considering that the probability of an organizational design for microenterprises is low, this type of company despite representing 92% of the population was not considered for the study, so the size of the population was only 57,015 companies. The sample size was determined by Eq. (1).

$$n = \frac{z^2 * p * q * N}{e^2 * (N-1) + z^2 * p * q} = \frac{1{,}96^2 * 0{,}5 * 0{,}5 * 57015}{0{,}05^2 * (57015) + 1{,}96^2 * 0{,}5 * 0{,}5} = 381{,}59 = 382 \quad (1)$$

where,

- N = population size = 57,015;
- z = constant of the normal distribution for 95% confidence = 1.96;
- p = probability of success;
- q = probability of failure;
- e = researcher error of 5%.

The composition of the sample can be seen in Table 2. It was not possible to gain access to representative companies of the extractive sector. The instruments were applied to the managers of the selected organizations.

Table 2. Sample composition

Company type	*Agriculture, forestry, and fishing*	*Commerce*	*Construction*	*Industries*	*Services*	*Total*
Large	4	13	2	5	9	33
Medium "B"	5	12	2	3	9	31
Medium "A"	6	13	3	3	20	45
Small	22	73	17	20	141	273
Total	37	111	24	31	179	382

3.4. Step 4: Processing of the results

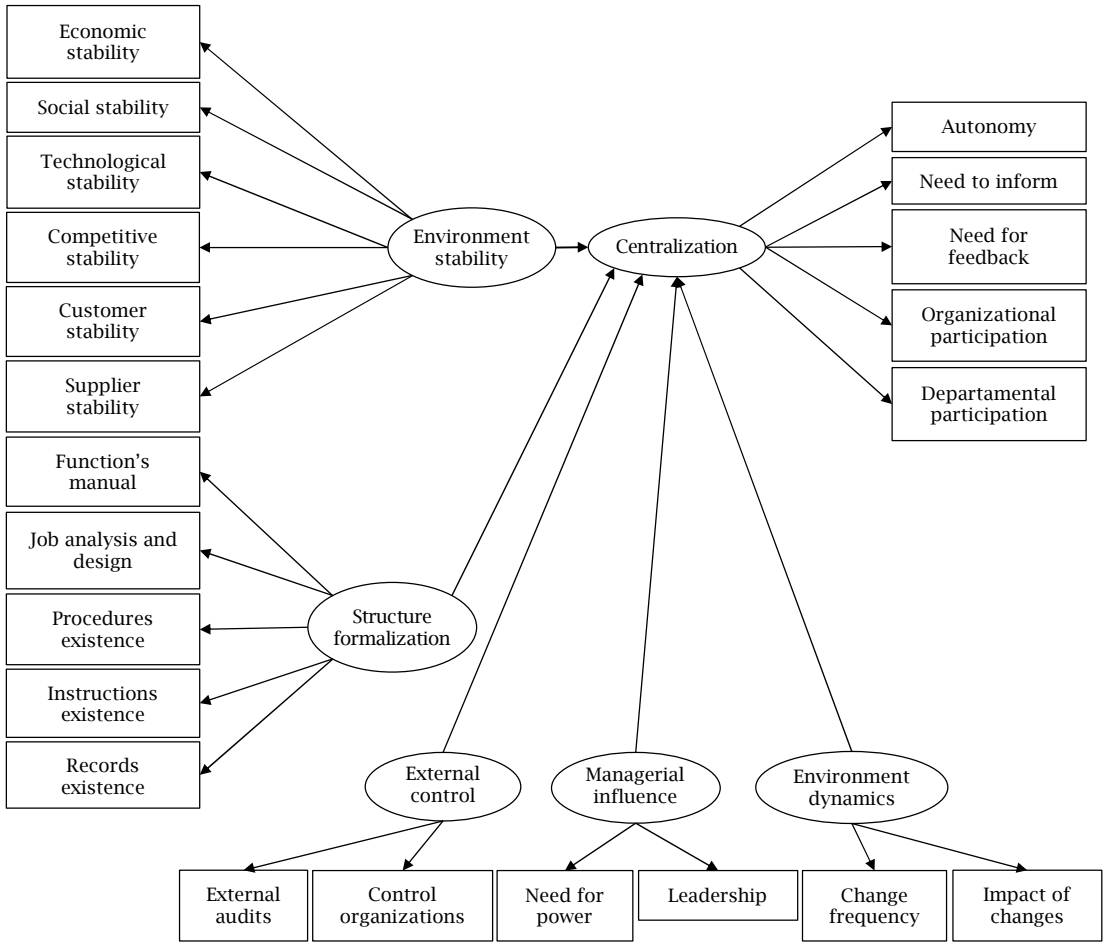
Once the instruments were applied and their results compiled, their processing began. According to the researchers' criteria, the information processing strategy could be developed through different methods specific to multivariate statistics, such as, among others, the analysis or evaluation of a multiple correlation model. However, the choice of the analysis of a structural equation model was considered pertinent, although the possibility of applying other techniques such as those mentioned is not ruled out and is defined as a suggestion for possible future research to be developed by the researchers themselves or others.

This processing was carried out with the help of the statistical package SPSS.IBM (version 25.0, 2017). It began with the development of a factorial analysis to confirm the existence of the supposedly existing dimensions. The validity of the factorial analysis was confirmed by the Kaiser-Meyer-Olkin (KMO) coefficient, the percentage of variance explained, and the statistical significance of Bartlett's test of sphericity.

Subsequently, a structural equation model was created to correlate the independent and dependent variables. The proposed model is the one represented in Figure 2. For this purpose, the IBM SPSS AMOS 23 software was used.

For the evaluation of the model obtained, the indicators established for these purposes will be used, which are summarized in Table 3.

Figure 2. Proposed structural equation model



Source: Authors' elaboration using SPSS.IBM (version 25.0, 2017).

Table 3. Value evaluation indicators of the generated model

Indicators	*Acronyms*	*Contrast value*
Chi-square value/degrees of freedom	CMIN/DF	< 3 — good
Probabilistic level associated with the Chi-square value	Probabilistic level	> 0.05 — significant
Comparative fit index	CFI	> 0.95 — very good
Goodness of fit index	GFI	> 0.95 — excellent
Adjusted goodness-of-fit index	AGFI	> 0.90 — traditional
Root mean square error of approximation	RMSEA	> 0.80 — permissible
Probability of perfect fit	PCLOSE	> 0.80 — acceptable

4. RESEARCH RESULTS

Table 4 shows the general behavior of each of the variables and dimensions analyzed. As can be seen in general, in correspondence with the behavior of the minimum, mean, and maximum of each variable, these generally present great variability in their behavior.

Table 4. Characterization of the variables evaluated (Part 1)

Dimensions	*Variables*	*Minimum*	*Maximum*	*Mean*
Structure formalization	*Function´s manual existence*	1.79	0.95	4.56
	Job analysis and design	1.38	0.43	4.01
	Procedures existence	1.98	0.88	4.56
	Instructions existence	1.44	0.43	4.25
	Records existence	2.02	1.02	4.91
External control	*External audits*	3.86	2.74	5.45
	Control organizations	3.86	2.94	5.19
Environment dynamics	*Change frequency*	4.44	3.83	5.47
	Impact of changes	4.23	3.68	5.34

Table 4. Characterization of the variables evaluated (Part 2)

Dimensions	*Variables*	*Minimum*	*Maximum*	*Mean*
Environment stability	*Economic stability*	4.20	3.83	4.59
	Social stability	4.20	3.82	4.58
	Technological stability	4.20	3.82	4.58
	Competitive stability	4.20	3.82	4.58
	Customer stability	4.20	3.82	4.58
	Supplier stability	4.21	3.82	4.59
Managerial influence	*Need for power*	3.66	3.22	4.06
	Leadership	2.82	2.10	3.50
Centralization	*Autonomy*	6.63	5.66	6.80
	Need to inform	6.56	5.76	6.69
	Need for feedback	6.50	5.59	6.64
	Organizational participation	5.98	5.09	6.85
	Departamental participation	6.01	5.08	6.92

Source: Authors' elaboration using SPSS.IBM (version 25.0, 2017).

The factor analysis carried out initially was valid (see Table 5), a KMO coefficient greater than 0.902 was observed with a highly significant Bartlett's sphericity test. The formation of six factors was achieved that explain more than 82% of the explained variance.

Table 5. Analysis validity indicators

No.	*Feigenbaum*	*% of variance*	*% accumulated*
1	6.994	25.905	25.905
2	6.320	23.407	49.312
3	3.944	14.608	63.920
4	2.311	8.559	72.479
5	1.667	6.175	78.654
6	1.020	3.779	82.434
Kaiser-Meyer-Olkin measure of sampling adequacy			0.902
Bartlett's test of sphericity		Approx. Chi-squared	12,774.756
		Sig.	0.000

Source: Authors' elaboration using SPSS.IBM (version 25.0, 2017).

In Table 6, you can see how the six dimensions or factors are formed. In the first dimension, the variables related to the stability of the environment are grouped, explaining 25.90% of the variance. In the second, the variables linked to the level of formalization or standardization of the structure, provided a level of explanation of the variance of 23.4%. In the third factor, the items that make up the dependent variable *centralization* are incorporated, contributing 14.60% of the variance. The fourth factor groups the variables related to external control, contributing 8.55% of the explained variance. The fifth factor includes the variables that characterize the dynamics of environmental changes, explaining 6.17% of the variance, and, finally, the sixth factor considers the variables that characterize the managerial influence on the decision to centralize, providing 3.77% of the explanation of the total variance.

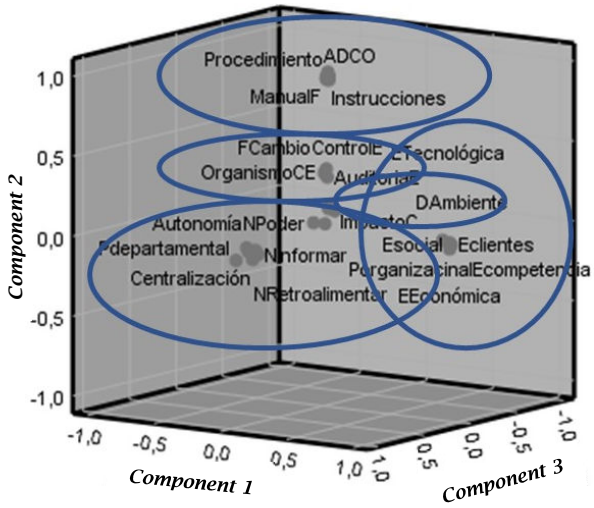
Table 6. Rotated component matrix

Variables	*Component*					
	1	*2*	*3*	*4*	*5*	*6*
Customer stability	**0.962**	0.001	0.020	-0.011	-0.035	-0.025
Technological stability	**0.961**	-0.029	0.016	-0.011	-0.014	-0.046
Competitive stability	**0.961**	0.009	0.014	-0.010	-0.017	-0.051
Economic stability	**0.958**	-0.018	0.007	0.024	-0.041	-0.053
Supplier stability	**0.957**	-0.012	0.003	-0.009	-0.026	-0.005
Social stability	**0.957**	-0.008	-0.012	0.018	0.008	-0.048
Structure formalization	-0.012	**0.969**	-0.064	0.186	0.079	0.018
Function's manual	-0.004	**0.957**	-0.055	0.165	0.066	0.014
Job analysis and design	-0.001	**0.940**	-0.064	0.154	0.064	0.029
Records existence	-0.016	**0.940**	-0.051	0.192	0.080	0.026
Procedures existence	0.013	**0.924**	-0.038	0.185	0.073	0.000
Instructions existence	-0.027	**0.920**	-0.069	0.190	0.077	0.015
Organizational participation	0.053	-0.015	**0.810**	0.059	-0.066	-0.049
Autonomy	0.003	-0.032	**0.808**	-0.028	-0.039	-0.008
Departmental participation	-0.032	-0.012	**0.783**	-0.079	-0.044	0.071
Need to inform	0.041	-0.048	**0.758**	0.002	-0.091	0.023
Need for feedback	-0.047	-0.100	**0.696**	0.022	-0.035	-0.101
External audits	0.020	0.321	-0.012	**0.903**	-0.007	0.018
Control organizations	0.006	0.349	0.003	**0.895**	0.040	-0.011
Change frequency	-0.036	0.105	-0.106	0.000	**0.903**	0.053
Impact of change	0.013	0.096	-0.104	0.011	**0.901**	0.006
Leadership	-0.019	0.021	-0.044	-0.042	0.007	**0.810**
Need for power	-0.081	0.026	-0.009	0.048	0.024	**0.594**

Note: Extraction method: principal component analysis. Rotation method: varimax with Kaiser normalization.
Source: Authors' elaboration using SPSS.IBM (version 25.0, 2017).

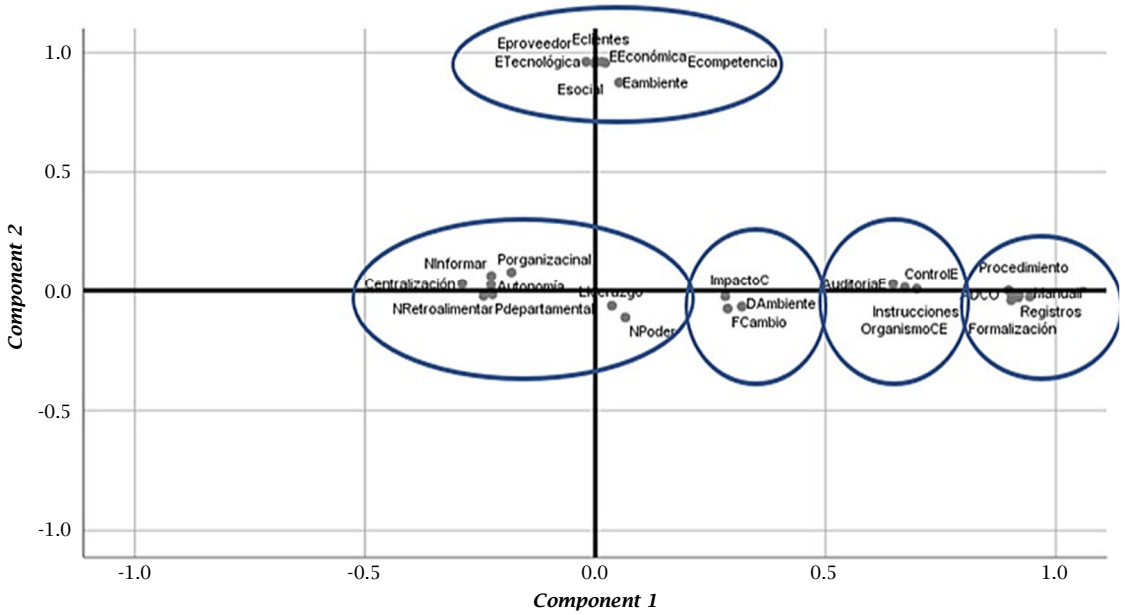
In Figure 3 you can see graphically the grouping of the variables and the formation of the dimensions. On the left side, the grouping of the variables in three dimensions is shown, and on the right side only in two dimensions. In both, it can be seen how the variables related to the formalization of the structure and the stability of the environment are grouped at the extremes of the dimensions, and in the third dimension or in the center of the graph of the two components the variables that characterize the degree of centralization, with an intermediate location, loading more on the formalization dimension, the dynamics of change, and the degree of external control are observed.

Figure 3a. Component in rotated spaces



Source: Authors' elaboration using SPSS.IBM (version 25.0, 2017).

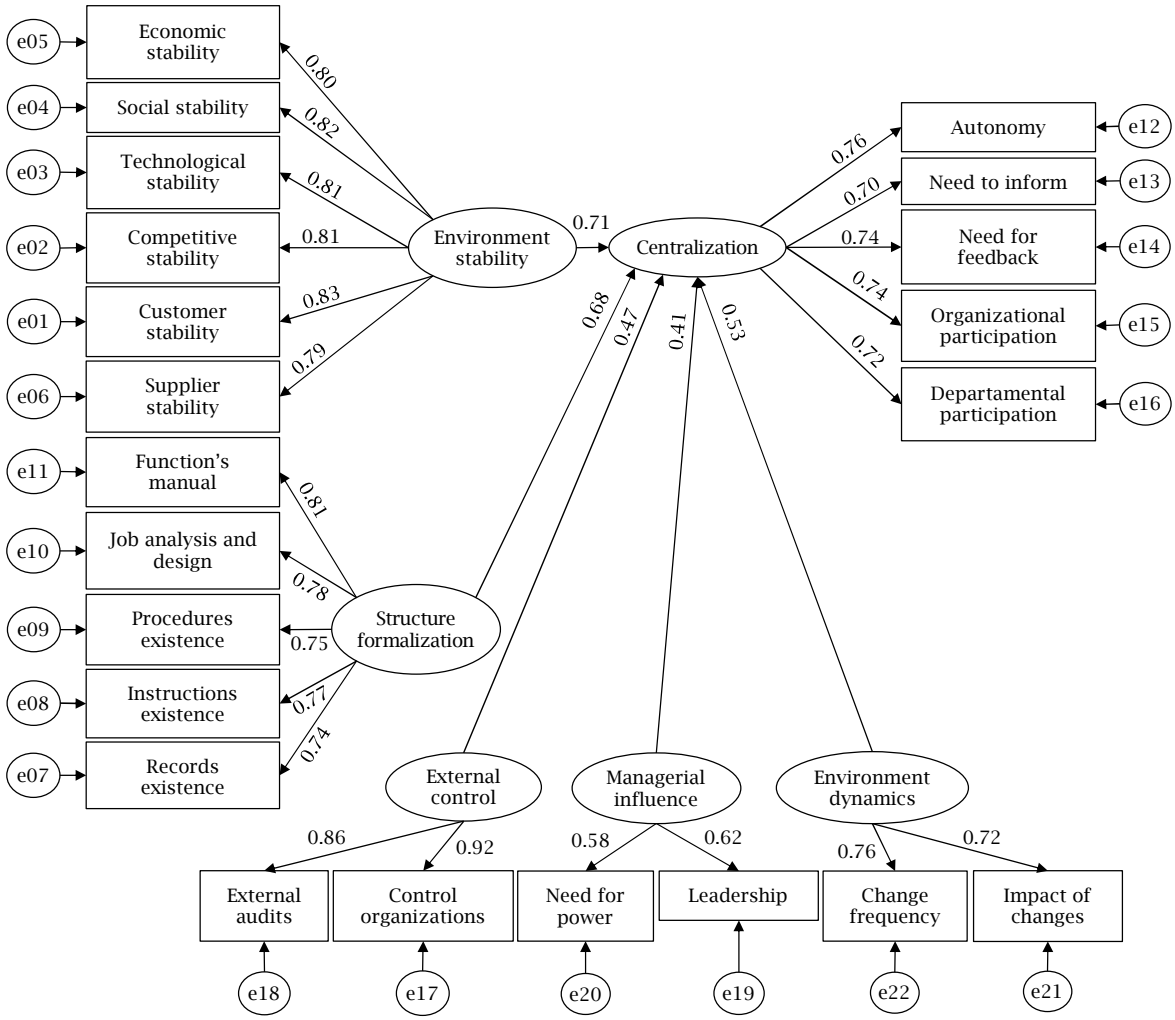
Figure 3b. Component in rotated spaces



Source: Authors' elaboration using SPSS.IBM (version 25.0, 2017).

Once the existence of the six dimensions was confirmed, the structural equation model presented was tested. After having characterized the state of the variables under analysis, compliance with the model presented in the methodology was evaluated, so as to verify compliance with the formulated research hypotheses. The results obtained are shown in Figure 4.

Figure 4. Structural equation model



Source: Authors' elaboration using IBM SPSS AMOS 23.

The observed values allow us to affirm that the proposed model represents the relationship between the measured and latent variables with respect to the *centralization* declared as a dependent variable. Based on these results, it can be stated that the variables that make up each of the dimensions or factors show high degrees of relationship with the latent variable to which they contribute. In general, the latent variables show variation in their level of incidence on the level of *centralization* of the organization.

The levels of correlation between the dimensions under analysis and the dependent variable range from 0.41 to 0.71. The lowest value is presented in the dimension of *managerial influence*, which is conditioned by the *need for power* expressed by managers and the management style that they express. The dimensions of *external control* (composed of *external audits* variables and the existence of external *control organizations*) and the *environment dynamics* (characterized by the *change frequency* and *impact of changes*).

The greatest degrees of influence are observed in the formalization dimensions, which are considered as an expression of the degree of development and standardization of work methods (characterized by the description of work methods and performance records) and in the dimension of the *environment stability*, which has the highest degree of incidence of 0.71. All observed incidence or relationship values are considered significant levels of correlation with the dependent variable according to the criteria of Hair et al. (2016).

Table 7. Adjustment indicators of the model

Indicators	*Values*	*Contrast value*
CMIN/DF	2.161	Good
Probabilistic level	0.307	Significant
CFI	0.901	Very good
GFI	0.812	Permissible
AGFI	0.802	Acceptable
RMSEA	0.067	Moderate
PCLOSE	0.051	Significant

Source: Authors' elaboration using SPSS.IBM (version 25.0, 2017).

Table 7 summarizes the fit indicators of the analyzed model, according to which it can be stated that the relationships between the variables constitute a good model since all the fit indicators comply with the established parameters, except the GFI (0.812) which only achieves a permissible value (> 0.80) and the RMSEA (0.067), whose behavior is classified as moderate (0.05–0.10).

5. DISCUSSION

The degrees of correlation reported between the observed and latent variables, as well as between these dimensions and the variable *centralization* as a dependent variable, allow us to state that the structural equation model makes it possible to corroborate the incidence of a direct relationship between the independent variables analyzed and the level of *centralization* as a dependent variable. Behavior that corresponds to the hypotheses of Mintzberg (2001), which are under analysis, since of the 16 hypotheses formulated by this author, only five are considered in this research. The highest correlation coefficient is observed between the variables *environment stability* and *centralization*, which corroborates that the greater the instability of the environment, the higher the level of centralization, criteria that coincide with the results reported in previous research such as those of Caruana et al. (2015) or Moreno et al. (2016).

Likewise, to the extent that the levels of formalization of organizations are favored, through the standardization of functions, operations, or processes, it is possible to establish a higher level of decentralization in the organization, which validates the hypothesis that: to the extent that the actions of the organization are formalized, it facilitates the implementation of decentralized processes for making decisions; these observed results are closely related to those reported by researchers who have evaluated the existence of this relationship in other contexts and for almost three decades, among which we can point out Quester and Conduit (1996), Dunford et al. (2013), Güttel et al. (2015), Cabri and Fioretti (2022), and Dominguez Gonzalez (2023).

Similarly, although to a lesser extent, the existence of significant levels of correlation between variables inherent to the individuality of managers and their tendency to facilitate decentralization in decision-making was also found. These results coincide with those reported by Eva et al. (2021), Bani-Melhem et al. (2022), and Mumtaz et al. (2023). In addition, the existence of a direct incidence between the manifestation of external control mechanisms and the degree of decentralization of decisions was validated, that is, the higher the level of external control to which the organization is subjected, the lower the degree of decentralization of decisions that managers allow in this behavior, which corresponds to the observations reported by Gorelov and Ereshko (2017), Dong et al. (2022), and Lehtovaara et al. (2022).

Finally, a statistically significant correlation was also found between the perceived dynamics of the environment and the levels of decentralization allowed by managers in the organizations under study; results that had already been previously observed by researchers such as Mavondo (2015) and Stonig et al. (2022). Additionally, it should be noted that, unlike previous researchers, the construction of the structural equation model allows for a comprehensive evaluation, and not separately as previous research does, of the relationship between the independent variables analyzed and decentralization in decision-making as a dependent variable; which gives a more holistic, systemic and complex character to this new proposal and increases the coherence of the analysis with the characteristics of the administrative processes themselves.

6. CONCLUSION

As a general conclusion, it can be stated that the main finding of this research is to corroborate, through the construction of the structural equation model, the fulfillment of several of the hypotheses established by Mintzberg (2001), among which the hypotheses stand out: *H1, H2, H3, H4,* and *H5*.

Based on this, it can be generally stated that the level of centralization in an organization is the result of the conditioning of multiple variables related to the individual characteristics of the managers, the level of maturity or development of the organizational forms that are present in the organization and the characteristics of the environment where the organization operates.

Knowing these particularities can become a work tool that managers use to lead organizations in accordance with their personal preferences the characteristics of the organization and the environment in which it carries out its operations. Based on the knowledge gained, managers can adapt their management style to the conditions existing in the organization. They can also identify the degree of formalization existing in the organization and accelerate the process of standardization of processes or, if not, adopt more centralized management methods. On the other hand, the more dynamic the environment, the more likely it will be to centralize decision-making.

The observed results lead to several managerial implications, alerting administrators that although the level of centralization may respond to their personal decision based on the power needs that characterize it and the leadership style by which they, consciously or subconsciously, choose, there are also other variables that can promote or hinder centralization and that they must consider when establishing centralization or decentralization mechanisms. It will be difficult for managers to act on variables external to the organization such as the stability and dynamics of the environment, but they will be able to create mechanisms that mitigate the adverse effects that these variables generate on the organization.

On the other hand, it will depend on the decision of the managers to favor the formalization and standardization mechanisms of the organization if they wish to increase the levels of centralization in the organization. Failure to consider the relationship between the variables described when evaluating or implementing decentralization actions can generate contrary impacts on the achievement of organizational objectives and delay the design and implementation of actions to formalize processes, which are an expression of the degree of maturity of the organization.

As limitations, it can be noted that the research was developed in the context of companies in Ecuador, and in this sense, there is no evidence that

allows the results to be generalized beyond the country's borders, although the results corroborate those achieved by research in other countries contexts. On the other hand, the incidence of other variables that are considered in Mintzberg's hypotheses, such as the information system, the size of the organization, and the age of the organization, were not considered. Likewise, due to the researchers' decisions, the variable availability of financial resources was not considered either, due to difficulties in accessing this information and normalizing its values on a single scale that will ensure the feasibility and validity of the research in a context of such organizations diverse as are the investigations under study.

Based on the above, it can be defined as a perspective for future research to evaluate the degree of relationship or incidence of variables, such as the information or control system, the size of the organization, both at the vertical or horizontal level, the time of the organization's foundation, or the state of financial variables, such as the degree of liquidity and solvency, in the degree of decentralization to be applied in organizations. Likewise, it will be possible to evaluate the fulfillment of the relationships observed in contexts other than that of Ecuadorian organizations. On the other hand, in the same way, other techniques could be applied, such as multiple regression models to verify whether the results obtained are consistent.

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APPENDIX. SURVEY TO EVALUATE THE DEGREE OF CENTRALIZATION IN YOUR ORGANIZATION

This survey aims to evaluate the level of centralization in your organization. Please indicate your agreement with the following statements using a scale of 1 to 10, where 1 means "strongly disagree" and 10 means "strongly agree".

Statements	***1-2-3-4-5-6-7-8-9-10***
In my organization, there are clear and detailed role manuals.	
In my organization, there are clear and detailed job descriptions.	
In my organization, there are clearly defined work procedures.	
In my organization, there are detailed, easy-to-follow work instructions.	
In my organization, there are detailed records of all activities carried out.	
I have the necessary authority to make decisions related to my work.	
It is necessary to regularly report on the progress and results of my work.	
It is necessary to receive feedback on my performance.	
I have the opportunity to participate in important decisions of the organization.	
I have the opportunity to participate in important decisions in my department.	
Changes in the organization's environment occur frequently.	
Changes in the organization's environment have a significant impact on my work.	
My organization's environment is stable.	
The financial situation of my organization is stable.	
The social situation within my organization is stable.	
The technology used in my organization is stable and reliable.	
The relationship with our suppliers is stable.	
The relationship with our clients is stable.	
My organization's competitive position in the market is stable.	
In my organization, external audits are carried out regularly.	
In my organization, there are external control bodies that supervise our activities.	
The leaders in my organization are effective and capable.	
In my organization, there is a significant need for power and control.	