

Government Financial Condition and Contingency Factors: Pseudo-Open Model for Performance in the Organizational Management of Local Governments

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Abstract

Objective: This study aims to analyze the relationship among contingency factors and the financial condition of local governments.

Method: A pseudo-open model proposal of governmental financial condition was developed, encompassing financial and socio-environmental aspects with regard to contingency factors. Financial condition was assessed using the model of Wang et al. (2007), with the adaptation by Arnett (2014). The variables of the contingency factors were divided into two dimensions, following the criteria of Woods (2009), namely: (i) External factors, represented by the Environment; and (ii) Internal factors, including Technology, Structure, Size, and Strategy. The research covered the 223 municipalities of the state of Paraíba from 2017 to 2020, except for the municipality of São Vicente do Seridó, which could not be included in the 2017 analysis due to lack of available data. Thus, the final sample consisted of 891 observations.

Results: The results indicate that municipalities with larger population size show better financial condition, while higher personnel expenditures are negatively associated with performance. In addition, the use of information technology, measured by IGOVTI, revealed a negative and significant effect, suggesting possible challenges in integrating technology into management.

Contributions: The findings provide support for the financial management of local governments, highlighting the importance of efficient personnel administration and a critical assessment of technological investments in order to promote the sustainability of financial condition.

Keywords: Contingency factors. Governmental financial condition. Local governments.

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Introduction

In a scenario of constant change and uncertainty, organizations across all sectors, including the public sector, face the challenge of carrying out their activities with efficiency and effectiveness, seeking to achieve goals that are often complex and ambiguous, requiring entities to have the capacity for continuous adaptation and innovation, as well as a strategic and systemic view of their processes and results (Hansen & Ferlie, 2016; Szymaniec-Mlicka, 2014).

In the public sphere, municipalities are responsible for managing and delivering essential public services as they exercise their allocative function, alongside other fiscal policy functions, such as distributive and stabilizing roles, carried out by the State at the federal level (Musgrave, 1974). These services range from garbage collection and cleaning of public roads to ensuring education, health, and social assistance for the elderly and the most vulnerable groups in society.

Faced with new and urgent social problems, these organizations are often responsible for creating and implementing innovative solutions that meet the demands of citizens (Walker & Andrews, 2015). Moreover, municipalities represent the most visible face of the State for most people, as the “street-level bureaucrats” who execute local public services interact directly with clients and users of these services, shaping their perception of what it means to be a citizen (Vinzant & Crothers, 1996).

Therefore, the management and performance of local governments are topics of great relevance and interest for researchers, policymakers, and citizens themselves (Sharpe, 1970). In this context, the process of assessing the performance of public sector organizations is part of a set of administrative reforms aimed at implementing a new public management model based on managerial principles and performance measures capable of ensuring greater efficiency in the allocation and use of public resources (Gonzaga et al., 2016).

In this scenario, one of the most relevant aspects of public management is the analysis of governmental financial condition, which consists of the ability of local governments to finance their services on a continuous basis (Nollenberger et al., 2003). This condition concerns the capacity of governments to preserve the standard of public services, avoid crises in the local and regional economy, and respond to the needs arising from natural growth, decline, or transformation.

Thus, governmental financial condition is the ability of a government to continue honoring its financial obligations and providing present and future public goods and servi-

ces to the population, taking care of revenue collection, expenditures, and indebtedness (Lima & Diniz, 2016; Wang et al., 2007). Therefore, the analysis of a healthy governmental financial condition should be one of the priority objectives, if not the most important one, to be pursued by public officials, since the capacity to fulfill essential functions and meet societal needs depends on it, promoting the well-being of the population.

However, financial condition is a complex phenomenon that depends on several factors related to the political context and fiscal policy. For this reason, academic research in this field seeks to adopt the principles of open systems theory, which states that governments are not isolated entities but interact with their external environment, being influenced by it while also exerting influence on it. This interaction affects the internal environment of governmental organizations as well as their capacity to manage public finances efficiently and sustainably (Lima & Diniz, 2016).

Thus, the financial condition of local governments can be affected simultaneously by external and internal organizational factors (Woods, 2009). Among these factors are public revenues and expenditures, management and tax collection practices, local and regional policy choices, existing legislation, demography, socioeconomic conditions, and natural disasters (Krishnakumar et al., 2010).

It is inferred that diagnosing the financial health of a public entity requires understanding its financial condition and the effects of contingency factors that influence management. Contingency theory is associated with organizational contingency factors and seeks to optimize the structure of the entity and adapt the factors to the context in which it is inserted (Otley, 1980; Luo, 2002). Contingency formulations incorporate internal factors such as technology, structure, size, and strategy, as well as external environmental factors (Wadongo & Abdel-Kader, 2014).

In this regard, academic literature has presented several studies that explore the relationship among contingency factors and the performance of public organizations. Some of these studies address topics such as the implementation of management control systems and their relationship with organizational effectiveness (Felício et al., 2021), the application of strategies and their influence on the efficiency of public services (George et al., 2019), the influence of size, planning, staff quality, staff stability, bureaucracy, and networking on the performance of public organizations (Walker & Andrews, 2013), the impacts of public management reforms on the financial results of public entities (Goeminne & George, 2019), and the internal and external factors that affect the per-

formance of public organizations (Sell et al., 2020; Fiirst & Beuren, 2021).

However, despite the relevance of these studies, there is still a gap in the literature regarding the development of empirical work that tests contingency theory associated with governmental financial condition. Therefore, the following research question emerges and guides this study: What is the relationship among contingency factors and the financial condition of local governments? Based on this, the general objective of this research is to analyze the relationship among contingency factors and the financial condition of local governments.

From this perspective, the research is justified primarily by expanding knowledge about the factors which affect the management of public organizations, considering the similarities and differences between these factors and those applied in the private sector, as stated by contingency theory (Woods, 2009; Fiirst & Beuren, 2021). It also proposes to complement the studies of Sell et al. (2020) and Fiirst & Beuren (2021), which analyzed the relationship among contingency factors and municipal performance, using Net Current Revenue per capita and the Firjan Human Development Index as indicators, respectively.

Both indicators adopted in these studies, although relevant to their purposes, capture specific dimensions of fiscal or socioeconomic performance. Net Current Revenue per capita indicates available revenue but does not address solvency across different time horizons, while the Firjan Index focuses on education, health, employment, and income, disregarding variables related to liquidity, indebtedness, and fiscal sustainability. In contrast, the Financial Condition Index (FCI) used in this study combines a set of dimensions such as cash solvency, budgetary solvency, long-term solvency, and service-level solvency, providing a more comprehensive view of the local government's ability to sustain its obligations and maintain the quality of public management.

By bringing these different aspects together into a single index, the FCI enhances analytical capacity to assess the financial health of local governments. This is particularly relevant when seeking to understand how contingency factors influence such performance. Thus, this study advances by empirically testing how these contingencies are associated with municipal financial condition, something that has not yet been explored in the literature. With this, it is expected to contribute to more efficient and effective management in the allocation of public resources and to the sustainable development of municipalities, ultimately promoting social well-being.

2 Literature Review and Hypotheses Development

Government financial condition is a complex phenomenon influenced by several factors related to the political and fiscal environment in which governments operate (Lima & Diniz, 2016). For its understanding, the Theory of Financial Condition (TFC) is adopted, which proposes a systemic and multidimensional approach to the financial situation of federative entities.

According to this theory, the financial condition of a government should be analyzed by considering its characteristics, components, related fiscal problems, analytical techniques, and determining factors, while establishing as reference dimensions the performance in terms of efficiency, equity, financial condition, and accountability (Lima & Diniz, 2016).

Among the several possible determinants of the financial condition of local governments, financial factors play a central role, as they are directly related to the public entity's solvency and its ability to maintain essential services (Nollenberger et al., 2003). These factors encompass dimensions such as short-term solvency, budgetary solvency, long-term solvency, and the capacity to maintain the level of public services (Wang et al., 2007).

These dimensions reflect the capacity of the local government to meet its obligations both in the short and long term, involving aspects such as fiscal balance, public debt sustainability, efficient allocation of public resources, tax collection, and control of public expenditures, among others (Lima & Diniz, 2016).

However, financial condition can be influenced by several factors, or contingencies, that reflect the particularities of each organization. This suggests that each local government must adapt to the specific context in which it is embedded (Imperial, 2005), as proposed by Contingency Theory. Thus, the alignment of organizational characteristics with contingencies is directly associated with higher levels of organizational effectiveness and performance (Clement et al., 2022).

Thus, the contingency approach is based on the idea that there is no single system suitable for all organizations in all contexts (Otley, 1980; Luo, 2002). Based on this logic, certain organizational configurations emerge that, when facing similar contexts, tend to generate similar results among different public organizations (Andrews et al., 2016).

Contingency Theory also seeks to explain how certain moderating factors influence organizational outcomes based on these structural configurations (Luo, 2002). The theory proposes that different internal and external factors affect the structure and performance of organizations (Donaldson, 2001).

Among the external factors, the environment stands out, while structure, strategy, technology, and size are considered relevant internal factors within the reality of local governments (Fiirst & Beuren, 2021; Woods, 2009). The following table presents some dimensions that comprise the main contingency factors considered in this study.

Table 1. Internal and External Contingency Factors

Internal Factors			External Factors	
Technology	Structure	Size	Strategy	Environment
- Information Technology Governance Index	- Personnel Expenditure - Investment Expenditure	- Population	- Mayor's Education Level - Mayor's Age	- Gross Domestic Product (GDP)

Source: Lima and Diniz, (2016); Fiirst and Beuren (2021).

The internal contingency factors are those related to the inherent characteristics of the government, such as the technology it uses, the organizational structure it uses, the size it possesses, and the strategy it follows, providing support for assessing governmental performance regarding efficiency in resource allocation, equity in the distribution of benefits, and accountability (Wadongo & Abdel-Kader, 2014).

The external contingency factors, in turn, are related to the environment in which the government operates, such as the social, economic, and demographic factors that affect the demands and expectations of society (Fiirst & Beuren, 2021). These factors are relevant for determining whether the government has sufficient resources to meet the population's needs and whether it faces financial problems arising from exogenous variables, such as economic crises or natural disasters (Nollenberger et al., 2003; Lima & Diniz, 2016).

Figure 1 presents the conceptual framework of the research, relating the theoretical dimensions of Contingency Theory to governmental financial condition, measured through the Financial Condition Index.

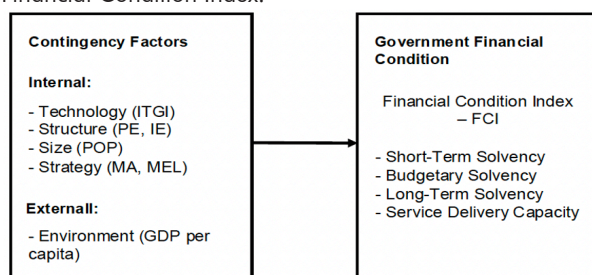


Figure 1. Conceptual framework of the research
Source: Prepared by the authors

The proposed conceptual framework establishes a relationship between the contingency factors, grouped into internal and external dimensions according to Contingency Theory, and the financial condition of municipalities. This structure allows understanding how different institutional and organizational contexts affect the fiscal health of local entities.

Environmental contingency factors can be interpreted as evidence that management systems are directly influenced by the external context (Chenhall, 2003). Organizational progress tends to be related to the environment in which the entity operates, reflecting the level of economic and social development of the local context (Prajogo, 2016).

In this study, following Fiirst and Beuren (2021), municipal GDP was chosen as the environmental variable, as it is a widely available indicator, comparable among municipalities, and capable of reflecting the level of local economic development. Thus, GDP is adopted as a proxy for the economic and fiscal potential of municipalities, as it directly reflects their capacity to generate revenues and the financial sustainability of local governments.

Based on this, it is inferred that more developed socio-economic contexts tend to favor the financial condition of municipal governments by expanding the tax base and reducing dependence on intergovernmental transfers. Therefore, the following hypothesis is proposed:

H1: Environmental contingency factors are related to the financial condition of local governments.

In addition to the environment, the structure of the entity is also a contingency factor that determines its form of organization (Donaldson, 2001). Understood as an internal factor under the entity's own control (Gorla & Lavarda, 2012), structure influences the efficiency of activities, the motivation of individuals, the flow of information, and managerial controls, guiding decisions and defining the direction of the organization (Chenhall, 2003).

To measure the structure of local governments, Sell et al. (2020) used the personnel expenditure index, indicating how much of the municipal net current revenue is spent on personnel. Complementarily, Fiirst and Beuren (2021) used the investment expenditure index, showing the level of municipal investments relative to net current revenue.

Thus, measuring structure from the perspectives of current expenditures, such as personnel expenses, and capital expenditures, represented by investments, reflects in a comprehensive way the structure of municipalities (Macedo & Corbari, 2009).

The empirical results, however, are not convergent. Sell et al. (2020) identified a positive relationship between personnel expenditures and municipal performance, indicating that municipalities with larger structures showed better results, while Fiirst and Beuren (2021) did not find statistical significance for structure in explaining performance.

This empirical divergence may be related to the different ways the concept of structure was operationalized, to the context of the municipalities analyzed, or to interactions with other variables not controlled for in the models. Despite the differing results, there is consensus that structure affects the way resources are allocated and used, thus influencing the financial condition of local governments. Based on this premise, the following hypothesis is proposed:

H2: Structural contingency factors are related to the financial condition of local governments.

Another relevant internal factor is technology, considered a determining element of organizational structure and performance (Donaldson, 2001). The underlying logic of the relationship between technological resources and organizational structure is that the appropriate combination increases the capacity to perform transformation processes compatible with their nature (Victor, 2020). Perrow (1967) also emphasized the central role of technology in the transformation process, stating that the type of technology used by the organization determines the most efficient structure for successful performance.

A broad definition of technology includes software and hardware, but should not be limited to the computer itself; it also encompasses the knowledge that supports computational activity. This conception of technology allows greater flexibility in recognizing the several ways in which technology is relevant. Thus, the technological factor occurs within information technologies but also within the minds of individuals, or even as a combination of cognitive and behavioral activities performed by a team (Power & Waddell, 2004).

These alternative computation mechanisms, based on cognitive skills provided by individual members of the organization, deal with more complex sociotechnical arrangements that combine human and machine competencies into a broader technological apparatus. This dimension of operations, based on cognitive functions performed by teams, can profoundly influence the choice of the best organizational design (Victor, 2020).

In this regard, municipalities that invest in technology are expected to have better financial conditions than those that do not. However, some empirical studies suggest that the

relationship between technology and municipal performance is not so simple and direct.

For example, Fiirst and Beuren (2021) found a negative influence of technology on socioeconomic results. One possible explanation for this negative influence is that local governments may invest in technologies that are not compatible with their needs, capacities, and objectives, generating waste, inefficiencies, and misalignments. Moreover, the use of technologies may require organizational, cultural, and behavioral changes that are not always well accepted or implemented by public managers and employees.

Thus, technology may become a factor of resistance, conflict, and dissatisfaction, compromising the financial condition of local governments. Therefore, the following hypothesis is proposed:

H3: Technological contingency factors are related to the financial condition of local governments.

The literature (Avellaneda & Gomes, 2017; Fiirst & Beuren, 2021; Sell et al., 2020) has also examined the importance of size as a determining contingency factor in the analysis of the financial situation of local governments. Size refers to the physical dimensions of the entity, recognized as an internal characteristic of the organization that influences its results (Cavichioli, 2017). In this perspective, larger cities tend to use more management tools and positively impact public performance (George et al., 2019).

However, size can be represented by different metrics depending on the context and the dimensions investigated (Chenhall, 2003). A frequently used measure to assess municipal size is municipal revenue, which may reflect size disparities in the public sector (Fiirst & Beuren, 2021; Sell et al., 2020). Another measure is population size, which may impact performance. According to Kloha et al. (2005), population is believed to positively influence the financial condition of local governments.

In the international context, Wang et al. (2007) investigated the determinants of the financial condition of 87 U.S. cities between 1997 and 2002 and found that city size, measured by population, has a positive effect on financial condition. In the Brazilian scenario, Sell et al. (2020) analyzed the influence of contingency factors on the socioeconomic performance of 293 municipalities in Paraná between 2013 and 2017 and found a positive and significant association between organizational size, measured by population density, and municipal performance, measured by RCLPC. Therefore, based on the arguments presented above, the following research hypothesis is proposed:

H4: Size-related contingency factors are related to the financial condition of local governments.

Unlike the other contingency factors, strategy does not constitute an element of the context, but rather an instrument through which managers can influence external factors and direct organizational dynamics, demonstrating they are not merely constrained by the context in which they operate but can act deliberately to shape their results (Chenhall, 2003).

In this perspective, the managers' behavior and characteristics play a central role in the configuration and use of control systems. Young et al. (2001) found the level of innovative managerial practices is positively associated with the education level of top management. Complementarily, Santos et al. (2018) concluded that both the manager's education and age of influence the modern controls, and family firms exhibit distinct patterns in these mechanisms.

These findings reinforce the managers' profile directly influences how policies are conducted, how priorities are defined, and how resources are allocated. Thus, such choices significantly affect the performance and financial condition of public organizations. Based on this understanding, the following hypothesis is formulated:

H5: Strategic contingency factors are related to the financial condition of local governments.

3 Aspectos Metodológicos

3.1 Population, Sample, Study Period, and Data Collection

The target population of the study comprised the 223 municipalities of the state of Paraíba, considering the period from 2017 to 2020. The year 2020 was used because it was the last calendar year with complete information regarding the Information Technology Governance Index. However, one of the municipalities, São Vicente do Seridó, could not be included in the analysis for the year 2017, as no data were available.

Thus, the final sample consisted of 891 observations. According to Fiirst and Beuren (2021), contingency factors that influence public management are considered similar across all municipalities in Brazil, which provides

validity to the sample for conducting the empirical study.

The accounting and financial information necessary to assess the financial condition measures of local governments was obtained through electronic consultation of the websites of the National Treasury Secretariat (STN), where the Finanças do Brasil (FINBRA) data are available, and the Brazilian Public Sector Accounting and Fiscal Information System (SICONFI). In addition, the contingency factors were collected from the electronic portals of SICONFI, the Brazilian Institute of Geography and Statistics (IBGE), and the Superior Electoral Court.

3.2 Econometric Model and Data Analysis Technique

In the present study, the aim was to evaluate the relationship among contingency factors and the financial condition of local governments. To achieve this, an empirical model was used, which allows for analyzing the relationships between the explanatory variables. Thus, a multiple linear regression with panel data was employed.

Before estimating the regression coefficients, the hypotheses of homogeneity, endogeneity, and heteroscedasticity of the data were tested using the Chow, Hausman, and Breusch-Pagan tests, respectively. Based on the results of these tests, the most appropriate regression model for the variables was selected, choosing among pooled, random effects, or fixed effects models. In general, the model proposed in this study was presented in the following equation, which enables understanding of the results obtained in the research.

$$FCI_{it} = \alpha + \beta_1 GDP_{it} + \beta_2 ITGI_{it} + \beta_3 PE_{it} + \beta_4 PIE_{it} + \beta_5 POP_{it} + \beta_6 MA_{it} + \beta_7 MEL_{it} + \epsilon_{it} \quad (1)$$

Table 2 presents a summary of the variables used in the study, including the dependent variable and the used contingency factors as explanatory variables. These factors were organized based on their nature and comprise elements of the external environment, administrative structure, technology employed, organizational size, and the strategic profile of public managers, which may influence the financial condition of local governments.

Table 2. Summary of Variables

Variable	Variable Name	Measurement	Source	Theoretical Basis
Dependent Variable				
FCI	Financial Condition Index	Closed model of Wang et al. (2007) adapted by Arnett (2014)	SINCONFI	Arnett (2014); Wang et al. (2007)
External Independent Variables (Environmental)				
GDP	Gross Domestic Product	Representa a soma de todos os bens e serviços finais produzidos em determinados municípios/per capita	IBGE	Fiirst e Beuren (2021)
Internal Independent Variables (Technology)				
ITGI	Information Technology Governance Index	Measures IT governance maturity and the use of IT resources for societal benefit	IEGM	Authors
Internal Independent Variables (Structure)				
PE	Personnel Expenditure	Personnel expenditure indicator	SINCONFI	Sell et al. (2020)
IE	Investment Expenditure	Investment expenditure indicator	SINCONFI	Fiirst and Beuren (2021)
Internal Independent Variables (Size)				
POP	Population	Measured by the natural logarithm of total population	SINCONFI	Sell et al. (2020)
Internal Independent Variables (Strategy)				
MA	Mayor's Age	Capacity of the mayor related to age	TSE	Avellaneda e Gomes (2015); Sell et al. (2020)
MEL	Mayor's Education Level	Capacity of the mayor related to education level	TSE	Sell et al. (2020)

Source: Made by the authors

Wang et al. (2007) model was chosen as the objective metric for financial condition because, according to Araújo et al. (2023), it is a method that remains underexplored in Brazilian research and is capable of capturing short-, medium-, and long-term dimensions of financial management, revealing possible differences in managerial behavior across time horizons. The index is composed by 11 indicators distributed across 4 dimensions, as shown in Table 3.

Table 3. Financial condition metric according to Wang et al. (2007)

Dimension	Indicator	Definition
Cash Solvency	Cash position	(Cash + cash equivalents + short-term investments) / short-term obligations
	Immediate liquidity	(Cash + cash equivalents + short-term investments + receivables) / short-term obligations
	Current liquidity	Current assets / short-term obligations
Budgetary Solvency	Operating position	Total revenue / total expenditure
	Per capita surplus/deficit	Total surplus (deficit) / population
	Net asset index	Restricted and unrestricted net assets / total assets
Long-Term Solvency	Long-term obligations indicator	Long-term obligations / total assets
	Long-term obligations per capita	Long-term obligations / population
	Taxes per capita	Total tax revenue + current transfers / population
Service-Level Solvency	Revenue per capita	Revenue per capita
	Expenditure per capita	Total expenditures / population

Source: Wang et al. (2007) and Araújo et al. (2023)

After measuring Wang et al. (2007), the modification proposed by Arnett (2014) and applied in the Brazilian context by Araújo et al. (2023) was used. The model of Arnett (2014), adapted from the financial condition metric of Wang et al. (2007), seeks to provide a comprehensive structure for analyzing financial condition.

The model proposed by Arnett (2014) combines key elements of the original model by Wang et al. (2007), incorporating relevant adjustments and extensions to understand financial dynamics. The author measures financial condition based on weights rather than a simple average, arguing that the use of weights reduces the effects of different indicator time horizons and the imprecision of the service solvency proxy. The following weights were assigned: 0.35 for cash solvency, 0.35 for budgetary solvency, 0.2 for long-term solvency, and 0.1 for service-level solvency. Through these dimensions, the overall Financial Condition Index is obtained.

From the financial condition index duly measured, the model sought to identify the factors that influence its variation across municipalities. To achieve this, independent variables representing different contingency dimensions were incorporated, as outlined by Contingency Theory.

GDP was used as a proxy for the external environment, representing the sum of all goods and services produced in the municipalities (IBGE, 2025). As argued by Fiirst and Beuren (2021), municipalities with higher GDP per capita tend to have more developed local economies, with greater productive activity, income-generation capacity, and tax collection.

Among the internal factors, ITGI variable was used to represent the technological dimension of municipal administration. ITGI aims to measure how IT resources are used to promote improvements in management and public service delivery, being provided through the Municipal Management Effectiveness Index of the State Court of Accounts (TCE-PB, 2025).

The organizational structure dimension was represented by two variables: personnel expenditure (PE) and investment expenditure (IE), both measured as a proportion of Net Current Revenue. Personnel expenditure reflects the budgetary commitment to maintaining public administration and is calculated based on the ratio between the sum of personnel and

social charges and Net Current Revenue. Investment expenditure reflects the effort of the public manager to allocate resources to infrastructure, public works, and durable goods acquisition, obtained by dividing investment expenditures by Net Current Revenue (Fiirst & Beuren, 2021).

Organizational size was measured using the natural logarithm of population (POP), capturing the effect of scale on financial condition. Municipalities with larger populations tend to present greater administrative complexity and more diverse demands, potentially facing distinct challenges in terms of fiscal balance (Avellaneda & Gomes, 2015; Sell et al., 2020).

Finally, the model includes variables related to the profile of municipal managers, inserted as proxies for leadership and strategy. The mayor's age (MA) was considered an indicator of managerial experience and articulation capacity, as argued by Sell et al. (2020), while education level (MEL), according to Avellaneda and Gomes (2015), may be related to the technical skills and level of managerial professionalization.

MEL variable was operationalized following the ordinal scale proposed by the authors, ranging from 1 to 8 according to the declared educational level: (1) Barely able to read their own name; (2) Incomplete Elementary School; (3) Primary Education; (4) Incomplete Secondary Education; (5) Complete Secondary Education; (6) Incomplete Undergraduate Education; (7) Complete Undergraduate Education; and (8) Graduate Education.

4 Analysis of Results

4.1 Descriptive Statistics

The results in Table 4 allow observing the variation, mean, standard deviation, and minimum and maximum values of each variable, as well as the number of available observations for each of them.

To analyze the dependent variable FCI, the criterion proposed by Araújo et al. (2023) was adopted, according to which higher indices indicate greater fiscal balance, solvency capacity, and robustness in the management of public finances. In contrast, negative values or values significantly below the mean reveal signs of fiscal fragility, associated with difficulties in budgetary control, expenditure containment, and maintaining investment capacity.

Table 4. Descriptive statistics of the variables

Model variables					
Variables	Número de observações	Mean	Standard deviation	Minimum	Maximum
FCI	891	0.5947638	0.2798494	-0.7263038	1.451288
GDP	891	10809.82	6633.695	6382.42	111427.1
ITGI	891	43.08754	13.63221	0	87
PE	891	0.6229948	0.0980194	0.3038427	1.52785
IE	891	0.0651825	0.0703236	0.0022753	0.877752
POP	891	9.067371	0.9273547	7.47817	13.60357
MEL	891	6.720539	1.543.895	2	8
MA	891	48.8642	115.4379	22	83

Source: Made by the authors

FCI presented an average of approximately 0.59, with a standard deviation of 0.28, a minimum value of -0.72 and a maximum of 1.45, indicating that the municipalities analyzed have a relatively favorable financial condition, but with considerable dispersion in the sample.

Regarding the independent variables, it is noteworthy that the Information Technology Governance Index,

Table 5. Correlation matrix

	FCI	GDP	ITGI	PE	IE	POP	MEL	MA
FCI	1.0000							
GDP	-0.0017	1.0000						
ITGI	-0.0141	0.2161*	1.0000					
PE	-0.0330	0.0205	0.0462	1.0000				
IE	-0.0103	-0.0524	0.0274	-0.0974	1.0000			
POP	0.1240*	0.3006*	0.3062*	0.3106*	-0.2056*	1.0000		
MEL	0.0065	0.1364*	0.0502	0.0198	-0.0993*	0.1733*	1.0000	
MA	0.0165	0.0814*	0.0861*	0.0854*	0.0339	0.0432	-0.0762	1.0000

Note: *, **, *** represent statistical significance at 1%, 5%, and 10%, respectively.

Source: Made by the authors

It is observed that none of the correlation coefficients between the variables exceeded 50 percent, which suggests that there is no multicollinearity problem in the model. Multicollinearity occurs when there is high correlation between explanatory variables, which may compromise parameter estimation and the interpretation of results.

Among the explanatory variables, the only one which showed a positive and significant relationship with the dependent variable was the internal variable size (population), which measures the municipality in terms of inhabitants. This means the larger the municipality, the higher its performance in the dependent variable.

4.2 Regression Analysis

As previously mentioned, this study employed the technique

which evaluates the degree of technological adequacy of municipalities, had an average of only 43 percent, revealing a low level of information technology use in public management. Another relevant aspect was the indicator of personnel expenditure (PE), which had an average of 62 percent, demonstrating that the municipalities analyzed are spending above the limit established by the Fiscal Responsibility Law, which is 60 percent of Net Current Revenue.

In addition to it, the variable mayor's education level (MEL) showed there are mayors with different educational backgrounds, ranging from those who have only incomplete elementary education to those with graduate degrees. Similarly, the variable mayor's age (MA) showed substantial variation, with an average age of 48 years, a minimum of 22 years, and a maximum of 83 years.

The following table shows the results obtained, indicating the direction (positive or negative) and intensity (weak, moderate, or strong) of the correlations between the variables studied, based on the calculated correlation matrix.

of multiple linear regression with panel data to verify how contingency factors affect the financial condition of local governments. To determine which kind of panel model would be most appropriate for analyzing the collected data, the Chow, Hausman, and Breusch-Pagan tests were performed.

The results indicated that: i) Chow Test presented a Prob>F value of 0.0992, meaning that there is no significant difference between the coefficients estimated by the pooled model and the fixed-effects model; ii) Hausman Test showed a Prob>Chi2 value of 0.0433, which implies the random-effects model is inconsistent and, therefore, the fixed-effects model should be preferred; and iii) Breusch-Pagan Test revealed a Prob>Chi2 value of 0.2228, which suggests there is no heteroscedasticity among the groups and, thus, the pooled model is more appropriate than the random-effects or fixed-effects models.

Table 6. Panel Data Regression

Variables	Model variables			
	Coefficient	Standard Error	t	P-value
GDP	-1.79e-06	1.50e-06	-1.20	0.232
IGOVTI	-0.0012305	0.0007282	-1.69	0.091***
PE	-0.2497221	0.1005759	-2.48	0.013*
IE	0.0677604	0.1360681	0.50	0.619
POP	0.0563698	0.0117989	4.78	0.000*
MEL	-0.0021509	0.0061746	-0.35	0.728
MA	0.000557	0.0008161	0.68	0.495
CONS	0.2944012	0.1115788	2.64	0.008*
R-squared	0.0271			
Chow Test	0.0992			
Hausman Test	0.0433			
Breusch-Pagan Test	0.2228			

Note: *, **, *** represent statistical significance at 1%, 5%, and 10%, respectively.
Source: Made by the authors

According to Table 6, the coefficient of ITGI, which represents the Information Technology Governance Index, presented a p-value of 0.091 and a statistical significance level below 0.10, indicating a negative and significant relationship with the financial condition of local governments. This means that the higher the ITGI, the lower the financial condition of local governments, and vice versa. Therefore, hypothesis H2, which states that technological contingency factors are related to the financial condition of local governments, cannot be rejected.

This result contradicts part of the literature that argues that technology contributes to improving organizational performance, especially in the public sector. For example, Victor (2020) argues that the alignment between technological resources and organizational structure increases the organization's capacity to perform transformation processes compatible with its nature and objectives. Additionally, Perrow (1967) emphasizes the central role of technology in the transformation process, stating that the type of technology used by the organization determines the most efficient structure for successful performance.

However, this study corroborates the findings of Fiirst and Beuren (2021), who also observed a negative effect of variables related to the technological factor on municipal performance. This indicates that, in the public sector, compliance with legal limits still predominates as the main goal of management, to the detriment of the pursuit of a quality level of service oriented toward the public interest.

Regarding structural contingency factors, the results indicated that the coefficient of the variable PE was significant ($p = 0.013$) and presented a negative relationship with financial condition, meaning that the higher the personnel expenditure, the lower the municipality's financial capacity.

The coefficient of the variable IE, however, was not significant ($p = 0.619$), suggesting that public investments do not significantly affect the financial condition of

municipalities. Thus, hypothesis H3 of this study, which predicted that structural contingency factors are related to the financial condition of local governments, cannot be partially rejected. The literature on contingency theory states that the organizational structure of entities is determined by internal and external factors that affect their performance (Donaldson, 2001).

Thus, organizational structure may impact employee satisfaction, internal communication, operational efficiency, and the capacity to adapt to environmental changes (Chenhall, 2003). In the context of local public administrations, some empirical studies have found evidence that organizational structure, especially personnel expenditure, is positively related to municipal performance (Sell et al., 2020). However, other studies did not find a significant relationship between organizational structure and the socioeconomic performance of local governments (Fiirst & Beuren, 2021).

To examine the impact of contingency factors related to size on the financial condition of local governments, the variable POP, which reflects the natural logarithm of population, was employed. The estimated coefficient for this variable was 0.000, indicating its high significance in explaining the variation in the financial condition of local governments.

Additionally, the level of statistical significance was below 0.01, suggesting a positive and robust relationship between POP and financial condition. In other words, an increase in the natural logarithm of population is associated with an improvement in the financial condition of local governments, and vice versa. Thus, hypothesis H4, which argues that size-related contingency factors affect the financial condition of local governments, cannot be rejected.

This finding is consistent with the study of Sell et al. (2020), who also observed a positive relationship between size and municipal performance. According to Fiirst and Beuren (2021), municipalities with greater financial leverage capacity, especially in terms of own-source revenue and constitutional transfers, combined with population growth, are better able to invest in areas such as health, education, and income, which are components of the socioeconomic performance indicator used in this study.

Therefore, hypothesis H4, which posits that size-related contingency factors impact the financial condition of local governments, cannot be rejected. This result aligns with the findings of Sell et al. (2020), who also verified a positive relationship between size and municipal performance.

According to Fiirst and Beuren (2021), municipalities

with greater financial leverage, especially regarding own-source revenues and constitutional transfers, combined with a higher population index, have better conditions to invest in the areas of health, education, and income, which are the dimensions of the socioeconomic performance indicator used in this research.

Regarding the other independent variables considered in the analysis, none of them showed a significant effect on the dependent variable. Thus, research hypotheses H1 and H5, which proposed that internal contingency factors related to the organizational environment and external contingency factors related to the strategy adopted by municipalities would influence their financial condition, cannot be confirmed. Therefore, these hypotheses are rejected based on the results obtained.

5 Final Considerations

The present study aimed to analyze the relationship among contingency factors and the financial condition of local governments. The results indicated that municipalities with larger populations tend to present better financial conditions, while higher personnel expenditures are negatively associated with financial performance. The use of information technology, measured by IGOVTI, also showed a marginally significant negative relationship, suggesting possible challenges in integrating technology into public management.

From a theoretical standpoint, the results of this study contribute to advancing the literature on public finances of local governments by applying Contingency Theory using an approach focused on the financial condition of municipalities. Unlike previous studies such as Sell et al. (2020) and Fiirst and Beuren (2021), which predominantly focus on socioeconomic performance or net current revenue, this study expands the scope by incorporating dimensions of short, medium, and long-term solvency.

To achieve this, a pseudo-open model was proposed that considers not only financial aspects, such as the capacity for own revenue collection, expenditure control, and the quality of public services, but also socio-environmental aspects, such as the environment, technological level, organizational structure, size of municipalities, and the strategy factor.

The study also presents practical contributions. The findings are expected to support decision-making by public managers, as well as the development of public policies aimed at improving municipal financial condition. Thus, it is essential that municipal managers adopt appropriate mechanisms to ensure transparency, accountability, and efficiency in public administration, as well as public policies

that meet social demands in areas such as education, health, security, culture, and leisure, among others.

Furthermore, it is necessary to seek ways to increase municipalities' own revenues and to prevent population loss to other urban centers, which may compromise local development. These actions may contribute to improving municipal outcomes in terms of socioeconomic performance, measured by indicators such as per capita income, human development index, quality of life, and citizen participation.

However, this study identified some limitations that open space for the development of future research on the theme of financial condition and contingency factors that affect municipal performance. One of the limitations was the theoretical choice of the variables used to represent governmental financial condition and contingency factors.

These variables explain only 2.7 percent of the variance of the dependent variable (R^2), which indicates that there are other variables also related to municipal performance that were not included in the model. Therefore, future studies may explore other variables that could better capture the contingency factors affecting municipal performance in the public sector, thereby expanding the scope of investigations on this topic.

Another limitation was the single measure of financial condition as an indicator of municipal performance. There are other ways to measure the financial condition of local governments, which may be more appropriate or complementary to the measure used in this study. As a suggestion for future research, the exploration of other metrics of governmental financial condition for analyzing municipal performance is recommended.

Finally, a third limitation was the restriction of the sample and the period analyzed, which limits the generalization of the findings to other geographic and temporal contexts. Thus, future research may apply the proposed model in other municipalities and in other time periods to confirm the robustness and validity of the results found in this study.

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