Validation of Structural Equation Modeling Through Social Representation Theory in the Context of Governance

Validação da Modelagem de Equações Estruturais Através da Teoria da Representação Social no Contexto de Governança

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ABSTRACT

This article proposes the use of social representation theory to validate the structural model of structural equation modeling, thereby enhancing the understanding of the research object. To achieve this, it was employed action research to construct, implement, and confirm the practical feasibility of the methodological procedures described herein. This was accomplished through their practical application in a case analysis. It was possible to validate the structural model used in structural equation modeling by applying the proposed methodological procedures to a case involving the governance system construct. This validation opens the possibility for future research to use these procedures in conjunction to validate theoretical models and the causal relationships between their constructs. Therefore, the primary theoretical contribution of this paper is the proposition of a research methodology that combines social representation theory with structural equation modeling to validate the structural model. This approach reduces the risk of using the statistical method to confirm or refute a theoretical model whose causal relationships may not represent a reality supported by practice.
Keywords: Structural Equation Modeling, Social Representation Theory, Content Analysis, Lexical Analysis, Research Methodology.

RESUMO

Este artigo propõe o uso da Teoria da Representação Social para validar o modelo estrutural da Modelagem de Equações Estruturais, com o objetivo de aprimorar a compreensão do objeto de pesquisa. Para isso, foi empregada a pesquisa-ação para construir, implementar e confirmar a viabilidade prá-

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RESUMO

tica dos procedimentos metodológicos aqui descritos. Isso foi realizado através de sua aplicação prática em uma análise de caso. Foi possível validar o modelo estrutural usado na modelagem de equações estruturais, aplicando os procedimentos metodológicos propostos neste artigo, a um caso envolvendo o constructo sistema de governança. Esta validação abre a possibilidade para pesquisas futuras usarem esses procedimentos em conjunto para validar modelos teóricos e as relações causais entre seus constructos. Portanto, a principal contribuição teórica deste artigo é a proposição de uma metodologia de pesquisa que combina a teoria da representação social com a modelagem de equações estruturais para validar o modelo estrutural. Esta abordagem reduz o risco de usar o método estatístico para confirmar ou refutar um modelo teórico cujas relações causais podem não representar uma realidade apoiada pela prática.

Palavras-chave: Modelagem de Equações Estruturais, Teoria das Representações Sociais, Análise de Conteúdo, Análise Lexical, Metodologia de Pesquisa.

Introduction

Structural Equation Modeling (SEM) is a tool to analyze structural models, which represent the relationships between constructs and their variables, capturing and explaining the complexity of the studied phenomena. It is a useful tool to propose or modify theories, based on the analysis of a structural model proposed by the researcher, and elaborated from the available theory. In this case, the model represents the causal relationships between constructs and variables, generating hypotheses to be tested: soft theory. On the other hand, if the objective is to generate new hypotheses in a previously unexplored field, with little empirical and theoretical foundation, SEM is used with a predictive or exploratory approach, capturing relationships that may be unknown or less formally elaborated: hard theory (RICHTER, 2016; MEMON, 2017).

According to Richter (2016) and Memon et al. (2017), SEM is one of the most powerful statistical research techniques across different areas of knowledge. However, understanding their methodological assumptions, before analyzing the data, is essential to obtain more robust results. Regardless of the approach used by the

SEM, one of the keys and usually most problematic factors in terms of negative impacts, if not properly designed, is the process of creating the structural model of the SEM.

In turn, the Social Representation Theory (SRT), with its developments and theoretical and methodological assumptions, seeks to understand and build knowledge from the real everyday life of a group of individuals. Social Representations (SR) bring out the common sense of this social group about a certain object, built and shared based on relationships and their daily lives, representing how this object is recognized and understood by the group based on their past experiences. The operationalization of SRT takes place through different approaches and structures, with its main one centered on the socio-cognitive processes and on the identification of the structures of the social representation of the research objective, based on the central core theory (MARTINS-SILVA et al., 2016).

It is in this context that the article seeks to answer the following research question: "How to use SRT to validate the structural model used by SEM and better understand the investigated object?" Considering the aforementioned problem, our objective is to propose a method of using SRT, associated with lexical and content analysis, to validate the structural model used by the SEM and better understand the studied object.

It should be noted that no article was identified in the Scopus and Web of Science databases that proposed the combined use of the SRT for the validation of the structural model adopted in the SEM; however, Spini (1996) sought to understand just the opposite - how the use of structural equations, with latent variables, can be used as a strategy for the development of the theory of social representations. This demonstrates the theoretical contribution of the work, which identifies and discusses a possible knowledge gap.

This article contributes academically and methodologically to the improvement of the use of SEM, mitigating the risks of its inappropriate use and potential harmful consequences. It also contributes to the practical discussion of the methodological proposal described here, based on its application in real research. It is, therefore, a relevant topic, since by suggesting the methodological improvement of an already established statistical technique of multivariate analysis such as SEM, it also contributes to a better development of future research using this technique.

Literature Review

This review was divided into four parts that address the theoretical framework associated with Structural Equation Modeling (SEM), Social Representation Theory (SRT) and Lexical (LA) and Content Analysis (CA) methods, in order to clarify their usefulness and complementarity, for greater reliability in the use of the SRT.

STRUCTURAL EQUATION MODELING (SEM)

SEM or Structural Equation Modeling Analysis is a relatively recent multivariate technique of statistical analysis, whose initial application was in the area of social sciences, with further use in other areas of knowledge. This modeling allows the researcher to simultaneously examine the relationships between different conceptual variables, which are defined in two types (CASTRO, 2018; CORRÊA; LIMA; CAMPOS, 2015; RODRIGUES; QUEIRÓS; PIRES, 2016): 1) latent variables (not manifest or constructs) and 2) manifest variables (measurable or observable).

Latent and manifest variables can be classified as exogenous (independent) variables - that is, variables that do not depend on other model variables, but only on external influences - or endogenous (dependent) variables - that are directly influenced by one or more model variables. The manifest variables can be continuous, ordinal, dichotomous or censored, and are the variables measured directly with the respondents, forming part of the data collection questionnaire. The latent variables are obtained from the manifest variables, that is, the joining of a group of manifest variables is what characterizes a latent variable, which is not measured directly, but indirectly (CASTRO, 2018; CORRÊA; LIMA; CAMPOS, 2015; RODRIGUES; QUEIRÓS; PIRES, 2016).

As reported by Castro (2018), SEM has gained prominence and relevance in the areas of social and exact sciences, being academically recognized as a robust statistical methodology with significant academic acceptance. Perhaps the greatest advantage of the SEM is its ability to (CASTRO, 2018, p.98) “test the global fit of models and the individual significance of parameters within a theoretical framework that comprises several statistical methods in a single multivariate statistical method”.

In classical statistics, an exploratory strategy is used to validate hypotheses, based on the collected data. In the SEM, from a theoretical model that was previ-

ously built, valid null hypotheses are identified, and, from the collected data, the relationships previously established by the theoretical model are either validated or not. Thus, SEM is proactive in establishing and validating null hypotheses, supporting multiple theories determined by the data. Traditional statistics is reactive, as it is dependent on precedent hypotheses and predetermined data; as such, data drives theory (CASTRO, 2018).

In other words, SEM has a significant ability to interrelate concepts and associated hypothetical variables, predefined by a theoretical model, specifying, estimating, and testing the relationships between these variables, whether dependent or independent. Thus, with SEM, it is possible to statistically identify which factors have the greatest influence on a particular phenomenon studied, calculating the effects of each of the variables on the others (BEUREN et al., 2016; COSTA, 2016; MEDRANO; MUNOZ-NAVARRO, 2017).

For Medrano and Munoz-Navarro (2017), SEM is among one of the most powerful tools for identifying causal relationships for non-experimental data, replacing experimental control by statistical – covariances. With the SEM it is possible to apply any theoretical framework, reflected in a theoretical model, in a graphically represented way, which expresses the relationships between the different variables that compose it. Such variables are not inferred by the SEM, based on the previously defined theoretical model. The SEM measures the covariances between the variables, and this understanding of the covariances helps researchers to validate or not their theoretical model and its respective hypotheses.

SEM is an inferential multivariate statistical technique of confirmatory nature - that is, based on the data, it determines whether the theoretical model is valid - as well as of non-exploratory nature - based on the defined data, it defines a model that best fits them, that is, the factors that represent the data are identified -, as is the case of the application in this research. Thus, the SEM is performed following the application of confirmatory factor analysis (CFA), that is, the CFA is a procedure that is part of the SEM (COSTA, 2016; SOUZA; ALEXANDRE; GUIRARDELLO, 2017)

Structural Equation Model

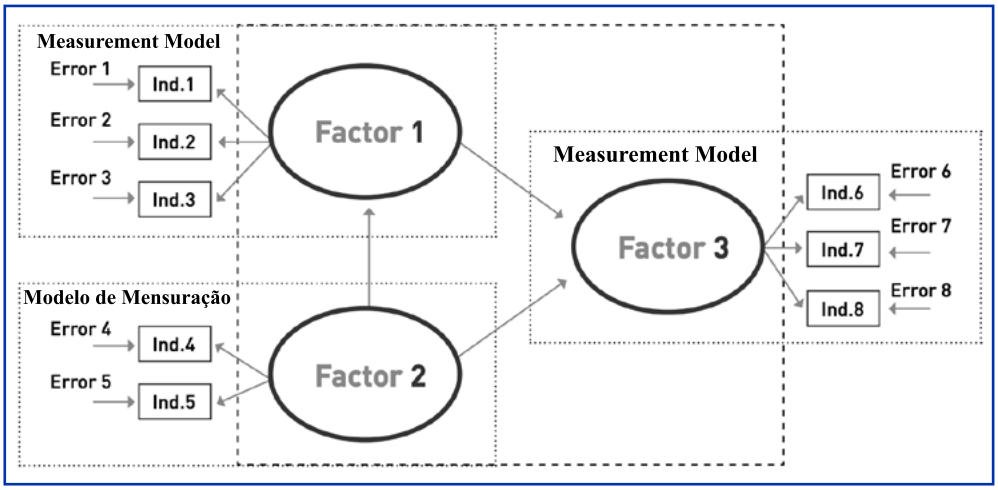
One of the main advantages that SEM presents is that the analysis process begins with the development of the theoretical model; from data collection and anal-

ysis, the model is either validated or not. In the model there is an objective that goes through its validation through a structural relation of the obtained data, and the model is not unique, that is, with the collected data new models can be established. The analysis process of the theoretical structural equation model has been approached with increasing theoretical and statistical depth, but it is generally agreed that the adjustment model has a significant weight in the evaluation of the proposed model (Bentles, 2007; Mcdonal; Ho, 2002; Hayduk, et al., 2007).

Medrano and Munoz-Navarro (2017), Castro (2018) and Souza, Alexandre and Guirardello (2017) state that the SEM is a combination of factor analysis and multiple regression, considering two components or sub-models: 1) Model of measurement - relationships between a series of manifest variables and the hypothetically measured construct, which demonstrate how manifest variables relate to represent a construct and 2) Structural model - hypothetical relations between latent variables (constructs) represented by the arrows in theoretical models, that is, by demonstrating how the constructs are associated, whether endogenous or exogenous.

According to Castro (2018), the graphical representation of the measurement models and the structural model is used to facilitate the understanding of the relationship between the different variables, improving the understanding of the idea, concept and theoretical model analyzed by the SEM. As an example, in Figure 1, the larger box represents the structural measurement, while the three smaller boxes represent the measurement model. Factors 1, 2 and 3 represent the constructs (latent variables) and Inds. 1 to 8 represent the manifest variables. The CFA is used to check whether the indicators adequately represent the construct (latent variable). As an example, CFA is used to check whether Ind. 1, Ind. 2, and Ind. 3 (manifest variables) in fact represent Factor 1 (construct or latent variable). In turn, the SEM is used to assess how well the manifest variables combine to identify the construction of relationships between the constructs (latent variables) and the respective hypotheses. As an example, SEM will evaluate the different combinations between Ind. 1 to 8, in order to validate the relationships between Factor 1, 2 and 3, corroborating or not with the hypotheses built from these relationships between the constructs (Medrano; Munhoz-Navarro, 2017).

Figure 1. Components of an SEM - Structural model and measurement model.



Source: Adapted from Medrano; Munhoz-Navarro (2017, p. 219).

For an effective use of SEM, theoretical mastery of the studied topic is essential, in addition to a prior knowledge of the relationships between constructs and their variables, considering that these previously defined relationships can change after data analysis using the technique. As it is possible to define hypotheses based on the relationships between the constructs and their variables, the SEM is an ideal confirmatory analysis technique to test these hypotheses, unlike other multivariate techniques that seek to explore the relationship between the data, with a more descriptive approach. In addition, the SEM is capable of evaluating or correcting measurement errors, as it provides unbiased estimates of the variables, whether manifest or non-manifest; therefore, it is useful for studying research objects whose concepts are abstract (Costa, 2016). The approach to reality, through SEM, allows associating theoretical foundations with empirical evidence, mapping the back-and-forth processes between theory and the practical reality of the researched event (Medrano; Munhoz-Navarro, 2017).

SOCIAL REPRESENTATION THEORY (SRT)

The Social Representation Theory (TRS) was created by Serge Moscovici, in 1961, through his work entitled La Psychanalyse, son image, son public. Social rep-

resentation can be defined as a common knowledge that emerges from the social, a common sense, which is practically transmitted by a certain group of individuals, allowing them to interpret the environment in which they live (Mazzotti, 2002; Corrêa; Lima; Campos, 2015). Until 1961, it was believed that individual and collective perceptual phenomena had no relation whatsoever and were considered independent (Lukosevicius; Soares; Joia, 2018).

SRT is a theory of social psychology, which provides a broad and systemic view on the creation of meaning by certain social groups. However, over time, it has also been used in other areas, such as social sciences, information technology, and applied social sciences (MAZZOTTI, 2002; WEERASINGHE et al., 2018). Among the various scholars on SRT, Denise Jodelet (2001) stands out, bringing a more applied view to the theory, by defining that social representation is "a form of socially elaborated and shared knowledge, with a practical purpose, that contributes to the construction of a reality common to a social set" (p. 22, own translation). For Marchese and Pullin (2011), social representation interprets reality, determining the behaviors and practices of a group of individuals.

Around the central core, there is the system; unlike the first, it is flexible and accommodates contradictions, different momentary and immediate perceptions, and context changes that arise in a group of different individuals. Thus, the peripheral system allows individuals to adapt to the social representation defined by the central core, without impacting it. As such, the peripheral system modulates the individuals of a group, not jeopardizing the central core and its meaning, which gave rise to the social representation already established by that same group (Mazzotti, 2002; Marchisotti; Joia; Carvalho, 2019).

According to Joia (2017), the Average Evocation Frequency (AEF) measures the average frequency of evocation of a word, and its calculation is performed by the total evocations of a word over the total number of distinct words. Average Evocation Order (AEO) measures the average evocation of words considering the order in which they were evoked, and its calculation is performed by dividing the sum of all AEOs by the total number of distinct words, according to the formula represented in Figure 2, where f1 represents the number of times that the expressions belonging to the category are evoked first; f2 represents the number of times the expressions belonging to the category are evoked in second place; and so on.

Figure 2. Calculation of the Average Evocation Order.

$$OME = \frac{(f_1 *1) + (f_2 *2) + (f_3 *3) + (f_4 *4) + (f_5 *5)}{\Sigma_f} \quad (1)$$

Source: Joia (2017, p.3).

It can be seen, therefore, that the most frequently and most readily evoked words, in relation to the average, will be part of the central core, which will define the social representation of the studied object. For a complete understanding of how the construction of a social representation takes place using Vergès' four quadrants technique, it is necessary to detail each of the quadrants in Figure 3 (Lukosevicius; Soares; Joia, 2018; Marchisotti; Joia; Carvalho, 2019).

Figure 3. Vergès' Four Quadrant frame.

Core Has a evoke frequency higher than the AEF and a evokes order lower than AEO	**First periphery** Has a evoke frequency higher than the AEF and a evokes order higherthan the AEO Close connection to the core
Contrast zone Has a evoke frequency lower than the AEF and evokes order lower than the AEO Close connection to the core	**Second periphery** Has a evoke frequency lower than the AEF and evokes order higherthan the AEO Distant connection to the central core

Source: Marchisotti; Joia; Carvalho (2019, p. 19).

- **Central core:** Contains the most important evoked words that attribute meaning to the social representation of the object of study.
- **Contrast zone:** Contains the evoked words that are relevant only to a small group of individuals (minorities) but are very close to the central core.
- **First periphery:** Contains the evoked words with many citations, with little relevance to individuals, but also very close to the central core.
- **Second periphery (peripheral system):** Contains the evoked words with few citations and relevance for social representation, keeping a distance from the central core.

In the same vein, Cosso and Fernandes (2018) went further, as shown in Table 1, when explaining in more detail the importance of each of the quadrants and what each one represents in terms of information that can be abstracted, for a correct identification of the social representation of any given thing.

Table 1. Descrição do Quadrante de Quatro Casas de Vergès.

Central core: Greater frequency – lesser Average Order of Evocation • Collective memory and the group's history, • Consensual and stable, • Resistant to change, • Little sensitivity to immediate context, • Determines organization, • Generates meaning towards representation.	**First periphery:** Greater frequency (last position) – Greater Average Order of Evocation • Integrates history and individual experience, • Supports the heterogeneity of the group/contradictions, • Flexible/sensitive to immediate context, • Assimilation of new concepts, • Possibility of innovation in creeds and opinions.
Contrast zone: Lesser frequency (first position) – Lesser Average Order of Evocation • Interlocutors debate with the central core, trying to avoid or stay on it • Existence of a minoritarian subgroup with different representation • Elements that complement or are in transition with the first periphery • Biases/stereotypes.	**Second periphery:** Lesser frequency (less evoked first position) – Greater Average Order of Evocation • More distant from the central core, • Smaller possibility of belonging to the central core, • That which is said the least.

Source: Adapted from Cosso; Fernandes (2018, p. 12).

According to Zouhri et al. (2016), there are elements that sometimes do not have equal values or are in line with current social norms. These are elements that are masked by the respondents and represent a negation and the so-called mute zone of social representation. As discussed by Abric (2005), the mute zone represents the elements that respondents have difficulty expressing, because they are loaded with moral value or symbolism, or that represent taboos that inhibit people from saying what they really think, which contributes for a dissociation between discourse and practice, either spoken or hidden.

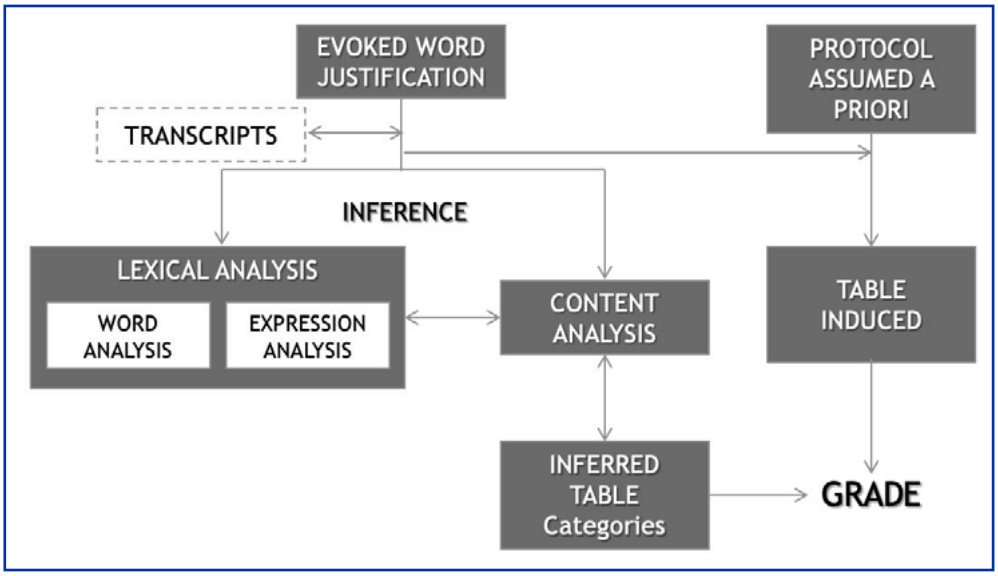
LEXICAL AND CONTENT ANALYSIS

As described by Vergara (2015) and Bardin (1997), content analysis is based on data analysis from the agglomeration of words or contents with common characteristics, through categorization, which enables the researcher to infer the content, main ideas, and knowledge related to the data. If the analyzed data come from the literature, the categories are defined as a closed grid. If they are categories based on data collected in the field, they are defined as an open grid.

In turn, lexical analysis (LA), according to Freitas (2011), is the attention towards the lexicon, that is, of all terms or words used in a text, considering their frequency of occurrence. However, as in content analysis, lexical analysis allows interpreting a given text in a dynamic way. Usually, lexical analysis is used as a support for content analysis, either to serve as a basis for categorization – from the most frequent words, categories and their respective explanations are created; either to assist in its validation or prioritization – once the categorization based on codes is carried out, they are grouped to form categories.

To facilitate the understanding of the combined use of lexical and content analysis techniques combined, Freitas and Janissek (2000) developed an analysis plan, as shown in Figure 4, which was adopted in this research, based on the identification of words most frequently found in the articles analyzed and the text that each participants wrote to justify the first evoked words. It is noticed that, initially, it is necessary to identify the most frequently used words in the content to be analyzed and, subsequently, from these words, carry out the categorization, which, in turn, allows the performance of content analysis.

Figure 4. List of methodological activities for content analysis.



Source: Adapted from Freitas; Janissek (2000, p. 85).

Thus, according to Ander-Egg (1978) and Freitas and Janissek (2000), certain steps must be followed so that a content analysis can be consistently carried out: 1) Choice of the sample: establishment of criteria to choose the sample, according to the research objective; 2) Definition of the unit of analysis: choosing what will be the basic element of content analysis, which can be a word or phrase, and 3) Categorization of words: agglutinating the subjects that converge.

Before the data could be categorized, it was necessary to encode it; that is, organize the collected data in a systematic way, dividing, connecting, and grouping it, so that it was possible to identify its meaning. Codes are represented by words or short phrases, which represent the essence of a certain excerpt of the analyzed text, that is, they are a construct that translates and interprets certain data, through the search for patterns of actions. They are never identified in the first reading, and therefore several coding cycles must be carried out, until a reliable result is reached (Saldana, 2015).

According to Saldanha (2015), coding is the synthesis of a given text analyzed, which enables the identification of patterns. Those codes that have similar

characteristics – Similarities, Differences, Frequency of occurrence, Sequence of occurrence, Correspondence, or Cause and effect – and follow the same patterns; once agglutinated, they are treated as a category. Codes can be represented by a word or phrase, expressing the essence of the analyzed data.

Codes, once created, are later grouped into categories based on shared characteristics. In order to carry out an adequate categorization, the procedures proposed by Bardin (1997) were followed, which mentions the search for exhaustiveness, that is, the creation of categories to the point where they are repeated throughout the analyses, no longer being necessary the elaboration of new categories. The categories need to be mutually exclusive, that is, their meaning cannot be the same; therefore, the researcher needs to be objective and relevant in their categorization. During the creation of codes and categories, there is the possibility to create subcodes and subcategories (Vergara, 2015).

At the end of the categorization and quantification process, it was necessary to verify the results and validate the content analysis, analyzing some aspects such as: 1) Reliability – Objective and independent analysis of the measurement tool; 2) Logical Validity – Reliable description of the original facts relevant to the answer to the research problem; 3) Inferences - Ensuring the correct interpretation of words and/or expressions, as many vary in meaning within a given context and 4) Empirical validity - The more prepared the researcher (training, study, knowledge and practice), the greater the validity empirical analysis of content (GRAWITZ, 1993).

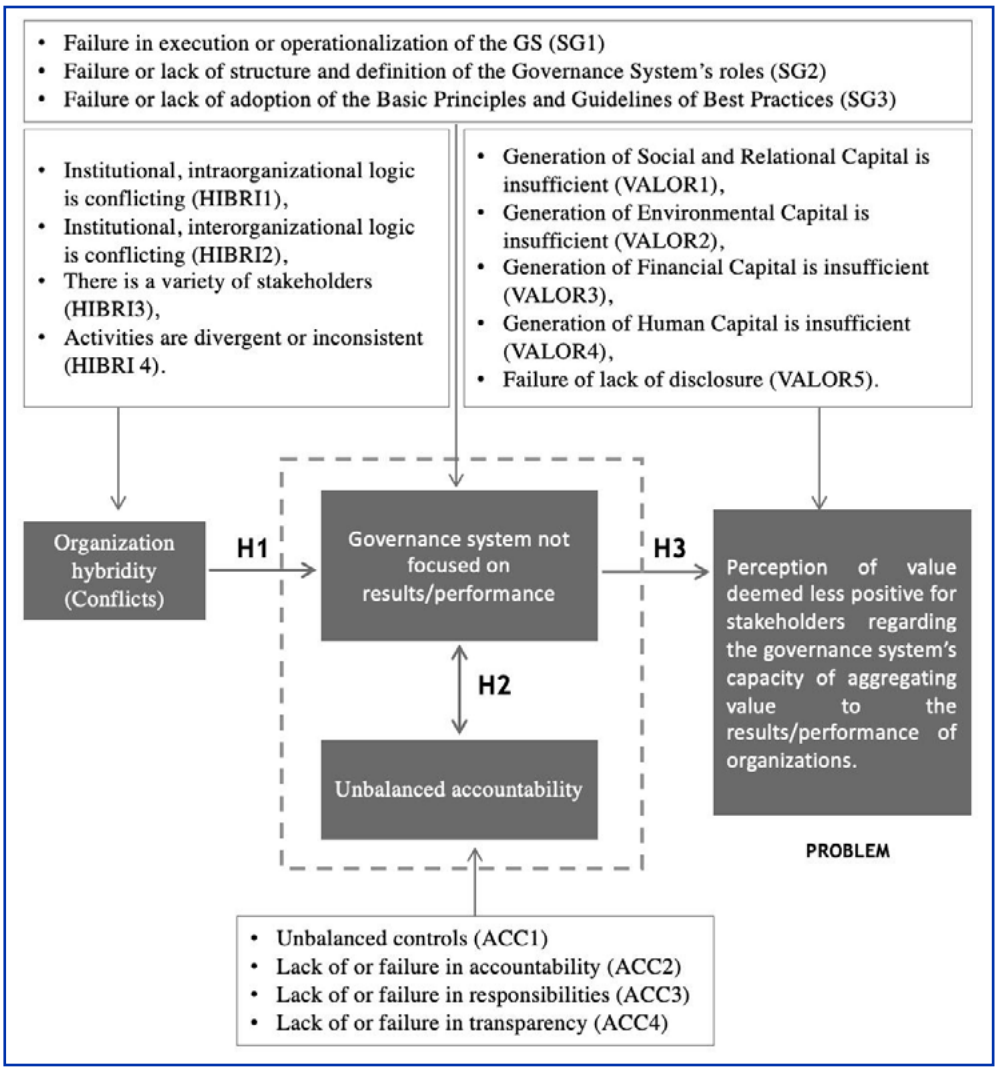
Methodological Procedures

In order to meet the objective of this article, which is to use the SRT and LA/CA methods for further validation of the structural model initially elaborated from the theory (Vergara, 2015; Bardin, 1997), we used a practical experiment of using this method integration proposition applied in a practical case by Marchisotti et al. (2021a), which used the SEM to validate a theoretical model on a governance system (GS) and Marchisotti et al. (2021b), which used SRT to capture the respondents' perception of how they recognize what a GS is.

DESCRIPTION OF THE PRACTICAL CASE

The theoretical model proposed by Marchisotti et al. (2021a), from the analysis of the theoretical framework, and their respective hypotheses are presented in Figure 5 and Table 2.

Figura 5. Modelo teórico proposto, seus construtos, variáveis e relação com o problema de pesquisa.



Source: Adapted from Marchisotti et al. (2021a, p. 763).

Table 2. Hypotheses validated from the proposed theoretical model.

Hypotheses
H1 – Organizational Hybridism (HYBRI) is positively related to a non-performance/outcome-oriented Governance System (GS).
H2 – A non-performance/outcome-oriented Governance System (GS) is positively related to an unbalanced Accountability (ACC).
H3 – A non-performance/outcome-oriented Governance System (GS) is positively related to the perception that the SG does not add value to results/performance (VALUE).

Source: Adapted from Marchisotti et al. (2021a, p. 764).

The theoretical model proposed in Figure 6 seeks to explain the reason why there is a less positive perception of value of the ability of a governance system to contribute to the results/performance of an organization, and that it considers its endogenous (dependent) variables the accountability and GS constructs, and as an exogenous (independent) variable the organizational hybridity construct. Tables 3 to 6 summarize the conceptualization adopted by the case, for each of the variables, which help in its understanding (Marchisotti et al. 2021a).

Table 3. List of variables associated with organizational hybridity.

HYBRI variables	Description
Conflicting intra-organizational institutional logics (HYBRI1) **Conflicting interorganizational and institutional logics (HYBRI2)**	Presence of plural and conflicting institutional logics and objectives within an organization (intra-organizational) or between organizations (inter-organizational) that act in partnership.
Different stakeholders (HYBRI3) **Divergent or inconsistent activities (HYBRI4)**	The organization involves with a variety of different stakeholders and engages in inconsistent or divergent activities.

Source: Adapted from Marchisotti et al. (2021a, p. 759).

Table 4. List of variables associated with organizational hybridity.

GS Variables	Description
Execution and Operationalization Failure (EXEC_OPER)	Practical aspects that involve the day to day and actions related to the dynamics of the functioning of the GS in organizations. It includes eventual problems or weaknesses that affect the GS, preventing it from being efficient and generating results.
Failure or lack of Structure and Role Definition (STRUCT_PAPEIS)	It refers to the organizational structure and the correct definition of the roles, rights, and responsibilities of each member of the GS, so that it is efficient and generates results.
Failure or lack of adoption of the Basic Principles and Guidelines (PRINC_DIRET)	It encompasses the topics associated with the basic principles and main guidelines recommended by national and international organizations, to be incorporated into the organizations' GS.

Source: Adapted from Marchisotti et al. (2021a, p. 760).

Table 5. List of variables associated with the accountability system of a GS.

ACC variables	Description
Controls (ACC1)	It is the imposition of rules and restrictions, followed by penalties or incentives, by a certain actor; for another party to meet certain demands of an organization.
Accountability (ACC2)	It is the imposition, by the organizations, that their governance agents must be accountable for their actions, allowing the owners' representatives to check whether their managers are focused on their personal interests or on those of the organization.
Responsibility (ACC3)	Accountability is associated with the punishment to which individuals and the organization are subjected due to acts impacting on stakeholders affected by their actions.

Transparency (ACC4)	It is the act of giving visibility to information associated with organizational sustainability, in accordance with its values, principles, and objectives.

Source: Adapted from Marchisotti et al. (2021a, p. 761).

Table 6. List of variables associated with the perception of value of a GS.

VALUE Variables	Description
Social and Relationship Capital (VALUE1)	These are the behavioral patterns and common values shared by all stakeholders in an organization. It is the organization's willingness to contribute to the improvement of individual and collective well-being, to protect the reputation of the organization regarding social respect.
Natural Capital (VALUE2)	It refers to environmental resources - renewable and non-renewable - and their processes associated with the environment, the production of goods, or the provision of services by an organization.
Financial Capital (VALOR3)	It is the set of resources available in the organization to produce goods and/or the provision of services; obtained by means of financing - debt, shares or subsidies - or conceived by investments.
Human Capital (VALUE4)	These are the competencies, skills, and experience of employees at all levels, including their ability to innovate, to lead, to collaborate, and to support the GS.
Results Release (VALUE5)	Disclosure of results is the act of formally exposing, in reports, the organizational results in an integrated (social, economic, environmental and social data), transparent, timely and truthful manner.

Source: Adapted from Marchisotti et al. (2021a, p. 762).

METHODOLOGICAL STRATEGY OF THE ARTICLE

We sought to incorporate into the methodological procedures related to SEM, which has post-positivist assumptions typical of quantitative methods, the contribution of constructivist-interpretivist assumptions, typical of qualitative methods, through the SRT and LA/CA, which intend to understand the real world through the meanings provided by the interviewees, as well as their opinion and perspective on the topic to be researched (Creswell; Poth, 2016). The contribution of SRT and LA/CA to the SEM lies in the practical validation, not only theoretical, of the structural model of the SEM, which is a key step for the success of research based on this strategy.

As for the objectives, this stage of the research can be characterized as methodological and interventionistic, as it is the construction of an instrument for capturing and manipulating reality, and that a procedural path to be followed by the researcher to reach a certain end: validation of the structural model of the SEM from the SRT and LA/CA. Finally, regarding the procedures and the research strategy, this work uses action research, since, in order to arrive at the proposition of the proposed method, there was a participative intervention by one of the authors in relation to reality (Creswell; Poth, 2016).

SRT AND CA FOR VALIDATION OF THE STRUCTURAL MODEL OF THE SEM

The contribution of SRT and CA to the validation of the structural model of the SEM of the case shown in Figure 7 is given considering two perspectives: 1) Validation of the research problem - value perception construct, that is, understanding whether the perception of value about the governance system is it in fact positive or negative and why; and 2) Validation of the Structural SEM model, that is, validating whether in fact the constructs and variables used in the proposed theoretical model, as a whole, are corroborated in the field, which would reinforce the correction of the structure of this theoretical model, which was initially built from theory.

For the validation of the research problem, in perspective 1, the following methodological procedures were adopted: in order to identify the central core of the social representation according to the SRT, it is necessary to apply a technique for the collection of calls, called technique of evocation of words. According to Vergara (2015) and Lima and Do Be (2017), the word evocation technique seeks to capture

the first five words expressed by respondents, so that it is possible to identify the social representation of a research object. The answers were obtained through a survey that was sent by social networks. For the generation of Vergès' Four Quadrants, which allows the identification of the central core of the social representation of the researched theme, we used the EVOC 2005 software.

It was also required to include an open question asking respondents to justify the reason for choosing the first word evoked by them, which, in practice, is the most important word, as it was the first that came to mind. From the answer to this question and through the analysis of its content, it was possible to understand the meaning of the words that served as the basis for identifying the social representation of the research object (Marchisotti; Joia; Carvalho, 2019). The NVIVO software was used to identify the inferred categories and their respective results.

For the validation of the structural model of the SEM, in perspective 2, the following methodological procedures were adopted: the constructs and predefined variables in the theoretical model initially proposed by Marchisotti et al. (2021a) were considered as the categories of content analysis, and the words (lexicons) evoked by the respondents during the application of the word evocation technique, in the context of the application of the STR, were associated with each of these categories, when applicable, in order to ensure that the categories and subcategories, which represent the constructs and variables of the theoretical model to be used for statistical validation of the SEM, are supported by the field. The use of LA to support CA, more specifically in the categorization phase, is considered relevant and useful for large amounts of text (Freitas; Janissek, 2000; Vergara, 2015; Bardin, 1997). Microsoft Excel was used as a tool for associating lexicons and categories, based on the analysis of the content of each lexicon, through the NVIVO 11 software.

Thus, all the words evoked were used to validate the proposed theoretical model, which gives greater security in relation to its validity. Therefore, all the words evoked by the respondents were agglutinated, according to the constructs and manifest variables that make up the theoretical model proposed in this thesis, in order to carry out an analysis between the words (and their meanings), the constructs and the manifest variables (and their meanings), using the manifest variables as agglutinating categories of words, according to the similarity of meaning, and after carrying out the content analysis.

Data Analysis and Results Discussion

Marchisotti et al. (2021b) applied the SRT and LA/CA in 665 responses, representing 3321 evoked words (427 different words); after the filters and application of the premises imposed by the methodology, they arrived at the effective analysis of 1662 evoked words - 24 different words. From then, it was possible to build Vergès' Four Quadrants frame, as shown in Figure 6, and subsequent use of the CA, analyzing and categorizing the justifications presented by the respondents about the evocation of the first word, as shown in Table 7.

Figure 6. Vergès' Four Quadrants for the Governance System theme.

Quadrant for the term inductive "Governance System"					
RANG < 2,90			RANG ≥ 2,90		
Centrality	**Freq**	**OME**	**1ª Periphery**	**Freq**	**OME**
Control	223	2,68	Responsibility	67	3,15
Management	188	2,35	Results	48	4,52
Transparency	172	2,63	Monitoring	48	3,10
Organization	136	2,36			
Processes	73	2,80			
Planning	73	2,51			
Compliance	72	2,11			
Accountability	68	2,75			
Administration	59	2,68			
Éthics	50	2,90			
RANG < 2,90			RANG ≥ 2,90		
Contrast Zone	**Freq**	**OME**	**2ª Periphery**	**Freq**	**OME**
Lidership	45	2,40	Reliability	41	3,34
Governance	42	2,14	Sefity	40	2,93
Decision-making	30	2,50	Efficiency	38	3,11
Hierarchy	28	2,86	Rules	32	2,91
			Strategy	31	3,32
			Structure	31	3,00
			Participation	27	3,33

Source: Adapted from Marchisotti et al. (2021b, p. 767)

Table 7. Categorization of justifications for evoking words – Validation of the research problem (value perception construct).

Words (Centrality)	Inferred Categories	Simplified Description (Meaning)	Dictionary Definition[1]
Administration	Resource Management	The GS is associated with a tool used to manage an organization.	"The act, process, or result of administration."
	Respondent: "*The GS is one of the tools that assists the management of companies.*"		
Accountability	Providing Accounts of the acts	Need for accountability, including control, transparency, responsibilities, and ethics, in order to ensure good management of organizational resources and the activities to be performed. It is essential for the GS to be effective and bring results to the organization.	"To provide satisfaction or explanation as to the reasons for one's expenses or expenditures to the person in charge; to explain the reason for certain attitudes to someone; to justify expenses or actions "To be judged by one's actions, to submit oneself to judgment."
	Respondent: "*Accountability and all its elements (control, transparency, etc.) are essential for the GS to bring results to the company.*"		
Compliance	Compliance and Legality	The GS is the best way to ensure compliance, i.e., to ensure that internal and external rules and laws are followed as defined.	"Quality or state of that which is conforming or similar, analogy, resemblance. " Act or effect of conforming; concordance conformation."
	Respondent: "*Governance is one of the main ways to provide and ensure compliance with legislation, internal policies and public policy and stakeholder requirements*"		

Control	Internal and external controls	It is the function of the SG to participatively control the activities, actions, demands, procedures, and information considered essential to the performance and results of the administration and management of an organization.	"The act of directing any activity, supervising, and guiding it in the most convenient way. "Overseeing and mastering someone or something." " Financial fiscalization."
	Respondent: "*The GS must have mechanisms capable of exercising adequate control over the actions of managers in order to ensure the achievement of the company's objectives, preventing the occurrence of irregularities, misconduct, etc.*"		
Management	Organizational Management	A good GS supports, promotes, and gives sustainability to a good management, through monitoring, control, and evaluation.	"Act of managing or administering"
	Respondent: "*The GS promotes effective management of institutions by leveling and aligning goals, people, and resources in order to bring about effective results and decisions.*"		
	Governance	Governance has often been associated with management, as if they were synonyms.	
	Respondent: "*Management is the way we run things and plan our projects.*"		
Organization	Administrative Institution	It is the concept of the organization as an administrative institution, that is, every kind of company. It is the object where a GS is implanted.	"Set of guidelines, standards, and functions that contribute to the smooth operation of any enterprise. Institution, association, or entity that acts within the scope of common interests; organism."
	Respondent: "*A GS addresses the relationships of people, their roles and responsibilities, in an ORGANIZATION*"		

Organization	Act of organizing	Organization is understood in the sense of structuring a system of relationships that define roles, responsibilities, and decision-making power, internally and externally, to deliver quality results. GS in the sense of organizing the organization.	"Act or effect of arranging(-self)." "Orderly arrangement of the parts of a whole."
	Respondent: "*When we have organization in a GS, we have more confidence in the institution.*"		
Planning	Institutional and Strategic Planning	Institutional and/or strategic planning is the actions necessary for the guidance and fulfillment of institutional and strategic objectives, meeting the desires of all stakeholders, and is the basis and starting point for the efficiency of a GS and the guarantee of the organization's existence in the long term.	"Organization of a task with the use of appropriate methods. "Determination of actions to achieve the goals set by a company, government agency, etc.; planning."
	Respondent: *"A GS relates to planning the actions necessary to accomplish institutional or strategic objectives.*"		
Processes	Process Management	GS is based on process management (creation, implementation, and improvement), as a formal means of consolidating a GS.	"Continuous and extended action or operation of some activity; course, continuance. A continuous sequence of facts or phenomena that present a certain unity or are reproduced with a certain regularity; progress, development."
	Respondent: "*Processes are the primary means to which governance systems are consolidated. Well-structured processes enrich governance rites.*"		

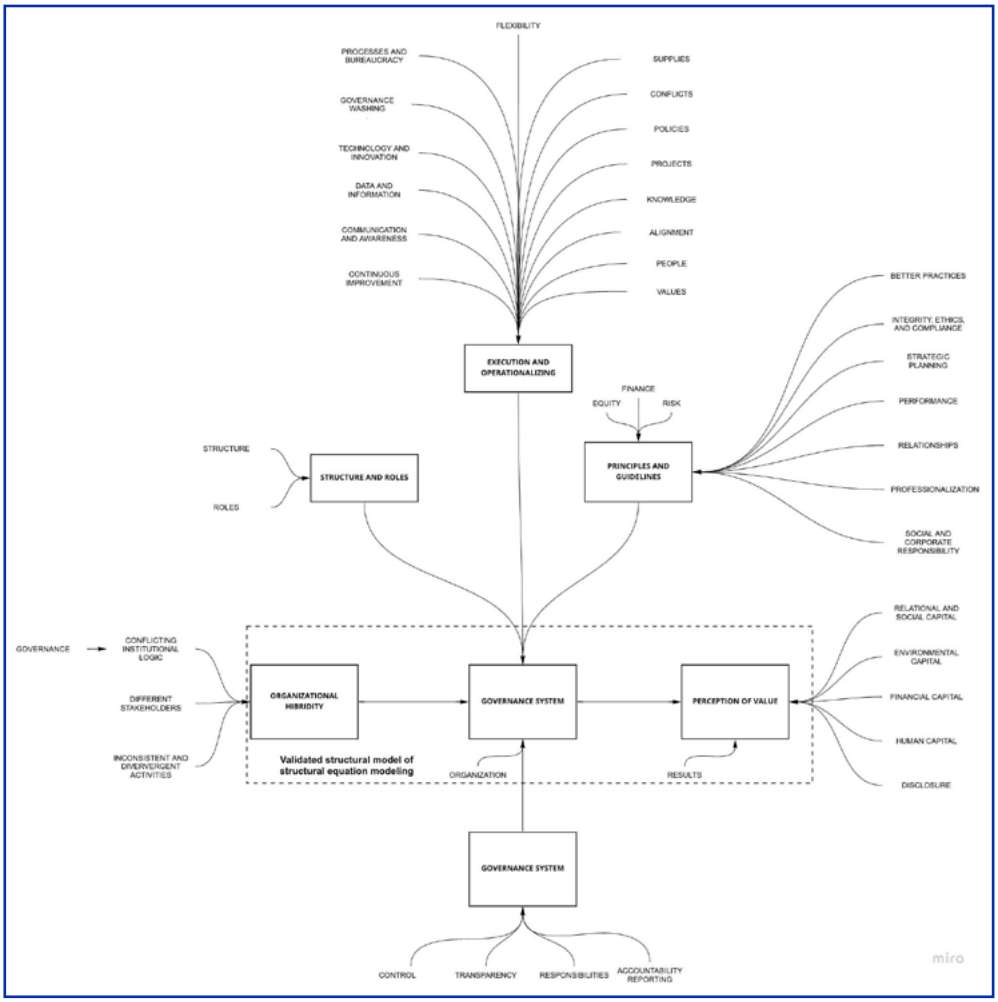
Source: Adapted from Marchisotti et al. (2021b, p. 767).

It was identified that, contrary to what was exposed by the theoretical model, the perception about the GS is positive. However, it is suggested that there is a mute zone in the social representation of the GS, as only 2% of the respondents expressed a negative word or expressed a negative perception about the GS. In this sense, the results of Marchisotti et al. (2021b) can be used to understand that the model proposed by Marchisotti et al. (2021b) portray the view of a minority, since in general the view is positive about the GS and identifies suspicions that people are occasionally afraid of speaking ill about the systems of governance. In this sense, the SRT helps the study of the SEM by providing additional information that provide a better understanding of the applicability of the proposed theoretical model, its context and delimitation.

Next, all the words evoked by respondents in Marchisotti et al. (2021b) and adopting the constructs and variables of the theoretical model proposed by Marchisotti et al. (2021a) as categories and subcategories. The words evoked by the respondents, from the use of the word evocation technique, are used to collect data for the elaboration of Vergès' four quadrants frame, which enable the identification of the core of the social representation of the research object - in the case studied, the governance system. They were associated with the constructs and variables proposed by Marchisotti et al. (2021a), and its meaning was inferred from the content analysis of the explanations given by respondents about what a system of governance was, as presented by Marchisotti et al. (2021b). Those words not associated with the model to be validated were discarded. Figure 15 shows the construction of the model proposed by Marchisotti et al. (2021a) from the perspective of Marchisotti et al. (2021b), validating the structural model used by the SEM through the words evoked and used by the SRT.

A Técnica de Incidentes Críticos (TIC) e a Bibliometria são as atividades anteriores sugeridas por Marchisotti et al. (2021a) para construir corretamente o Modelo de Equações Estruturais. Depois disso, seguindo os passos propostos neste artigo, é possível validá-lo por meio do TRS e, ao mesmo tempo, obter mais informações sobre o construto da pesquisa associado ao modelo.

Figure 7. Validation of the Theoretical Model through SRT and CA.

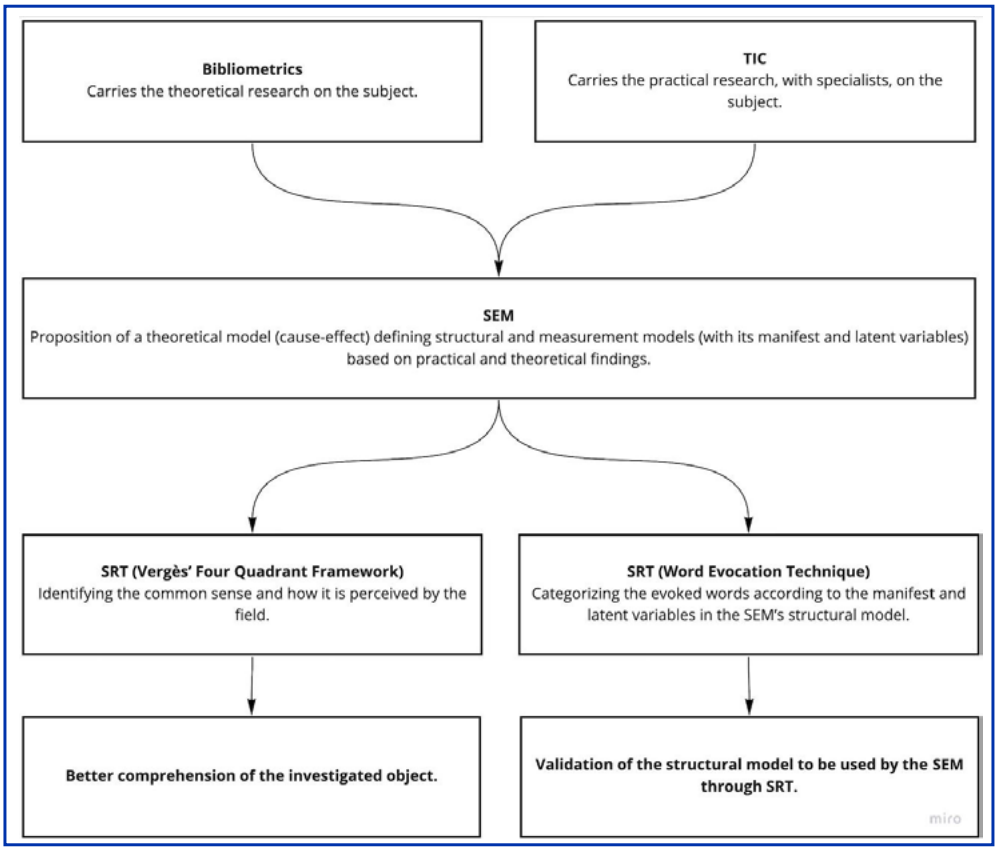


Source: Elaborated by authors.

When comparing Figures 5 and 7, it was identified that, in fact, the proposed theoretical model is in line with the perception of the field, since all constructs and manifest variables of the proposed theoretical model were qualitatively corroborated by the evoked words, considering the meanings expressed by respondents. Once validated, the theoretical model would be able to be statistically and quantitatively validated in the future. In this way, it is possible to propose a sequence of activities

to be performed by the researcher to incorporate the SRT for the validation of the structural model of the SEM, as well as for a better understanding of the object of their research, as shown in Figure 8.

Figure 8. Steps to be followed for using SRT to validate the structural model of the SEM.



Source: Elaborated by authors.

The Critical Incident Technique (TIC) and Bibliometrics are the previous activities that are suggested by Marchisotti et al. (2021a) to correctly build the Structural Equation Model. After that, following the steps that are proposed in this article, it is possible to validated it through SRT, and, at the same time, get more information about the research's construct associated with the model.

Conclusion

This work adequately answers its research question, as it proposes, theoretically and practically, how to use the Social Representation Theory (SRT) and the Lexical and Content Analysis (LA/CA) to validate the structural model used by the Structural Equation Modeling (SEM). For this purpose, the contribution to the validation of one of the constructs of the model, as well as the model, was evaluated.

We concluded that, from the analysis of the results obtained in the practical application of the methodology proposed in this article, it was possible to validate the structural model of the SEM after its design, based on theory. Thus, before applying the statistical analyses required by the SEM, its structural model, which is of vital importance for the success of the research that uses such a quantitative model, will have been validated by the field, which guarantees greater methodological reliability.

It opens, therefore, the possibility of using the methodological approach proposed here in other studies that use the SEM to validate a theoretical model and the causal relationships between its constructs, reducing the risk of using this statistical method to validate a theoretical model whose causal relationships do not represent a reality supported by practice. This is a relevant theoretical contribution of this paper.

A limitation of this research refers to the organization of words, which can bring to light possible errors on the part of the researcher. Likewise, there is the possibility of including inference errors when categorizing words, both for the validation of the perception of value construct of the theoretical model. This represents the research problem, and issues with the validation of the structural model of the SEM. However, this limitation was mitigated in this work, since the content analysis had only the function of explaining what the respondents meant when they evoked the words.

There are also limitations related to content analysis, as even with the use of support software such as NVIVO, it is up to the researcher/interviewer to analyze the text and transcribe its meanings. However, this analysis may have been influenced by the researcher/interviewer's assumptions and past experiences and could potentially bias the correct meaning of the analyzed data. Furthermore, this

new methodology proposed in this article, based on a case study, needs to be replicated in other future studies, to ensure its adequacy in other contexts and involving other constructs.

Future studies could also assess the possibility of using SRT and LA/CA) not only to validate the structural model of SEM, but also in its prior definition, reinforcing the findings of the theoretical research that was used for its construction. This study advances the state of the art by proposing an innovative methodological approach that combines SRT and LA/CA with SEM. This approach can help overcome some of the current challenges in the field of administration, such as the need for more rigorous methods for validating theoretical models.

In addition, the practical application of this approach can open new possibilities for research in administration. For example, it may allow researchers to explore more deeply the causal relationships between different constructs in their theoretical models. However, it is important to note that the implementation of this approach may present its own challenges. For example, the effective application of LA/CA requires a solid understanding of text analysis techniques, and the successful integration of SRT and LA/CA with SEM may require an interdisciplinary approach to research.

Therefore, the next steps in this line of research may include the development of more detailed guidelines for the implementation of this approach, as well as the conduct of more empirical studies to test its effectiveness in different research contexts in mangement.

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