A Framework for Organizational Surveys

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A survey aims at collecting structured and clustered information with a margin of reliability, requiring an accurate knowledge of the researcher about the subject. The objective of this paper is to present a framework to support the development, structuring, application and analysis of organizational surveys. Through the verification of 14 surveys in different organizational areas with an amount of 1,457 people surveyed, different and important parameters were identified for the development of a survey. We proposed a structure in five levels: (i) constructs; (ii) modeling; (iii) instrumentation; (iv) application; and (v) analysis and closure. These levels allow the definition and structure of criteria by similarity which can be verified by calculating their correlation, indicating if the structure is efficient and satisfactory. Thus, the correlation can be verified in the pilot test or after the application in the last level, being important because it indicates if the results are reliable to the researched reality. Moreover, the literature do not presents models or frameworks for organizational surveys that contemplate all levels since conception until analysis of results, given the difficulty in establishing relationships among criteria, elaborating families of variables and evaluating the instruments based on a conclusive pilot test. In this way, this framework aims to fill this scientific.

Keywords: Survey, Survey Framework, Survey Conception, Modeling, Variables, Criteria.
1. Introduction
A survey aims to find the ideal solution for a situation that should represent the decision problem as closely as possible by transforming information into actions and solutions (LINDBLOM & TIKKANEN, 2010). According to Shankar & Maturen (2019), the term "survey" is vast and refers to the collection of data about a population through various measures. Survey are often used to observe customers' subjective responses to products (YANG et al. 2019).

Survey researchers use different methods and models, such as mail, telephone, and email for data collection (FAN & YAN, 2010). A survey has many advantages, especially when it's online, because it can easily reach more people (FU, YAN & FENG, 2018) and has lower costs, requires less time and is feasible to get sufficient sample quantities (SUZUKI et al. 2019). Online surveys provide changeability on the device and internet connection and another benefit is that the results are more likely subject to interviewer tendencies, but still have their own objection (HARTMAN & CRAIG, 2019).

Increasing competitiveness among the enterprises brings the need to obtain adequate information obtained through surveys with quality (ENGEL et al. 2015), and the quality of a survey is influenced directly by the data availability of a research, which makes it possible or not to investigate directly any subject or problem (FRYDMAN & STILLWAGON, 2018) High response rate is often an efficient indicator of good quality data (KRATINA et al., 2015). Therefore, a quality survey that results in relevant information must follow an appropriate development script from conception until analysis of results.

The basis of a survey is the data collection instrument (MACKEY & GASS 2012). It is necessary to carefully select, write and order the questions, as well as to use an appropriate language (FINK 2015). Therefore, the questionnaire preparation is usually the stage that needs more time and resources (CALLEGARO, MANFREDA & VEHOVAR, 2015), and a detailed preparation is necessary following predetermined steps that may lead to a structuring of a relevant questionnaire.

Different authors proposed ways to develop surveys. Table 1 presents a list of related works which seek to instruct the researchers to set up an efficient survey. These papers present techniques to obtain answers, to show how to do survey management and data analysis, to show how to conduct research using digital instruments and to show how to clarify statistical methods for analysis of results.
The proposal of this paper is to present a framework, which lists all the necessary steps for a survey, becoming a complete guide to assist in the creation, development, application, and analysis of organizational surveys. The framework is divided into five levels and each level is subdivided into detailed steps to be followed in the development of a survey. Our framework was based on 14 organizational surveys where each of the levels can be clearly identified. Thus, researchers that uses this framework as a guide could obtain more accurate data to portray the reality researched, data that can be transformed into important information and that will help in the processes of decision making in organizations.

2. Proposal of Organizational Surveys Framework
The organizational survey framework proposed in this article is subdivided into 5 levels, as can be seen in Figure 1.

In the sequence each level is detailed.

2.1 Level 1 - Constructs
Figure 2 presents the steps that compose Level 1.
Step 1 - Subject: in this step is defined the subject that will be approached comprehensively by the researcher.

Step 2 - Problem: definition of the problem to be answered in the survey.

Step 3 - Objective: definition of the survey objectives.

After defining the subject, problem and objective we set out to level 2.

2.2 Level 2 - Modelling

The objective of this level of the survey is to elaborate a modeling composed of criteria and subcriteria arranged in a decision tree until 3 evaluation axis. Figure 3 presents a generic decision tree model and in this model the evaluation axis correspond to the letters C, D and E and the number of criteria in each axis can range from 1 to n.

With this decision tree example, we can detail the steps of level 2 presented in Figure 4.
Step 4 - Choice of criteria: here the criteria to be used and evaluated in the survey should be defined. These criteria, which in Figure 3 are represented by the letter "C" followed by a number, can be defined through specific regulations of the object to be searched, bibliographic research on the topic or through research with experts in the subject to define the criteria.

Step 5 - Grouping of criteria: the criteria defined in step 4 should be grouped according to their similarity or concepts in the upper evaluation axis that will form a second level in the modeling. This upper evaluation axis in Figure 3 is represented by the letter "D" followed by a number, corresponding to the number of clusters. According to Brauers and Zavadskas (2006), the assignment of sub-objectives or sub-criteria represents a solution when the survey criteria do not have many connections to each other, which can be verified by calculating the correlation coefficient.

Step 6 - "Is it possible to compose more than one evaluation axis?:" this step is a checkpoint which analyzes if these criteria and sub-criteria could be grouped again together to form a further evaluation axis. This is represented by the letter "E" followed by a number in Figure 3.

Step 7 - Decision tree: with the composition of the evaluation axis, we arrive at a structure that can be elaborated with 2 or 3 levels in a decision tree format which the most detailed level will be the criteria to be evaluated by the survey respondents. The number of criteria or groupings may vary according to the established situation. With this modeling in a decision tree format, the respondents' opinion can be evaluated in a global way and each level of the decision tree could have an assigned concept or be grouped by similarity.

Step 8 - Variables definition: each level structured in the modelling will be a variable that could be evaluated, following its concepts in the survey. These variables can have specific denominations and conceptualizations corresponding to the survey evaluation axis. For
example, in Figure 3 we present 3 axes or evaluation levels, corresponding to three variables: E, D and C.

**Step 9** - Data analysis method: with the elaborated modelling one can glimpse one or more methods that can be used to analyze the data to obtain results.

### 2.3 Level 3 - Instrument

In level 3 the instrument is developed. Figure 5 presents the steps that compose this level.

![Level 3 detailing - Instrument](Source: Elaborated by the authors (2020))

**Step 10** - Scale definition: Definition of the scale to be used to evaluate the criteria in the survey. The scale of evaluation of the criteria may be quantitative, qualitative, or qualitative-quantitative.

**Step 11** - Number of questions for each criterion: in this step it is defined how many questions will be elaborated for each criterion of the survey.

**Step 12** - Preparation of questions: the questions should be clear and objective, so that not occurs dubious interpretations on the part of the respondents.

**Step 13** - Pilot test: the pilot test is a questionnaire application developed for at least 3 respondents of the group to be surveyed.

**Step 14** - “Is the correlation above 0.9?”: in this step, we suggest the use of the MONNA software (NARA et al., 2018) to test the questionnaire, since using technological tools is an effective way to do it (LARSON & FARBER, 2010). MONNA presents the "Criterion Correlation", which corresponds to the product-moment of the Pearson's Correlation coefficient, where:

- If the resulting correlation is equal to or greater than 0.9: questionnaire has high correlation and is ready to be applied.
- If the resulting correlation is greater than or equal to 0.7 and less than 0.9: the questionnaire needs refinement, and some questions may be included or changed (Return to step 11).
- If the resulting correlation is less than 0.7: a complete reformulation of the questionnaire is suggested (Return to step 11).

Steps 13 and 14 are suggested in this specification, but are not required. It indicates that these steps are being performed to achieve greater reliability in the search results. The correlation coefficient indicates the strength of the relationship between two variables, which may be negative, positive or null (GRAY, 2012). If the researcher chooses not to perform these two steps, the research can go directly to step 15.

**Step 15** - Application platform: the questionnaire can be applied by printed or digital means.

**Step 16** - Inserting the instrument in the platform: in this stage the final elaboration of the questionnaire according to the chosen platform.

### 2.4 Level 4 - Application

The application of the questionnaire should follow the steps of level 4, according to Figure 6.

**Step 17** - Deadline for data collection: the deadline for data collection should be determined, avoiding very short deadlines (less than one week) or too long (more than two months).

**Step 18** - Population to be surveyed: the researchers must define the population that will be the focus of the research, gathering physical or electronic addresses.

**Step 19** - Definition of sampling: calculation of sample size.

**Step 20** - Sending the questionnaire: this step is the sending of the questionnaires themselves.

**Step 21** - The desired sample was reached?

- Yes
- No

**Step 22** - Collection of answered questionnaires

[Diagram: Level 4 detailing - Application]

Source: Elaborated by the authors (2020)
Step 21 - "The desired sample was reached?": if it has not been reached, it is suggested to send the questionnaires to that part of the population that has not yet responded by seeking to sensitize them the importance of the research.

Step 22 - Collection of answered questionnaires: the questionnaires are collected and saved, preferably with backup of the data to avoid data loss.

2.5 Level 5 - Analysis and Closure

Figure 7 shows the steps that compose level 5.

![Figure 7 - Level 5 detailing - Analysis and Closure](image)

Source: Elaborated by the authors (2020)

Step 23 - Data tabulation: data are typed and tabulated;

Step 24 - Data analysis: this step seeks to obtain the results by applying the method(s) of data analysis.

Step 25 - Results analysis: as final step the data analysis is performed and it is verified if the objectives were met and the research problem was answered.

3. Framework applications

Initially, we analyzed 14 developed studies that applied surveys looking for a direct connection with each of the 5 levels presented. Table 2 shows this connection, the relations and results obtained in each level of the framework.
### Table 2 - Studies that used surveys

<table>
<thead>
<tr>
<th>Nº</th>
<th>Author</th>
<th>Theme</th>
<th>Problem</th>
<th>Goal</th>
<th>Criteria Definition</th>
<th>Analysis Method</th>
<th>Scale</th>
<th>Total of questions</th>
<th>Population surveyed</th>
<th>Results obtained</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Schaefer, J. L.</td>
<td>Competitiveness in Micro and Small Enterprises</td>
<td>How to measure?</td>
<td>Find a Global Rate</td>
<td>Delphi Method</td>
<td>MAUT</td>
<td>Importance (Likert - 1 to 5)</td>
<td>18</td>
<td>316</td>
<td>Global Competitiveness Rate of SMEs</td>
</tr>
<tr>
<td>2</td>
<td>Moraes, J.</td>
<td>Competitiveness in Business Associations</td>
<td>How to measure?</td>
<td>Find a Global Rate</td>
<td>Literature and Documentary Research</td>
<td>MAUT</td>
<td>Importance (Likert - 1 to 5)</td>
<td>31</td>
<td>31</td>
<td>Global Competitiveness Rate of BA</td>
</tr>
<tr>
<td>3</td>
<td>Carvalho, J. F.</td>
<td>Corporate governance (COBIT e ITIL)</td>
<td>How to simplify control for small businesses?</td>
<td>Create a hybrid version</td>
<td>He related two ready instruments</td>
<td>MAUT</td>
<td>Importance (Likert - 1 to 5)</td>
<td>20</td>
<td>100</td>
<td>Hybrid IT Governance Model</td>
</tr>
<tr>
<td>4</td>
<td>Watte, E. F.</td>
<td>Competitiveness in Philanthropic Hospitals</td>
<td>How to measure?</td>
<td>Find a Global Rate</td>
<td>Hospital Norms (QUALISS)</td>
<td>Calculation Replacement Rates</td>
<td>Importance (Likert - 1 to 4)</td>
<td>44</td>
<td>220</td>
<td>Ranking of competitiveness by KPIs</td>
</tr>
<tr>
<td>5</td>
<td>Sordi, D.</td>
<td>Competitiveness in Health and Safety of slaughterhouse industry</td>
<td>How to measure?</td>
<td>Find a Global Rate</td>
<td>Regulatory Norm 36 of the Brazilian Ministry of Labor</td>
<td>MAUT</td>
<td>Importance (Likert - 1 to 4)</td>
<td>33</td>
<td>86</td>
<td>Global Competitiveness Rate of Slaughterhouses</td>
</tr>
<tr>
<td>6</td>
<td>Soliman, M.</td>
<td>Competitiveness in Plastic Transformation Industries</td>
<td>How to evaluate?</td>
<td>Create a tool to measure competitive performance</td>
<td>Scientific literature and sectoral documents</td>
<td>Calculation Replacement Rates</td>
<td>Importance (Likert - 1 to 5)</td>
<td>52</td>
<td>203</td>
<td>Electronic tool to measure and evaluate competitiveness in Plastic Transformation Industries</td>
</tr>
<tr>
<td>7</td>
<td>Cattelan, V. D.</td>
<td>Competitiveness of companies in the Wine Sector in southern Brazil</td>
<td>How to measure!</td>
<td>Create a modeling to measure competitive performance</td>
<td>Bibliographic research</td>
<td>Calculation Replacement Rates</td>
<td>Importance (Likert - 1 to 5)</td>
<td>36</td>
<td>20</td>
<td>Identification and Prioritization of KPIs that influence competitiveness</td>
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<tr>
<td>8</td>
<td>Neuenfeldt Junior, A. L.</td>
<td>Performance of Bus Rapid Transit Systems in Brazil</td>
<td>How to measure?</td>
<td>Create a modeling to measure competitive performance</td>
<td>Documentary research</td>
<td>AHP</td>
<td>Satisfaction (Likert - 1 to 5)</td>
<td>18</td>
<td>12</td>
<td>Level of competitiveness of impacting factors in the Sector</td>
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<tr>
<td>9</td>
<td>Santos, A. M.</td>
<td>Competitiveness in Technologically Based Companies</td>
<td>How to evaluate?</td>
<td>Create a modeling to measure competitive performance</td>
<td>Bibliometric research and adaptation of the author</td>
<td>AHP</td>
<td>Importance (Likert - 1 to 9)</td>
<td>57</td>
<td>60</td>
<td>Evaluation of the level of competitiveness in technology-based companies</td>
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<tr>
<td>No.</td>
<td>Autor</td>
<td>Título</td>
<td>Como Medir?</td>
<td>Cálculo</td>
<td>substitutes Favoráveis (Likert 1 a 7) e Importância (Likert 1 a 5)</td>
<td>Número de Participantes</td>
<td>Participantes</td>
<td>Descrição da Metodologia</td>
<td></td>
<td></td>
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<td>-----</td>
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<td></td>
</tr>
<tr>
<td>10</td>
<td>Dickel, D.G.</td>
<td>Inovação na indústria naval e offshore brasileira</td>
<td>Crie uma modelagem que permita medir o nível de inovação</td>
<td>Pesquisas bibliográficas e documentais</td>
<td>50</td>
<td>120</td>
<td>Modelagem e medição da inovação na indústria naval e offshore brasileira</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Rosa, C.B.</td>
<td>Competitividade na geração de energia fotovoltaica</td>
<td>Crie um modelo que permita medir a competitividade do setor</td>
<td>Pesquisas bibliográfica e documental</td>
<td>41</td>
<td>15</td>
<td>Índices de competitividade na geração de energia fotovoltaica</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Funke, E.</td>
<td>Nível de satisfação do cliente</td>
<td>Crie uma modelagem para medir o desempenho da empresa baseado na satisfação do cliente</td>
<td>Perguntas do cliente, encontros e literatura</td>
<td>18</td>
<td>33</td>
<td>Identificação de KPI e Índice de Satisfação do Cliente</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>13</td>
<td>Sinigaglia, T.</td>
<td>Competitividade do uso de hidrogênio</td>
<td>Estabeleça uma taxa de substituição</td>
<td>Leitura bibliográfica</td>
<td>37</td>
<td>174</td>
<td>Índice de desempenho competitivo do uso de hidrogênio</td>
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<tr>
<td>14</td>
<td>Gelain, C.</td>
<td>Sustentabilidade do tabaco</td>
<td>Crie uma taxa de substituição e modelagem TBL</td>
<td>Relatórios públicos</td>
<td>-</td>
<td>67</td>
<td>Taxas de substituição globais para analisar cada aspecto TBL</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fonte: Elaborado pelos autores (2020)
For verification and validation of the framework, we verified that each of these research went through all levels of the framework using the steps described from the definition of the theme to analysis of results.

Schaefer (2019) had the objective of obtaining a global competitiveness rate for small and medium-sized enterprises, for which he defined the criteria through the Delphi method with specialists in the field. Moraes (2019) measured the global competitiveness of the Business Associations of Rio Grande do Sul, Brazil. Carvalho (2018) created a hybrid view of COBIT and ITIL for small organizations Watte (2017) presented a global competitiveness rate for philanthropic hospitals, through a survey structured by specific norms. Sordi (2017) applied a survey in refrigeration industries in the southern region of Brazil. Soliman (2014) sought in scientific literature and sectoral documents with the objective of developing an electronic tool to measure and evaluate competitiveness in Plastic Transformation Industries.


All surveyed data were used in a developed modeling resulting in some global rate that allows the researchers to ranking the respondents. Some checks were not made on the surveys analyzed, such as the number of questions for each criterion, the correlation between the criteria and how a low correlation could interfere with the results. These are important points that the proposed framework in this study could contribute, since it provides a complete guide to researchers portray as accurately as possible the reality in their surveys.

4. Conclusion
Initially we searched for some survey guides in the literature, but we did not find
frameworks for organizational surveys that contemplate all levels, from conception to analysis of results. Likewise, the difficulty of creating relationships between the criteria of a research, elaborating families of variables, defining the scale of the answers and evaluating the research instrument also deserves greater attention. These points are addressed and detailed in the proposed framework, becoming a guide to support the creation, development and application of organizational surveys to provide data capable of portraying the researched reality.

The framework was verified based on the researches presented in Table 3. The framework was tested with 14 surveys on the most varied subjects, involving 1,457 respondents and 455 questions. With this, it was possible to verify the adequacy of the framework model proposed. The main contribution of our framework is in the survey construction procedures detailed in steps in a modeled and organized way, thus enabling the clustering and correlation of the questions formulated for each type of survey. This verification showed that all the researches have passed, by all the proposed levels obtaining results in each level of the framework. In this way, the objective of this paper has been reached, presenting a comprehensive, consistent framework applicable to any type of organizational survey independent of the goal and the method of data analysis.

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