Applying Swot Analysis Adapted to Public Management: An Action Research

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This initiative aimed to adapt the SWOT analysis to the public management context. The adapted technique was applied in a case study of a Brazilian organization focused on Science, Technology, and innovation in the healthcare sector. Data was gathered through questionnaires from 67 participants involved in the institution's strategic planning and analyzed using mixed methods with the assistance of Iramuteq software. Similarity analysis identified four distinct classes, one of which was a novel category termed "management," which seemingly contradicts traditional SWOT theory. However, this classification resolves the planning dilemma by shifting the focus to management rather than solely emphasizing finalistic areas. Consequently, these findings contribute to enhancing the quality of public management.

Keywords: Public Management. Strategic Planning. SWOT. Innovation. Improvement. Iramuteq.

The Unified Health System (SUS) was established for universalization by Brazil's Federal Constitution in 1988, highlighting health as a pivotal area for instigating structural changes and holding the potential to mitigate inequalities [1]. However, increasing globalization amplifies economic and political disparities among countries [2]. Consequently, the centrality of Science, Technology, and Innovation (ST&I) in addressing health challenges and the significance of this domain as a catalyst for economic, social, and environmental development emphasize the necessity for concentrated efforts directed toward productive transformation and technological innovation, as well as novel forms of scientific production. These efforts should expand access to essential rights, as demonstrated during the COVID-19 pandemic [2].

In this context and in response to diverse challenges, health ST&I institutions must strive for continual improvement and the integration of organizational learning, which can foster innovation in management processes and enhance performance and sustainability. Thus, it is imperative to cultivate a culture that esteems learning, thereby facilitating the commitment and concerted action of all individuals within an organization [3,4].

In pursuing process enhancement, public Science, Technology, and Innovation (ST&I) organizations, aligned with the principles of new Public Management, frequently endeavor to integrate practices from the private sector. The private sector, driven by the imperative to navigate constant market pressures and technological advancements, demonstrates agility in implementing novel solutions. However, a significant challenge arises in adapting these practices while respecting the distinctive characteristics of public administration [5].

The SWOT analysis (Strengths, Weaknesses, Opportunities, and Threats) is one of the most utilized internal and external analysis techniques within strategic planning processes [6]. It aids in identifying organizational strengths, weaknesses, opportunities, and threats through a comparative assessment of competitors [7,8]. However, the emphasis on competitive analysis is more relevant in private organizations, necessitating adjustments for its application in public administration to account for its unique characteristics and context. Proposed adaptations have culminated in a prototype that

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injects innovation, albeit incrementally, into the SWOT framework [9]. Nonetheless, there is a risk that altering a tool grounded in theoretical and empirical foundations may yield unsatisfactory outcomes.

Hence, this study aims to showcase the outcomes of employing the adapted SWOT Matrix within a Brazilian public health ST&I institution affiliated with the Ministry of Health. Doing so contributes to improving management practices in public administration while integrating lessons learned and innovative approaches.

Materials and Methods

The method adopted for this study encompasses a specific aspect of the strategic planning process, focusing solely on the context analysis conducted using the adapted SWOT framework. Several studies have proposed adaptations of this tool, with the primary adjustment involving a shift in the comparative analysis from competitors to organizational identity, comprising the mission, vision, and organizational values [10,11]. While some authors include organizational identity as a stage in the planning process, they continue to center the analysis on competitors.

Variables were identified to guide the analysis and categorized into the internal and external environment of the organization. While some studies relate SWOT to another technique called PESTAL [12,13], our adjustment extends beyond macroeconomic variables. Additionally, variables guiding the internal analysis, such as organizational functions and managerial roles [14,15], and microeconomics, utilizing the adapted five competitive forces model, are included.

Furthermore, the adapted SWOT is employed to generate generic strategies and indicate the organization's positioning, a well-established aspect in the literature [16,17]. Each quadrant of the resulting matrix, derived from the intersection of strengths and weaknesses with threats and opportunities, yields a generic strategy [18,19]. Following the analysis of these variables, the dominant strategy or the institution's predominant positioning in a particular quadrant is identified, guiding the formulation of objectives in the subsequent planning phase.

The adapted SWOT Matrix underwent testing through an action research project conducted in a teaching/educational unit responsible for training staff for the Unified Health System (SUS). This unit operates within a health Science, Technology, and Innovation (ST&I) institution, encompassing care, teaching, research, communication, and scientific dissemination. The sample for this study comprised 100 planning participants out of a total of 570 workers, conducted in July 2022. This research was conducted as part of a project approved by the SENAI/CIMATEC Research Ethics Committee under Certificate of Submission for Ethical Appraisal No. 59519522.5.0000.9287.

Data collection was facilitated through an anonymous questionnaire distributed via email. The questionnaire was structured with closed and mandatory questions and open and optional questions, encompassing 25 variables related to the internal and external environment. Closed questions were categorized according to a Likert scale [21] and analyzed quantitatively, utilizing descriptive statistics to generate mean values and standard deviations. On the other hand, open questions were qualitatively analyzed using the Iramuteq 0.7 software [22]. This software was utilized to identify similarities among the analyzed text segments and to classify these segments arranged in a descending hierarchy [23]. Finally, a comparison was drawn between the quantitative and qualitative data analysis results to assign names to the emerged classes identified by the software.

Results and Discussion

Closed Questions Results

The analysis of closed questions from the questionnaires completed during the planning process yielded 67 responses out of 100 participants (67% response rate). The variables were arranged

in ascending order based on a Likert scale ranging from -4 to 4, with the average responses calculated to identify the primary strengths, weaknesses, opportunities, and threats related to the organizational identity of the surveyed institution. The standard deviation (SD) was also determined.

Table 1 presents the initial results of the 12 variables about the internal environment, encompassing final services and management, which were analyzed to discern strengths and weaknesses. The table illustrates the outcomes of the analysis of 13 external environment variables, encompassing both micro and macroeconomic factors, yielding values for opportunities and threats.

Based on the analysis of the proposed variables, it is possible to discern the organization's strategic positioning per the TOWS Matrix quadrants. Each quadrant suggests a strategic scenario based on the current context, ranging from the most optimistic (where strengths predominate and opportunities abound) to the most pessimistic (which combines weaknesses and threats) [16,17]. The institution falls within the quadrant where strengths prevail in addressing threats. In this quadrant, the most appropriate generic strategy is maintenance [24], which involves creating short--, medium---, and long-term objectives to preserve identified strengths or address threats [25].

Results of Open-Ended Questions

Each variable included an open-ended question, which was analyzed using Iramuteq. The 67 participants generated 59 texts, segmented into 780 text fragments, of which the software successfully analyzed 709, encompassing 90.9% of the produced texts. We identified classes using the descending hierarchical classification method (Figure 1).

The dendrogram (Figure 1) illustrates a hierarchy among the classes derived from the analysis. These classes consist of text segments (STs), lemmas (words without prefixes or suffixes), and themes (25 pre-defined variables). Lemmas were incorporated into suggested classes based on similarity, determined by their chi-square size (x2). The most significant class was Class 3, comprising 191 out of the 709 STs, thus contributing the most to the textual corpus, with 26.94% of the total.

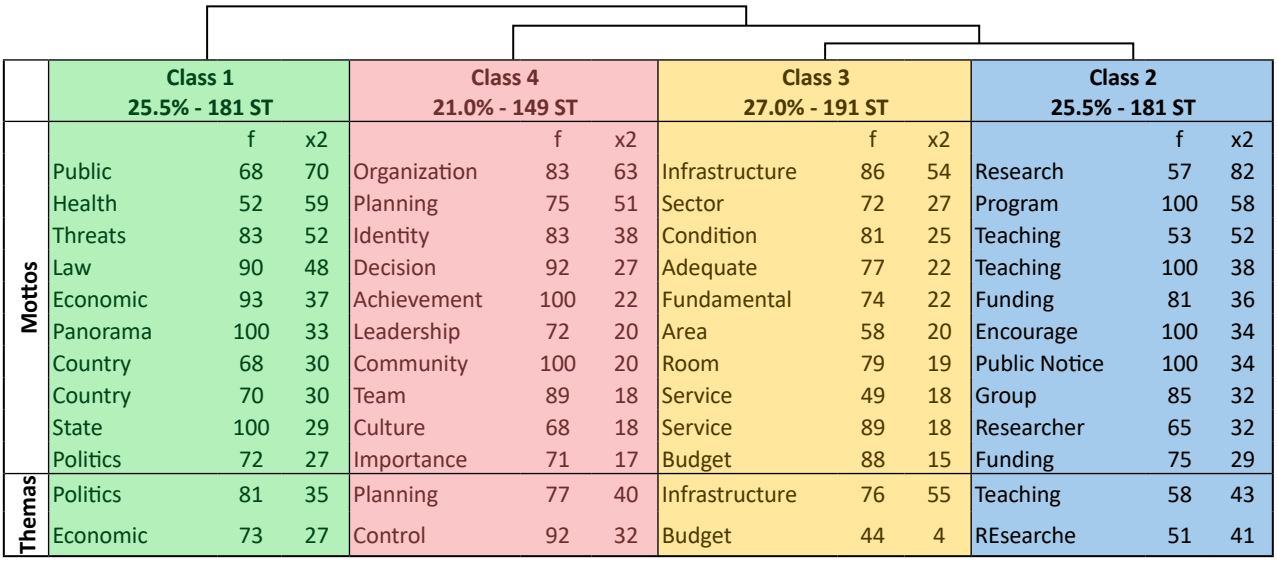
Class 1, representing 25.5% of the corpus, is the least interconnected with others. It is characterized by the most prominent lemmas ($p< 0.0001$) and the

Table 1. Results of the analysis of internal and external environment variables survey data.

Internal Variables	Mean	PD(+-)
Teaching	2.3	1.8
Research	1.6	2.1
Workers	1.2	2
Leadership	1.1	1.8
Health services	0.8	2
Organizational culture	0.7	1.9
Unit organization	0.5	1.7
Planning	0.3	1.7
Communication	0.1	2.3
Internal control	0	1.7
Infrastructure	-1	1.9
Budget	-1	1.9

Internal Variables	Mean	PD(+-)
Financiers	2.7	1.2
Technologies	2.3	1.7
Partners	0.8	0.4
Society	0.6	2.2
Citizen-user	0.6	0.7
Environment	0	2.2
Suppliers	0	1.2
Competition	-0.4	2
Legislation	-0.6	1.9
Health	-0.7	2.2
Education	-1.1	2.3
Politics	-2.8	1.8
Economy	-3	1.4

Figure 1. Dendrogram of the class suggested by Iramuteq.



	Class 1 25.5% - 181 ST			Class 4 21.0% - 149 ST			Class 3 27.0% - 191 ST			Class 2 25.5% - 181 ST		
		f	x2		f	x2		f	x2		f	x2
Mottos	Public	68	70	Organization	83	63	Infrastructure	86	54	Research	57	82
	Health	52	59	Planning	75	51	Sector	72	27	Program	100	58
	Threats	83	52	Identity	83	38	Condition	81	25	Teaching	53	52
	Law	90	48	Decision	92	27	Adequate	77	22	Teaching	100	38
	Economic	93	37	Achievement	100	22	Fundamental	74	22	Funding	81	36
	Panorama	100	33	Leadership	72	20	Area	58	20	Encourage	100	34
	Country	68	30	Community	100	20	Room	79	19	Public Notice	100	34
	Country	70	30	Team	89	18	Service	49	18	Group	85	32
	State	100	29	Culture	68	18	Service	89	18	Researcher	65	32
	Politics	72	27	Importance	71	17	Budget	88	15	Funding	75	29
Themas	Politics	81	35	Planning	77	40	Infrastructure	76	55	Teaching	58	43
	Economic	73	27	Control	92	32	Budget	44	4	REsearche	51	41

highest chi-squared value for this class, including terms such as "public" (x^2 = 70), "health" (x^2 = 59), and "threat" (x^2 = 52). Besides these lemmas, the themes most influential in shaping this class were "politics" (x^2 = 35), "health" (x^2 = 37), and "economics" (x^2 = 24). Notably, the themes of economics and politics emerged as primary threats in the quantitative analysis of closed questions. Consequently, Class 1 was labeled "Threats to public health," with representative text segments reflecting this classification: "The current political landscape poses a significant threat, as the federal government's stance against science and public health..." "The country is facing an economic crisis due to various factors, exacerbated by the federal government's adoption of neoliberal policies undermining public investment, including in public health and ST&I."

Class 2 primarily comprised the lemmas "research" (x^2 = 82), "program" (x^2 = 58), and "teaching" (x^2 = 52), along with the themes "research" (x^2 = 43) and "teaching" (x^2 = 41). The quantitative survey and thematic analysis indicated that participants regarded these slogans and themes as the school's primary strengths. Therefore, this class is aptly named "Strengths," encompassing 149 STs or 21% of the corpus. The following text segment encapsulates the essence of this class, emphasizing the imperative of integrating research with teaching and education: "Fostering collaboration between teaching and research, fostering greater synergy between undergraduate and graduate programs, training faculty in active teaching methodologies, and engaging students in addressing real-world public health challenges."

Class 3, comprising 191 text segments, represents 26.94% of the total corpus. It is characterized by the lemmas "infrastructure" (x^2 = 54), "sector" (x^2 = 27), and "conditions" (x^2 = 25), along with the thematic variable "infrastructure" (x^2 = 55). Compared with the quantitative analysis results, it aligns with the institution's main weaknesses, particularly in infrastructure and budgetary resources. Although budget-related slogans and themes are present, they are not the most significant. Notably, this class is linked to Class 2 through budgetary concerns, as illustrated by the following text segment: "We need to establish programs to stimulate and facilitate the internationalization of our research groups and our extensive and selective programs, with special attention to overcoming the financial constraints that currently serve as the primary obstacle to this internationalization." Hence, Class 3 is aptly named "Weaknesses," underscored by the following significant text segments: "The healthcare facilities

are currently experiencing significant disruptions to their regular operations due to lack of maintenance ..., resulting in considerable wear and tear on these facilities, delays, and service interruptions." "The pandemic has presented challenges, such as adapting classroom layouts. The arrangement of workspaces... needs to be reassessed."

Class 4 comprises 188 text segments, constituting 26.5% of the total corpus. It is characterized by the lemmas "organization" ($x^2 = 63$), "planning" ($x^2 = 51$), and "leadership" ($x^2 = 20$), alongside the thematic variables "planning" ($x^2 = 40$), "control" ($x^2 = 32$), "culture" ($x^2 = 23$), and "leadership" ($x^2 = 15$). Representative text segments for this class include: "Planning holds significant importance for organizational identity as it serves as a guiding element, defining the vision of the future and organizational objectives, thereby facilitating the achievement of desired institutional social outcomes, while also aiding in the evaluation process of these outcomes." "Leadership is a crucial aspect for the organization and its identity." "Internal control is indispensable for ensuring organizational transparency...".

These text segments underscore the significance of managerial functions, initially outlined by Fayol in the early twentieth century [15]. While the classes might have been anticipated to align with SWOT theory and address opportunities, this was not the case. Consequently, this class was labeled "Management," despite not strictly adhering to the SWOT Matrix theory, exhibits closer ties to Classes 2 and 3 than Class 1. This proximity in relationship could be attributed to classes 2 and 3 addressing the internal environment. The empirical findings indicate a tendency to concentrate analysis on management, although such evidence cannot be universally applied. Class 4 underscores the innovation of introducing variables exclusively dedicated to management, thereby allowing other variables to focus on issues about the organization's core functions without the risk of diverting planning focus solely towards administrative concerns, such as personnel shortages, budget constraints, systems, or infrastructure inadequacies.

Conclusion

The empirical research has yielded a significant finding in class 4, which delves into management functions. It may initially be a deviation from the theoretical precepts of SWOT, which has emerged as a solution to the observed inclination towards prioritizing management at the expense of analyzing core areas. Thus, the initial concept of delineating themes for both management and core areas is further validated. The application of SWOT, adapted for public management through action research, has successfully yielded the intended outcomes. It facilitated identifying and analyzing strengths, weaknesses, opportunities, and threats while indicating strategic positioning based on the predominant quadrant. Consequently, it has generated insights that can enhance public management quality by introducing a new class.

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