



## SWOT analysis in health research: a guide for the development of scientific studies

### *Abordagem SWOT na pesquisa em saúde: um guia para construção de estudos científicos*

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#### ABSTRACT

To provide a guide on using the SWOT analysis in health research and scientific studies. This theoretical study focused on health innovation using the design thinking tool. In the inspiration step, the challenges were identified based on the literature review. Then, the ideation step explored strategies to adapt SWOT analysis using insights from other fields. SWOT analysis adapted to health research evaluated strengths, weaknesses, opportunities, and threats. Strengthening research maximized the expertise, clinical resources, and collaborations to increase quality and impact. Addressing weaknesses was crucial to achieving progress. Identifying opportunities highlighted the productive collaboration and technological advancements, improving significance and innovation. However, facing threats requires mitigation strategies. SWOT analysis may help to understand the internal strengths and external opportunities, resulting in more relevant and innovative research.

**Keywords:** Health. Planning. Research. Research methodology.

#### RESUMO

Fornecer um guia sobre a utilização da abordagem SWOT na construção de artigos e pesquisas científicas em saúde. Artigo de desenvolvimento teórico com foco na inovação em saúde. O processo seguiu o design thinking. Na etapa de Inspiração, foram identificados desafios na pesquisa em saúde a partir de revisão bibliográfica. Na Ideação, estratégias de adaptação da SWOT foram exploradas com base em experiências de outros campos. A metodologia SWOT adaptada para pesquisa em saúde enfoca forças, fraquezas, oportunidades e ameaças. Fortalecer a pesquisa maximiza a experiência, recursos clínicos e colaborações para aumentar qualidade e impacto. Abordar fraquezas é crucial para garantir progresso. Identificar oportunidades destaca a colaboração produtiva, e avanços tecnológicos, melhorando relevância e inovação. Enfrentar ameaças requer estratégias de mitigação. A análise SWOT pode direcionar pesquisadores a compreender as forças internas e oportunidades externas, resultando em pesquisas mais relevantes e inovadoras.

**Palavras-chave:** Metodologia como Assunto. Planejamento. Pesquisa. Saúde.

**INTRODUCTION**

Health research is a complex and diverse scientific area that aims to create knowledge to assist clinical practices, improve healthcare systems, and offer alternatives for better quality of life for individuals and communities<sup>1</sup>. As this research advances, new methodologies arise to allow a broader analysis of variables and the identification of efficient strategies to face the challenges.

The SWOT (strengths, weaknesses, opportunities, and threats) analysis has been used in design, marketing, and business. This analysis was originally conceived for strategical business analysis and is often recommended to evaluate factors influencing an organization, product, project, or service<sup>2</sup>. Internationally, the SWOT analysis assesses health outcomes and supports decision-making<sup>3,4</sup>. Health research faces challenges that may hinder its direction and results; however, the SWOT analysis has not been used in this field<sup>5</sup>.

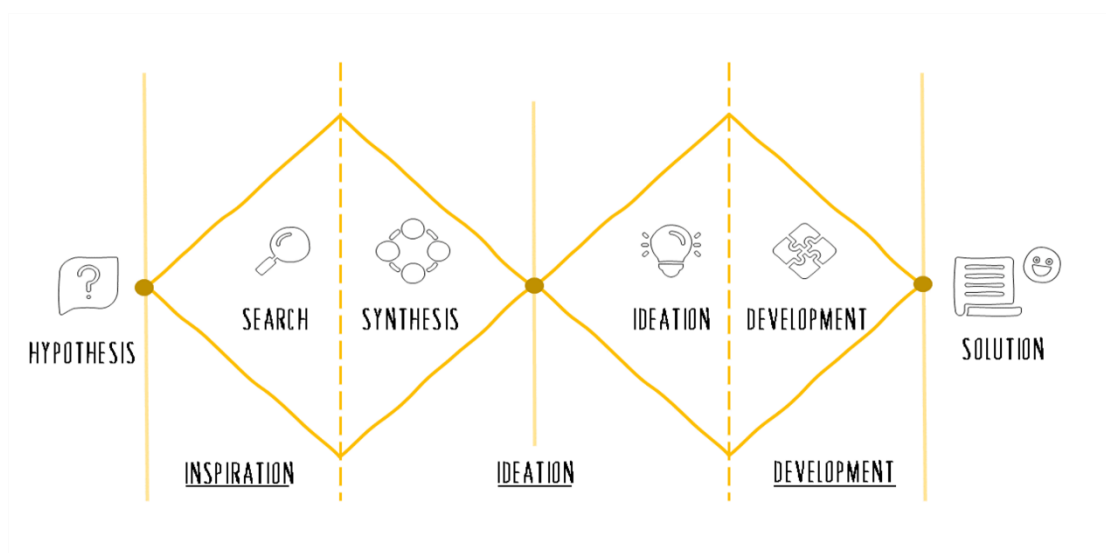
Health research is a rapidly evolving area characterized by continuous scientific, technological, and clinical advancements. Thus, the importance of adopting a strategic

methodology becomes even more evident<sup>5,6</sup>. In this context, SWOT analysis may help evaluate the current situation and develop robust strategies to improve research, maximize its impact, and benefit society.

Based on a solid strategic methodology and a profound comprehension of health research, scientists can face the complex challenges and opportunities<sup>6</sup>. Hence, this study aimed to guide the use of SWOT analysis for health research; this analysis may strengthen and improve research initiatives, contributing to continuous advances in the health sciences and to the quality of life of the society.

**METHODS**

This study focused on health innovation. The development of SWOT analysis adapted for health research followed a process inspired by the double diamond model and design thinking. This process can be divided into three main stages: inspiration, ideation, and development (Figure 1).



**Figure 1.** Methodological process for the study development. **Source:** adapted from Caulliraux et al. 2020<sup>7</sup>.

## INSPIRATION

In this stage, the aim was to understand the problem and the factors related to methodological construction for health research using academic experiences and searching. The databases used were Scopus, PubMed/MEDline, and Web of Science, with the descriptors searched in Portuguese and English: “Challenges,” “Methods,” “Scientific research,” and “Health research”. Then, the studies selected were indexed on Mendeley (version 2.108.0). This search did not intend to review the literature but to obtain insights on the theme.

The challenges identified were regarding organization, systematization, and reproducibility of methods. Additionally, a need for more structured methods hindered the health research progress once these processes demanded a spiral development model.

## IDEATION

In this stage, available strategies, literature, and tools found in the inspiration step were explored to find scientifically validated solutions to adapt SWOT. However, these solutions were not found.

Similar challenges were faced in developing products focused on inclusive design and solving business problems. Thus, successful instruments

and methodologies were identified to deal with these challenges. Among them, the SWOT analysis was evidenced as an adequate tool.

## DEVELOPMENT

Based on the knowledge gathered in the previous steps, the SWOT analysis adapted for health research was created based on design thinking<sup>8</sup>; defined and structured stages were established for its application. In this analysis, the researcher was placed at the center of the process to increase efficacy and efficiency in health research.

The adaptation of the SWOT analysis followed a robust and creative process, incorporating principles of design thinking to address the specific needs of researchers in health research.

## RESULTS

The adapted SWOT analysis was developed following its basic principles, which were incorporated into the research. The analysis begins in the early stages of research planning and goes up to the peer-reviewed stage. Figure 2 summarizes the idea, and each phase is detailed below.



Figure 2. Adapted SWOT analysis for health research. Source: The author.

**STRENGTHS**

In the first stage, the focus is on identifying and maximizing strengths in health research. Strengthening positive aspects (e.g., experience, clinical resources, and collaboration) may improve the quality and impact of studies and increase the reliability of results, the credibility of researchers, and the relevance of the research. Chart 1 outlines the main aspects to be considered.

**WEAKNESSES**

The second aspect addresses common weaknesses in health research and how to overcome them (Chart 1). Weaknesses include limitations in financial resources, ethical constraints, and other challenges that may hamper the research progress. Consequently, recognizing and overcoming them is the first step to ensure research quality. In this scenario, discussing common weaknesses in similar research and seeking solutions to overcome them is essential.

**Table 1.** Strengths and weaknesses evaluation.

Strengths	
Aspects to evaluate	How to evaluate
Experience	Assess the clinical and scientific knowledge of the research team, highlighting relevant individual and collective specializations.
Resources	Identify equipment availability, infrastructure, and accessibility to conduct the research.
Collaborations	List partnerships with healthcare professionals, institutions, research centers, or other researchers who can contribute to and add value to the work.
Data availability	Verify whether electronic medical records, patient data, and relevant databases are available.
Weaknesses	
Aspects to evaluate	How to evaluate
Resource limitations	Identify how to seek external funding, optimize available resources, and establish strategic partnerships.
Lack of access to study populations	Consider the difficulties in accessing suitable study populations due to geographical or ethical restrictions.
Lack of knowledge of research methodology	Evaluate the lack of experience in research methodologies, clinical studies design, and statistical analysis.
Ethical challenges	Address the importance of strict compliance with ethical regulations and emphasize the need for ethical approval.

**Source:** The author.

**OPPORTUNITIES**

The third aspect identifies opportunities to improve health research (Chart 2). It elucidates how to recognize opportunities to form productive collaborations with other researchers, benefit from technological advances, obtain funding, and stay current with relevant topics and discoveries. Furthermore, this aspect highlights how the early discovery of opportunity can

improve the relevance and innovation of health research and increase funding acquisition.

**THREATS**

The last aspect addresses threats that may impact health research and suggests strategies to mitigate them (Chart 2). These threats include experience, regulatory changes, and other factors hindering the research development.

**Table 2.** Identifying opportunities and threats.

Opportunities	
Aspects to evaluate	How to identify
Interdisciplinary collaborations	Participate in research networks, events, and conferences to identify collaboration opportunities with researchers in different areas.
Technological advances	Stay updated on technological innovations in health research and explore partnerships with healthcare and technology companies to enhance research.
Research funding	Seek grants, scholarships, and partnerships with public and private sectors. Scientific crowdfunding can also be considered.
Emerging subjects	Stay updated on the scientific literature, participate in forums and academic networks, and collaborate with trend observers to identify emerging topics and relevant findings in health research.
Threats	
Aspects to evaluate	How to mitigate
Experienced competition	Address and promote collaboration with established researchers and pursue research niches that can help overcome competition.
Regulatory changes	Discuss the importance of compliance with constantly evolving regulations and the need to adapt research protocols.
Resilience and flexibility	Develop contingency plans to deal with unforeseen obstacles and be flexible to changes in the research environment.
Resistance to innovation in health	Recognize that some resistance may occur in adopting discoveries or practices in health research and try to adapt the research with alternatives to this scenario.

**Source:** The author.

Creating a Four Aspects Evaluation Matrix using spreadsheets, presentation software, or another suitable tool is useful to represent the conclusions of the critical analysis of each SWOT aspect (Figure 3). This visual resource is

important for the researcher to identify strategies that can evidence strengths, mitigate weaknesses, seize opportunities, and address threats in health research.

POSITIVE ASPECTS	STRENGTHS (S)	WEAKNESSES (W)	NEGATIVE ASPECTS
	<ul style="list-style-type: none"> <li>Highly qualified and experienced research team in medicine and health science.</li> <li>Team members with numerous relevant scientific publications in the field.</li> <li>Well-equipped laboratories with state-of-the-art technology for clinical analyses.</li> <li>Established partnerships with specialist doctors, nurses, and pharmacists.</li> <li>Availability of clinical databases.</li> </ul>	<ul style="list-style-type: none"> <li>Limited research budget, which can affect the ability to conduct extensive studies.</li> <li>Lack of access to study populations.</li> <li>Ethical complexities related to research involving pediatric patients.</li> <li>Dependence on external consultants for statistical analysis.</li> </ul>	
	OPPORTUNITIES (O)	THREATS (T)	
	<ul style="list-style-type: none"> <li>Collaboration with universities and multidisciplinary research centers.</li> <li>Potential to develop mobile health monitoring applications.</li> <li>Participation in grant programs for innovative health research.</li> <li>Potential to translate findings into innovative treatments.</li> </ul>	<ul style="list-style-type: none"> <li>Difficulty in attracting participants due to competition with renowned institutions.</li> <li>Reduced research budgets due to healthcare budget cuts.</li> <li>Ethical requirements constantly evolving, increasing the time needed to obtain approvals.</li> <li>Reluctance of healthcare professionals to adopt innovative practices or therapies.</li> </ul>	

Figure 3. Example of Four Aspects Evaluation Matrix. Source: The author.

SWOT analysis can be effective when applied at the beginning of research planning, helping to establish a solid foundation and guide the study. Furthermore, revisiting the SWOT analysis during the peer review phase can help address constructive criticism, identify areas for improvement, and strengthen argumentation on the research.

## DISCUSSION

A SWOT analysis adapted for health research was presented as a tool to provide a solid foundation and improve research quality. The findings highlighted the potential of SWOT analysis to enhance the effectiveness of health research and promote informed decision-making. Also, the analysis can help evaluate a research project, identifying internal strengths (e.g., clinical resources and collaborations) and external opportunities (e.g., funding and emerging technologies)<sup>10</sup>.

Studies that have used SWOT analysis reported its strong support to improve the practices in research conduct<sup>10,11</sup>. Researchers and healthcare professionals can use the SWOT analysis to evaluate the research setting comprehensively. The adapted SWOT analysis

may help direct research resources efficiently by highlighting internal strengths and identifying external opportunities,<sup>12</sup>. As a result, the increased research quality and the development of more efficient interventions may improve the health of the population<sup>11</sup>.

SWOT analysis can contribute to the relevance of health research by assisting researchers in identifying areas that potentially impact public health. Additionally, the analysis optimizes limited resources, highlighting weaknesses and threats and directing researchers towards areas of greater importance<sup>13</sup>. By acknowledging limitations (i.e., limited resources or regulatory changes), researchers can develop strategies to mitigate them and make informed decisions throughout the research<sup>14,15</sup>.

Nevertheless, SWOT analysis may be challenging regarding the subjectivity in assessment and the complexity of collecting data. Overcoming these limitations requires expertise and care in interpreting the results, evidencing the need to adopt this analysis<sup>12</sup>. Training and education, dissemination of successful case studies, and providing practical guides are viable strategies to promote the widespread application of SWOT analysis in health research<sup>16</sup>.

The SWOT analysis proposed in this study has the potential to promote innovation,

effectiveness, and relevant health research, providing a solid framework for informed decision-making<sup>17</sup>. Identifying strengths, weaknesses, opportunities, and threats allows researchers to stand out in a competitive, dynamic field. Adopting this analysis in health research may increase effectiveness, relevance, and innovation. By addressing common challenges and embracing their potential, researchers can enhance the quality of research and contribute to substantial advancements<sup>18</sup>.

Last, the SWOT analysis is an important and guiding tool for health research, enabling researchers to achieve greater quality and impact<sup>12,18</sup>. Facing common challenges and recognizing its limitations is the first step to improving its application. Encouraging the academic community to adopt it may promote more effective, relevant, and innovative health research.

In this context, well-structured research guided by SWOT analysis will promote better results that will directly impact the quality of life and promote health for the population. Furthermore, this study highlights how the adapted SWOT analysis can improve the relevance of health research, identifying potential areas to impact public health, assisting researchers in prioritizing their areas of study, and optimizing limited resources.

## CONCLUSION

The SWOT analysis was adapted encompassing four main aspects to give a broader analysis of the health research and was characterized as a promising tool. The analysis can direct researchers to better understand internal strengths and identify external opportunities, resulting in more relevant and innovative research to impact the health of the population. SWOT analysis adapted for research can also enable researchers to proactively tackle common

challenges, such as regulatory changes and competition from experienced researchers. They can also develop mitigation strategies and make informed decisions by recognizing weaknesses and threats at all project stages. However, applying SWOT analysis requires collecting detailed information, interpreting skills, and addressing inherent limitations. Therefore, training researchers and sharing successful studies is needed to promote the widespread adoption of this analysis.

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