
Improvement of the Efficiency Model in Health Care through the use of Stakeholders' Analysis Techniques

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Abstract. The pursuit of health efficiency has become the aim of many stakeholders in their respective sector, because of the increasing demand for health care services and the rising expenses in the sector. However, the efficiency analysis is complex in systems, like the health system, where exist conceptual challenges, multiple objectives and great scope for error. One of the difficulties is the selection of prominent variables of the efficiency model, which represent the requirements of stakeholders. The Stakeholders' Analysis is a technique used to evaluate different clusters of interest in complex systems. Yet, its application for efficiency analysis in the health sector is still rare. This paper aims at using the stakeholders' analysis as a support for the efficient health model and verify its advantages and restrictions.

Keywords. Health Sector, Complex System, Efficiency Model, Stakeholders Analysis

1 Introduction

During the last decades, an astonishing increase of pursuit for health care in all countries has been stated, independently of the economic classification in the world scope. The increase of demand excels actions of important social actors: the consumers, anxious for a long and healthy life and the suppliers, who, come across new medicines and technological advances in the health area. These changes are favorable, since they increase the life expectancy and well-being of the people. However, from another point of view, the countries have a raised expenditures with health, consuming a sizeable proportion of their gross domestic product. Because of this characteristic of the health sector, policy makers, administrators and clinicians are not only worried about supplying quality services, but also about efficient ways to deliver health services. According to [10], efficiency improvements in the health sector, even in small amounts, can yield considerable savings of resources or expansion of services for the community.

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So, health is seen as a production model, just like it normally occurs in industrial processes [1]. The main idea, of this model, is the process of converting health inputs (medical cares, medicines, food habits, education, etc) into health improvements (outputs). The health production model aids to identify possible variables, which will be used to measure efficiency and to find benchmarks. Notwithstanding, this model doesn't consider the actor involved in the process. So, how can we measure the efficiency in the health sector, considering inputs and outputs that represent the requirements of stakeholders?

The technique, usually used in processes of goods and services production, is the Stakeholders' Analysis. Mentioning the enterprise area, [5] affirm that on the strategic level, the performance optimization of any production can be achieved by identifying stakeholders of the operation. In complex sectors, stakeholders' analysis is used with the intention to promote improvements in the sector. [12] use context analysis and stakeholders' identification to improve the sectors (health and education) in the rural areas of Nicaragua.

[13] describes three main reasons for applying stakeholders' analysis in the health care field. These intentions are resumed as follows: understanding and influencing policy; facilitating the implementation of organizational goals or objectives; and finally determining optimal ways of relating with key stakeholders.

This paper intends to discuss the advantages and restrictions of the application of Stakeholders' Analysis to identify the variable in efficiency models in the health sector. In section 2, we discuss the conceptual aspects that involve the evaluation of performance in the health sector and the difficulties in defining the variable necessary to measure efficiency in this sector. Section 3 presents the concepts about Stakeholders' Analysis. Section 4 presents the methodology proposal in this paper, followed by a case study. Finally, section 5 presents the final commentaries about the methodology proposal.

2 Defining the Variable of the Efficiency Model in Health Care

To develop a satisfactory empirical model of efficiency in the health sector, it is necessary to consider three issues [4]: What is the appropriate unit of analysis (Decision-Making Unit - DMU)? What are the outputs of health care? What inputs are used in the production of these outputs and how should these be valued?

The DMUs of the health sector usually composes the basic objective of the analysis and they don't present great difficulties in being definite. For example, a macro approach, used by the World Health Organization (WHO), is the international comparison of health care systems. There the unities of analysis are the members of the WHO. In a micro approach, as like measuring hospital efficiency, the DMUs could be the hospitals in a country or region [10].

Notwithstanding, defining inputs and outputs isn't as easy as defining DMUs. It is always difficult to give clear inputs and outputs measurement of the health system because the whole health system is hard to measure in terms of quantity [7]. Also these variables are not usually chosen considering the stakeholders of the system. Further, different stakeholders need different sets of performance indicators, so that all of them are taken into consideration: suppliers and customers

[2]. The distinct stakeholders' points of view become the variable of model dynamic. The figure 1 shows an example. The variable "number of hospital beds" can be an output or input, in a hospital efficiency context. From the point of view of the administrator, this variable represents a system resource (input). For the beneficiary, it is an output, which he wants available whenever he needs.

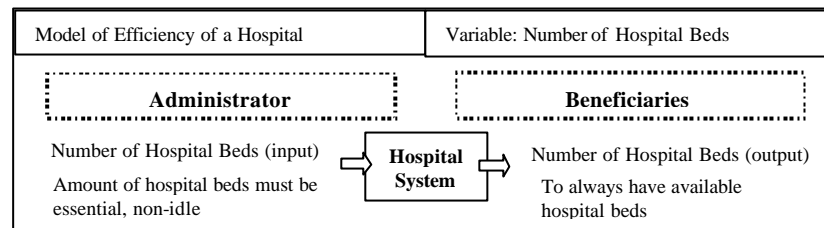


Figure 1. Variable, hospital beds, under different point of view

Source. Authors

Another difficulty is the trust in the results of the efficiency model. As, most of the time, the choice of these variable is subjective. So, the goal of the analysis might be compromised, as some of the stakeholders could be biased. [4] stress that to attain the objective of the efficiency analysis and identification of benchmarks, in the health sector the correct identification of the inputs and outputs of the model is necessary. The methodology for performance evaluation depends on the clarity of the objectives and goals of the health systems that it desires to evaluate [6].

3 Stakeholders' Analysis

Stakeholders' Analysis is a methodology that promotes ways to evaluate and to understand people, groups of people and institutions involved in the system, through the identification of stakeholder requirements. Stakeholder requirements express what stakeholders of a system require of the product, processes and the organization of that system; these requirements may be expressed as needs, wants, expectations, desires, priorities, objectives, or capabilities [8].

[14] defines Stakeholders' Analysis as being a systematic process of capturing and analyzing qualitative information, used for identifying interests of third parties when wanting to develop and/or implement a policy or a program. For [15] Stakeholders' Analysis is a methodology to identify key stakeholders of a project, searching for their interests, and verifying how these interests can affect the risk and the viability of the project. In the health sector, [11] concludes that Stakeholders' Analysis is an important task to guarantee the success of the reform in the sector. Therefore this question must be answered: What have been the roles of stakeholders, and their effect on the process of health sector reforms in developing countries?

To apply Stakeholders' Analysis doesn't exist only one way to specify the stakeholders' requirements. However, is useful to know the goals of the project

before start the analysis. The first step in approaching stakeholder analysis is determining the purpose of your inquiry; which in turn determines the time focus of interest and issues to consider in conducting the analysis [13].

4 Methodology and Application

Figure 2 presents the performance measurement and management cycle, which enables from the conceptualization and definition of the variables to measure efficiency of systems that compose the health sector. The outcomes can be used to assist the process of improvement in this sector. The methodology of Stakeholders' Analysis has as objective to find the best variables of the efficiency model.

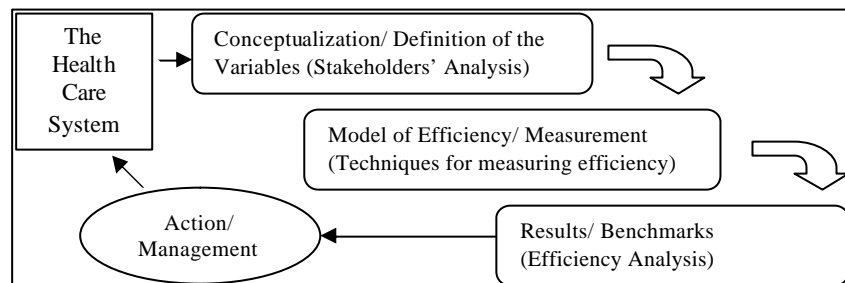


Figure 2. Stakeholders' analysis, performance measurement and management cycle

Source. Authors, adapted from [6]

The methodology is composed for three phases (table 1), illustrated for a case study. This case pursues to identify the variables of the efficiency model, for a comparative analysis among the diverse Health Care Systems of the country members of the WHO. The definite variable (from this methodology) will be compared with the variable used in other studies as [7] and [9].

Table 1. Methodology of Stakeholders' Analysis for Efficiency Models

Phase	Methodology of Stakeholders' Analysis for Efficiency Models
1	1. Context Analysis of the health model to be evaluated 1.1 Objective 1.2 Context Analysis and DMUs' specification
2	2. Stakeholders' Analysis of health model 2.1 Identifying, describing and clustering of the stakeholders (inside the Context) 2.2. Capturing the stakeholders expectations and responsibilities in the sector, and how this information can influence the objective of the health system.
3	3. Variables Analysis: The variables are identified from the last phase

The first phase is characterized by the identification and context analysis of the system. Describing the objective is the first activity to be done. After, it is possible to specify the DMUs, which will be used in the efficiency model.

According to the phase I of methodology, the fundamental objective of our study is an international comparison of health systems. Therefore, each DMU will be represented by the Health Care System of these countries. For this reason, we need to define what will be considered a Health Care System. According to [16] “The Health Care System” is the total sum of all the organizations, institutions and resources whose primary purpose is to improve health.

In the second phase the identification and the clustering of stakeholders is done (figure 3). Further, it captures the requirements of stakeholders in the sector, which is the most important stage of the methodology. It is important to observe that the stakeholders are part of the health system. This determines the approach used by the methodology of the stakeholders’ analysis, and it is based on two issues: What stakeholders receive from the health system (expectations): what stakeholders supply to the system (responsibilities). To identify the stakeholders of the health system, we have used a guidance list provided by [3], which have helped us to execute a brainstorming. After the brainstorming we have interviewed health sector expertise.

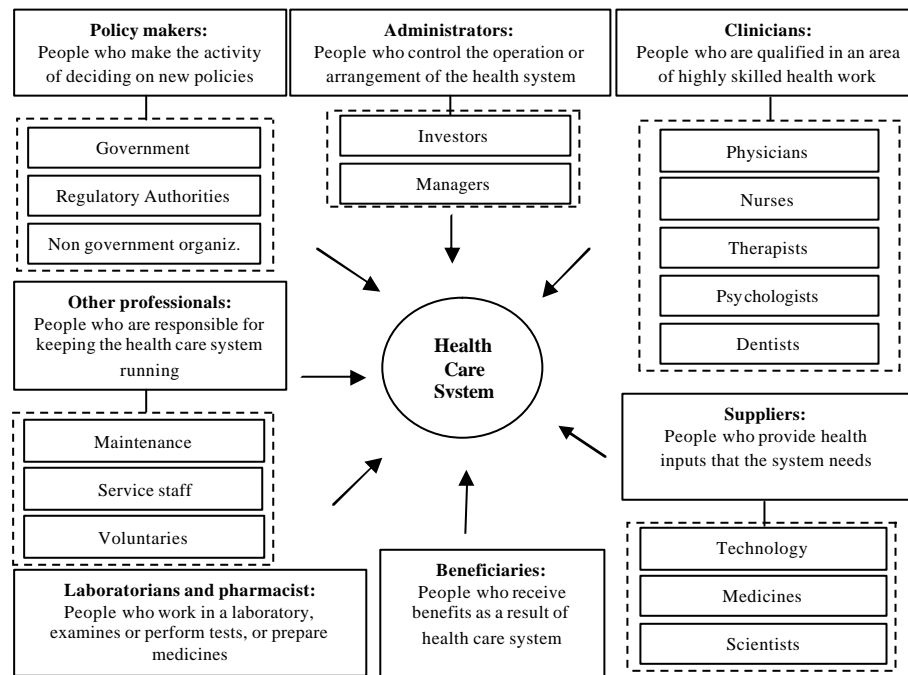


Figure 3. Stakeholders' Diagram

Source. Authors

To apply the phase three, we choose two clusters of stakeholders, the policy makers and the beneficiaries (figure 4). The variables are found answering the two previous issues. The inputs possibly come from the responsibilities of stakeholders and the outputs come from the expectations.

	Responsibilities	Indicator (possible input)	Expectations	Indicator (possible output)
Policy Makers	1. Promoting conditions for protection and recovery of the health of the population	<ul style="list-style-type: none"> • Basic infrastructure: number of professionals, hospitals, medicines • % covering of sanitations services and garbage collection • % population in urban and rural area 	1. Supplying health for all the population with quality and fairness	<ul style="list-style-type: none"> • Infant Mortality • Life expectancy • % of population covered by health programs
	2. Promoting laws and programs aiming at improvements in the health	<ul style="list-style-type: none"> • Number of laws and national programs (preventions, immunization, vaccination) 		
	3. Financial accounting of the health system	<ul style="list-style-type: none"> • Total expenditure on health (as % of GDP, per capita, government, private) • Number of beneficiaries of private and public plans 		
Beneficiaries	1. Payment of taxes	<ul style="list-style-type: none"> • The beneficiaries' contribution to health expenses 	1. To have a long and healthy life	<ul style="list-style-type: none"> • Life expectancy
	2. Respect for the law	<ul style="list-style-type: none"> • Expenses with taxes 	2. Basic infrastructure	<ul style="list-style-type: none"> • Numbers of clinicians, laboratorians, pharmacists and hospital beds
	3. Awareness of the health programs	<ul style="list-style-type: none"> • Number of laws and national programs (preventions, immunization, vaccination) 	3. Indicators of quality	

Figure 4. Phase 2 and 3 of methodology

Source. Authors

Table 2 presents a comparison among the variables used in two other studies about efficiency analysis with the variables found through our methodology. As can observe, there are several approaches that can be used for efficiency analysis, for example historical, monetary or quantitative approaches. However, the stakeholders approach identifies different variable that are based on the requirements of stakeholders. Through inputs as: “% covering Sanitation” and “Average years of schooling”, the methodology retracts the complexity of evaluating the health sector.

5 Conclusion and Final Commentaries

With the methodology proposal it is possible to obtain a larger understanding of the size of the problem that will be studied. Specifying the objective and the context of the analysis, we can justify why we use these variable in the efficiency model. Thus, the subjectivity of the analysis is avoided and certain are aided

DMUs. Further, we can observe the dynamic of variables, because of the stakeholders in the system; the variables can be used as an input or output, according to the stakeholders requirements. The Stakeholders' Analysis provides security to define when one variable is input or output based on the point of view of the stakeholder in the health system.

Because of the data limitations, the study case encountered difficulties, which are normal in the health sector. Another complex matter was the time spent to identify the stakeholders requirements, which can increase the cost of the project.

Notwithstanding the methodology when used for specific goals, for example, can be applied to justify the necessity of an investment or assist a reform in the health sector, because it is based on the responsibilities and expectations of influential stakeholders.

Table 2. The paragraph styles defined in the Springer Word template

Papers	Variables for Efficiency Model in Health Care Systems		
	<i>Approach</i>	<i>Inputs</i>	<i>Outputs</i>
Our Methodology (Stakeholder's Analysis)	Policy makers	<ul style="list-style-type: none"> • Number of health professionals • Number of hospital beds • % covering sanitation • % urban population • Average years of schooling • Health expenditure 	<ul style="list-style-type: none"> • Life expectancy at birth • Low birthweight infant mortality • % of population covered by public health system
	Beneficiaries	<ul style="list-style-type: none"> • Taxes expenditure • Out-of-pocket expenditure 	<ul style="list-style-type: none"> • Life expectancy • Number of health professionals • Number of hospital beds
[9] “Compare the efficiency of health systems in G-20 Countries”	Fairness Model	<ul style="list-style-type: none"> • Gini coefficient • Health expenditure as % of GDP 	<ul style="list-style-type: none"> • Life expectancy at birth • Low birthweight infant mortality
	Historical Model	<ul style="list-style-type: none"> • Life expectancy at birth (1995) • Low birthweight infant mortality (1995) 	<ul style="list-style-type: none"> • Life expectancy at birth (2005) • Low birthweight infant mortality (2005)
[7] “Compare the efficiency of health systems in Canada and the U.S. at sub-national levels”	Quantity Model	<ul style="list-style-type: none"> • Numbers of (per 1000): <ul style="list-style-type: none"> • Physicians • Nurses • Hospitals • Real expenditure on pharmaceuticals per 1000 population 	<ul style="list-style-type: none"> • Life expectancy at birth • Low birthweight infant mortality • Age-standardized self-assessed health status • PYLL (Years of Potential Life Lost) from: <ul style="list-style-type: none"> • malignant neoplasms • cerebrovascular disease
	Monetary Model	<ul style="list-style-type: none"> • Expenditure on: <ul style="list-style-type: none"> • physicians • hospitals • pharmaceuticals • others 	

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