

Probabilistic Scenarios for Private Health Care Entities: Analysis of Medical and Administrative Management

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The strategic prospective is a convergence of diverse disciplinary fields, that applied to private health entities at a national level allows to consider the probable future of these companies; This method is based on the use of three softwares: the first called Micmac aims to prioritize the 6 main influential and dependent variables, by using a table of two inputs called structural analysis matrix, the second program called Mactor values relationships of force among the 30 identified actors, studying the convergences and divergences with respect to the associated objectives. In addition, the games of actors are constructed to formulate hypotheses of the system under study. Once established, the Delphi methodology is used. Finally, in the Smic Prob-Expert methodology, the simple and conditioned probabilities of events are determined, represented in 64 possible scenarios and identifying the normative trends, allowing to discern the probabilities of the entities of the sector.

Keywords: prospective, micmac, mactor, smib prob expert

INTRODUCTION

The strategic prospective is an analysis where we try to describe what can happen (possible futures) and what we would like to happen in an organization. On the other hand, in accordance with Batista, Sánchez, Méndez and Rojas (2015) they mention that the strategic prospective nowadays has become the best partner of strategic planning because of the fast changes in the environment and because it is a tool that points out the most appropriate means to reach the perspective visualized by the person, since when carrying out an analysis the establishment of a desirable future is anticipated, making possible the creation of adequate plans applied to the reality.

This tool applied in the private health sector makes it easier for managers to make rational use of human, financial, and technical resources, and also contributes to the provision of quality and efficient services in the long term. Linking prospective and strategic planning tools makes it possible to discern the past, present, and future of the system under study, so that private health entities can achieve their purposes or objectives (desired future) in order to compensate for the deficiencies that have been arising in recent years.

The prospective method uses three programs that allow you to discern future scenarios. For the application of the first software, called Micmac, within the strategic prospective methodology, according

to Godet and Durance (2009), a state of the art must be made in order to allow companies to support their distinctive competences and transform them into key factors for their success in what are, or will be, their business sectors. This analysis is integrated by foresight workshops where there is a situational diagnosis, whose main objective is to help the leaders make decisions and guide the activities. Later, the competence tree is made, with the purpose of representing the whole organization, without reducing it to its products or markets. In addition the expected changes for the future, the stereotypes and the description of the factors are performed.

With the information gathered from the state of the art and prospective workshops, a homogeneous list of 30 variables (internal and external) was identified that describe the system studied and its environment. After this, a matrix was made representing the direct influences between variables. Finally, the 6 key variables were identified, which because of their indirect actions, play a principal role and are in charge of promoting the development of the system, given the determining role they play in it.

With regard to the second Mactor software, 30 actors were identified who control or influence the key variables of the structural analysis. This has the objective of evaluating the relations of forces between each one of them, knowing the positioning of the actors regarding the objectives, and studying the convergences and divergences with the strategic challenges that were elaborated, taking into consideration the 6 key variables analyzed in the Micmac.

Finally, the third software is the Smic Prob-Expert. This probabilistic cross-impact method determines the simple and conditioned probabilities of events, as well as the probabilities of combinations of the latter, taking into consideration the interactions between the hypotheses, keeping as a main objective to highlight the most probable scenarios and examine the combinations of events that will be excluded a priori. This program takes into account the interdependence between the proposed themes and ensures the consistency of the responses. Its development is fast and the results are easy to interpret. The application of these three methods will help to reduce the uncertainty that exists in companies and will facilitate the making of correct decisions under different but equally probable scenarios, thus allowing to build a better possible future.

METHODOLOGY

This research was conducted at a national level, with 603 private for-profit health entities (INEC, 2016) as the object of study. Using the formula proposed by Hernández, Fernández, and Baptista (2010), a probability sample of 35 companies was applied during 2017 and the first quarter of 2018, based on the collection of information obtained from the review of laws, regulations, reforms, and reports published by the control agencies that make up Ecuador's health sector and to which private companies providing medical services are subject.

The registration of financial statements, was obtained through the Superintendence of Companies, Insurance and Securities, consequently through the characterization of micro and macro environment strategic tools as the competitive forces of Porter and PESTEL factors respectively, we proceeded to the analysis of the operating conditions, development and elements that may affect private health houses within the environment in which they operate, in order to establish the first criterion within the prospective methodology, called state of the art.

According to Godet and Durance (2009), strategic prospective is based on three processes: collective reflection, decision preparation and action implementation. The collective reflection involves six of the nine stages, within the framework of the identification of key variables using the Cross-impact matrix multiplication applied to classification (Micmac) program, which through the use of prospective workshops obtains factors that condition the system, i.e. internal and external variables recognized on the basis of the information collected, which have a direct impact on the private health sector.

The aforementioned factors are interrelated through a two-entry table called structural analysis matrix, considering the influence relationship of one variable to another, where the rating according to Godet and Durance (2009), 0: is no influence, 1: weak influence, 2: medium influence and 3: strong influence. Concerning the degree of interrelation, it is possible to determine the importance of certain

factors through the plane of potential indirect influences and dependencies, where those variables that have a high degree of influence and dependencies are considered as strategic challenges that take a predominant role in the development of the system.

The analysis and formulation of the actors and games of actors is made possible through the use of the Method of actors, objectives and relationships of force (Mactor). For the development of this program, 30 actors are identified who will condition the future system, with reference to the study of the art diagnosed in the initial stage, then, the strategic challenges that will be determinant in private health entities are entered into the software and by obtaining these objectives, the groups of actors are formulated, establishing a relationship between the strategic challenges and the actors, which can positively or negatively influence the achievement of the objectives.

The Mactor software allows the analysis of the influences between actors and the evaluation of relationships of force through the matrix of indirect influences and dependencies (MIDI), based on the rating mentioned by Godet and Durance (2009), where 0: has no influence, 1: can put at risk the operational processes, 2: can put at risk the projects and 3: risk of fulfilling its missions, also identifies the most important convergences and divergences, as well as the associated objectives and positions each actor in relation to each objective with the use of the matrix of actors by objectives (2MAO), facilitating the enunciation of the key hypotheses for the development of the system.

At the conclusion of the collective reflection process, the probabilistic cross-impact method (Smic Prob-Expert) allows minimizing the risk through the identification of the most probable scenarios. For the development of this program it is essential to carry out the surveys to Delphi experts, which in reference to Reguant & Torrado (2016) is a technique of information collection, based on consultation with experts in one area, these were addressed to specialists in the sector such as 34 medical directors of private health facilities and the zonal health coordinator 4, with the objective of minimizing the uncertainty of the various key events for the future of private health care in the country.

Smic Prob-Expert defines the most probable futures, which a posteriori are used as a basis for the construction of scenarios. From the objectives that become hypotheses for the experts, their opinion is discerned qualitatively and quantitatively through the qualification of simple and conditional probabilities, which once entered into the software are reflected in the histogram of the extremes, projecting 64 possible scenarios. Then, based on the referenced histogram 2 scenarios are identified: the trend that indicates the highest relative probability of occurrence for the health sector, recognized by the highest significant percentage; and the scenario betting that it is the one that meets all the proposed objectives, identified by the binary combination of (11111).

The decision preparation includes the seventh and eighth stage. In the seventh stage, the strategic results provided by the system are evaluated, and within the eighth stage there is a framework for the prioritization of objectives and transcendental decisions, that is, after the deliberation of the results found, the decision on a route to follow is made. The action which is the last procedure establishes the ninth stage which deals with the operationalization of the action plan.

OUTCOMES

Structural Analysis Using the Micmac Method

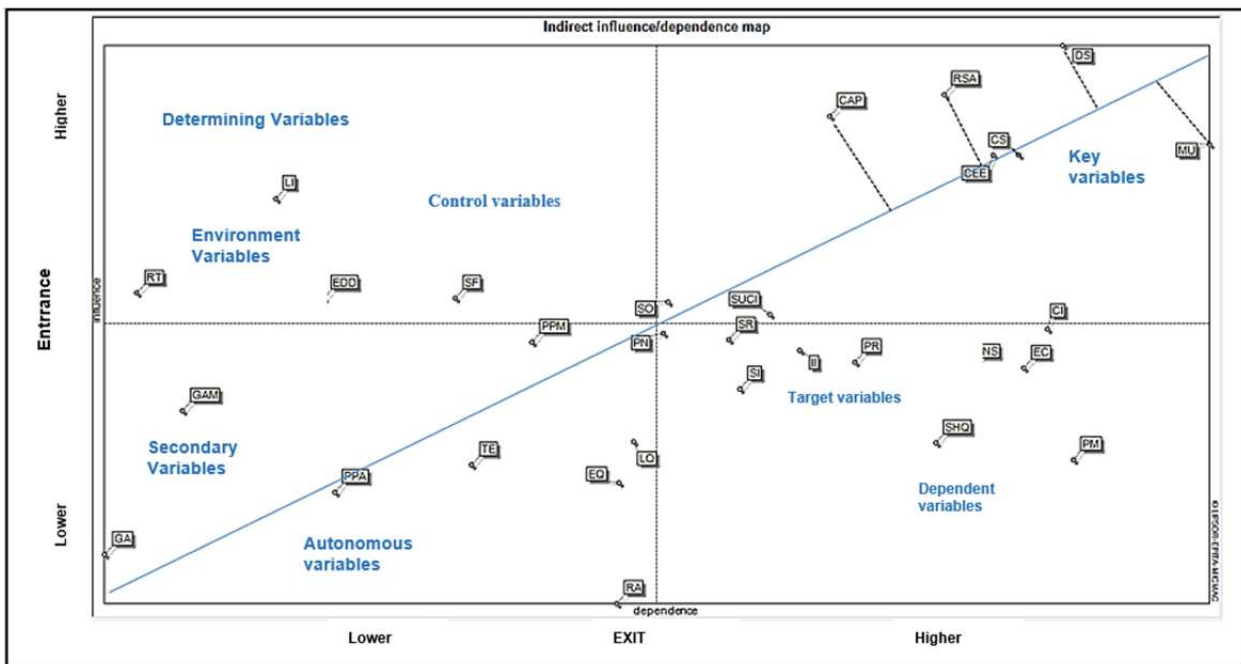
In order to create the Micmac, a situational diagnosis was initially carried out. This allows the analysis of the current situation of the organizations, that is, to know the problems that it shows in the internal and external environment and thus carry out the strategic analysis. With regard to external analysis, changes and trends in the environment were evaluated with the main variables being political, economic, social, technological, environmental, and legal (PESTEL). A market analysis was also carried out, followed by the analysis of Porter's five forces and consequently the opportunities and threats could be determined. Finally, with this information, the external factor evaluation matrix EFE was carried out.

The internal analysis assessed the current situation of the private health facilities by analyzing the most relevant financial ratios. Additionally, the services were described according to the unique qualities

of their respective life cycles, which allowed the BCG matrix to be made and later the value chain and process map to be analyzed from different service areas and specialties. As a last step, the Internal Factors Analysis (IFA) matrix was designed and used for the development of the strategies. Once the two evaluation matrices of both external and internal factors had been obtained, the SWOT matrix was designed and the Internal-External Matrix (IE) was subsequently designed.

According to Arcade, Godet, Meunier, and Roubelat (2004), the Micmac is composed of three phases, the first is the identification of variables, the second is the relationship between variables where a structural analysis matrix is qualified allowing the redefinition of the variables and consequently refining the analysis of the system, this known double entry matrix originated the indirect influence graph that is in charge of determining the relatively influential variables and the map of influences and indirect dependencies. The last and most important phase is the identification of the key variables, essential for the evolution of the system. This ranking of factors allowed us to confirm the importance of each one of them and equally exposed variables that because of their actions play an important role in the system.

FIGURE 1
INFLUENCES AND INDIRECT DEPENDENCIES PLAN



Source: LIPSOR Micmac

Arcade, Godet, Meunier, and Roubelat (2004), mention that in the distribution of each one of the variables some diagonals are taken, being the first one the related to entrances and exits, facilitating the classification of the factors of entrance or determining, where it is, free import of equipment of medicine (LI by its Spanish acronym), the second variable is related to regulation which participate in the regular operation of the system, in this one is located, suppliers' power of negotiation (PN by its Spanish acronym), dental care service (SO by its Spanish acronym) and rehabilitation service (SR by its Spanish acronym); and finally the output or dependent variable, where it is located: market share (MP by its Spanish acronym), hospital and surgical service (SHQ by its Spanish acronym), customer preference (PR by its Spanish acronym) and imaging services (SI by its Spanish acronym).

The second diagonal that helps to categorize the variables is the strategic diagonal, since the further away from the origin the more strategic the variable is, thus classifying the autonomous variables, where we find environmental management (GAM by its Spanish acronym), productivity of administrative staff

(PPA by its Spanish acronym), waiting time of patients (TE by its Spanish acronym), return on assets (RA by its Spanish acronym), cash and cash equivalents (CTE by its Spanish acronym) and liquidity (LQ by its Spanish acronym), therefore the variables where the technology restriction was found for the health area (RT by its Spanish acronym), debt (EDD by its Spanish acronym), pharmaceutical services (SF by its Spanish acronym) and medical staff productivity (PPM by its Spanish acronym), a priori the secondary variables were identified, composed by administrative expenses (AG by its Spanish acronym) and the target variables, being infrastructure and facilities (II by its Spanish acronym), ICU service (SUCI by its Spanish acronym), customer satisfaction level (NS by its Spanish acronym), competitive efficiency (EC by its Spanish acronym) and industry growth (CI by its Spanish acronym). Finally, the most important typology are the key variables, since the actions taken for the progress of the private health sector will be directly related to these, there were 6 which are: service diversification (DS by its Spanish acronym), profit margin (MU by its Spanish acronym), agreements with state entities (CEE by its Spanish acronym), agreements with insurers (CS by its Spanish acronym), return on assets (RSA by its Spanish acronym) and training of administrative and medical staff (CAP by its Spanish acronym).

Games of Actors With the Mactor Method

FIGURE 2
INDIRECT INFLUENCE AND DEPENDENCE MATRIX (MIDI)

MID	MSP	PM	PA	IESS	ISSFA	ISSPOL	FF	PIQ	PEM	AP	CP	SS	HP	PCT	PSMP	USM	IF	QTEX	AF	ANT	MF	CPT	PGM	ARCSA	RPIS	FAR	MIES	DM	OCES	AFP
MSP	0	1	0	2	2	2	1	1	1	0	2	3	3	1	0	2	0	0	1	1	1	1	0	3	3	0	1	2	0	
PM	1	0	0	1	1	1	0	0	0	0	2	2	2	3	0	2	0	0	1	1	0	0	0	3	3	0	1	2	0	
PA	0	1	0	1	1	1	0	0	0	0	2	2	1	1	1	1	1	1	1	0	0	0	1	0	0	1	1	1	1	
IESS	2	2	1	0	0	0	0	1	1	0	2	1	1	1	0	1	0	0	3	1	1	0	0	1	2	0	1	1	0	
ISSFA	2	2	1	0	0	0	0	1	1	0	2	1	1	1	0	1	0	0	3	1	1	0	0	1	2	0	1	1	0	
ISSPOL	2	2	1	0	0	0	0	1	1	0	2	1	1	1	0	1	0	0	3	1	1	0	0	1	2	0	1	1	0	
FF	2	1	0	0	0	0	0	1	1	0	3	0	0	0	0	0	0	0	0	0	1	1	1	2	0	3	0	0	0	
PIQ	1	0	0	1	1	1	1	1	1	0	1	1	1	0	0	0	1	0	0	0	0	0	0	2	0	0	0	1	0	
PEM	2	0	0	1	1	1	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	2	2	2	0	0	0	2	0	
AP	0	0	0	0	0	0	0	0	0	2	0	0	0	2	2	1	0	0	0	1	0	1	0	1	2	1	1	1	1	
CP	3	2	1	1	1	1	1	1	1	1	0	0	0	0	3	3	1	1	1	1	0	0	1	2	1	1	0	2	1	
SS	3	2	0	0	0	0	0	0	0	0	0	0	2	3	0	3	0	0	1	1	1	0	0	2	3	1	0	2	0	
HP	3	3	1	0	0	0	1	1	1	0	0	2	0	3	0	3	1	0	1	1	1	0	0	2	3	1	0	2	0	
PCT	1	2	1	1	1	1	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	
PSMP	0	1	1	0	0	0	0	0	0	3	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	
USM	2	2	0	2	2	2	0	0	0	0	2	2	2	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	
IF	1	0	0	1	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	
QTEX	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
AF	1	2	1	3	3	3	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
ANT	2	0	0	0	0	0	0	0	0	3	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
MF	2	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	
CPT	1	2	0	0	0	0	0	0	0	1	0	0	0	3	1	3	0	0	0	0	0	0	0	2	0	1	0	0	1	0
PGM	1	0	0	1	1	1	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	
ARCSA	3	0	0	3	3	3	0	0	0	0	3	3	3	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0
RPIS	3	0	0	1	1	1	0	0	0	0	1	3	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0
FAR	0	1	0	1	1	1	3	0	0	0	1	1	1	2	1	2	0	0	1	0	0	0	0	1	0	0	0	0	0	0
MIES	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
DM	0	3	1	1	1	1	0	0	0	0	1	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
OCES	3	0	0	2	2	2	1	1	1	0	2	2	2	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0
AFP	0	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0

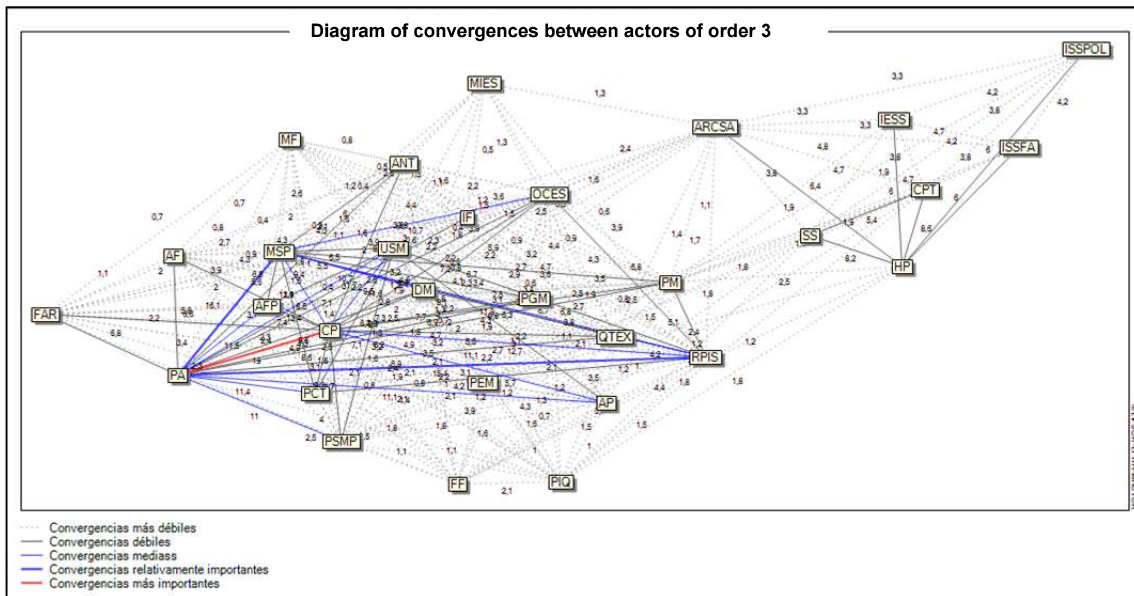
Source: LIPSOR Mactor

The Mactor method is one of the crucial stages of strategic prospective. According to Medina and Ortégón (2006), it seeks to estimate the force relationships between one actor and another, in addition to analyzing their convergences and divergences with respect to a certain number of associated positions and objectives; based on this methodology, the objective was to discern the importance of each stakeholder in order to identify those who have the greatest degree of influence in the private health sector.

In relation to the state of the art, within this phase 30 actors were determined for the system under study, evidenced in figure 5, which through the indirect influences and dependences matrix (MIDI) were qualified taking as reference the criteria established by Godet and Durance (2009), where 0: has no influence, 1: can put at risk the operational processes, 2: can put at risk the projects and 3: can put at risk the fulfillment of its missions, as can be seen in figure 2.

Based on the above-mentioned rating, the Mactor program made it possible to classify the agents involved in 4 categories in relation to the degree of influence and dependence, with the following being identified as dominant actors with high influence and low dependence: administrative staff (PA by its Spanish acronym) and affiliates (AF by its Spanish acronym); the dominant actors with low influence and high dependence were: integral public health network (RPIS by its Spanish acronym) and patients (PCT by its Spanish acronym); and the repeating actors with high influence and high dependence were identified within this category: Ecuadorian Social Security Institute (IESS by its Spanish acronym), Social Security Institute of the Armed Forces of Ecuador (ISSFA by its Spanish acronym), Social Security Institute of the National Police (ISSPOL by its Spanish acronym), National Health Regulation, Control, and Surveillance Agency (ARCSA by its Spanish acronym), and users of medical services (USM by its Spanish acronym), medical staff (MP by its Spanish acronym), health monitoring and evaluation bodies (OCES by its Spanish acronym), health sub-centers (SS by its Spanish acronym), public hospitals (HP by its Spanish acronym), private clinics (CP by its Spanish acronym) and the Ministry of Public Health (MSP by its Spanish acronym), and finally the autonomous actors, which have low influence and dependence: private financing agents (AFP by its Spanish acronym), Quifatex S. A. (QTEX), medicinal gas suppliers (PGM by its Spanish acronym), Ministry of Economic and Social Inclusion (MIES by its Spanish acronym), private insurers (AP by its Spanish acronym), financial institutions (FI by its Spanish acronym), persons with private health insurance (PSMP by its Spanish acronym), pharmaceutical firms (FF by its Spanish acronym), Ministry of Finance (MF by its Spanish acronym), National Traffic Agency of Ecuador (ANT by its Spanish acronym), private physicians' offices (CPT by its Spanish acronym), medical equipment suppliers (PEM by its Spanish acronym), pharmacies (FAR by its Spanish acronym), chemical input suppliers (PIQ by its Spanish acronym), and the medical director (DM by its Spanish acronym).

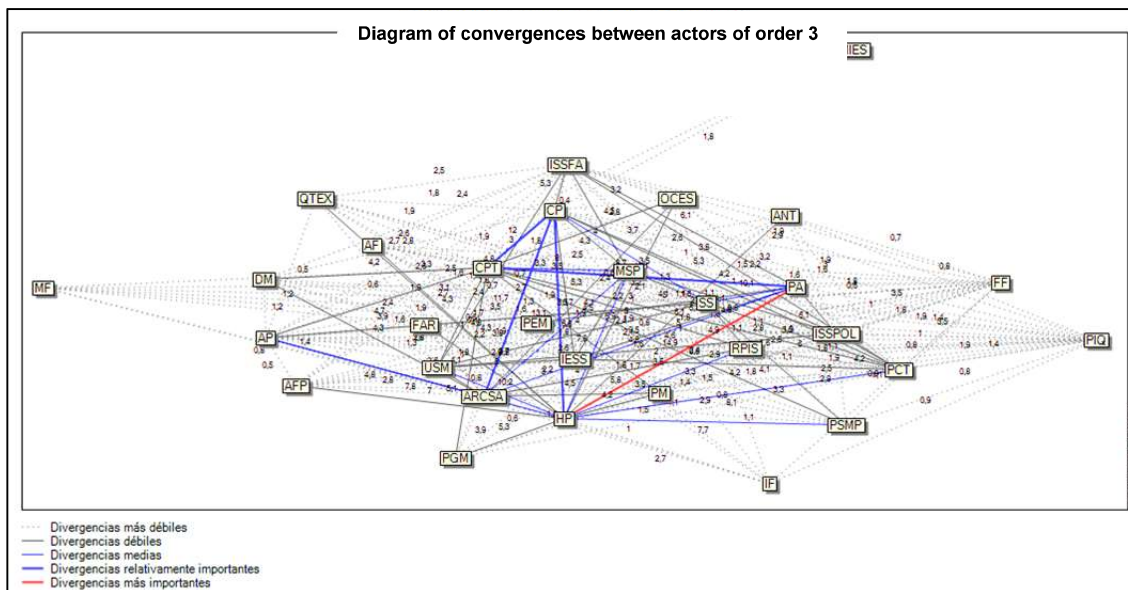
FIGURE 3
DIAGRAM OF CONVERGENCES BETWEEN ACTORS OF ORDER 3



Source: LIPSOR Mactor

The analysis of the partnerships or convergences and conflicts or divergences were determined through the matrix of actors by objectives MAO3, which is multiplied three times by the software, within the chart of convergences between actors of order 3 (figure 3), the most important partnership between private clinics (CP by its Spanish acronym) and administrative staff (PA by its Spanish acronym) is identified by the thick red line; with respect to the chart of divergences between actors of order 3 (figure 4), the most important conflict is established between public hospitals (HP by its Spanish acronym) and administrative staff (PA by its Spanish acronym), also identified by the thick red line.

FIGURE 4
CHART OF DIVERGENCES BETWEEN ACTORS OF ORDER 3



Source: LIPSOR Mactor

Subsequently, in the next phase of the Mactor methodology, 6 objectives were formulated in relation to the key variables identified in the Micmac method, these strategic challenges are: 1. To increase the service portfolio by 3% in 5 years (APSE), 2. To increase the profit margin of the sector by 5% in the period of 5 years (INMC), 3. To increase to 8.72% the return on assets of the sector in the lapse of 5 years (AURS), 4. To implement permanent training programs for administrative and nursing staff in a period of 5 years (IPCP), 5. To establish the integral public health network within 5 years (CRPI), and 6. To establish a private network with health insurance companies in a period of 5 years (ERPA).

The development of the 6 strategic challenges for the private health sector, allowed the structuring of the matrix of actors by objective 2MAO (figure 5), taking into consideration the sign that indicates if the actor is favorable or opposed to the objective; being 0: The objective is inconsistent, 1: The objective compromises the operational processes of the actor/ is indispensable for its operational processes, 2: The objective compromises the success of the actor's projects / is indispensable to its projects, 3: The objective compromises the fulfilment of the actor's mission / is indispensable to its mission, and 4: The objective compromises the very existence of the actor / is indispensable to its existence.

The rating of this matrix made it possible to determine the commitment that the agents have to meet the objectives by means of the histogram of involvement of the actors on the 2MAO objectives, identifying the commitment of the stakeholders to increase the return on assets of the sector to 8.72%, with a rating of 28 points for its execution. Similarly, the qualification of the 2MAO matrix established the capacity of the agents to meet the objectives by means of the mobilization histogram of the actors on

the 3MAO objectives, distinguishing the increase to 8.72% the return on assets of the sector and the extension of the service portfolio by 3%, with a valuation of 29.3 and 24.8 respectively.

FIGURE 5
MATRIX OF ACTORS BY OBJECTIVES 2MAO

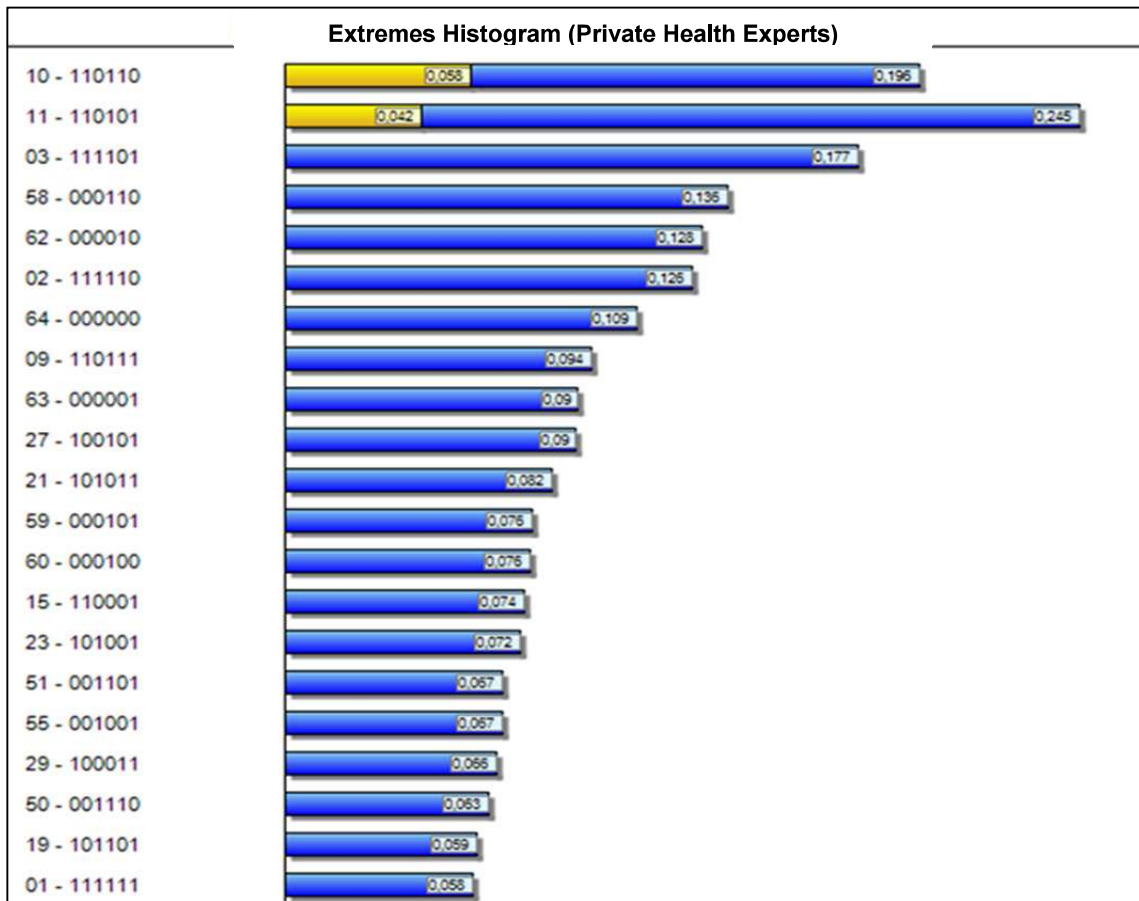
2MAO	APSE	INMC	AURS	IPCP	CRPI	ERPA
Ministry of Public Health (MSP)	1	0	2	3	3	1
Medical staff (PM)	2	0	-1	0	2	1
Administrative staff (PA)	2	3	2	1	1	2
Ecuadorian Social Security Institute (IESS)	-1	0	-2	0	0	0
Social Security Institute of the Armed Forces of Ecuador (ISSFA)	-1	0	-2	0	0	0
Social Security Institute of the National Police (ISSPOL)	-1	0	-2	0	0	0
Pharmaceutical companies (FF)	0	-1	1	0	0	0
Suppliers of chemical inputs (PIQ)	0	-1	1	0	0	0
Suppliers of medical equipment (PEM)	2	-2	0	0	1	0
Private insurance companies (AP)	1	2	2	1	0	3
Private Clinics (CP)	2	3	2	2	2	2
Health sub-centres (SS)	-3	-1	-3	0	0	0
Public hospitals (HP)	-3	-2	-3	0	0	-1
Patients (PCT)	2	2	3	1	-1	0
People with private health insurance (PSMP)	1	1	2	0	0	3
Users of medical services (USM)	2	2	3	0	0	1
Financial institutions (IF)	0	1	0	1	0	1
Quifatex S.A. (QTEX)	1	0	1	1	1	0
Affiliates (AF)	0	1	2	0	0	0
National Transit Agency of Ecuador (ANT)	0	1	1	0	1	3
Ministry of Finance (MF)	0	1	0	0	1	0
Private practices (CPT)	-2	-2	-3	0	-1	-1
Suppliers of medical gases (PGM)	1	0	1	0	1	0
National Agency for Regulation, Control and Health Surveillance (ARCSA)	-1	0	-1	2	-1	-1
Integral Public Health Network (RPIS)	1	1	2	1	3	1
Pharmacies (FAR)	2	1	0	0	0	0
Ministry of Economic and Social Inclusion (MIES)	0	0	0	1	0	0
Medical Director (DM)	0	0	1	2	3	1
Health monitoring and evaluation bodies (OCES)	1	0	1	2	2	0
Private financing agents (AFP)	1	1	1	1	0	2

Source: developed by author

The Delphi method according to Reguant & Torrado (2016) is a technique for collecting information, based on consultation with experts in an area, in order to obtain the most reliable consensus opinion from the group consulted. Delphi surveys are an essential part of the system's development. This technique is based on consulting experts in the private health sector through successive questionnaires in order to discern uncertainties in this sector and provide a structured criterion to guide decision-making and these questionnaires were addressed to the 34 medical directors of the health facilities and to the health coordination of zone 4.

Probabilistic Scenarios With the Probabilistic Cross-Impact Method

**FIGURE 6
HISTOGRAM OF THE EXTREMES**



Source: LIPSOR Smic Prob-Expert

The development of probabilistic scenarios, requires considering the key variables identified in the Micmac methodology, and the strategic challenges established in the Mactor method, given that from these events the hypotheses formulated to the experts arise, this criterion provided by the experts is expressed in a quantitative way, divided into three parts: simple probabilities, positive conditional probabilities and negative conditional probabilities. Once this information has been entered into the Smic Prob-Expert software, by means of the histogram of the extremes (figure 6), 64 scenarios with different probabilities of occurrence are obtained.

In relation to the scenarios description, the trend (scenario No. 11) that presented the highest relative probability of occurrence with a percentage of 24.5% corresponding to the most significant of the entire

histogram and a binary combination of (110101), this event establishes that the private health sector will manage to expand the service portfolio, given that several factors such as agreements with insurance companies and state entities and training of administrative and nursing staff contribute to the increase in service provision by the sector entities. In this way, it will be able to increase the return on assets, as a result of the variables related to the productivity of medical and administrative staff.

Regarding the bet scenario (scenario No. 01) which is the one that meets all the objectives, it presented a relative probability of occurrence of 0.06% and a binary combination of (111111), it focuses on the increase of the profit margin and the return on assets of the sector through the expansion of the medical services portfolio, the establishment of the integral public network, the establishment of private networks with health insurance companies, and the training of administrative and nursing staff, supported by direct links with health control agencies in Ecuador managed through agreements and plans for obtaining accreditation.

DISCUSSION

With reference to the reports issued by the World Health Organization (2000), it has a world ranking of the best health systems, which considers factors equivalent to healthy life expectancy, distribution regarding inequality, level of response capacity, distribution of response capacity and financial contribution. At the head of this ranking is France with an index of 0.994, second place is obtained by Italy with 0.991 and third place is given to San Marino with a score of 0.910. In accordance with the WHO, the level and distribution of response capacity and financial contribution are considered to be determining variables of a good health system, which are associated with the factors analyzed in this study, which are related through the key variables: return on assets and diversification of services.

The Pan American Health Organization (2017), through its report called Health in the Americas, 2017 edition, highlights the importance of anticipating future scenarios, not only through a prediction exercise but also through elaboration, emphasizing the training and allocation of human resources and the distribution of health services. Based on this approach, the relevance of the key variable of the private health sector is emphasized: training of administrative and medical staff, becoming a fundamental axis for the development of this sector.

The variables considered for establishing rankings are very diverse. In this sense, the Colombian Association of Hospitals and Clinics (2017) establishes factors that are directly related to the key variables identified in the private health sector; good management of these components has led to Japan, Sweden and Norway having the best health systems. In the case of Latin America, the country that stands out in this regard is Cuba, which, in reference to what Batista, Sánchez, Méndez, and Rojas (2015) have stated, the main elements underlying the improvement of the system are the conversion of positions in the planning areas, the process of business improvement and the availability of real estate expansion. The analysis of the variables mentioned connotes the importance of anticipating and foreseeing probable futures, with the aim of improving the private health system in Ecuador.

The analysis of probabilistic scenarios has had relevant effects within other sectors, determining the possible contexts in which an industry can develop. In fact, Arias and Abril (2015) in their study of Higher Education Institutions show important findings such as the difficulty of fulfilling the regulations required by the CEAACES, due to the fact that the criteria is related to the formation of the teaching staff, research, student welfare and infrastructure of the Head Offices and Extension Offices, which are in a process of purification and evaluation to remain within the system.

CONCLUSIONS

The probabilistic analysis provides a general vision of the key aspects that affect the private health system, in addition to foreseeing a future in which the entities in this sector can improve in organizational aspects, in this sense through the structural method Micmac six key variables are identified, regarding internal and external aspects that underlie within the sector, the most important challenges in the industry

are aligned to the diversification of service (DS by its Spanish acronym), profit margin (MU by its Spanish acronym), agreements with state entities (CEE by its Spanish acronym), agreements with insurers (CS by its Spanish acronym), return on assets (RSA by its Spanish acronym) and training to administrative and medical staff (CAP by its Spanish acronym).

The degree of convergence and divergence is determined by the identification of the thirty actors that influence the private health system, where the most important alliance between private clinics and administrative staff and the most relevant conflict between public hospitals and administrative staff stand out. Using the Mactor software, these actors and key variables take on a preponderant role in the system through the formulation of six strategic objectives, which subsequently allow the formulation of key hypotheses; the commitment and capacity of the sector's agents are reflected in the strategic challenge of increasing the sector's return on assets to 8.72%.

The probable futures of the private health sector are reflected in the characterization of 64 possible scenarios identified through the Smic Prob-Expert program. The trend that has the highest probability of occurrence (24.5%) establishes that the private health sector will be able to expand its service portfolio through agreements with insurance companies and state entities, in addition to increasing the return on assets through the training of administrative and nursing staff. The scenario that fulfills all of the objectives known as bet has a relative probability of occurrence of 0.06%, which is extremely low. It focuses on the fulfillment of the six established strategic challenges, making it possible to increase the participation of the health system and the optimal functioning of the country's private medical services sector.

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