Management Control Use and Decisions in Brazilian Health Organizations: an Exploratory Study

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ABSTRACT
This article analyzes the interplay of the use of management control systems, organizational learning, management decisions and the performance of health organizations. In the quantitative step, we collected data on 48 Brazilian hospitals and other health facilities by means of a survey. Principal component analysis identified three dimensions of management decisions (financial, costs and client relationship) and two performance dimensions (economic and non-monetary). Structural equation modeling confirmed the following hypotheses: (i) interactive use of the management control system is positively associated with organizational learning (OL); (ii) OL is positively associated with financial decisions and cost and process decisions; (iii) cost and process decisions and decisions related to clients are positively associated with economic performance; and (iv) cost and process decisions are also positively associated with non-monetary performance. In the qualitative step, we interviewed four key informants to discuss and interpret the results.

Keywords: Management controls. Organizational learning. Management decisions. Hospitals.
1 INTRODUCTION

This paper investigates relationships among management control system use, organizational learning, management decisions and performance of organizations. This theme is relevant because health organizations have highly complex processes: services, organizational structures, diversification of professionals and technologies applied to protect people’s health (NOVAES, 2004). This panorama involves a set of categories that makes it difficult to identify, measure and analyze the individual impacts of these aspects on performance of these organizations.

This study is focused on Brazilian health organizations. The country’s health sector is very relevant to the overall economy, but today it can be said to face unfavorable conditions in relation to other sectors. Private Brazilian hospitals and other health facilities are strongly dependent on reimbursements from the National Health System (SUS), which are often slow in coming due to budget deficits. Another aggravating factor is the low prices for services paid by private health plan operators and insurers (CREMESP, 2006; IBGE, 2008).

According to Tanaka & Tamaki (2012, p. 822), “management decisions in the health field are complex and permeated with subjectivity and uncertainties,” because of the routine dilemma of resolving health problems of the population or satisfying the demands of users. These two factors limit the time for reaching decisions. In turn, Merhy & Cecilio (2003, p. 111) state that “only hospitals that produce the best ‘products’ by means of an aggressive policy of incorporating technology and ongoing improvement and control of their internal processes will survive.”

Three characteristics have been identified in the sector, which combined increase the complexity of these organizations: (i) managers have to deal with services that have a strong effect on human life; (ii) the services are paid by different sources (government, patients and health insurance plans); and (iii) profit-making organizations coexist with nonprofit governmental and nongovernmental organizations in the same field. The diversity of the organizations acting in the sector creates extreme situations in terms of performance, because there are both charitable and for-profit organizations (GADELHA, 2003).

The sector in general lines has organizations characterized by providing excellent levels of services. With the recent growth of the middle class in Brazil, the health sector has attracted a good deal of interest from private equity investors, which require highly professional management. The health sector in recent years has also been marked by various...
mergers and acquisitions (PRICEWATERHOUSE, 2011). However, there are also many organizations operating in the red, such as the hospitals operated by the Santa Casa de Misericórdia Brotherhood (CARDOSO, 2012).

This panorama of the sector makes it fertile ground for research in the field of management accounting. In this line, Chenhall (2003) recommends that researchers interested in management accounting should devote more effort to analyzing specific sectors.

In the Brazilian setting, there is a gap in research into the use of management information in health organizations regarding organizational learning. For example, Escrivão Junior (2007) found that public hospitals run by the state government in the São Paulo metropolitan region produce a considerable volume of data, but their managers are unaware of the existence of such information or do not use it adequately to support hospital management decisions.

An eye on Brazilian research in management accounting allows identifying growing interest in the health sector, as reflected by the works of Camacho (2004), Ferreira (2005), Prochnick, Dias & Carvalho (2005), Aguiar, Rezende & Dalmácio (2007) and Miranda et al. (2007).

The international scenario is quite similar, with the main difference between Brazilian and international research being that the latter has investigated the adoption and use (diagnostic and interactive) of business budgeting and its effect on performance and strategy (ABERNETHY; STOELWINDER, 1991; ABERNETHY; BROWNELL, 1999); relationships between monetary and non-monetary indicators and the implementation of strategies (NARANJO-GIL; HARTMANN, 2006); and interactions of management control systems with managers (CINQUINI; CAMPANALE, 2010).

In this literature, concern can be noted to study how management accounting constructs can influence the performance of these organizations, although there is recognition that performance is affected by a wide range of variables, as evidenced by Gonçalves & Quintela (2006).

In this study we followed the approach advocated by Malmi & Grandlund (2009) for the management accounting field, with the purpose of investigating techniques that can improve organizations’ performance. Hence, this article is in line with other works that have investigated the influences of management control on performance, both in Brazil...
(FREZATTI, 2006; GUERRA, 2007; ESPEJO, 2008) and internationally (HENRI, 2006; WIDENER, 2007).

Besides the mentioned studies, there are various theoretical constructs on strategy, market orientation, entrepreneurship and organizational learning that have been used in management accounting studies (BISBE; OTLEY, 2004; HENRI, 2006; WIDENER, 2007). These constructs have been associated with measuring performance in studies of strategy (HURLEY; HULT, 1998; PERIN, 2001).

Following this tradition, in this article we focus on organizational learning, which is an organizational competency characterized by the way organizations acquire and internally disseminate new knowledge (CHENHALL, 2005). The ability to learn is considered one of the main sources of a company’s competitive advantage (LEITE; PORSSE, 2005; TIPPINS; SOHI, 2003) and can be stimulated by using an effective management control system (SIMONS, 2000).

Henri (2006) confirmed that interactive use of information, a typology proposed by Simons (2000), positively influences the degree of organizational learning in a sample of Canadian companies, and also demonstrated that the diagnostic use of information negatively influences organizational learning. The explanation is that diagnostic use, based on comparison of the results achieved with those budgeted, causes shortsighted orientation, negatively influencing the development of competencies.

However Widener (2007), who studied American companies, found that interactive use of the management control system is not positively and directly associated with the level of organizational learning, instead finding that interactive use is indirectly related by means of diagnostic use. Hence, the results are not yet conclusive about the relationships between use of management control systems and organizational learning, constituting an opportunity for further research.

Another research current has analyzed the effects of organizational learning, which is represented by institutionalizing of learning, by means of routines (VERA; CROSSAN, 2003; GRANT, 2008). The routine can be identified by the decisions reached by managers, whose key activity is to process information about the available alternatives in search of organizational goals (CHOO, 2006). Although management accounting is an established organizational routine, it must be recalled that decisions are also made based on sources of information other than just that from accounting (HALL, 2010).
Instead of using the existing decision typologies, here we innovate by focusing on those arising from the use of management accounting constructs (ATKINSON et al., 2008; OYADOMARI et al., 2010), together with other decisions made in the organizational routine, identified by three interviews.

Therefore, we considered only the most relevant management decisions, defined as those with greatest influence on performance based on the perception of the respondents. Our purpose in this choice is to contribute to the “practical” interests of managers, who seek evidence of techniques that can improve their performance.

This article is organized into five sections including this introduction. The next section covers the theoretical framework, the development of hypotheses and presentation of the diagnostic use of management control systems, besides organizational learning in the Brazilian health sector and the measurement and structural model. The third section describes the research method used, while the fourth summarizes the main results and the last contains our final considerations.

2 THEORETICAL FRAMEWORK

2.1 DIAGNOSTIC USE OF MANAGEMENT CONTROL SYSTEMS AND ORGANIZATIONAL LEARNING

Diagnostic use is the traditional use of management control systems, focused on monitoring of activities, seeking to assess whether objectives are being attained and obtaining feedback to improve performance (SIMONS, 2000). This allows organizations to correct small deviations, through what has been called single-loop learning (ARGYRIS; SCHÖN, 1996), and to adjust processes so as to meet the objectives set by senior management (HENRI, 2006).

Although Henri (2006) identified a negative relation between diagnostic use and organizational learning, other authors have not confirmed this result. For example, Abernethy & Stoelwinder (1991) found that the adoption of business budgeting makes a positive contribution to performance, by means of analyzing budget variations and proposing corrective actions, providing evidence of organizational learning. In turn, Graffon, Lillis & Widener (2010), in a survey among business unit managers of Australian companies, identified that the diagnostic use, called feedback control use, has a positive influence on organizational learning.
In Brazil, Oyadomari et al. (2011) identified a positive relation between diagnostic use and organizational learning, arguing that the dysfunctional effect found by international studies does not exist in Brazilian firms. The above discussion serves as the base for the following hypothesis:

**H1: The diagnostic use of the management control system positively influences organizational learning.**

### 2.2 INTERACTIVE USE OF MANAGEMENT CONTROL SYSTEMS AND ORGANIZATIONAL LEARNING

The main characteristics of interactive use are its recurring presence on the agenda of executives and its purpose of stimulating emerging strategies by means of innovation and organizational learning (DIEHL, 2006; 2000; HENRI, 2006; SIMONS, 1995; SIMONS, 2000). Therefore, interactive use is linked to the requirements to develop competencies, especially organizational learning, since these arise in complex environments that are undergoing transformations and are subject to strategic uncertainties. By means of this use, managers hope to develop techniques to enable them to analyze the environment and trace out new ways of acting (BISBE; OTLEY, 2004). However, in an empirical study, Widener (2007) did not find a statistically significant positive relationship between interactive use and organizational learning.

For some authors, interactive use stimulates double-loop learning, because it focuses on the formulation of new action plans and alters the premises and basic values present in decision situations (SIMONS, 2000; ARGYRIS; SCHÖN, 1996). Empirical evidence of this effect in the health sector is supplied by the study of Abernethy & Brownell (1999), who found that interactive use allows hospital organizations to adapt to the necessary changes in the health sector by implementing new strategies.

In relation to this adaptive ability that results from the organizational learning, process, Naranjo-Gil & Hartmann (2006) concluded, based on a survey of Spanish public hospital organizations, that interactive use exerts a stronger influence than diagnostic use on the implementation of strategies. This leads to our second hypothesis:

**H2: The interactive use of the management control system positively influences organizational learning.**
2.3 MANAGEMENT DECISIONS

Various decision making typologies can be found in the literature, such as that which separates decisions by temporal dimensions (tactical and strategic) or by functional dimensions (financial, operational, among others) (HATCH, 1997).

In this study we decided *a priori* not to use any of these proposed typologies, but rather to try to validate, from an empirical standpoint, the various types of decisions based on use of the management control techniques according to the proposals of Atkinson et al. (2008, p. 53, 56, 59).

Since accounting information is only one element of the information on which managers base decisions (HALL, 2010), we identified other decision types, based on three interviews with health sector professionals. Therefore, we measured this construct not by the frequency of decision types, but rather by the decisions’ relevance, measured by the influence on organizational performance, in light of the respondents’ perception.

We believe that these decisions reflect the operationalization of the organizational learning process, in line with Argyris & Schön (1996), leading to the following hypothesis:

*H3: Organizational learning positively influences making relevant management decisions.*

2.4 PERFORMANCE

Since the relevant management decision construct was operationalized based on the influence of determined decisions on organizational performance, it is important to investigate what dimensions of performance are influenced by these decisions.

We considered the following variables to measure performance: gross revenue, profit, return on investment (CYERT; MARCH, 1992), client satisfaction and indicators of the quality of processes and overall performance (KAPLAN; NORTON, 1997).

On the matter of collecting the data to calculate the indicators, in some cases these figures were not available, even the accounting data, because they are not disclosed. Therefore, in line with the tradition of studies of strategy and management accounting, we measured the performance construct through a process of self-evaluation.

Another limitation was the difficulty of comparing the competing companies, despite being in the same sector. Hence, we defined performance as the degree of attaining the organizational objectives set by each company analyzed (DONALDSON, 2001; OTLEY,
This metric is less influenced by factors such as size and availability of resources, but is possibly more influenced by the quality of decisions and by exogenous variables that are hard to identify in surveys. Although only in exploratory form, this discussion leads to the following hypothesis:

**H4: The taking of relevant management decisions positively influences performance.**

2.5 THEORETICAL MODEL, HYPOTHESES AND VARIABLES

From the literature review presented and the hypotheses proposed, we prepared a structural model in which we related the constructs and hypotheses. Figure 1 depicts the variables and hypotheses evaluated:

- **H1**: diagnostic use of the management control system positively influences organizational learning;
- **H2**: interactive use of the management control system positively influences organizational learning;
- **H3**: organizational learning positively influences making relevant management decisions;
- **H4**: taking of relevant management decisions positively influences performance.

All models represent a simplification of reality, so other endogenous and exogenous variables could have been included, such as the system of management incentives and organizational culture. But due to restrictions on the scope of this study, we did not include them.

Without the presence of a system of performance-based incentives (achieving targets), managers can act differently than they would do without such a system. This can also happen...
among managers of organizations that stress cultural controls (MALMI; BROWN, 2008), because they can be less stimulated to engage in diagnostic and interactive use of the management control system.

3 METHODOLOGICAL PROCEDURES

3.1 POPULATION AND SAMPLE

According to the Brazilian Federation of Hospitals (FEDERAÇÃO BRASILEIRA DE HOSPITAIS, 2012), the country’s hospital sector has 6,690 institutions, of which 2,142 (32%) are public hospitals and 4,548 (68%) are private ones. Of these hospitals, 98 are associated with universities, mainly public institutions.

Because of the lack of an organized public database available for the hospital segment, to enable obtaining a probabilistic sample we used a database obtained from a firm specialized in organizing congresses and other events for companies in the health sector.

The data collection protocol involved the following procedures and steps: (i) first we sent an electronic invitation letter to 190 potential respondents; (ii) we then sent a message to those that indicated willingness to participate, containing a link to access the questionnaire (see the appendix); and (iii) a week later we called each prospective respondent by telephone to request a position on participation.

The messages with the questionnaire link were sent in March and April 2010 with the help of a trained research assistant. A total of 65 respondents filled out the questionnaire, but 17 of these questionnaires contained incomplete data, so we only considered 48 of the 190 to be valid, resulting in a valid response rate of 25.3%. The respondents’ profile was suitable to the research purpose, because 84% of them worked in the areas of control, accounting, finance or administration, and 56% occupied positions as managers or supervisors.

With respect to the profile the organizations, 30 were private hospital companies (63%) and 18 were nonprofit associations. Also, 65% of the organizations had 800 or more employees.

The samples had the bias of only including organizations that had participated in events organized by the specialized firm, but it is interesting to observe that the proportion of private hospital organizations in the sample is near that in the census of the Brazilian Federation of Hospitals (2012): 63% and 68%, respectively.
3.2 PREPARATION AND VALIDATION OF THE QUESTIONNAIRE

We used a both a quantitative (questionnaires) and qualitative approach (interviews with managers). According to Patton (1990), qualitative and quantitative methods are alternative but not mutually exclusive research strategies, and indeed are often used together. The combined use of both has the following advantages: (i) confirmation of one by the other through triangulation; (ii) provision of richer details; and (iii) suggestion of new lines of thinking and discovery of new insights (MILES; HUBERMAN, 1994).

The preparation of the questionnaire was, when possible, based on the scales developed and used in previous studies, as shown in Chart 1.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizational Learning</td>
<td>Oyadomari et al. (2010)</td>
</tr>
<tr>
<td>Diagnostic Use</td>
<td>Oyadomari (2008)</td>
</tr>
<tr>
<td>Interactive Use</td>
<td>Oyadomari (2008)</td>
</tr>
<tr>
<td>Relevant Management Decisions</td>
<td>Adapted from Atkinson (2008)</td>
</tr>
<tr>
<td>Performance</td>
<td>Adapted from Oyadomari (2008)</td>
</tr>
</tbody>
</table>

Chart 1: Source of Questions

To improve the face validity (NETEMEYER; BEARDEN; SHARMA, 2003) of the data collection instrument, we first conducted three interviews with managers of these organizations, as presented in Chart 4, to ascertain the adherence of the questionnaire to the reality of the health sector, since no data were available from previous studies of the same theme regarding this sector.

To improve the triangulation of the data from the interviews with those collected by other methods (SEIDMAN, 1991; YIN, 2001), we decided to conduct four more interviews to compare the responses with the quantitative results, in line with the approach undertaken by Cadez & Guilding (2008). This strategy permits inferences on possible explanations of the results, even if contradicting other findings in the literature, which in this case is scant.

To mitigate the risk that the realization of only one interview would bias the results due to subjective aspects (vision) of the respondent about the phenomenon, we conducted other interviews, which permitted connection, comparison and verification of the comments and opinions of the participants (SEIDMAN, 1991; YIN, 2001).
4 ANALYSIS AND DISCUSSION OF THE RESULTS

Because of the exploratory nature used in the operationalization and the use of some constructs, specifically decisions and performance, we opted first to apply principal component analysis, followed by application of structural equation modeling and then discussion and triangulation of the results based on the interviews conducted with the seven managers.

4.1 PRINCIPAL COMPONENT ANALYSIS

For organizational learning, diagnostic use and interactive use, we expected the constructs to be one-dimensional, based on the results of Oyadomari (2008). But for the relevant management decisions and performance constructs, we had no expectation about their dimensionality, so we used principal component analysis before structural equation modeling, i.e., to confirm the unidimensionality of organizational learning, diagnostic use and interactive use, as well as to determine the dimensionality of the other constructs. When more than one component was extracted by the principal component analysis, we used varimax rotation.

Below we present the clusters obtained in general, but the appendix contains details of the final results of the structural equation modeling.

Diagnostic use was measured by four indicators, and item DU4 (see the appendix) was removed for presenting low factor loading. For the other items, only one principal component was extracted (77% extracted variance), with factor loadings between 0.85 and 0.89 and Cronbach’s alpha equal to 0.85.

Interactive use was measured by seven indicators, with only one principal component being extracted (65% extracted variance). The factor loadings ranged from 0.62 to 0.90 and Cronbach’s alpha was equal to 0.91.

Organizational learning was measured by 12 items, and in the principal component analysis, items OL5 and OL11 (see the appendix) were dropped for having low factor loading. For the other items, only one principal component was extracted (53% extracted variance), with factor loadings between 0.53 and 0.83 and Cronbach’s alpha equal to 0.90.

Finally, for the relevant management decisions construct, three principal components were extracted, interpreted as follows:

- Factor 1 – “Financial Decisions”, because these decisions typically are connected to the organization’s cash flow;
• Factor 2 - “Decisions on Costs and Processes”, which grouped decisions linked to management of costs, results and operational processes; and

• Factor 3 - “Decisions Related to Clients”, which grouped decisions related to management of agreements with health plan operators/insurers that impact patients, outsourcing and exchange of doctors, which although they can have effects on costs and processes, significantly influence the client dimension.

The clustering of the variables in their respective factors can be seen in Chart 2.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor 1 - Financial Decisions</td>
<td>DE 3</td>
<td>3. Focus on actions to reduce nonpayment.</td>
</tr>
<tr>
<td>(alpha = 0.78)</td>
<td>DE 4</td>
<td>4. Negotiation of payment with suppliers.</td>
</tr>
<tr>
<td></td>
<td>DE 5</td>
<td>5. Decisions on bank debt.</td>
</tr>
<tr>
<td>Factor 2 - Decisions on Costs</td>
<td>DE 6</td>
<td>6. Improvement of margins and results.</td>
</tr>
<tr>
<td>and Processes (alpha = 0.80)</td>
<td>DE 7</td>
<td>7. Changes in calculation of costs.</td>
</tr>
<tr>
<td></td>
<td>DE 12</td>
<td>12. Decisions on inventory policies.</td>
</tr>
<tr>
<td>Factor 3 - Decisions Related to</td>
<td>DE 1</td>
<td>1. Ending an agreement with a health plan operator or insurer.</td>
</tr>
<tr>
<td>Clients (alpha = 0.81)</td>
<td>DE 2</td>
<td>2. Changes in prices.</td>
</tr>
<tr>
<td></td>
<td>DE 9</td>
<td>9. Ceasing to offer a service.</td>
</tr>
<tr>
<td></td>
<td>DE 10</td>
<td>10. Substitution of a doctor with another who charges lower rates.</td>
</tr>
<tr>
<td></td>
<td>DE 11</td>
<td>11. Outsourcing of services.</td>
</tr>
</tbody>
</table>

Chart 2: Variables and factors of the decisions construct based on accounting information

Note: Based on use of principal components extraction and varimax rotation; the variables maintained in the model presented favor loadings greater than 0.6.

The variables of the performance construct were grouped in two factors: Factor 1 - Economic Performance, and Factor 2 - Non-Monetary Performance, as presented in Chart 3.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor 1 - Economic Performance</td>
<td>P 1</td>
<td>1. Gross revenue</td>
</tr>
<tr>
<td>(alpha = 0.89)</td>
<td>P 2</td>
<td>2. Profit</td>
</tr>
<tr>
<td></td>
<td>P 3</td>
<td>3. Return on investment</td>
</tr>
<tr>
<td>Factor 2 - Non-Monetary</td>
<td>P 4</td>
<td>4. Client satisfaction</td>
</tr>
<tr>
<td>Performance (alpha = 0.88)</td>
<td>P 5</td>
<td>5. Process quality indicators</td>
</tr>
<tr>
<td></td>
<td>P 6</td>
<td>6. Overall performance</td>
</tr>
</tbody>
</table>

Chart 3. Performance Variables and Factors

Note: Based on use of principal components extraction and varimax rotation; the variables maintained in the model presented favor loadings greater than 0.6.

After the cluster analysis of the variables and with the factors obtained, we expanded the theoretical model initially proposed (Figure 1) by separating the “Decisions” construct
into three dimensions and the “Performance” construct into two dimensions, as presented in Figure 2.

We should mention that the grounds for hypotheses H1 and H2 were already justified preliminarily and the other sub-hypotheses are derived from hypotheses H3 and H4, also previously justified. However, we should also stress the exploratory aspect of the relationship of the different dimensions of decisions and the two types of performance.

![Figure 2: Expanded Theoretical Model](image)

### 4.2 STRUCTURAL EQUATION MODELING

(A) For empirical analysis of the relationships, we used structural equation modeling, which in general is a method guided more by theory than by empirical results (HAIR JR. et al., 2005). However, the partial least squares path modeling method (pls-pm) is recommended in the initial phase of theoretical development, as a way to test and validate exploratory models (HENSELER; RINGLE; SINKOVICS, 2009, p. 282).

(B) Another advantage is that this technique is suitable for small samples (SMITH; LANGFIELD-SMITH, 2004), which has contributed to its frequent use in accounting research (HALL, 2008; CHAPMAN; KINH, 2009, HARTMANN; SLAPNICAR, 2009). As done by hartmann & slapnicar (2009), here we also used the smartpls 2.0 m3 software (RINGLE; WENDE; WILL, 2005).
The analysis of the results was based on the steps recommended by Hair Jr. et al. (2005), Hair Jr. et al. (2011), Henseler et al. (2009) and Tenenhaus et al. (2005).

### 4.2.1 Evaluation of the measurement model

Three variables (OL-6, OL-7 and OL-11) intended to measure the Organizational Learning construct did not present convergent validity, with loadings under 0.60. Therefore, we excluded these variables. Then we ran the adjusted model without these indicators. The main statistical results are presented in Tables 1, 2 and 3.

Regarding convergent validity, all the indicators presented significant factor loadings (p < 0.05) greater than 0.6 (see appendix), and the constructs presented average extracted variance (AEV) higher than 0.50 (Table 1). They also presented compound reliability indexes and Cronbach’s alpha greater than 0.7 (HAIR JR. et al., 2005; HAIR JR. et al., 2011; HENSELER et al., 2009; TENENHAUS et al., 2005).

Table 1 shows there is discriminant validity at the level of the constructs. According to Fornell & Larcker (1981), if the correlations are lower than the square root of the average extracted variance (AEV), there is discriminant validity, i.e., the constructs are correlated, but are still distinct from each other.

The discriminant validity was also assured by the level of the indicators, because comparative analysis of the factor loadings (cross loadings) allowed identifying the indicators without high factor loadings in their constructs and low in the others, so they were dropped from the measurement model (appendix).

### Table 1: Matrix of correlation between the latent variables and validity and reliability assessment

<table>
<thead>
<tr>
<th>Latent variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Diagnostic Use</td>
<td>0.878</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Interactive Use</td>
<td>0.479</td>
<td>0.838</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Organizational Learning</td>
<td>0.394</td>
<td>0.731</td>
<td>0.776</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Decisions – Financial</td>
<td>0.235</td>
<td>0.444</td>
<td>0.440</td>
<td>0.838</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Decisions – Costs &amp; Processes</td>
<td>0.367</td>
<td>0.566</td>
<td>0.402</td>
<td>0.565</td>
<td>0.795</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Decisions - Relationship with Clients</td>
<td>0.219</td>
<td>0.172</td>
<td>0.241</td>
<td>0.426</td>
<td>0.372</td>
<td>0.747</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Economic Performance</td>
<td>0.227</td>
<td>0.301</td>
<td>0.210</td>
<td>0.419</td>
<td>0.495</td>
<td>0.598</td>
<td>0.910</td>
<td></td>
</tr>
<tr>
<td>8. Non-Monetary Performance</td>
<td>0.386</td>
<td>0.425</td>
<td>0.307</td>
<td>0.328</td>
<td>0.571</td>
<td>0.175</td>
<td>0.476</td>
<td>0.898</td>
</tr>
</tbody>
</table>

Scale (appendix) = (a) (b) (c) (d) (e) (f) (g) (h)

Mean = 3.6 3.6 3.8 3.6 3.2 2.6 2.4 3.3
Standard deviation = 1.08 0.96 0.90 1.04 1.15 1.14 0.84 0.79

Average extracted variance = 0.771 0.703 0.602 0.703 0.632 0.558 0.827 0.806
Compound reliability = 0.910 0.934 0.923 0.876 0.873 0.863 0.935 0.926
Cronbach’s alpha = 0.853 0.915 0.905 0.789 0.808 0.805 0.895 0.879

Source: Research data.
Nota 1: Correlations greater than |0.29| are significant at 5% (two-tailed) and correlations greater than |0.39| are significant at 1% (two-tailed).
Nota 2: The diagonal on boldface contains the square roots of the average extracted variance (AEV).
Legend: (a) = 1 (never used) to 5 (always used)
(b) = 1 (totally disagree) to 5 (totally agree)
(c) = 1 (little influence) to 5 (great influence)
(d) = 1 (much less than expected) to 5 (much more than expected)

4.2.2 Evaluation of the structural model

The PLS-PM technique provides goodness-of-fit indexes of the model, as occurs with linear structural relations (LISREL) modeling (based on the reproduction of the covariance matrix), because its objective is to maximize the explanation of the variance of the dependent variables rather than to reproduce the covariance matrix.

Despite this, to obtain some information about the adequacy of the model in general (measurement and structural), we performed the goodness-of-fit test proposed by Tenenhaus et al. (2005), given by the geometric mean between the AEV and average $R^2$, obtaining 0.53, which can be considered adequate according to Wetzel et al. (2009, p.187).

For better visualization of the results attained, in Table 2 we show the hypotheses tested and the results obtained.

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Result</th>
<th>Coefficient</th>
<th>P-value</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1 – Diagnostic use is positively associated with organizational learning.</td>
<td>Not validated</td>
<td>0.058</td>
<td>0.620</td>
<td>53.6%</td>
</tr>
<tr>
<td>H2 – Interactive use is positively associated with organizational learning.</td>
<td>Validated</td>
<td>0.703</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>H3.1 - Organizational learning is positively associated with Financial Decisions.</td>
<td>Validated</td>
<td>0.440</td>
<td>0.008</td>
<td>19.3%</td>
</tr>
<tr>
<td>H3.2 - Organizational learning is positively associated with decisions on costs and processes.</td>
<td>Validated</td>
<td>0.402</td>
<td>0.005</td>
<td>16.2%</td>
</tr>
<tr>
<td>H3.3 - Organizational learning is positively associated with decisions related to clients.</td>
<td>Not validated</td>
<td>0.241</td>
<td>0.212</td>
<td>5.8%</td>
</tr>
<tr>
<td>H4.1 - Financial decisions are positively associated with economic performance</td>
<td>Not validated</td>
<td>0.056</td>
<td>0.738</td>
<td></td>
</tr>
<tr>
<td>H4.3 - Decisions on costs and processes are positively associated with economic performance.</td>
<td>Validated</td>
<td>0.290</td>
<td>0.040</td>
<td>44.6%</td>
</tr>
</tbody>
</table>
H4.5 - Decisions related to clients are positively associated with economic performance.  
| Validated | 0.466 | 0.000 |

H4.2 - Financial decisions are positively associated with non-monetary performance.  
| Not validated | 0.023 | 0.921 |

H4.4 - Decisions on costs and processes are positively associated with non-monetary performance.  
| Validated | 0.577 | 0.000 |

H4.6 - Decisions related to clients are positively associated with non-monetary performance.  
| Not validated | -0.050 | 0.718 |

Source: Research data.

Note 1: The p-values were estimated by bootstrapping, with 48 cases and 1,000 resamples.

Note 2: Since the sample was small (n = 48), we tested the statistical power to assess whether the non-significant results were caused by this reason. The G*Power 3 program (Buchner et al., 2006) indicated statistical power of 80% at 5% significance (recommended by Hair Jr. et al., 2005) in a sample of 48 cases and 3 predictors (which was the most critical situation to determine the sample size). Furthermore, as recommended by Chin & Newsted (1999), any R^2 greater than 20% will be significant. The R^2 values were 44% for economic performance and 33% for non-financial performance, so despite the small sample size, it was sufficient to test the proposed hypotheses.

4.2.3 Analysis and discussion of the hypotheses tested

When using multiple sources of evidence, it is necessary make sure there is convergence and conditions to validate the results found, by means of triangulation of information, data, evidence and even theories (MARTINS, 2008), so that the conclusions and discoveries will be more convincing and accurate, because they are supported by a set of corroborations.

Therefore, to triangulate the results obtained from the quantitative data, we conducted seven interviews with professionals from health organizations, as shown in Chart 4. Three of these interviews served to support the validity of the questionnaire, while the other four were performed during the process of analyzing the data.

<table>
<thead>
<tr>
<th>Respondent</th>
<th>Position</th>
<th>Corporate structure</th>
<th>Description</th>
<th>Number of employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Controller</td>
<td>For-profit limited liability company</td>
<td>Large hospital</td>
<td>1,500</td>
</tr>
<tr>
<td>2</td>
<td>Assistant to the CEO</td>
<td>For-profit limited liability company</td>
<td>Medium hospital</td>
<td>830</td>
</tr>
<tr>
<td>3</td>
<td>Controller</td>
<td>For-profit limited liability company</td>
<td>Diagnostic medicine clinic</td>
<td>280</td>
</tr>
<tr>
<td>4</td>
<td>Nursing Manager</td>
<td>Charitable organization</td>
<td>Philanthropic association</td>
<td>80</td>
</tr>
<tr>
<td>5</td>
<td>Cost Manager</td>
<td>For-profit limited liability company</td>
<td>Large hospital</td>
<td>1,500</td>
</tr>
<tr>
<td>6</td>
<td>Supervisor of Control</td>
<td>For-profit limited liability company</td>
<td>Large hospital</td>
<td>1,200</td>
</tr>
<tr>
<td>7</td>
<td>Controller</td>
<td>For-profit limited liability company</td>
<td>Clinical imaging and diagnostic laboratory</td>
<td>280</td>
</tr>
</tbody>
</table>

Chart 4: Characteristics of the interviewees
To facilitate discussion of the results, we restated the hypotheses after making a general comment on each construct of the structural model.

**Use of management control and organizational learning**

The diagnostic use of management control (H1) was not significant, but interactive use explained 53.6% of the variance of organizational learning (H2). Below we discuss these results in light of the theoretical framework and the interviews conducted.

**H1: The diagnostic use of the management control system positively influences organizational learning. Not validated.**

The coefficient was not significant, a result that diverges from that found by Henri (2006), who identified a negative influence of the diagnostic use on organizational learning. The result found here suggests that in the organizations studied, the traditional use of management control does not have a positive effect on the sharing of information and dissemination of knowledge.

Evidence of this came from respondent 5, who mentioned that managers justify any deviations between the results budgeted and realized, seeking to understand such variations as well as to formulate possible corrections of processes.

A possibility, although not investigated here, is that in these organizations, although there is an emphasis on using the budget as a base to evaluate performance, this practice has not generated significant effects on organizational learning, in function of the low indexes of attaining economic performance, as shown in the appendix.

**H2: The interactive use of the management control system positively influences organizational learning. Validated.**

This result suggests that in the health organizations in the present sample, the interactive use of management control positively stimulates organizational learning, a finding in agreement with that of Henri (2006). This is also coherent with Simons (2000), according to whom the focus of interactive use is to deal with strategic uncertainties, something strongly present in Brazil given the intense competition, high level of complexity and ongoing consolidation of companies in the health care sector.

Confirming this result, respondents 5, 6 and 7 all mentioned that the market is very dynamic and that companies are constantly on the lookout for innovations, mainly in the area of equipment.
H3: Organizational learning is positively associated with relevant management decisions.

Since the principal component analysis applied to the relevant management decisions construct generated three distinct dimensions, we divided this hypothesis into three sub-hypotheses: H3.1, H3.2 and H3.3.

Organizational learning presented a significant relation with two of the three dimensions of relevant management decisions, explaining 19.4% of the variance of the “financial” dimension, 16.3% of the variance of the “costs and processes” dimension but only 7.9% of the “relationship with clients” dimension (H3.1, H3.2 and H3.3, respectively).

H3.1: Organizational learning is positively associated with financial decisions. Validated.

This result suggests that the degree of organizational learning influences the making of relevant financial decisions. In other words, there is an environment that favors the organizational learning process and influences financial decisions. These decisions can be both of the single-loop and double-loop type (ARGYRIS; SCHÖN, 1996), such as alterations in average payment periods and new strategies to obtain long-term financing.

This result also indicates there is a routine discussion of the financial situation of the organizations, in the form of weekly meetings, and that this contributes to the survival in the short run, crucial at a moment when news published in the business press reveals the grave situation faced by nonprofit health organizations, such as the hospitals run by the Santa Casa de Misericordia Brotherhood (CARDOSO, 2012).

Empirical evidence of this finding was supplied by respondent 1, who indicated that his organization typically faces cash flow difficulties on the 5th and 20th days of the month, when salaries are paid, mainly because of the slow payment by health plan operators/insurers. In turn, respondents 6 and 7 mentioned that cash flow management is a routine activity, including monitoring of reimbursements denied by health plan operators/insurers.

H3.2: Organizational learning is positively associated with decisions on costs and processes. Validated.

This result suggests that the organizational learning process is positively related to decisions on costs and processes, demonstrating that the sharing of ideas propitiates the
making of decisions and affects the activities of these organizations, with respect to both incremental and more profound changes (ARGYRIS; SCHÖN, 1996).

This might be influencing the way managers are calculating costs and modifying medical procedures, as addressed in the study of Italian hospital organizations by Cinquini & Campanale (2010), besides modifications of inventories and procurement schedules.

Respondent 2 mentioned that his company is purchasing more generic drugs and domestically produced prostheses because these are cheaper, providing evidence of an effort to reduce costs.

**H3.3: Organizational learning is positively associated with decisions related to clients. Not validated.**

This result suggests that the organizational learning process, with a smaller coefficient than for the other two dimensions, does not have a positive association with decisions related to clients. This result is in a certain way similar to that found by Perin et al. (2006), in a study of the electrical-electronics industry, where the results showed that double-loop learning had a low coefficient in relation to the response capacity.

The evidence here shows that decisions to end or maintain agreements with health plan operators/insurers is very common, as indicated by respondent 1, and that organizations discuss the best mix of services to maximize profits, as mentioned by respondent 3. However, these decisions, for being more of a strategic nature, are possibly being reached at the senior management level, without necessarily being stimulated by discussion and exchange of ideas at different organizational levels.

This can be explained by the high bargaining power of clients (health plan operators and insurers), the long-term contracts involved and the heavy regulations faced by hospitals, themes that are sensitive to the performance of these organizations.

**H4: Decisions are positively associated with performance.**

Based on the principal component analysis of the variables of the performance and decisions constructs, we divided this hypothesis into six sub-hypotheses. For a question of better flow of the text, here we do not follow the order of these hypotheses, instead undertaking an analysis that contemplates the conceptual proximity of these hypotheses.

An initial analysis shows that 43.7% of the variance of the economic performance construct was explained by the “relationship with clients” and “costs and processes”
dimensions (H4.3 and H4.5), and the relationship was not significant with the “financial” dimension (H4.1). In turn, 33.1% of the variance of the non-financial performance was explained by the “costs and processes” dimension (H4.4), and there were no significant relations with the other two decision dimensions (H.4.2 and H.4.6).

These results suggest that the performance construct has more than one dimension and that these dimensions (economic and non-monetary) are influenced differently by the various dimensions of decisions. This is a contribution to the Brazilian literature, because most previous studies have used performance as a single construct (FREZATTI, 2006, ESPEJO, 2008, OYADOMARI, 2009, HENRI, 2006, WIDENER, 2007).

**H4.1: Financial decisions are positively associated with economic performance. Not validated.**

This hypothesis involves financial decisions focused on management of procurement, payment of suppliers and bank indebtedness, and their relationship with the indicators gross revenue, profit and return on investment. The non-validation of this relationship can indicate that financial decisions have low importance for meeting economic performance indicators. Therefore, it can be inferred that these financial decisions are basic conditions for the organization’s short-term survival, so they do not have a large influence on the economic performance, although they produce reflections on expenses, and in the final analysis have an impact on the net income and return on equity.

**H4.3: Decisions on costs and processes are positively associated with economic performance. Validated.**

In turn, the validation of this hypothesis suggests that because the hospital organizations studied face an extremely competitive market, their focus is on decisions regarding costs and processes, which have a stronger effect on economic performance.

It is by management of operations that performance measured by gross revenue, profit and return on investments is attained, as shown by Zanardo (2004), and the monitoring of margins and results stimulates performance measured by economic indicators.

Additionally, these results suggest that Brazilian hospital organizations are correct to invest in training their employees, as mentioned by respondent 1, because improved worker competencies should positively influence operational efficiency.

Hypothesis H4.2 was not validated, indicating no relationship between financial decisions and non-monetary performance. In principle this is to be expected, since these decisions do not produce directly effects on performance measured by non-monetary indicators (here measured by client satisfaction, indicators of the quality of processes and overall performance). [It would seem that overall performance by definition contains monetary elements, so it should be deleted here.] [I cannot comment on the literature, since I only briefly consulted a few of the references (usually just the abstracts) listed by the authors. However, the adjective “overall” by definition means both monetary and non-monetary aspects, just as the expression “overall population” includes both males and females, young and old people, etc. Just because the literature has used overall performance as non-monetary performance does not make it correct.]

As previously mentioned, financial decisions act to assure the short-term survival and functioning of the organization, but without influencing the indicators more focused on long-term performance.

H4.4: Decisions on costs and processes are positively associated with non-monetary performance. Validated.

This result is important by indicating that decisions on costs and processes positively influence the perception of non-monetary performance, such as quality of processes, client satisfaction and overall performance.

The correlation between the variables of changes in medical procedures and non-monetary performance was high (around 0.5), suggesting these changes have a positive effect on non-monetary performance, and to a greater degree on indicators of the quality of processes.

H4.5: Decisions related to clients are positively associated with economic performance. Validated.

This result suggests that actions connected with ending or maintaining agreements with health plan operators and insurers, as well as alteration of prices for services rendered, have a positive effect on the economic results.
These decisions could be observed in the comments of respondent 5, regarding the decision to adjust the cost reimbursement tables under one such agreement so as not to be disqualified by an important health plan operator, and of respondent 6, who mentioned that the offer of new services, made possible by investments in refurbishment and expansion of installations and purchase of new equipment, boosted revenues.

The empirical results demonstrate that actions recommended by experts (SALU, 2012) produce positive effects on economic performance. Carrying out such actions can be a reaction of hospital organizations to the fact that many health plan operators/insurers do not differentiate prices suitably in function of the complexity of the services (CAMACHO; ROCHA, 2009).

**H4.6: Decisions related to clients are positively associated with non-monetary performance. Not validated.**

A possible explanation for this result is that routine cancellation of agreements with smaller health plan operators can negatively affect the satisfaction of consumers, something that also applies to increases in rates. A complementary analysis of the correlations between these variables showed low or even negative figures, but they were not statistically significant.

All the respondents mentioned that conducting periodic client satisfaction surveys was an organizational practice, and the data from the quantitative study showed this variable had a better average in terms of performance than the economic indicators (gross revenue, profit and return no investment).

This contrast, in terms of differences of the performance dimension, shows that these organizations appear to weigh and emphasize the long-term dimension, even though facing difficulties in the short run. This perspective could be equilibrated by the use of balanced scorecard analysis, which would enable equalization of the interests of the different stakeholders involved with health organizations (FUNCK, 2007).

**5 FINAL CONSIDERATIONS**

The purpose of this study was to identify the interplay of the use of management control systems, organizational learning, decisions and performance in Brazilian hospital organizations. Although it can be classified as exploratory, we believe the findings have contributed to the literature and the practice of management accounting, mainly in the following aspects: (1) methodological – by combining qualitative methods to identify
questions to be applied in the survey, and also using interviews to triangulate with the qualitative results, which is in line with the practice in international studies in management accounting; (2) theoretical – by developing a new construct, relevant management decisions, based on the literature and practice, with the advantage of being described in a more adequate language to the field of practices, besides being usable in new academic studies; (3) the findings – by demonstrating the positive associations of decisions related to clients and decisions about costs and processes with economic performance, besides showing that the organizations studied have high averages in the non-monetary performance dimension, in detriment to low economic performance indexes.

Based on the results, discussed on section 4, we can make some recommendations to control professionals who work in these organizations that can be useful to improve economic performance. Chiefly we suggest improving the diagnostic use of the management control system, to positively influence the level of organizational learning, but without ignoring interactive use, since it has a positive effect on reaching more coherent decisions to improve organizational performance.

Another important contribution is the validation of the expression “You obtain what you measure.” In other words, there are correlations between the types of decisions and the performance dimensions, so organizations should take this into account in the process of choosing performance indicators. A final important finding is that hospital organizations appear to prioritize service and client satisfaction, even though they face situations of unsatisfactory economic performance. Although there are opportunities for better management, there must be a better balance of forces among hospitals, health plan operators, insurers and the government.

Since this was an exploratory study, some limitations can be mentioned: (i) the results cannot be generalized, because of the non-random sample used; (ii) the results are in the majority based on perceptions of professionals working in the control area, so the results could have been different if the respondents had been drawn from the operational area; and (iii) performance was measured by self-perception rather than by accounting indicators.

As avenues of future research, we can recommend using the organizational learning construct in segregated fashion: single-loop and double-loop organizational learning. Finally, it would be interesting to carry out longitudinal studies, which could provide stronger evidence to propose causal inferences.
REFERENCES


APPENDIX: QUESTIONNAIRE AND DESCRIPTIVE STATISTICS

Indicate the degree to which managers and senior executives use management controls to carry out the activities described. Mark 1 (never used) to 5 (always used)

<table>
<thead>
<tr>
<th>Description of the variables</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>Factor loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>DU 1 1. Monitoring the attainment of targets</td>
<td>3.73</td>
<td>1.30</td>
<td>0.877</td>
</tr>
<tr>
<td>DU 2 2. Forecasting the most likely results</td>
<td>3.46</td>
<td>1.25</td>
<td>0.882</td>
</tr>
<tr>
<td>DU 3 3. Making small adjustments after comparing targets versus results achieved</td>
<td>3.56</td>
<td>1.15</td>
<td>0.874</td>
</tr>
<tr>
<td>DU 4 4. Analyzing only significant variations between the planned and realized budget</td>
<td>3.48</td>
<td>1.13</td>
<td>(*)</td>
</tr>
</tbody>
</table>

Source: Research data.
Note: The factor loadings were obtained by PLS-PM and are significant at 1%.
Legend: (*) Item removed from the model for having low factor loading.

Descriptive analyses of the variables - construct: interactive use

<table>
<thead>
<tr>
<th>Description of the variables</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>Factor loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>UI 1 5. Revising the main targets</td>
<td>3.65</td>
<td>1.21</td>
<td>(*)</td>
</tr>
<tr>
<td>UI 2 6. Discussing opportunities for improvement with superiors, subordinates and peers</td>
<td>3.60</td>
<td>1.28</td>
<td>0.846</td>
</tr>
<tr>
<td>UI 3 7. Formulating new action plans</td>
<td>3.79</td>
<td>1.07</td>
<td>0.901</td>
</tr>
<tr>
<td>UI 4 8. Focusing on critical questions to the organization’s success</td>
<td>3.69</td>
<td>1.04</td>
<td>0.749</td>
</tr>
<tr>
<td>UI 5 9. Unifying the organization’s vision about the problems that affect its performance</td>
<td>3.40</td>
<td>1.20</td>
<td>0.854</td>
</tr>
</tbody>
</table>
UI 6 | 10. Creating a common language to all managers and executives | 3.38 | 1.16 | 0.871
UI 7 | 11. Developing new strategies | 3.52 | 1.13 | 0.801

Source: Research data.
Note: The factor loadings were obtained by PLS-PM and are significant at 1%.
Legend: (*): Item removed from the model for having low factor loading.

Question: Analyze the statements below and indicate the degree to which they describe your organization, from 1 (“totally disagree”) to 5 (totally agree).

<table>
<thead>
<tr>
<th>Description of the variables</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>Factor loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>OL 1 1. Capacity to learn is seen as fundamental to the organization’s success</td>
<td>4.33</td>
<td>1.10</td>
<td>0.802</td>
</tr>
<tr>
<td>OL 2 2. Expenditures for training are considered to be necessary investments to keep the organization competitive</td>
<td>4.10</td>
<td>1.33</td>
<td>0.825</td>
</tr>
<tr>
<td>OL 3 3. The knowledge acquired from new situations is shared among managers and senior executives</td>
<td>3.75</td>
<td>1.02</td>
<td>0.803</td>
</tr>
<tr>
<td>OL 4 4. Diverging views about certain situations are discussed among managers and senior executives</td>
<td>3.77</td>
<td>1.04</td>
<td>0.760</td>
</tr>
<tr>
<td>OL 5 5. Managers exchange information in ways other than routine, i.e., outside performance assessment meetings</td>
<td>3.58</td>
<td>1.20</td>
<td>(*)</td>
</tr>
<tr>
<td>OL 6 6. Profound changes have occurred recently in the way of acting</td>
<td>3.62</td>
<td>1.14</td>
<td>(*)</td>
</tr>
<tr>
<td>OL 7 7. Decisions are based on past experiences</td>
<td>3.77</td>
<td>0.97</td>
<td>(*)</td>
</tr>
<tr>
<td>OL 8 8. Professionals from different areas meet to find solutions to problems</td>
<td>3.71</td>
<td>1.34</td>
<td>0.761</td>
</tr>
<tr>
<td>OL 9 9. The knowledge generated in the organization is used to meet organizational objectives</td>
<td>3.79</td>
<td>1.20</td>
<td>0.805</td>
</tr>
<tr>
<td>OL 10 10. People discuss errors as a way to learn from them</td>
<td>3.21</td>
<td>1.30</td>
<td>0.747</td>
</tr>
<tr>
<td>OL 11 11. Only small changes have occurred recently in the way of acting</td>
<td>3.04</td>
<td>1.35</td>
<td>(*)</td>
</tr>
<tr>
<td>OL 12 12. There is a search for new knowledge generated outside the organization</td>
<td>3.90</td>
<td>1.04</td>
<td>0.695</td>
</tr>
</tbody>
</table>

Source: Research data.
Note: The factor loadings were obtained by PLS-PM and are significant at 1%.
Legend: (*): Items removed from the model for having low factor loadings.
Question: If the decisions below were made in the past two years, indicate their degree of influence on the financial performance, from 1 (little influence) to 5 (great influence). Use N/A (not applicable) if the decision has not been made in that time frame.

Descriptive analyses of the variables - construct: management decisions

<table>
<thead>
<tr>
<th>Description of the variables</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>Factor loading</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Decisions – Financial</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DE 3 3. Focus on actions to reduce nonpayment</td>
<td>3.33</td>
<td>1.52</td>
<td>0.820</td>
</tr>
<tr>
<td>DE 4 4. Negotiation of payment with suppliers</td>
<td>3.83</td>
<td>1.29</td>
<td>0.868</td>
</tr>
<tr>
<td>DE 5 5. Decisions on bank debt</td>
<td>3.02</td>
<td>1.74</td>
<td>0.826</td>
</tr>
<tr>
<td><strong>Decisions – Costs &amp; Processes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DE 6 6. Improvement of margins and results.</td>
<td>3.71</td>
<td>1.20</td>
<td>0.805</td>
</tr>
<tr>
<td>DE 7 7. Changes in cost calculations</td>
<td>2.88</td>
<td>1.67</td>
<td>0.725</td>
</tr>
<tr>
<td>DE 8 8. Changes in medical procedures</td>
<td>2.79</td>
<td>1.60</td>
<td>0.825</td>
</tr>
<tr>
<td>DE 12 12. Inventory policy decisions</td>
<td>2.90</td>
<td>1.83</td>
<td>0.750</td>
</tr>
<tr>
<td><strong>Decisions – Relationship with clients</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DE 1 1. Ending an agreement with a health plan operator</td>
<td>2.10</td>
<td>1.68</td>
<td>0.767</td>
</tr>
<tr>
<td>DE 2 2. Alterations of prices</td>
<td>3.06</td>
<td>1.56</td>
<td>0.747</td>
</tr>
<tr>
<td>DE 9 9. Ceasing to offer a service</td>
<td>2.71</td>
<td>1.64</td>
<td>(*)</td>
</tr>
<tr>
<td>DE 10 10. Substitution of a doctor with another who charges lower rates</td>
<td>2.02</td>
<td>1.74</td>
<td>0.731</td>
</tr>
<tr>
<td>DE 11 11. Outsourcing of services.</td>
<td>2.65</td>
<td>1.60</td>
<td>0.821</td>
</tr>
</tbody>
</table>

Source: Research data.
Note: The factor loadings were obtained by PLS-PM and are significant at 1%.
Legend: (*) Items removed from the model for having low factor loadings.
Question: With respect to the performance indicators below, indicate the degree of attainment in relation to the targets established: 1 (much less than expected); 2 (a bit less than expected); 3 (as expected); 4 (a bit more than expected); 5 (much more than expected). Indicate N/A if the indicator is not used in your organization.

Descriptive analyses of the variables - construct: performance

<table>
<thead>
<tr>
<th>Description of the variables</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>Factor loading</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Economic Performance</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P 1 1. Gross revenue</td>
<td>2.69</td>
<td>1.62</td>
<td>0.882</td>
</tr>
<tr>
<td>P 2 2. Profit</td>
<td>1.88</td>
<td>1.26</td>
<td>0.936</td>
</tr>
<tr>
<td>P 3 3. Return on investment</td>
<td>1.88</td>
<td>1.39</td>
<td>0.911</td>
</tr>
<tr>
<td><strong>Non-Monetary Performance</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P 4 4. Client satisfaction</td>
<td>3.56</td>
<td>1.16</td>
<td>0.860</td>
</tr>
<tr>
<td>P 5 5. Process quality indicators</td>
<td>2.97</td>
<td>1.40</td>
<td>0.930</td>
</tr>
<tr>
<td>P 6 6. Overall performance</td>
<td>3.09</td>
<td>1.20</td>
<td>0.902</td>
</tr>
</tbody>
</table>

Source: Research data.

Note: The factor loadings were obtained by PLS-PM and are significant at 1%.