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The "economic paradigm" in management accounting

Return on equity and the use of various management accounting artifacts in a Brazilian context

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Abstract

Purpose – This paper seeks to examine the profile of artifacts with superior returns in order to identify the usage of management accounting in a Brazilian context.

Design/methodology/approach – This paper is part of an empirical research project based on a probabilistic sample (119 entities) from medium and large Brazilian companies, selected according to economic sector and revenues. The management accounting artifacts were identified according to the five stages of *International Management Accounting Practice 1* (*IMAP 1*, International Federation of Accountants (IFA), 1998). Logistic regression was applied to identify the artifacts most adherent to companies with the outstanding profile.

Findings – In the analysis of the five stages of *IMAP 1*, only the fifth stage, value management, provided the significance level to accept the hypothesis. In this stage, the artifacts that were accepted with a significance level of 90 percent were return on equity and balanced scorecard.

Research limitations/implications – The field research was applied only in the Brazilian market.

Practical implications – Especially for researchers, this paper raises some important questions, and aims to stimulate future studies in management accounting.

Originality/value – This paper contributes by presenting research from outside the Anglo-Saxon world, and by analyzing the artifacts' profile with approaches balanced between positive and qualitative accounting.

Keywords Management accounting, Management techniques, Brazil, Companies

Paper type Research paper

Introduction

Atkinson *et al.* (2001, p. 36) have stated that the operational and financial information provided by management accounting should be determined "... by the information needs of individuals inside the company and ... should guide their decisions." In this perspective, managers have a variety of management accounting tools at their disposal. Each of these provides one or more specific types of management-accounting information, and these various tools can thus support, enable, and encourage managers in their decision-making. According to the authors, management accounting has

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four organizational functions. Firstly, operational control provides feedback about the efficiency and quality of tasks performed. Product and client costing measures the cost of resources that are used to produce, sell and deliver a product or service to clients. Administrative control provides information about the performance of managers and operational units. Finally, strategic control supplies information about long-term financial and competitive performance, market conditions, client preferences, and technological innovations. The more the environment turns turbulent and volatile, the the more the managers require external information.

Chenhall (2003) relates the use or usefulness of a management accounting information system (MAIS) to two different outcomes: behavioural and organizational. If the artifacts are useful, they are likely to be used and satisfy the individuals who can then presumably approach tasks with enhanced information. As a consequence, these individuals take improved decisions and are better able to achieve organizational goals. There is no evidence to assure the direct linkage between availability of MAIS artifacts and the financial results (Chenhall, 2003).

Like any other investment alternative, a decision by a company to invest in a management-accounting artifact requires funds. Moreover, from a traditional view of investment, the benefits of committing to the use of such management accounting artifacts are often less evident than they are for other investment alternatives – given the essentially qualitative and indirect nature of the benefits of such artifacts (at least in economic terms). Investments require the commitment of resources and choosing among competing alternatives can be difficult – especially if the quantitative benefits of certain alternatives are unclear. In these circumstances, it is difficult to apply a strict economic paradigm to the management accounting artifacts such as information systems, strategic planning, activity-based costing (ABC) and balanced scorecard systems. This is because the entity knows how much it will have to pay for these tools, but it might not have a clear perception of the likely economic benefits. Research that provides evidence of the efficacy of this kind of investment is therefore crucial.

Two theories of management accounting

Two distinct approaches to the problem of the adoption of management accounting artifacts can be noted. Zimmerman (2001) offered a pragmatic utilitarian view of positive accounting according to which information can be considered valuable only if it has an economic impact. Lukka and Mouritsen (2002), criticized Zimmerman's (2001) monodimensional approach as being detrimental to the development of management-accounting research. Lukka and Mouritsen (2002) were concerned that Zimmerman's (2001) approach excluded any elements that could not be included in the economic paradigm. They wanted to emphasize how entities performed their activities, rather than whether certain economic benefits could be verified. The how approach has been extensively studied, mainly in case studies and local field research.

This study contends that the how approach cannot stand in isolation without some consideration of the whether factor. The present study thus cautiously accepts Zimmerman's (2001) view, at least in terms of commitment. This means that management accounting tools should only be recommended if they at least "appear" to be useful or to exert some economic impact on internal agents. On the other hand, any analysis of economic benefit has to make due allowance for the question of how this is to be achieved.

Managers know that there is no single factor that guarantees corporate success. However, they also know that there are certain essential factors without which organizations simply cannot be managed. In this context, Bhimani (1993) argued that an essential factor for survival in a permanently competitive environment is the availability of the relevant information that enables managers to act. If this is true, it is apparent that an attempt should be made to identify economically successful and non successful organizations and to analyze their adherence to a conceptual framework of management accounting. The problem with Zimmerman's (2001) approach is that no evidence is provided that managerial artifacts are the reasons for the financial success. On the other hand, it is admitted that it is important to understand what the successful companies have as a structure.

The following research question is thus proposed to guide the present study of large and medium-sized Brazilian companies:

RQ1. Is there an association between return on equity (ROE) and conceptual adherence to management accounting artifacts?

For the purposes of the present study, the following definitions and usages are adopted:

- *Management-accounting artifacts.* Management accounting makes use of different concepts and constructions. These are variously referred to as "tools," "concepts," "systems" and "methods." Schein's (1985) term – "artifacts" – is used in this study to synthesize these different terms and concepts.
- *Association.* In the present context, an "association" is taken to be an identified relationship between study variables (irrespective of its precise statistical nature).
- *ROE.* ROE is calculated by dividing net profit by owner's equity (using data obtained from the entities' financial statements). These returns are then ranked in two clusters. In spite of imperfections, such as the failure of this indicator to consider the cost of capital, this is a commonly used indicator of returns to stockholders. It allows for a reasonable approximation of the return potential created in a limited time period. It also allows for comparisons, which are harder to make with other indicators of return (Brav *et al.*, 2000).
- *Brazilian large and medium-sized companies.* Definition of company size was based on the approach adopted by the Brazilian Economic and Social Development Bank. This official funding body defines medium-sized companies as entities whose annual net revenues exceed US$18 million.
- *Conceptual adherence.* In an attempt to transform a qualitative description into a quantitative analysis, the degree of use of each artifact (based on their components) is treated on an ordinal scale from 1 to 5. A general calculation of the points for each component gives the total points possible, within a hierarchical perspective. The sum of points obtained in each organization divided by the component points results in an adherence percentage. The higher the percentage, the greater the adherence to what would be possible in terms of the theoretical framework.

This survey of Brazilian companies is significant because, despite Brazil's economic significance as the 11th largest economy in the world and the largest in Latin America, there has been little research published in management accounting in Brazil,

particularly in comparison to the other large developing economies of China, India and Russia. Brazilian companies are becoming increasingly integrated into the international economy and are raising capital in the American ADR market and on the Eurobond market. Even after more than ten years without double digit inflation, interest rates are amongst the highest in the world, which increases the financial risk for companies. The Brazilian government remains highly influential in the setting of the accounting rules.

Literature review

The literature review explores three general areas:

(1) the role of management accounting;

(2) management accounting and performance; and

(3) the constructs of management accounting artifacts.

The role of management accounting

Anthony and Govindarajan (1998) have noted that management control is the means of guaranteeing that strategies are followed and that goals are reached. Management control includes such activities as planning, coordination, communication, evaluation, decision-making and influence on the persons involved, with a view to changing their behavior. In assessing the status of management accounting in such management control, Ward (1992) observed that management accounting plays an important role in providing managers with the financial data they require in administering and controlling the business in the best interests of stockholders. Additionally, proper financial analysis is required to define the status of the business and to guarantee that the chosen strategy is realistic and appropriate.

In this context, Otley (1986) noted that the design of a management control system continues to be more of an art than a science – with organizations learning from their mistakes and adjusting their systems as they proceed. It is thus crucial for entities to customize management elements and practices to their specific needs. In doing so, organizations have various combinations of instruments and practices at their disposal. Customization can thus involve the components – for example, some organizations do not have enterprise-resource planning (ERP) fully implemented; the elements of artifacts – for example, some organizations think they realize strategic planning simply by defining the long-term goal; and/or the relative importance of each artifact – for example, some organizations consider the costing system to be merely bureaucratic (as a part of management accounting) whereas others consider it to be the heart of the management process.

The questions to be addressed include what is needed and what lies outside the organization's cost/benefit analysis? These questions are difficult to answer generically – because organizations differ in terms of activities, size, experience, complexity, competitive environment and collective internal behavior.

Management accounting and performance

Various studies have attempted to relate management-accounting variables to performance; however, when considering performance, not all authors have used such measures as income, economic value-added (EVA), or earnings per share.

Some have used other measures, and some have even used non-monetary measures of performance. Chenhall (2005) mentioned that has been "little survey work to confirm the adoption or effects on desired organizational outcomes." The following examples can be given:

- Chenhall and Langfield-Smith (1998) found an association between what they called the "most advanced" management-accounting tools (activity-based cost management, strategic planning, benchmarking, and so on) and performance (as measured by a set of financial and non-financial elements).
- Abernethy and Lillis (1995) found an association between management control (using manufacturing measures) and performance (as measured in terms of cost efficiency, flexibility, and quality).
- Perera and Poole (1997) followed up the work of Abernethy and Lillis (1995), but found no evidence of any link between "metrics" and performance.
- Suwignjo *et al.* (2000) considered that "... performance management should be viewed as a key business process which is central to the future wellbeing and prosperity of any manufacturing enterprise."

These examples show that various studies focus on different aspects of the problem, and that they often reach apparently contradictory conclusions. Despite the difficulties, there is obviously significant interest in the subject.

The constructs of management-accounting artifacts

A conceptual framework of management-accounting artifacts can indicate the stage of development of management accounting in a given firm. The following framework was based on *IMAP 1* (IFA, 1998), which was published by the IFA. The framework has been adapted for the present study in accordance with the contributions of various authors who have researched the issue. The following sequence of phases can be noted:

- structured and formalized costing system;
- strategic plan and budget;
- management reports;
- waste-reduction program; and
- value-management system.

Each of these is considered below. All variables were treated on an ordinal scale (of 1-5), according to AHP approach described in the following topics.

Structured and formalized costing system

This allows an organization to calculate cost per

- type;
- product line; and
- group.

From a qualitative perspective, a higher frequency of standard cost, as opposed to historical cost, can be expected. Various costing methods such as absorption costing, variable costing, and direct costing were identified in different sectors.

Hansen and Mowen (1996) identified the relevant elements to distinguish between organizations as follows:

- standard cost;
- costing methods.

Costing methods can be subdivided into:

- absorption costing;
- variable costing;
- direct costing; and
- ABC.

Strategic plan and budget

The key point is the objective formalization of the process. In strategic planning, consideration has been given to vision, mission, long-term goals, long-term strategies, and operational plans (Steiner, 1979; Ward, 1992; Welsch *et al.*, 1998); in addition Hansen and Mowen (1996) was used to identify relevant elements for analysis. Consideration has also been given to annual budget and the relevant elements of note include premises; marketing planning; planning for production, supplies, and storage; human-resources planning; capital budget; and projected financial statements (Horngren *et al.*, 2000; Welsch *et al.*, 1998; Hansen and Mowen, 1996).

Management reports

Performance analysis is based on the information system which is structured according to various reports. These reports allow the management team to understand the process according to entity, business unit, products, cost center, and so on. Relevant elements of note have included forecasted × realized data from income statement; and balance sheet and cash flow per area such as business unit, cost centre, investment centre, etc (Hansen and Mowen, 1996). Waste reduction programs have been considered (IFA, 1998). Research of note into value-management systems have included the balanced scorecard (Kaplan and Norton, 1992); activity-based management (Hansen and Mowen, 1996); ROE (Van Horne, 1995); and EVA and market value-added (MVA) (Rappaport, 1998; Copeland *et al.*, 1995; Stewart, 1991).

Field research

Objectives

The empirical research undertaken for the present study was essentially descriptive in nature, based on primary data collected by questionnaire and interviews with Brazilian large and medium-sized firms. The following specific objectives were formulated:

- Assessing the performance of firms as measured by ROE in the period 2001-2003.
- Identifying groups of organizations in two profile clusters according to ROE.
- Establishing whether any relationship exists between an organization's ROE and its profile of managment-accounting artfacts.

Methodology

Hypotheses

A null hypothesis and an alternative hypothesis were proposed for consideration in the regression analysis. These hypotheses can be expressed in the following terms:

H0. That the coefficients of all the predictors are equal to zero; that there is therefore no relationship between the predictors and the dependent variable; and that there is therefore no correlation between the independent variables and the company's management accounting profile.

H1. That at least one of the predictors has a coefficient different from zero; that there is therefore a relation between the predictors and the dependent variable; and that at least one of the independent variables is therefore correlated with the company's management accounting profile.

The logistic regression used in this paper treated the variables by groups as described in the sequence of phases (structured and formalized costing system, strategic plan and budget, management reports, waste-reduction program and value-management system) as described above.

Rationale for statistics

Logistic regression was chosen because it is a useful analytical tool in dealing with non-metric dependent variables in only two groups; it is considered relatively robust; and it does not require assumptions, which is the case here. The use of logistic analysis to identify the variables found in the successful group has advantages and disadvantages. Hair *et al.* (1998) discussed some of the advantages and disadvantages of this approach when comparing it with others available. Its odds ratio is:

$$\text{Prob}^{(\text{event})}/\text{Prob}^{(\text{no event})} = e^{B_0+B_1X_1+\cdots+B_nX_n}$$

where: $\text{Prob}^{(\text{event})}$ = probability of event occurrence; $\text{Prob}^{(\text{no event})}$ = complementary probability of event non-occurrence; B_0 = constant; $B_1, \ldots B_n$ = estimated coefficients; $X_1, \ldots X_n$ = independent variables to be treated.

The above approach compares the probability of an event's occurrence with the probability of its non-occurrence, and the challenge is to identify the lowest log-likelihood possible, using a stepwise process. Because the curve is a logarithm, the antilog is taken to provide the figures in an accessible form. A positive coefficient increases the predicted probability, whereas a negative value decreases the predicted probability.

To provide consistency among the groups of questions (which have various qualities and parameters), this approach involves running the figures separately for each item. The general criteria adopted were as follows:

- variables with less than ten observations were eliminated;
- a manual stepwise process was followed according to level of freedom and goodness-of-fit figures;
- the improvement in the log-likelihood, crossed with the level of freedom, was analyzed, and the difference of $\chi 2$ was computed and tested in the critical range; and
- a level of 90 percent was taken to be significant.

Sample

The original 24 economic sectors were recoded into seven groups for the purposes of the analysis (Figure 1).

In establishing the sample and its segmentation, the following steps were taken:

- The Brazilian magazine *Melhores e Maiores* was used as a primary source to identify the total population and its sectors in terms of size of revenues. In total, 2,281 organizations with revenues of US$18 million or more were identified.
- The total population was segmented according by economic sector; and annual revenues.
- The sample size (of 125) was established using a probabilistic approach to the segmentation of whole population (allowing for a 10 percent error in relation to the average). In the final analysis, questionnaires from 119 entities were considered (with a 12.2 percent statistical error in accordance with the average parameter).
- During the field research, if a respondent refused to answer the questionnaire, the questionnaire was sent to another firm with similar characteristics in terms of sector and annual revenues, according to the same random criteria used for initial selection.

Research variables

The variables of interest were divided in two groups:

(1) result variables; and

(2) management-accounting profile variables.

Resumed codes per sector	Original codes per sector	Title
1	2	Wholesalers and foreign trade
	5	Retailers
2	1	Food
	3	Automobile
	4	Beer and beverages
	6	Textile and confection
	7	Civil construction
	8	Electric-electronic
	9	Pharmaceutical
	10	Hygiene, cleaning and cosmetics
	12	Civil construction material
	13	Mechanic
	14	Mining
	15	Paper and cellulose
	16	Plastic and rubber
	17	Chemical and petrochemical substance
	21	Iron extraction and metallurgy
	22	Technology and informatics
3	11	Financial institutions
4	23	Telecommunications
5	19	Public services
6	18	Services – others
	20	Transport
	24	Communication
7	25	Various others

Figure 1.
Population segmentation per sector

For result variables the following indices were considered for use in this study: ROE; EVA; and MVA – all of which have certain advantages and disdavantages. ROE was chosen because it satisfies the criteria of objectivity, range, and association with stockholders and managers. In addition, ROE can potentially be verified by an external observer with a significant level of consistency. The other indices demand a level of sophistication and involvement that could not be verified in this study.

Entities were then ranked into "profiles," according to certain percentage intervals of ROE, as reached in 2001-2003. More successful companies (from the perspective of ROE) were thus ranked relatively more highly in terms of profile. The intervals used were as follows:

- profile 0: less than 10 percent ROE; and
- profile 1: higher than 10 percent ROE.

The figure of 10 percent is based on the average Brazilian ROE for 2001-2003 according to *Melhores e Maiores* (Editora Abril, 2004). A higher ROE indicates good performance for a company, although when considering by sector and size, particularities produce different levels of performance.

The management accounting profile variables were treated by means of analytic hierarchy process (AHP) (Saaty, 1996). The variables scores were ranked in hierarchical importance as follows:

- from the relatively more basic to the more complex/complete (in concept, resource, or actual sense);
- according to chronological sequence (in order of acquisition by the firm); or
- from the least required to the most desirable (from a conceptual perspective).

In order to define the scores, the first two criteria were the preferred forms of hierarchy for analysis. The last was to be used only if the first two were not applicable. Cronbach's α was used to assess reliability (Hair *et al.*, 1998). A standardized coefficient of 78 percent was obtained, which indicates excellent reliability of the mass of data.

The field study was carried out from April to November 2002. A questionnaire was the main instrument for data collection, followed by in-depth interviews with part of the sample as a double check. Following a pre-test and adjustment of certain items, questionnaires were sent and returned by e-mail. Personal interviews were then conducted with approximately 30 percent of the respondents.

Data analysis

As described before, the sample was split into two groups: profile 0 (lower ROE) and profile 1 (higher ROE). Data analysis structure has two different requirements: descriptive one treating each phase of the *IMAP 1* (see item 3.3) according to the adherence to the conceptual framework; and hypothesis test as the statistical way to identify association. Both are important and complementary approaches of analysis. The ROE profiles show that 35 companies have negative ROE, 33 companies have ROE higher than zero but lower than 10 percent, while 33 companies have a ROE higher than 10 percent per year. A consideration of ROE by sector in Table I shows:

Description	Return profile			Percentage on total		
	0	1	Total	0	1	Total
Entities						
Sector 1-wholesalers, retailers, foreign trade	13	3	16	15	9	13
Sector 2-industries – all	39	16	55	45	48	46
Sector 3-financial institutions	5	9	14	6	27	12
Sector 4-telecommunications	4	0	4	5	0	3
Sector 5-public services	11	1	12	13	3	10
Sector 6-services	13	4	17	15	12	14
Sector 7-other sectors	1	0	1	1	0	1
Total	86	33	119	100	100	100

Table I.
Sectors × return groups

- *Profile 0.* Wholesalers, retailers and foreign trade, telecommunications, public services concentrate the most of their companies in the lower ROE profile.
- *Profile 1.* Most of the financial institutions are in the higher ROE profile.
- *Balanced profile.* Industrial sector is relatively balanced in percentage of companies in both profiles.

Revenues profile provides a distribution in which the highest group has 19 percent of total and the lowest group 5 percent. Table II shows that:

- *Profile 0.* The smallest companies with revenues up to US$ 50 million predominate.
- *Profile 1.* Companies with revenues between US$ 3 billion and US$30 billion are the significant portion of this profile.

Each aspect of the conceptual framework was then analyzed. The results are shown in Tables III-XI. These tables show:

- the scores for each item; and
- the degree of adherence for each item – obtained by dividing the item score (as above) by the maximum theoretical score for that item.

Description	Return profile			Percentage on total		
	0	1	Total	0	1	Total
Entities						
Revenues up to U$ 50 millions	17	4	21	20	12	18
US$ 50 > and < US$ 100 millions	13	3	16	15	9	13
US$ 100 > and < US$ 250 millions	14	3	17	16	9	14
US$ 250 > and < US$ 500 millions	11	5	16	13	15	13
US$ 500 > and < US$ 1,000 millions	16	4	20	19	12	17
US$ 1,000 > and < US$ 3,000 millions	13	10	23	15	30	19
US$ 3,000 > and < US$ 30,000 millions	2	4	6	2	12	5
Total	86	33	119	100	100	100

Table II.
Revenues × ROE profiles

Description	Score	Return profile 0	1	Total	Adherence to conceptual framework (percent) 0	1	Total
Elements							
Standard costing	3	0.9	1.0	1.0	31	33	32
Absorption costing	1	0.4	0.4	0.5	42	58	50
Absorption costing – ABC	2	0.3	0.3	0.3	15	15	15
Direct costing	2	0.5	0.5	0.5	26	24	25
Variable costing	2	0.3	0.4	0.4	14	21	18

Table III.
Structured and formalized cost system

Description	Score	Return profile 0	1	Total	Adherence to conceptual framework (percent) 0	1	Total
Elements							
Vision	1	0.6	0.7	0.6	63	67	65
Mission	2	1.0	1.2	1.1	50	61	55
Long-term goals	4	3.3	3.6	3.5	83	91	87
Long-term operational plans	5	3.1	3.9	3.5	62	79	70
External scenario development	3	1.6	1.7	1.7	53	58	56

Table IV.
Strategic planning

Description	Score	Return profile 0	1	Total	Adherence to conceptual framework (percent) 0	1	Total
Elements							
Assumptions	1	0.7	0.7	0.7	66	70	68
Mkt plan	2	1.3	1.2	1.2	64	61	62
Prod./Serv. and logistics plan	2	1.4	1.6	1.5	70	82	76
Human resource plan	2	1.3	1.3	1.3	64	67	65
Capital budget	2	1.5	1.4	1.5	76	70	73
Projected financial statements	3	2.3	2.5	2.4	76	82	79

Table V.
Budget

Table III shows these results for the "structured and formalized costing system." It can be noted that "standard cost," "absorption" and "variable costing" were identified in the profile 1 more than profile 0. ABC was indicated as non discriminant in this group. In order to analyse the discrimination of the variables in the two profiles, the application of logistic regression in this group indicated some characteristics:

Table VI. Analysis segmentation – per type of result indicator

Description	Score	Return profile 0	Return profile 1	Return profile Total	Adherence to conceptual framework (percent) 0	Adherence to conceptual framework (percent) 1	Adherence to conceptual framework (percent) Total
Elements							
Revenues	1	0.8	0.8	0.8	80	82	81
Costs and expenses	2	1.7	1.7	1.7	86	85	85
Net income	3	2.6	2.6	2.6	87	88	88
Return on net equity	4	1.7	2.9	2.3	43	73	58
Cash flow	3	2.3	2.0	2.2	78	67	72
EVA	5	1.2	1.8	1.5	24	36	30
Company market value	5	0.6	1.8	1.2	10	30	20

Table VII. Analysis segmentation – per area

Description	Score	Return profile 0	Return profile 1	Return profile Total	Adherence to conceptual framework (percent) 0	Adherence to conceptual framework (percent) 1	Adherence to conceptual framework (percent) Total
Elements							
Cost centers	1	0.8	0.8	0.8	85	76	80
Result/profit centers	2	0.8	0.8	0.8	41	42	42
Investment centers/ business units	3	1.8	2.1	1.9	59	70	64

Table VIII. Analysis segmentation – per information element

Description	Score	Return profile 0	Return profile 1	Return profile Total	Adherence to conceptual framework (percent) 0	Adherence to conceptual framework (percent) 1	Adherence to conceptual framework (percent) Total
Elements							
Product group	1	0.6	0.7	0.6	63	67	65
Business area	2	1.3	1.5	1.4	66	73	70
Market	3	1.4	1.4	1.4	48	45	47
Clients (or types)	4	1.5	1.9	1.7	38	48	43
Projects	5	2.1	2.0	2.0	42	39	41

Table IX. ERP profile

Description	Score	Return profile 0	Return profile 1	Return profile Total	Adherence to conceptual framework (percent) 0	Adherence to conceptual framework (percent) 1	Adherence to conceptual framework (percent) Total
Elements							
ERP fully implemented	3	1.0	1.4	1.2	35	45	40

- Omnibus test of model coefficients: 0.544 is greater than 0.10 and, consequently does not allow to consider this group properly built.
- Hosmer and Lemeshow test: 0.767 that is greater than 0.10 and, consequently, does not allow to accept the coherence of the variables.
- Classification table: 72 percent of correct percentage in average but pending to profile 0.
- There is at least one variable with significance higher than 90 percent: absortion cost usage (8.6 percent).

Although there is one variable with significance higher than 90 percent, as consequence of the Omnibus and Hosmer and Lemeshow, hypothesis test was not considered.

Table IV shows the results for "strategic planning." Entities with the best ROE performance levels demonstrated the higher adherence in terms of "vision," "mission," "external scenarios," "long-term goals" and "long-term operational plans." Specially when compared with all other elements of all other groups, "long-term goals" indicated the highest adherence.

The application of logistic regression in this group has some characteristics:

- Omnibus test of model coefficients: 0.333, is greater than 0.10 and, consequently does not allow to consider this group properly built.
- Hosmer and Lemeshow test: 0.207 that is greater than 0.10 and, consequently, does not allow to accept the coherence of the variables.
- Classification table: 71 percent of correct percentage in average but pending to profile 0.
- There is at least one variable with significance higher than 90 percent: long-term operational plans (8.6 percent).

Table X.
Waste reduction programs

		Return profile			Adherence to conceptual framework (percent)		
Description	Score	0	1	Total	0	1	Total
Elements							
Waste reduction project	3	1.3	1.7	1.5	42	58	50

Table XI.
Value management system

		Return profile			Adherence to conceptual framework (percent)		
Description	Score	0	1	Total	0	1	Total
Elements							
Return on net equity	1	0.6	0.8	0.7	57	79	68
EVA	2	0.5	0.7	0.6	26	36	31
MVA	3	0.3	0.7	0.5	9	24	17
Balanced scorecard	4	0.4	1.1	0.8	10	27	19

Although there is one variable with significance higher than 90 percent, as consequence of the Omnibus and Hosmer and Lemeshow, hypothesis test was not considered.

Table V shows the results for "budget." Except for Mkt plan and capital budgeting, all other budgeting elements have higher adherence to the conceptual framework in the profile of the higher ROE. It should also be observed that "financial statement projection" displayed one of the strongest degrees of adherence (on average) – which indicates that entities gave significant attention to it. It happens even if this did not occur consistently in terms of the elements that might have offered an adequate rationale for the phenomenon. In other words, for some companies when they are asked if they have a budget it means to forecast balance sheet, cash flow and profit and loss, even though they do not have the required support (assumptions, market plan, production/services and logistic plan, human resource plan and capital budget plan). It is possible that a qualitative inference may be behind this. The application of logistic regression in this group has some characteristics:

- Omnibus test of model coefficients: 0.432, is greater than 0.10 and, consequently does not allow to consider this group properly built.
- Hosmer and Lemeshow test: 0.139 that is greater than 0.10 and, consequently, does not allow to accept the coherence of the variables.
- Classification table: 74 percent of correct percentage in average but pending to profile 0.
- There is at least one variable with significance higher than 90 percent: production/services and logistic plan (6.6 percent).

Although there is one variable with significance higher than 90 percent, as consequence of the Omnibus and Hosmer and Lemeshow, hypothesis test was not considered.

Table VI shows the results for "Management reports." The adherence for "p&l information" (revenues, cost and expenses and net income), "ROE," "cash flow," "EVA" and "market value" is the focus of this item. ROE, company market value and EVA are the ones with higher adherence to profiles 1. Focus in "net income" is the element with highest adherence in both profiles. The application of logistic regression in this group has some characteristics:

- Omnibus test of model coefficients: 0.007, is less than 0.10 and, consequently allows to consider this group properly built.
- Hosmer and Lemeshow test: 0.876 is greater than 0.10 and, consequently, does not allow to accept the coherence of the variables.
- Classification table: 73 percent of correct percentage in average but pending to profile 0.
- There is at least one variable with significance higher than 90 percent: ROE (0.9 percent), cash flow (3.2 percent) market value (3.3 percent).

Although there is one variable with significance higher than 90 percent, as consequence of the Hosmer and Lemeshow, hypothesis test was not considered.

Table VII shows the results for "management reports" in terms of particular areas within the entity. The higher profile has the highest adherence to "business units," "result/profit centers" is balanced in the two profile and "cost centers" has the more adherence in the group of lower ROE.

The application of logistic regression in this group has some characteristics:

- Omnibus test of model coefficients: 0.502, is greater than 0.10 and, consequently does not allow to consider this group properly built.
- Hosmer and Lemeshow test: 0.350 is greater than 0.10 and, consequently, does not allow to accept the coherence of the variables.
- Classification table: 72 percent of correct percentage in average but pending to profile 0.
- There is no variable with significance higher than 90 percent.

As consequence of the non-existence of a variable with significance higher than 90 percent, the Omnibus and Hosmer and Lemeshow hypothesis test was not considered.

Table VIII shows the results in terms of information elements in the management reports. The table shows that these that had higher ROE are the ones that have more adherence in the "business area" and "clients" in the reports. There is a balance in both profiles when talking about "product groups," "market" and "projects." The application of logistic regression in this group has some characteristics:

- Omnibus test of model coefficients: 0.837, is greater than 0.10 and, consequently does not allow to consider this group properly built.
- Hosmer and Lemeshow test: 0.505 is greater than 0.10 and, consequently, does not allow to accept the coherence of the variables.
- Classification table: 72 percent of correct percentage in average but pending to profile 0.
- There is no variable with significance higher than 90 percent.

As consequence of the non-existence of a variable with significance higher than 90 percent, the Omnibus and Hosmer and Lemeshow hypothesis test was not considered.

Table IX shows the results regarding ERP. It can be observed that the profile with the higher ROE has higher adherence. This could explain the low use of some artifacts. The application of logistic regression in this group has some characteristics:

- Omnibus test of model coefficients: 0.29, is greater than 0.10 and, consequently does not allow to consider this group properly built.
- Classification table: 72 percent of correct percentage in average but pending to profile 0.
- There is no variable with significance higher than 90 percent.

As consequence of the non-existence of a variable with significance higher than 90 percent, the Omnibus and Hosmer and Lemeshow hypothesis test was not considered.

Table X shows the results for waste-reduction schemes. The results demonstrate relatively strong adherence to waste-reduction programs in the higher ROE profile:

- Omnibus test of model coefficients: 0.124, is greater than 0.10 and, consequently does not allow to consider this group properly built.
- Classification table: 72 percent of correct percentage in average but pending to profile 0.
- There is no variable with significance higher than 90 percent.

As consequence of the non-existence of a variable with significance higher than 90 percent, the Omnibus and Hosmer and Lemeshow hypothesis test was not considered.

Table XI shows the results for value-management systems. All the elements of this group have higher adherence in the profile 1, the higher ROE perfomance. Although it has been subject to significant criticism, ROE received the strongest adherence among various value-management indicators and one of the highest of the research (79 percent). The lack of importance of the other return indicators (EVA, MVA and BSC) might indicate a perception that the indicator is not a relevant element in value management, but it may also clearly disclose that the environment's immaturity for the fourth step defined by the IFA:

- Omnibus test of model coefficients: 0.027, is less than 0.10 and, consequently allows to consider this group properly built.
- Hosmer and Lemeshow test: 0.052 is less than 0.10 and, consequently, allows to accept the coherence of the variables.
- Classification table: 74 percent of correct percentage in average but pending to profile 0.
- There is at least one variable with significance higher than 90 percent: ROE (8.2 percent) and balanced scorecard (10.0 percent).

As consequence, the hypothesis *H0* was rejected and *H1* was accepted for ROE and balanced scorecard. In other words, there is an association between the profile and both variables.

Conclusions

The present study has analyzed the relationship between ROE and the use of management-accounting artifacts among a sample of Brazilian firms. Although the nature of the local sample prevents broad generalization of the results, some general comments can be offered.

First, it is observed that degrees of adherence to the conceptual framework of management accounting that were developed for this study varied within the two different ROE profiles. The profile with the greatest ROE cannot therefore be simplistically associated with the greatest degree of conceptual adherence. Variables not included in this research might be responsible for these variations.

Secondly, most entities in the present study belonged to "performance profiles" with lower ROE. About 72 percent of the entities in the sample were in profile 0 – and the results of the study might therefore be of interest to organizations with low performance levels.

Thirdly, adherence was less for the more recent management-accounting artifacts (ABC, BSC, EVA, and so on) than for the more traditional artifacts. This reflects a low

degree of acceptance and implementation of newer techniques. This tendency is in accordance with other countries as described in the literature review (Scapens, 1994).

Fourth, the *IMAP 1* identified different phases for management accounting development and they were the starting point for this research. As a result, the hypothesis test provided no evidence of association of distinguished ROE and artifacts included in the following phases: structured and formalized costing system; strategic plan and budget; and management reports and waste reduction programs. At the level of significance of 90 percent, in the last phase proposed by *IMAP 1*, value management system, there were identified two variables that were associated with the higher ROE profile: ROE and balanced scorecard. At the same time, this phase included the artifacts that were the least adopted by the entities; this phase also included the ones that distinguished the different performances.

Essentially, the present study has not demonstrated a generalized association between adherence to management accounting artifacts and ROE, but it did find that particular entities define and use certain artifacts that might, in the short term or long term, be related to performance. The dichotomy between the positions of Zimmerman (2001) and Lukka and Mouritsen (2002) remains (and will probably continue for some time). However, the ongoing study and debate is likely to see the dichotomy reduced by common sense. After all, the elements that cannot be included in a strict economic paradigm at present might well become recognized as viable opportunities in the future.

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