

Impact of PMS on organizational performance and moderating effects of context

Impact of
PMS on
organizational
performance

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Abstract

Purpose – The purpose of this paper is to explore the impact of performance measurement systems (PMS) on organizational performance in public sector. In addition, it investigates the moderating effects of the organizational context.

Design/methodology/approach – Using a multivariate analysis, the authors investigate the extent of PMS used among Portuguese Government agencies and their effects on organizational performance. Data were gathered from the only survey (based on their Comparative Public Organization Data Base for Research and Analysis survey) applied to the Portuguese Government agencies.

Findings – The authors find that the extent to which agencies use PMS is positively associated with the organizational performance (in a multidimensional perspective). Moreover, the organizational performance is contingent upon the fit between PMS and the agency's context in light of the contingency theory (especially the orientation to citizens and the level of competition).

Originality/value – Although prior research has studied the use of PMS in public sector organizations, one question that has not been effectively answered is whether performance information is effectively used to improve public sector performance. In this way, this paper contributes to the understanding of the impact of PMS on the organizational performance, providing empirical evidence in a country that is in a period of "transition" in the introduction of NPM reforms.

Keywords Organizational performance, Performance measurement systems, Moderating effects, Government agencies, Organizational context

Paper type Research paper

1. Introduction

Performance measurement arises as a way to make managers accountable and improve organizational performance (Brignall and Modell, 2000; Modell, 2001; Ellingson and Wambsganss, 2001; Johnsen, 2005; Kaplan, 2001; Niven, 2003; Budding, 2004; Walker *et al.*, 2011). Townley *et al.* (2003) argue that performance measurement is an increasingly pervasive aspect of organizational life, especially in the public sector. The development of performance measurement systems (PMS) has been studied under a multi-theoretical approach, with a central focus on the contingency theory and the neo-institutional approach (see e.g. Geiger and Ittner, 1996; Bogt, 2003, 2004, 2008; Dooren, 2005; Lægveid *et al.*, 2006, 2007; Verbeeten, 2008; Ferreira and Otley, 2009; Johansson and Siverbo, 2009). Contingency-based studies call for empirical research that includes organizational performance as a dependent variable (Otley, 1980) and management control systems (MCS) and organizational context as independent variables (Chenhall, 2003;



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Gerdin and Greve, 2008). Moreover, neo-institutionalists are doubtful about the effective changes introduced by management and accounting innovations (DiMaggio and Powell, 1991; Gupta *et al.*, 1994; Carruthers, 1995; Geiger and Ittner, 1996). Many scholars have found that if the implementation of new management and accounting practices is intended to satisfy government mandates, they will be used to obtain legitimacy and external support rather than contribute to the decision-making process (Carruthers, 1995; Geiger and Ittner, 1996; Modell, 2001). Indeed, when the influence of isomorphism (coercive, mimetic, and normative) is significant, considerable decoupling is expected (Carruthers, 1995). Several scholars call for research that complements these two theoretical trends (Drazin and Van de Ven, 1985; Scott, 1987; Gresov, 1989; Gupta *et al.*, 1994; Geiger and Ittner, 1996)[1].

In this paper, we intend to make several different contributions. First, we seek to contribute to an understanding of the impact of PMS on organizational performance, as well as the fit between PMS and the organizational context. These issues have not been clearly addressed in prior studies, especially using the moderating approach. Second, we provide evidence from government agencies, which are typically neglected by researchers who tend to focus on local government. The creation of government agencies is a consequence of the agencification process under the NPM context. In Portugal, government agencies are responsible for implementing different public policies (e.g. education and science, health, environment, work and social security, etc.) and responding to the parent minister (with more or less autonomy). Third, and finally, data gathered from Portuguese agencies allow us to empirically address these issues in a country that is considered a “latecomer” in the adoption of NPM reforms (Araújo, 2002; Mendes *et al.*, 2012)[2].

We find empirical support for a direct (positive) effect of PMS on organizational performance (greater evidence for goals achievements and internal performance). Moreover, organizational performance is also dependent upon organizational context. Little empirical support was found for the moderating effects on organizational performance, but greater evidence was found for citizen orientation and competition.

The remainder of this paper is organized as follows. The next two sections present the theoretical background and hypotheses, followed by a summary of the main performance measurement initiatives adopted by the Portuguese Central Government. In the third section, we lay out our empirical analysis; namely, we discuss our original data, sample, dependent and independent variables, descriptive statistic and estimation effects. Finally, we discuss the findings and present concluding remarks.

2. Background and hypotheses

2.1 Performance and PMS

The multiplicity of objectives, diversity of stakeholders, and complexity that characterize government agencies are essential issues to consider in the development of a performance framework for the public sector (see e.g. Carter *et al.*, 1993; Brignall and Modell, 2000; Modell, 2001; Rainey, 2003; Johnsen, 2005). The bottom line or the net income figure is not sufficient to assess public performance in contrast with for-profit organizations (Carter *et al.*, 1993; Guthrie and English, 1997; Kloot and Martin, 2000; Reck, 2001)[3]. Many scholars argue that qualitative performance measures are more oriented toward long-term performance (Kloot and Martin, 2000; Kaplan, 2001; Ittner *et al.*, 2003; Widener, 2006), while quantitative performance measures are revealed to have greater capacity for predicting short-term performance (Hyndman and Eden, 2001; Said *et al.*, 2003; Newberry and Pallot, 2004; Verbeeten, 2008). For an adequate performance evaluation, a multidimensional approach should be used based on these two perspectives. If organizations are open systems that interact with different stakeholders who have different expectations and aspirations, the use of multidimensional PMS is crucial (Feltham and Xie, 1994; Ballantine *et al.*, 1998; Kaplan, 2001; Reck, 2001; Ittner *et al.*, 2003; Bisbe *et al.*, 2007; Verbeeten, 2008).

Based on the lack of agreement about what constitutes organizational performance, Ford and Schellenberg (1982, p. 50) identify three approaches: the goal approach, which defines performance in terms of the achievement of goals; the systems resource approach, which stresses the relationship between the organization and its environment, as well as its capacity to adapt and to innovate, and, finally, the process approach, which assesses performance in terms of the behavior of the organizations' participants. The goal approach is more concerned with objective and quantitative information on the main organization goals, while the resource and process approaches involve more qualitative information related to outcomes/effects, satisfaction, and motivation. Different stakeholders can be interested in different performance approaches that will result in differences in performance assessment. This is why many scholars advocate the use of a multidimensional framework in the study of performance (Feltham and Xie, 1994; Ballantine *et al.*, 1998; Kaplan, 2001; Reck, 2001; Bisbe *et al.*, 2007; Verbeeten, 2008), taking into account that organizations are open systems seen by different stakeholders who have different aspirations and expectations.

Under this multidimensional approach, PMS is defined in the literature as "collections of financial and/or non-financial performance indicators that managers use to evaluate their own or their units' performance, or the performance of their subordinates" (Tuomela, 2005, p. 297). The focus should be on multiple financial and non-financial performance measures linked to strategy, based on a chain of cause-effects relationships (Kaplan and Norton, 1996; Burney and Widener, 2007). Although different PMS attributes are identified in the strategic performance measurement literature (financial or non-financial, internal or external, future or past information), the most important issue is the combination and interconnection among them in order to help users assess the government, economy, efficiency, and effectiveness (Reck, 2001), thus resulting in performance improvements (Banker *et al.*, 2000). If the PMS ignores this connection, it is not balanced (Kaplan, 2001) and is misaligned (Gerdin and Greve, 2008). Organizations face multiple and sometimes competing objectives (Chenhall, 2003; Ferreira and Otley, 2009), which are typically set out by senior managers to meet key stakeholders' expectations (Otley, 2008, cited by Ferreira and Otley, 2009). "The corollary of having to satisfy multiple objectives is that performance becomes a multi-dimensional concept for which no single overriding measure is adequate" (Otley, 2008, cited by Ferreira and Otley, 2009, p. 267).

In the public sector, performance measurement primarily refers to those performance indicators of efficiency, effectiveness, and equity that are intended to be used to improve rational decision making in administrative and political processes (Johnsen, 2005; Johnsen and Vakkuri, 2006). Economy is also an important factor under the traditional use of "3Es" in public management (Mayston, 1985) and refers to quantitative aspects of performance, such as the consumption of resources (Brignall and Modell, 2000) and delivery of incentives (Verbeeten, 2008). Additionally, Brignall and Modell (2000) state that a specific feature of PMS in the public sector is the involvement of a broader range of financial and non-financial performance aspects of concern to key constituencies and the way these indicators can be used to balance conflicting interests (Feltham and Xie, 1994; Ittner and Larcker, 1998).

In this paper, we test the performance consequences of PMS (measured by the extent to which a set of performance measures is used by agencies), as well as the performance effects of the extent to which PMS are associated with agencies' characteristics.

2.2 *Impact of PMS on performance*

Under the NPM agenda, PMS arises as a way to "reinvent the government" (Osborne and Gaebler, 1993) and improve efficiency, effectiveness, and quality in public sector organizations (Hood, 1995). The main goal of PMS is the improvement of decision making and the promotion of accountability (Johnsen, 2005; Modell, 2001; Robinson, 2003;

Bovens, 2005; Cunningham and Harris, 2005). Different purposes are attributed to PMS, such as communication, measurement, accountability, and compensation, as well improvement and learning. However, many complex and ambiguous issues remain unanswered; these can act as barriers in the implementation process of PMS and, consequently, in its effects on government performance (for some references see Brignall and Modell, 2000; Lapsley and Pallot, 2000; Cavalluzzo and Ittner, 2004; Johnsen, 2005; Bogt, 2008; Verbeeten, 2008; Walker *et al.*, 2011).

For Sharma and Wanna (2005), a good PMS should provide answers to questions such as what has been achieved, how efficiently organizations' activities are performed, and whether expectations of customers/citizens have been met. All these issues appeal to a multidimensional model of performance measurement and management in the public sector (Brignall and Modell, 2000). Therefore, the use of PMS that include a broad range of qualitative and quantitative, internal and external measures (Ittner and Larcker, 1998; Abernethy and Lillis, 2001; Kaplan, 2001; Reck, 2001; Bogt, 2003, 2004; Verbeeten, 2008), with a focus on a long-term perspective is believed to lead to better performance (Ittner *et al.*, 2003).

As concluded by Walker *et al.* (2011), performance management directly affects organizational performance. These findings were obtained for English local governments. For US federal public agencies, Cavalluzzo and Ittner (2004, p. 250) find a direct and positive relationship between PMS and the organizational outcomes (accountability, use of performance information and results), based on the argument that the "availability and reporting of results-oriented performance information fosters improved decision-making by government managers." Along the same lines, Hyndman and Eden (2001) find that the chief executives of nine agencies in Northern Ireland indicate that a focus on targets and performance measures had improved their performance for all constituencies. In addition, for Ittner *et al.* (2003, p. 715) a greater "measurement diversity" (which implies supplementing traditional financial measures with non-financial measures that are expected to capture key strategic performance dimensions) will increase organizational performance. In this line, we argue that organizations will perform better when they use PMS to a greater extent. Apart from the inconclusive empirical results derived from the public sector research (Verbeeten, 2008), which makes it difficult to predict the impact of PMS on organizational performance consequences, we argue that:

H1. The use of PMS is likely to provide improvements in organizational performance.

2.3 Moderating effects of the organizational context

In this paper, we also investigate the interdependencies among performance, PMS and the organizational context. As Chenhall (2003, p. 132) asserts, "the link between enhanced organizational performance and usefulness of some aspects of management control systems (MCS) may well depend on the appropriateness of the useful MCS to the context of the organization." The contingency-based management control research argues that organizational performance consequences of PMS depend on the fit between the use of PMS and the organization's characteristics (Perera *et al.*, 1997; Abernethy and Lillis, 2001; Ittner *et al.*, 2003; Chenhall, 2003; Said *et al.*, 2003; Widener, 2006; Burney and Widener, 2007; Gerdin and Greve, 2008). For Abernethy and Lillis (2001), there is considerable support for the notion that organizational performance is enhanced when managers consider interdependencies between strategic choices, structural autonomy, and PMS. Concerning PMS, the most important consideration is the proper fit between contextual variables and performance information in order to enhance performance (Chong, 1996). Chenhall (2003) reinforces the argument that a good fit between MCS and context should lead to an improvement in performance, while a poor fit may imply a decrease in performance. In fact, there is no "best way to organize and any way of organizing is not equally effective" (Gerdin and Greve, 2008, p. 996).

Contrary to the economic (and NPM) assumptions, followers of the contingency line argue that the development of PMS does not assure the improvement of organizational performance (Chenhall, 2003; Verbeeten, 2008) but rather depends on a combination of contextual variables with PMS (Chenhall, 2003; Gerdin and Greve, 2008). Therefore, a moderating effect is assumed to exist between context and the effects of PMS on performance. "An interaction effect exists whenever the effect of an independent variable (structure)[4] on the dependent variable (performance) varies due to the values of a third variable (context)" (Gerdin and Greve, 2008: p. 996). This means that the effects of PMS on performance are not the same for all agencies; in contrast, the effects of PMS on performance may increase or decrease given a particular context (Ittner *et al.*, 2003; Said *et al.*, 2003; Gerdin and Greve, 2008; Verbeeten, 2008). In this paper, the organizational context is featured by strategic choices and the level of competition at which organizations operate.

2.3.1 Strategic choices. Based on contingency-based research, the extent to which PMS are aligned with strategic choices influences the organizational performance (Kaplan and Norton, 1996; Chenhall and Langfield-Smith, 1998; Ittner *et al.*, 2003). Chenhall (2003, p. 150) argues that strategy is somewhat different from other contingent variables because managers have "strategic choice;" this means that, when adopting a specific strategy, managers can position their organizations in a particular environment. In the public sector, strategic management can also help top managers create the conditions for strong organizational performance and for success in the future (Joyce, 2000; Kaplan, 2001; Niven, 2003). As a result of the "managerial" movement and the adoption of business-like tools, public organizations "become more concerned with strategy and less with carrying-out" (Pollitt, 2000, p. 184). The choice of a modern/traditional or an innovative/conservative strategy can help explain differences in public organizations (Hood, 1995; Abernethy and Lillis, 2001; Cavalluzzo and Ittner, 2004; Læg Reid *et al.*, 2006, 2007; Pizzini, 2006).

In this paper, we investigate possible moderating effects on performance when PMS is aligned with a more/less innovative strategy. Many scholars argue that more prospective strategies (entrepreneurial and innovative orientation) require more informal and flexible PMS featuring more subjective long-term control focused on informal communications (Chenhall, 2003; Ittner *et al.*, 2003). In contrast, more conservative strategies (a more defensive and harder orientation) are more associated with formal systems focused on formal controls and targets (Chenhall, 2003, p. 151). On the other hand, Abernethy and Lillis (2001) argue that "there is no *a priori* reason why a strategic commitment to innovation, in itself, will have positive organizational outcomes." Thus, no direct relation is expected between an innovative strategy and organizational performance. In contrast, authors argue that "improved organizational outcomes occur when management facilitates the implementation of strategic priorities through changes in their internal structures and PMS" (Abernethy and Lillis, 2001, p. 121). We, therefore, argue that the fit between the use of PMS and innovative strategies have effects on organizational performance, resulting in the following hypothesis:

H2a. The impact of PMS on organizational performance is moderated by innovative strategies.

On the other hand, an internal culture that emphasizes citizen satisfaction, quality, and results achievement represents an important strategic choice for public organizations (Hood, 1995; Pollitt, 2000). The introduction of output and outcome-oriented performance measures represents one of the most important changes in the government accounting system that traditionally focused on inputs and process measures (Hood, 1995; Bogt, 2004, 2008). These changes lead to the results-based approach that has been an extensive focus of public research in the last 20 years (Smith, 1993; Cavalluzzo and Ittner, 2004; Johnsen, 2005; Bogt, 2003).

In this context, the concern with citizen satisfaction, quality, and a results orientation is also perceived as a strategic choice that differentiates organizations (Perera *et al.*, 1997; Chenhall, 2003; Ittner *et al.*, 2003). These issues highlight internal cultures that varied among agencies. Læg Reid *et al.* (2006) predicts that agencies with an internal culture that emphasizes customer orientation and a strong service-quality would adopt PMS more easily than other agencies. However, they do not find a significant association; on the other hand, the performance consequences of this association have not been investigated.

Focusing on the manufacturing sector, Perera *et al.* (1997) predict enhanced performance as a result of the relationship between the use of non-financial performance measures and a customer-focused strategy. Despite a positive association between the customer-focused strategy and the use of non-financial measures, authors did not find that this relationship had significant effects on organizational performance. Based on these inconclusive empirical results and the lack of empirical studies on these relationships in the public sector, we will test a non-directional hypothesis about the effect of the fit between PMS and citizens/results orientation on organizational performance:

H2b. The impact of PMS on organizational performance is moderated by a strategy of citizens/results orientation.

2.3.2 Competition. The intensity of competition is one possible variable that affects the connection between PMS and organizational goals (Gordon and Miller, 1976; Gordon and Narayanan, 1984). Competition traditionally seems to be a strong feature of private and profit organizations; however, it has become an important issue among public organizations as well after the introduction of reforms by the NPM (Hood, 1995; Pollitt, 2000) with the main goal to reinvent government (Osborne and Gaebler, 1993) and secure a comparative advantage. In public sector agencies, the level of competition is determined by the way many organizations operate in the market delivering and/or producing similar services and/or products. This means that agencies compete comparatively and not directly. The greater the level of competition, the more likely organizations are to operate in a market or quasi-market mode and introduce innovative behavior to gain a competitive edge over competitors (Hood, 1991, 1995; Læg Reid *et al.*, 2006, 2007).

Besides the recognized importance of competition on public managers choices (Læg Reid *et al.*, 2006), no empirical results have been found about the consequences on public performance as a result of the fit between competition and PMS. Some important findings are those provided by the contingency-research developed in the private sector. According to Gordon and Miller (1976), environmental uncertainty, dynamism and heterogeneity increases the importance of non-financial information in tracking the environment. In addition, when decision-makers perceive greater environmental uncertainty, they tend to seek more external, non-financial and *ex ante* information in addition to internal, financial, and *ex post* information (Gordon and Narayanan, 1984). Chong (1996, p. 415) found that under a great uncertainty, the extent to which organizations use a broad scope of performance information leads to effective managerial decisions and enhance managerial performance. Accordingly, Khandwalla (1972) found that the sophistication of accounting and control systems was influenced by the intensity of competition. This way, we predict a positive effect on performance of the interaction between PMS and competition:

H3. More comparatively competitive agencies that use PMS to a great extent will perform better than less comparatively competitive agencies that use PMS to a great extent.

A synthesis of the theoretical model is presented in Figure 1.

3. Research design

3.1 Research setting in a Portuguese context

The Portuguese civil service has a very strong Weberian administrative system with a legal-administrative culture, a tradition of hierarchical relationships between policymakers and public administration (Mendes *et al.*, 2012, p. 134). The central government is composed of direct and indirect forms of administration, including centralized agencies (located in Lisbon) and those that operate in the periphery. In our study we refer to them as (0) dependent agencies and (1) legally independent agencies, respectively. Dependent agencies are departments or the equivalent with limited management autonomy (no financial autonomy), no legal identity and legally dependency on the parent ministry with some administrative autonomy. Legally independent agencies are semi-autonomous organizations at arm's length from the ministries; their legal identity differs from that of the central government but they are accountable to it. They are single organizations without subordinated units that cover the territory under review and perform activities or deliver services transferred from the parent ministry. They are structurally differentiated from the state and have some capacity for autonomous decision-making. According to the Law No. 3/2004 these agencies must have administrative and financial autonomy. However, in practice, they have different levels of management autonomy that mainly concern human resource implementation and policy implementation (Mendes *et al.*, 2012).

In the last 20 years, the Portuguese Government has introduced important initiatives regarding performance measurement and management as a result of NPM reforms (Araújo, 2002; Araujo and Branco, 2009; Mendes *et al.*, 2012; Gomes *et al.*, 2016). Reformers believed that increasing managerial autonomy would lead to efficacy in public service delivery. As a consequence of managerial autonomy attributed to independent agencies, the government decided to approve some managerial and control initiatives to evaluate performance.

The introduction of an integrated system of management and performance evaluation (SIADAP) in the Portuguese Public Administration (according to Law No. 66-B/2007 of December 28) aims to contribute to a better performance and quality of services. This initiative leads to the introduction of a performance measurement framework (QUAR) created for the evaluation of public functions and institutions based on criteria of quality, efficiency and effectiveness, accompanied by the elaboration of a strategic document defining the objectives and targets to be achieved was the first initiative. The main goal of this framework was to promote accountability based on performance results (Gomes *et al.*, 2016). Another element in these reforms was "structural rationalization, including re-engineering, outsourcing, decentralization, and private partnerships" (Mendes *et al.*, 2012, p. 137). One consequence of this rationalization was the reduction in the number of independent agencies from 440 in 2002 to 250 in 2009. As emphasized by Mendes *et al.* (2012, p. 137), as a consequence of these reforms new measures were introduced to transform the existing legalistic culture to a culture based on performance measurement and citizen-oriented values. In sum, it is expected that government agencies are now more sensitive to using PM practices, especially those that emphasize measurement and self-assessment of performance.

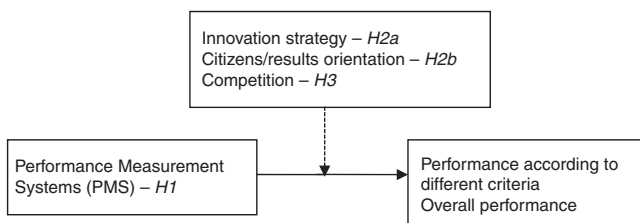


Figure 1.
Theoretical model

3.2 Data and sample

Based on unique survey data obtained from Portuguese Government agencies[5], we study the main features of the existing PMS in relation to their context, as well as their effects on performance. The unit of analysis is each responding agency. The majority of respondents are CEOs (38 percent) or senior managers (44 percent) of public agencies (e.g. assistants, vice-presidents, directors, sub-directors, coordinators) who are very familiar with the high-level decision-making process[6]. Their work experience is approximately ten years on average. Approximately 99 percent have a graduate degree and 20 respondents have PhDs. The survey data are the only data available on attitudes, perceptions, and behaviors in Portuguese Government agencies.

Data were collected online between October 2009 and May 2010. Each agency was contacted by post and e-mail, whereby we presented the objectives of the study, the means of collaboration and the link where they should access the survey. Several calls and e-mails were answered in order to clarify questions and doubts regarding the survey. In January 2010, a second request was sent to the agencies by post and e-mail[7]. The questionnaire was sent to a total of 342 agencies. Of these, 155 questionnaires were completed for a total response rate of 45 percent.

Our sample consists of two categories of agencies: 114 legally independent agencies and 41 departments[8]. Following the framework of the Comparative Public Organization Data Base for Research and Analysis (COBRA) database (on which we base our questionnaire), we focus on the steering relationship between agencies that report to the government/minister/department and the oversight authority as a complete result of the steering cycle[9].

Table II presents the sample characterization by each one of the two categories of agency, focusing on size (by full-time employees (FTE) and budgeting) and self-funding. The data show that, on average, legally independent agencies are larger organizations (considering FTE and budgeting) and have considerable financial independence (self-funding) in relation to the oversight authority than do dependent agencies. Differences in size are statistically significant (p -value < 0.01) (Table I).

4. Measurement of variables and descriptive statistics

4.1 Dependent variables

Two sets of dependent variables measure organizational public performance in this paper: one single measure that measures respondents' self-assessment related to general results of the organization (OVERALLPER) and the performance rating based on different criteria (see Table II). In order to measure performance, respondents were asked to rate the following criteria on a ten-point scale (1 = poor performance; 10 = very good performance): efficiency; effectiveness; quality of service delivery; motivation; satisfaction of staff; quality of management; internal cohesion; flexibility of the organization; stability of the organization in the environment; responsiveness to society; and accountability toward society.

Variable	Measures	<i>n</i>	Categories of agency		<i>Z</i> statistics
			0 – dependent agencies	1 – legally independent agencies	
Size	FTE	154	178	682	-3.87***
	Budget	153	23	136	-3.74***
Self-funding	1	155	2	35	-0.761
	0		39	79	

Table I.
Sample
characterization

Notes: Size: FTE, the average number of full time employees; budget, the total budget executed in December 31, 2008, in EUR million; self-funding: 1, self-income is the main source of income; 0, other income is the main source of income. * p < 0.1; ** p < 0.05; *** p < 0.01 (Mann-Whitney *U*-test)

Dependent variables (1 – poor; 10 – very good)	<i>n</i>	Mean	SD	Min/Max	Factor analysis
<i>OVERALLPER</i>					
How many points do you give your organization with regard to the general results of the organization?	151	7.72	1.18	4/10	
<i>GOALSPER</i> ($\alpha = 0.9172$)					
How would you assess the results of the organization on the following criteria?	154	7.89	1.41	3/10	1st factor
1. Efficiency	153	7.76	1.47	3/10	0.7620
2. Effectiveness	153	7.99	1.41	3/10	0.8413
3. Quality	154	7.97	1.40	3/10	0.7648
<i>INTERNALPER</i> ($\alpha = 0.8927$)					
How would you assess the results of the organization on the following criteria?	154	7.51	1.44	3/10	2nd factor
1. Motivation	154	7.65	1.62	3/10	0.7087
2. Satisfaction of staff	154	7.16	1.74	1/10	0.7031
3. Quality of management	153	7.86	1.60	2/10	0.5769
4. Internal cohesion	154	7.55	1.57	2/10	0.7527
5. Flexibility of the organization	154	7.27	1.79	1/10	0.6578
<i>SOCIETYPER</i> ($\alpha = 0.8891$)					
How would you assess the results of the organization on the following criteria?	154	8.21	1.85	1/10	3rd factor
1. Responsiveness to society	154	7.90	1.96	1/10	0.8281
2. Accountability toward society	154	8.21	1.98	1/10	0.8235

Notes: The extraction method was the principal factors; the rotation method is the orthogonal varimax with Kaiser normalization

Table II.
Measurement and
descriptive statistics
of performance

Factor analysis with varimax rotation indicates that these measures represent three underlying constructs[10]. First, we find three items loading greater than 0.7 on the first factor (efficiency, effectiveness and quality of service delivery). The increase in efficiency and effectiveness levels, as well as the improvement of quality in service delivery are considered the main goals of public sector organizations (Hood, 1991, 1995; Osborne and Gaebler, 1993; Dunleavy and Hood, 1994; Goddard, 2004) as a result of the NPM reforms. For this reason, we consider that this construct measures the agencies' goal achievements, which we label as goal achievements (GOALPER).

On the second factor, five questions loading greater than 0.5 covered motivation, satisfaction of staff, quality of management, internal cohesion, and flexibility of the organization. All the underlying questions related to the organization's employees and internal environment. Thus, this construct is labeled internal performance (INTERNALPER). Third, responsiveness and accountability toward society all load highly on factor three, which we label as performance in relation to society (SOCIETYPER). In contrast to the first factor, which is more oriented toward results, the second and third factors are more oriented toward the determinants of the goal achievements and have a more qualitative focus (Bogt, 2001, 2003; Verbeeten, 2008).

The resulting three constructs to assess performance are consistent with the literature on organizational performance, which calls for a multidimensional approach[11]. Descriptive statistics on performance, as well as the factor analysis results applied to the 11 criteria of performance are presented in Table II.

For all of the dimensions that assess performance we find that, on average, respondents' perception of performance is over seven points, considered good overall (7.72) and specific performance (7.89, 7.51, and 8.21, for GOALSPER, INTERNALPER, and SOCIETYPER, respectively). Greater performance is perceived in the society perspective; this signals the important role that the needs of citizens and the community play in public sector work.

4.2 Independent and control variables

4.2.1 PMS. We asked respondents about the extent to which their organizations use performance measures (labeled PMS) on a five-point Likert scale (from 1 – not at all to 5 – very great extent), such as measures of quantity of outputs, quality of service delivery, use of resources, effectiveness, efficiency, and, societal effects (see Table III). These items are very similar to those used by Cavalluzzo and Ittner (2004) to assess PMS. The data show that indicators of quantity and quality of outputs, use of resources, and efficiency are used to a great extent (4.17, 3.88, 3.87, and 3.83, respectively); this result is expected given the governmental recommendations introduced by the SIADAP in 2007. In contrast, societal effects are not widely used by respondents (2.92). This suggests that our findings are consistent with the theory regarding the difficulties of measuring and assessing the outcomes and effects of government work in the society.

The results of factor analysis show that five performance measures load on a single factor; this means that agencies use multidimensional measures to assess performance. This is consistent with the theory on performance measurement (see, e.g. Ballantine *et al.*, 1998; Kaplan, 2001). Only the societal effects measure was excluded from the analysis because it has

	<i>n</i>	Mean	SD	Min/Max	Factor loading ^a
PMS ($\alpha = 0.8964$)	155	3.90	0.96	1/5	
<i>To what extent does your organization use the following performance indicators (1 – not at all; 5 – to a very great extent)?</i>					
1. Quantity of outputs	155	4.17	1.10	1/5	0.77
2. Quality of service	155	3.88	1.20	1/5	0.74
3. Use of resources	155	3.87	1.07	1/5	0.75
4. Efficiency (outputs in relation to resources)	155	3.83	1.12	1/5	0.89
5. Effectiveness (outcomes in relation to resources)	155	3.73	1.20	1/5	0.86
6. Societal effects	155	2.92	1.33	1/5	< 0.50
CITIZENS ^b ($\alpha = 0.9092$)	147	5.95	0.86	2/7	
1. Emphasis on quality of service delivery	150	6.03	1.02	1/7	0.71
2. Honesty	151	6.09	1.06	1/7	0.72
3. Training is important	152	5.82	1.15	7/7	0.73
4. Integrity	150	6.04	1.12	1/7	0.80
5. Detail orientation	151	6.01	1.05	1/7	0.73
6. Goal orientation	151	5.99	0.98	1/7	0.69
7. Results orientation	152	5.8	1.21	1/7	0.67
8. Valuing customers	150	5.93	1.20	1/7	0.65
INNOVATION ($\alpha = 0.8706$)	143	5.05	1.01	1/7	
1. Support for employees	150	5.37	1.38	1/7	0.61
2. Interpersonal trust	149	5.54	1.16	1/7	0.60
3. Creativity	151	5.25	1.31	1/7	0.63
4. Keeping promises	149	5.11	1.28	1/7	0.64
5. Innovation	151	5.4	1.28	1/7	0.53
6. Willingness to experiment	150	4.75	1.50	1/7	0.77
7. Risk taking	152	4.05	1.45	1/7	0.69
COMPETITION	155	0.27	0.45	0/1	(-)
1 – Other actors/organizations deliver similar products or services and the organization is in competition with them	42	0.27			
0 – The organization is not in competition with other actors/organizations	113	0.73			

Table III. Measurement and descriptive statistics of independent variables

Notes: ^aThe extraction method was the principal factors; the rotation method is the orthogonal varimax with Kaiser normalization; ^bgiven the great number of variables having a factor loading greater than 0.50, we only select loadings greater than 0.60

a factor loading lower than 0.5. The PMS construct was composed by the mean standardized responses of these five indicators; a coefficient α of 0.8964 was found, which assures sufficient internal reliability.

4.2.2 Strategic choices. To assess strategic choices, we asked respondents about the extent to which 21 cultural items characterize the organization (on a seven-point scale). Two groups of variables were obtained based on the factor analysis, which involves 15 items (see Table III). The first group involves eight items that focus on citizens, results and quality; these items are: emphasis on quality of service delivery; honesty; training importance; integrity; detail orientation; goal orientation; results orientation, and valuing customers. We label this construct citizens and results orientation (CITIZENS), which measures the extent to which a focus on citizens and results is a feature of the internal culture. The second group consists of seven items strongly associated with the capacity to innovate and improve: support for employees; interpersonal trust; creativity; keeping promises; innovation; willingness to experiment, and taking risks. This factor was labeled innovation and improvement orientation (INNOVATION). The two underlying constructs show high α , which assures their internal reliability. Table III presents measurement and descriptive statistics for these two constructs. Descriptive statistics show that, on average, public agencies have a good orientation to citizens and results (5.95 in seven points) and a good capacity to innovate and improve (5.05).

4.2.3 Competition. COMPETITION is a dichotomous variable that reports whether there are other actors/organizations that deliver similar products or services and whether the organization is in competition with them (1 – if there are competitors that compete with the organization; 0 – if not). In Table III we see that only 27 percent (42 agencies) believe that there are other actors/organizations that are in competition with them. Thus, competition among agencies is low.

4.2.4 Control variables. Two control variables were introduced in the model (SIZE and AFFILIATION) to test for structural changes. Table IV presents measurement and descriptive statistics of control variables. For SIZE, we use the logarithm of the total number of FTE (reference at December 31, 2008) as a way to reduce the high variability in the FTE number. AFFILIATION indicates the relationship between agencies and the respective ministry (dependent or legally independent agencies). As shown in Table IV, legally independent agencies operate with greater financial independence and have a greater geographical component; in contrast, more dependent agencies operate more closely with the parent ministry and are generally national/central agencies. On average, approximately 53 percent of the sample is composed of legally independent agencies; on the other hand, the agencies in the sample have 545 FTE on average.

5. Results

5.1 Direct effects on performance

Using multivariate analysis, we study the fit of a performance model with evidence from the public sector. The purpose of this section is to analyze the extent to which our hypotheses

Control variables	<i>n</i>	Mean	SD	Min	Max
<i>SIZE (log fte)</i>					
Logfte	154	2.34	0.57	0.699	3.989
Fte	154	545	1,063	5	9,743
AFFILIATION	155	0.53	0.50	0	1

Notes: 1 – legally independent agencies; 0 – dependent agencies

Table IV.
Measurement and
descriptive statistics
of control variables

are confirmed by regression results. First, we present the results of the direct effect of PMS and the agencies' context (strategic choices and competition) on organizational performance; second, the results of the moderated effects of organizational context were presented. Table V shows the effects of PMS and agency context on organizational performance (direct effect)[12]. The likelihood ratios χ^2 are greater than 42.00 for all the models (GOALPER is the most significant model with an LR χ^2 of 74.15). This means that our models as a whole are statistically significant to some extent. The pseudo R^2 of approximately 11 percent provides evidence that GOALPER is the most robust model (compared to 7, 9 and 10 percent for INTERNALPER, SOCIETYPER and OVERALLPER, respectively). Generally speaking, these statistical results reveal that a good part of the variation in organizational performance is explained by estimated models, especially for the goal achievements approach. For the regression results we tested collinearity using the variance inflation factor (VIF). No VIF-value higher than 1.55 was reported in the models, which indicates that correlations between independent variables do not cause a problem of multicollinearity.

Regarding the strategic choices, significant direct effects on performance for CITIZENS and INNOVATION were found. Despite the fact that some authors speak about an indirect relation between strategic choices and performance (see e.g. Abernethy and Lillis, 2001), our results show that an innovative strategy coupled with a great orientation to citizens is positively associated with organizational performance (for all approaches). Thus, agencies more worried with citizens and their effective needs will perform better than agencies that reveal a low citizen orientation. The same is predicted in relation to the capacity to innovate. These results are consistent with prior contingency-based research that estimates a positive relationship between these strategic choices and performance (see e.g. Perera *et al.*, 1997; Ittner *et al.*, 2003; Said *et al.*, 2003; Bisbe and Otley, 2004).

In relation to COMPETITION, the empirical results are not very strong. We can say that more competitive agencies will have better performance in relation to less competitive agencies. However, this result is significant only for GOALPER and INTERNALPER, which means that agencies that operate in a more competitive market will achieve their goals to a greater extent (p -value < 0.05) and will provide better internal performance (p -value < 0.10). To a certain extent, our results support that theoretical propositions about a greater orientation of competitive agencies toward results and control information as a way of improving performance (Budding, 2004; Lægread *et al.*, 2006). Concerning control variables, we do not find significant effects on performance.

	GOALPER	INTERNALPER	SOCIETYPER	OVERALLPER
<i>Independent variables</i>				
PMS (HI)	0.44 (2.48)**	0.33 (1.97)**	-0.04 (-0.22)	0.41 (2.15)**
CITIZENS	0.87 (3.32)***	0.71 (2.61)***	0.70 (2.59)**	0.25 (0.88)
INNOVATION	0.70 (3.33)***	0.72 (2.86)***	0.54 (2.43)**	0.74 (3.05)***
COMPETITION	0.85 (2.19)**	0.64 (1.68)*	0.18 (0.49)	-0.17 (-0.44)
<i>Control variable</i>				
SIZE	-0.41 (-1.38)	-0.10 (-0.34)	0.41 (1.43)	0.45 (1.41)
AFFILIATION	-0.25 (-0.68)	-0.23 (-0.62)	0.55 (1.37)	-0.86 (-1.97)*
<i>n</i>	137	137	138	134
LR χ^2	74.15	62.55	45.99	42.35
Prob. > χ^2	0.0000***	0.0000***	0.0000***	0.0000***
Pseudo R^2	0.1052	0.0720	0.0940	0.1036

Notes: Ordered logit regression (OLOGIT) estimated coefficients with z-statistics in parenthesis (STATA). * p < 0.10; ** p < 0.05; *** p < 0.01

Table V.
Direct effects of
PMS and
agency context on
the organizational
performance

5.2 Performance consequences of the fit between PMS and agency context (moderating effects)

The effects of the fit between PMS and the agency context on organizational performance were tested following the model suggested by Gerdin and Greve (2008):

$$Y = b_0 + b_1X + b_2Z + b_3X \times Z + e,$$

where Y is a dependent variable (PERFORMANCE), X an independent variable (PMS), Z a moderating factor (context), $X \times Z$ the moderating effect that Z has on the relationship between X and Y , and e the error variable. In this paper, we have the following equation:

$$\begin{aligned} \text{PERFORMANCE} = & \beta_0 + \beta_1 \text{PMS} + \beta_2 \text{CITIZENS} + \beta_3 \text{INNOVATION} \\ & + \beta_4 \text{COMPETITON} + \beta_5 \text{PMS} \times \text{CITIZENS} \\ & + \beta_6 \text{PMS} \times \text{INNOVATION} + \beta_7 \text{PMS} \times \text{COMPETITION} \\ & + \beta_8 \text{CONTROL} + \varepsilon. \end{aligned}$$

Table VI presents data gathered to test $H2$ and $H3$. General statistics evidence high likelihood ratios χ^2 , with GOALPER continuing to reveal greater values (81.87), and p -values of 0.0000. The pseudo R^2 for GOALPER and OVERALLPER are approximately 12 percent, which represents the most significant value among all the estimated models. The pseudo R^2 increased somewhat in comparison with the models presented on Table V. We obtain statistical consistency comparatively to the previously estimated models about the effects of PMS and the agency context on performance, meaning that the inclusion of the moderating effects has the capacity to explain only a small part of the organizational performance variations. No VIF-value higher than 1.75 was reported in the models, indicating that correlations between independent variables do not cause a problem of multicollinearity[13].

Regarding the coefficients of the interactive effects we only find a moderate statistical significance. The interaction of PMS and CITIZENS is positive for all models, providing evidence of increases in performance when agencies with a citizens-focus use PMS to a

	Hypotheses	GOALPER	INTERNALPER	SOCIETYPER	OVERALLPER
<i>Independent variables</i>					
PMS		0.44 (2.50)**	0.32 (1.95)*	-0.06 (-0.35)	0.40 (2.00)**
CITIZENS		1.06 (4.05)***	0.96 (3.53)***	0.80 (2.71)***	0.30 (1.08)
INNOVATION		0.62 (2.83)**	0.54 (2.18)**	0.49 (2.12)**	0.76 (3.07)***
COMPETITION		1.03 (2.51)**	0.90 (2.25)**	0.26 (0.65)	-0.12 (-0.29)
<i>Interactive effects</i>					
PMS × CITIZENS	H2a	0.40 (1.86)*	0.23 (1.05)	0.18 (0.68)	0.34 (1.40)
PMS × INNOVATION	H2b	-0.10 (-0.05)	-0.15 (-0.66)	0.05 (0.24)	0.18 (0.74)
PMS × COMPETITION	H3	0.60 (1.45)	0.75 (1.97)**	0.27 (0.70)	-0.00 (-0.00)
<i>Control variables</i>					
SIZE		-0.46 (-1.54)	-0.13 (-0.43)	0.39 (1.34)	0.37 (1.15)
AFFILIATION		-0.33 (-0.87)	-0.24 (-0.63)	0.53 (1.32)	-0.98 (-2.21)**
n		137	137	138	134
LR χ^2		81.87	69.17	47.71	48.43
Prob. > χ^2		0.0000***	0.0000***	0.0000***	0.0000***
Pseudo R^2		0.1161	0.0797	0.0975	0.1184

Table VI.
Effects of the fit between PMS and agencies context on the organizational performance (moderating effects)

Notes: Ordered logit regression (OLOGIT) estimated coefficients with z-statistics in parenthesis (STATA); PMS × CITIZENS means the interactive effect of PMS and CITIZENS; PMS × INNOVATION the interactive effect of PMS and INNOVATION; PMS × COMPETITION means the interactive effect of PMS and COMPETITION. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

greater extent. However, we only find statistical significance for GOALPER (see Table VI). This means that when agencies focus on citizens and results and, simultaneously, use PMS to a great extent, they will perform better in the achievement of their goals (p -value < 0.1). Thus, the empirical results partially corroborate *H2a* on the moderated effect of CITIZENS on performance.

The interaction of PMS and INNOVATION on the organizational performance is used to test *H2b*. Although the effect of INNOVATION on the organizational effect is positive (direct effect of all four performance approaches), we do not obtain any statistical evidence about the moderating effect of INNOVATION. Thus, we have no statistical support to corroborate *H2b*. In some way, contrary to Abernethy and Lillis (2001), we predict a direct and positive relation between INNOVATION and performance; on the other hand, the fit between PMS and INNOVATION does not affect performance as predicted. Thus, no differences in performance are expected when more innovative agencies use PMS to a greater extent. The tendency for choosing more informal and flexible (organic) structures and more external and *ex ante* performance information under more prospective and innovative strategies (Chenhall, 2003; Ittner *et al.*, 2003) can be one possible reason for the insignificant effect of the relation between PMS and INNOVATION on performance.

Finally, regarding the coefficient of the interaction between PMS and COMPETITION, we obtain statistical support in relation to INTERNALPER (p -value < 0.05). Our results show that more competitive agencies that use PMS to a great extent will increase internal performance (such as motivation and staff satisfaction). Thus, we partially corroborate *H3*, which means that under a more competitive environment, agencies will perform better if they use PMS to a great extent. These empirical results support the theory about the importance of using a broad scope of performance information under great uncertainty and competitive environments (Khandwalla, 1972; Gordon and Narayanan, 1984; Chong, 1996). In sum, we found some statistical evidence that organizational performance (especially GOALPER and INTERNALPER) is contingent upon the appropriate fit between PMS and agency characteristics, such as CITIZENS and COMPETITION.

In relation to independent and control variables, these maintain their effects on performance (presented in Table V). This means that the introduction of interactive effects aims to filter the moderating effects on performance, without changes in the direction and significance of the other variables (Hartmann and Moers, 1999).

6. Discussion and conclusions

Based on assumptions of the contingency theory, we investigate whether PMS and the organizational context are associated with organizational performance (holistic approach) with evidence gathered from Portuguese Government agencies. The multiple regression analysis estimates direct and moderating effects on the organizational performance. Overall, the results provide strong empirical evidence to support the hypothesis regarding the positive (direct) effects of PMS and the agencies context on the organizational performance. Little evidence was found for the moderating effects.

Our findings suggest that the extent to which agencies use PMS is positively associated with organizational performance (stronger evidence for GOALPER and INTERNALPER); this is consistent with prior studies that associate enhancements on performance with the use of PMS (e.g. Hyndman and Eden, 2001; Ittner *et al.*, 2003; Cavalluzzo and Ittner, 2004). Thus, we agree with the literature that mentions the use of PMS that include a broad range of qualitative and quantitative, internal and external measures (Ittner and Larcker, 1998; Abernethy and Lillis, 2001; Kaplan, 2001; Reck, 2001; Bogt, 2003, 2004; Verbeeten, 2008), with a focus on a long-term perspective is argued to lead to a better performance (Ittner *et al.*, 2003).

In relation to the organizational context, the capacity to innovative and improve, as well as the citizen and results orientation, reveal themselves to be important drivers for organizational performance (positive and significant effects). Therefore, we agree that different strategic choices can position organizations in a particular environment (Chenhall, 2003) and can help public managers create the conditions for a good organizational performance and for success in the future (Joyce, 2000; Kaplan, 2001; Niven, 2003). Similar results were found for competition, which means that the external environment reveals itself to be an important performance driver (Chenhall, 2003). This result can be associated to the greater use of more sophisticated accounting and control systems in more competitive organizations (Khandwalla, 1972).

In addition, little empirical evidence was found concerning the effects of the fit between PMS and the organizational context on performance. Stronger evidence was found for the moderating effect of citizen orientation (positive effect on the goals achievement), and competition (positive effect on the internal performance). We find statistical evidence that agencies that use PMS at the same level will experience different levels of performance (especially in the goals achievement and the internal performance) as a result of the citizens-focus strategy and the level of competition. We find some consistency with the contingency-based research (see e.g. Perera *et al.*, 1997; Chenhall, 2003; Ittner *et al.*, 2003; Said *et al.*, 2003; Widener, 2006; Burney and Widener, 2007; Gerdin and Greve, 2008) which argues that organizational performance is contingent upon the fit between PMS and agency characteristics. Our findings reinforce conclusions that an enhanced performance is possible as a result of the relationship between the use of PMS and a customer-focused strategy (Perera *et al.*, 1997). Moreover, we agree, to a certain extent, with Chong (1996) that under great uncertainty, the great extent to which organizations uses a broad scope of performance information leads to effective managerial decisions and hence to improved managerial performance.

Concerning the moderating effects of innovation, we do not find significant results. These disappointing results are in line with prior research that studied these relationships (Ittner *et al.*, 2003; Bisbe and Otley, 2004). This weak relationship can be justified by the conclusions of Abernethy and Lillis (2001). According to these researchers, the effects of the fit between the capacity for innovation and the use of performance measures on organizational performance are dependent on an appropriate structure of autonomy. However, we did not test these interdependencies here (between the level of autonomy, the capacity to innovate and the use of performance measures). Thus, further investigation on these relationships is needed in the future to obtain a clear picture.

In sum, we find results that partially support Chenhall's (2003) argument that the link between enhanced organizational performance and usefulness of some aspects of MCS may well depend on the appropriateness of the usefulness of the MCS to the context of the organization. Moreover, we support the arguments of Oliver (1991) about the different responses of organizations even when they face similar institutional reforms.

This research paper is one of the first (and the first on the Portuguese Central Government) large-scale empirical analysis that investigates whether the use of PMS is associated with public performance, as well as the effects of the fit between PMS and the agencies context, based on a holistic approach (some exceptions are studies developed by Abernethy and Lillis, 2001; Verbeeten, 2008). However, some limitations should be mentioned. First, our performance variables are computed based on perceptual (self-reported) measures and not on objective measures (free from perceptual judgments); moreover, data were collected directly from the organizations whose performance was to be assessed. Following the classification scheme of Venkatraman and Ramanujam (1987), we use perceptual measures collected from primary sources. This method is in accordance with other studies that followed the same method to assess performance (see e.g. Anderson and

Young, 1999; Bogt, 2003, 2004; Cavalluzzo and Ittner, 2004; Læg Reid *et al.*, 2006, 2007; Verbeeten, 2008). In fact, organizational outcomes in contingency-based research have been dominated by self-assessment, where individuals give an indication of the organizational performance, across a range of performance criteria (Chenhall, 2003). Notwithstanding the concern with the validity and reliability of data, Venkatraman and Ramanujam (1987, p. 110) argue that neither objective nor perceptual measures are superior to one another.

Second, there are traditional limitations associated with the use of a survey, such as the validity of data and bias-related problems. However, this approach is the only possible method to develop a large-scale empirical study over a large geographical area. In this paper, the questionnaire allowed us to gather information concerning 45 percent of the Portuguese Government agencies. To reduce potential errors and increase the response rate, we use some procedures adopted by Dillman (2000) in the implementation process of the survey. Third, the lack of contingency-based research on the public sector hinders the prediction of the associations tested in this paper (especially the moderating effects of strategic choices). This work intends to contribute at this level.

Notwithstanding these limitations, our empirical work is a contribution to enhance the validity and reliability of prior findings on these issues and thereby provide a strong base to move forward. This paper provides a good contribution to understand the role of control practices (PMS) on the public performance, based on the contingency theory and focusing on the reality of public agencies, which has been neglected by researchers. For future research it would be interesting develop an empirical model that incorporates cultural differences among the agencies of different countries that applied the COBRA survey. Moreover, a quality study (case study) should be carried out as a means of clarifying certain inconclusive results in this paper and to provide a clear picture of the moderating effects of the agencies context on the organizational performance.

Notes

1. The most recent literature (see e.g. Lounsbury, 2008; Modell, 2009) indicates that the neo-institutional approach exclusively emphasizes isomorphism, which is no longer the core of institutional theory. While we are aware of the existence of this literature, in this paper, we use institutional theory in a more traditional way.
2. Portugal is a European Continental country influenced by Roman law. The political-administrative system features a legalistic and bureaucratic public management that traditionally slows the reform process (Corte-Real, 2008). However, following the trend of other OECD countries, recent changes have been introduced by the Portuguese Government concerning performance measurement and control.
3. Apart from the strong importance of financial measures to assess private sector performance, recent accounting studies have addressed the importance of non-financial information to assess company performance as a complement to traditional financial measures (see e.g. Banker *et al.*, 2000; Ittner *et al.*, 2003; Chenhall, 2003; Said *et al.*, 2003; Widener, 2006; Burney and Widener, 2007).
4. In a paper by Gerdin and Greve (2008), structure represents the use of certain management control systems with a specific design.
5. Our survey was adapted from the COBRA survey (Comparative Public Organization Data Base for Research and Analysis) to the context of Portuguese agencies. The final version of the Portuguese survey was obtained after incorporating the feedback provided by four CEOs who did the pilot tests.
6. Under the organizational theory, individual top managers are the appropriate unit of analysis in this kind of study because perceptions, willingness, beliefs and behaviors toward a particular change and innovation are determined by each one within the organization (Anderson and Young, 1999).

7. We do not find significant differences between previous responses and those from the second request.
8. In this paper, departments are agencies that operate closely to the respective parent ministry and consist of central (national) units to which many regional or local offices report (e.g. general secretaries, general directorates; general inspections, etc.). Legally independent agencies are single organizations without subordinate units that cover the territory under review (e.g. universities, hospitals, etc.). They are structurally differentiated from the state and have some capacity for autonomous decision making.
9. Subordinate agencies/subsidiaries that report to another agency were not included in our sample because they are not comparable to other agencies covered on our study.
10. Based on O'Conner (2000), we use the Velicer's minimum average partial test to indicate the number of factors to extract. This method is revealed to be more adequate for handling qualitative data. We repeat this technique for the factor analysis presented in this paper.
11. The resulting constructs are computed using mean standardized responses to the survey questions loading greater than 0.5 on the respective factor. Only the question about the "stability of the organization" was excluded from the analysis because its factor loading is lower than 0.5 for all the factors. To assess the internal reliability of the constructs we use the Cronbach's coefficient α . Table II shows that the three obtained constructs have a coefficient α greater than 0.5 (greater than the minimum level suggested by Nunnally, cited by Cavalluzzo and Ittner, 2004), which assures internal reliability.
12. The use of OLS in estimating the determinants on ordinal variables is problematic because the assumptions of OLS are violated when it is used with a non-interval outcome variable. Given that our dependent variables are ordinal variables (i.e. the categories are ordinal), the most appropriate regression technique is ordered logit regression (OLOGIT) (Hosmer and Lemeshow, 2000; Gibbons and Chakraborti, 2003).
13. According to Hartmann and Moers (1999), the centralization of independent variables allows for solving problems of multicollinearity when the interactive effects were introduced. We use the centralization method suggested by Jaccard and Turrisi (2003). The interactive effect is computed after centralization.

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