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Title: The relationship between the use of management accounting and financial performance. Results from a survey in the Italian public health care sector

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Purposes of the study: This paper addresses the need for research on the outcome of the introduction of NPM ideas and related instruments into the public health sector. In particular, we focused on the management accounting systems (MA) and developed a theoretical model, according to the contingency theory, to investigate some determinants of MA use and examine whether this latter has a beneficial effect on financial performance.
Methodology: To this end, a questionnaire was developed and mailed out to all Italian public health care organisations. Path analysis was performed to validate the research hypothesis.
Findings: The total response rate was about 49%. Our findings suggest that (i) strategies can positively affect MA design and (ii) MA use is directly and indirectly influenced by a number of contingency, organisational and behavioural variables. However, the results provide modest evidence for a possible relationship between MA use and financial performance.
Implications: These findings are crucial from the viewpoint of both managers (who may want to introduce MA into their organisations) and policymakers (who may want to mandate or encourage such introduction): not only must they make sure that MA are not relegated to a purely ceremonial role, but they must also be aware that even the actual MA use may improve organisational performance in ways and along dimensions that may not translate meaningfully into better financial results.

Suggested Reviewers:

The relationship between the use of management accounting and financial performance.
Results from a survey in the Italian public health care sector

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Keywords: Contingency theory, MA use; MA design; performance; Italy.

1. Introduction

Internationally, one of the most important trends involving the public sector in the last few decades has been the pursuit of ideas put forward by New Public Management (NPM) [1,2]. NPM-inspired reforms involve the adoption of private sector oriented management tools and techniques as a means to pursue efficiency and effectiveness in public-sector organisations. Among these tools, particular attention has been devoted to management accounting.

In this respect, a substantial body of literature has emerged that analyses the increased "invasive influence of financial measures and imperatives" [3, p 117] on the core values of the public sector [e.g. 3, 4, 5, 6, 7, 8, 9, 10]. Concurrently, another stream of literature has developed that adopts a contextual approach to management accounting in that it sees the context as having implications for the construction of techniques or it is interested in the interaction of accounting and context [11]. As pointed out by Pollit [12,13], however, little detailed, empirical research has been conducted on NPM-related practices and the results which can confidently be attributed to it [14,15,16]. Accordingly, Kukumaki, Laspley and Miller [17] have emphasised the need for further research on the interaction between general NPM ideas and the specific instruments used to implement them in different countries.

In response to this call for research, and following Chenhall's call for more contingency-based research in the service and not-for-profit organisations [18], we adopt a contextual approach and investigate some determinants and outcomes of management accounting use by public health-care organisations.

In this research, we focus on management accounting (MA). In the management accounting literature, "MA refers to a collection of practices such as budgeting or product costing, while MAS [management accounting system] refers to the systematic MA use to achieve some goals. MCS [management control systems] is a broader term that encompasses MAS and also includes other controls such as personal or clan controls" [18, p. 129]. We focus on MA because it is one of the most relevant business-like practices included in the "hard side" of NPM (e.g. accounting and control systems, auditing and performance measurement), but its actual benefits are still controversial. The assumption behind its adoption by public-sector organisation is that a coupling

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exists between accounting information and improved decision making [2]. However, at least with reference to health care, research has reported limited success, due to the failure to meet managers' needs or functional requirements [19]. At the same time, the use of refined MA has been shown to enable hospital managers to respond to growing pressures for cost control [20].

To test our hypotheses, we use data from the Italian National Health Service. The motivation for conducting this study in Italy is that the Italian health care sector has undergone significant NPM reforms, although the impact of NPM initiatives on health care organisations' performance has been questioned [21, 22]. Here, MA has been stressed as a management tool that enhances financial performance and improves efficiency. Moreover, the strong decentralisation that has characterised the Italian National Health Service in the last two decades has produced enough variation in managerial practices to successfully perform a cross-sectional statistical analysis. Thus, Italy provides a potential excellent research setting to deepen the impact of NPM related-techniques on organizations' performance results.

In considering the effects of MA adoption, we focus on the financial dimension of health-care organisations' performance. In Italy and other countries, cost control has traditionally been a major policy goal. The current financial crisis, moreover, has further reinforced the emphasis on downsizing policies and austerity measures. Not surprisingly, financial results are often a key variable in evaluating top-management performance. Hence, although performance in health care obviously involves different perspectives, financial performance reflects the increasing emphasis on higher efficiency and cost containment and MA, with its focus on financial aspects, can potentially exert a pivotal role in reaching these objectives. Whilst some empirical evidence does exist on the association between managers' use of MA and financial performance, as well as on the contextual determinants of MA use, this evidence is generally circumscribed to manufacturing [e.g. 23, 24, 25]. Little empirical evidence has so far been collected on the relationship between contextual variables, MA, and performance in public health care. In addition, the majority of past studies have examined variables in isolation.

Based on these premises, this study empirically examines a contingency framework that addresses three related questions, that is, whether: (i) MA use is influenced by MA design and

other contextual variables; (ii) top-management satisfaction with MA mediates the relationship between MA design and MA use; and (iii) financial performance is influenced by MA use. The empirical analysis is based on a survey involving Italian public health-care organisations.

The paper's intended contribution to the existing literature is three-fold. The first contribution is to enrich management accounting research by using a contingency-based framework to offer insights into the causal paths linking context, MA, and performance [26,27]. The second contribution is focused on management accounting research in the public sector and specifically in public health care, where the analysis of MA use, its determinants and its consequences remains undeveloped despite the acknowledged "need for more research [on MA and contextual variables] in service and not-for-profit organisations as these entities become increasingly important within most economies" [18]. Finally, the third contribution deals with policy issues and aims to shed some light on the impact of NPM-driven managerial reforms within the Italian public health care sector as a means to gain insights on the effectiveness of NPM. In doing so, the study adopts Hopwood's [28] perspective whereby accounting always operates in specific contexts and much is to be gained in explaining and understanding management accounting practices by relating local phenomena to global trends.

2. The Italian National Health Service

The Italian National Health Service (*Servizio Sanitario Nazionale* – SSN) covers the entire population, is tax-funded, and provides most care free of charge at point of service. It is a three-tier system with the Central Government at the top; 21 Regional Governments in the middle; and 265 public health-care organisations[1] at the bottom.

Since 1992, a series of reforms have been passed aimed at introducing NPM-related principles and instruments, including a 2001 Constitutional amendment that significantly "regionalised" the

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[1] Public health care organisations, in turn, come in four types: (i) Local Health Authorities (*Aziende Sanitarie Locali* – Asl), each responsible for the health of the whole population in a given area and consequently acting partly as providers – through their own personnel, hospitals, and other facilities – and partly as commissioners; (ii) Hospital Trusts (*Aziende Ospedaliere* – AO), providing inpatient care and hospital-based outpatient care; (iii) Public Teaching Hospitals (*Aziende Ospedaliero Universitarie* – AOU), combining the services of a hospital with the education of medical students and consequently owned by or affiliated with a medical school; and (iv) Public Research Hospitals (*Istituti di ricovero e cura a carattere scientifico* - Irccs and *Centri di ricerca*), combining the services of a hospital with advanced medical research.

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SSN. The Regions currently define health policies; appoint public health-care organisations' General Managers; provide them with goals and guidelines; fund their expenditures with regional taxes and user charges, with an equalisation fund to compensate for cross-regional differences in fiscal capacity. Individual public health-care organisations, in turn, have also gained greater autonomy, although with large cross-regional differences and a more recent, generalised tendency towards recentralisation at the regional level.

From an accounting perspective, public health-care organisations have traditionally relied on cash- and commitment-based budgeting and reporting. Between 1992 and 2002, however, they gradually abandoned such bases to introduce accrual-based financial and management accounting.

Italian public health care spending has traditionally been fairly low and still is (2,512 US$ PPP and 7.4% of GDP in 2010: OECD Health Data 2011). The deteriorating conditions of public finances, however, have emphasised the need for cost containment policies. Following the 2001 Constitutional amendment, in particular, Regional Governments have been required to break even and have been subjected to constraints and sanctions if they fail to do so (e.g. an automatic increase in their own tax rates or a more general loss of autonomy, under a "financial recovery plan" supervised by the Central Government, in exchange for a partial bail-out). These constraints and sanctions, moreover, have become increasingly stronger over time. Individual public health-care organisations, in turn, have similarly been expected to break even. The Regions in better financial conditions, conversely, have been able to claim further degrees of freedom from Central Government oversight. Financial results have thus been increasingly viewed as a key component of performance and MA use, in turn, has been increasingly perceived as pivotal in reaching these results.

3. Theoretical framework

To explain the potential determinants of MA use in public health care and its outcomes, we rely on contingency theory. Research in MA has often been grounded on a contingency approach (for a critical review, see 18). Contingency theory contends that an organisation's structure is contingent upon contextual factors and that the different components of an organisation must "fit" with each

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other for the organisation to perform adequately [30]. Thus, the idea that performance depends on the fit between organisational context and structure is central to the contingency view. In this vein, the contingency approach to accounting links the accounting systems to the environment and context in which these systems operate. Accordingly, the basic premise of the contingency approach to MA is that MA (or, more generally, any management control system) is affected by the particular set of circumstances faced by the relevant organisation and this, consequently, affects performance [31].

Contingency-based accounting studies have generally assumed that "fit is the result of a natural selection process that ensures that only the best-performing organisations survive to be observed at any point of time" [32, p. 307]. In other words, when appraising fit, these studies do not examine whether the context-structure relationship affects performance, because the impact of fit (between management control systems and contingency factors) on effectiveness is assumed as intrinsic and only the best performing organisations can survive. These studies adopt a "congruency" theory application in that a simple unconditional association is predicted among variables [33, 34].

This congruency theory application has been criticised because "signalling survival of the fittest is too crude a proxy for performance" [35]. It has consequently been suggested that contingency-based accounting research should employ organisational performance or other measures of effectiveness as the dependent variable [18]. Correspondingly, accounting researchers should analyse the "conditional association of two or more independent variables with a dependent outcome" [33, p. 514] and contingency models should be developed in order to ascertain the impact of the fit between context and structure on performance.

In contingency-based accounting research, however, even the concept of outcome can be an issue. As suggested by Chenhall [18], outcomes can be interpreted as use, or perceived usefulness, of a management accounting or control system or, alternatively, as behavioural and organisational results. In particular, management accounting or control system design is assumedly related to its use and, in turn, its use is assumedly related to organisational performance. These assumptions, however, have been challenged. According to Chenhall [18], in particular, contingency-based accounting studies should "first establish MCS adoption and use, then [...] examine how they are

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used to enhance decision quality, and finally investigate links with organisational performance". This is the starting point for our model, which is presented in the next Section.

4. Model development and research hypotheses

The model for our research is presented in Figure 1. It is a comprehensive model that includes: (i) multiple contingent variables; (ii) different aspects of MA that should be analysed following Chenhall [18]; and (iii) organisational performance as a dependent variable. In operationalising the variables, we adopted an intervening approach [18, 33]. Specifically, we analysed the causal paths linking context, structure, and performance in order to identify the determinants of MA and explain the relationship between MA and performance through the direct and indirect effects of the intervening variables.

Insert Figure 1 here

The model includes three contingency variables (exogenous constructs). The variable "strategy" stems from conventional theories of organisational structure, referred to as the strategy-structure-performance paradigm [36]. The variable "region" reflects the influence that Regional Governments exert on individual health-care organisations' adoption, design, and use of MA, both indirectly (e.g. through the importance assigned to financial performance within regional policies) and directly (e.g. through guidelines on MA design and incentives for MA adoption). The variable "organisational size", finally, was included for its reported contingent significance in several prior accounting studies [37,38,39].

The "heart" of the model includes several variables related to MA characteristics, mental models and behaviours associated with MA (respectively MA design, satisfaction with MA and MA use), modelled as endogenous constructs.

The model assumes a relationship between MA and performance. The difficulties associated with measuring the influence of MA on performance, however, suggested employing a mediating variable, namely MA use, the omission of which would have "constitute(d) a blind spot in the framework" [40, p. 265]. The underpinning assumptions are that (i) MA cannot contribute to

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performance if it is not used and that (ii) its use, in turn, is influenced by individual satisfaction with the accounting system.

The last element of the model is financial performance, which is viewed as the outcome variable, as previously discussed and consistent with [31, 41].

The remainder of this Section presents the research hypotheses.

Contextual variables and MA design

Contingency-based accounting studies generally support the existence of a relationship between contextual variables and MA design, despite some weaknesses and fragmentary conclusions [42]. More specifically, the external environment in which organisations operate has been argued to affect MA design in terms of certain information characteristics [43, 44, 45, 46]. This is because MA is intended to address decision-makers' information needs, which are supposed to be influenced by the external environment. The literature (in general, but also with specific respect to health care [20]) highlights four critical intrinsic characteristics (or attributes, or scope) of accounting systems that are significant in assisting managerial decision-making and can consequently be used to describe MA design: (i) the level of detail provided; (ii) the ability to disaggregate costs according to behaviour; (iii) the frequency of information reporting; and (iv) the extent to which variances are calculated. In particular, we consider the following links between the external environment (contingency variables) and MA design.

- The link between strategy and MA design

Contingency-based research contends that strategy influences MA design [e.g. 47,48,49]. In analysing the relationship between strategy and MA design, contingency-based accounting research highlights that certain designs are more consistent with certain strategies, since different strategies require different internal structures and processes, including appropriate MA information [e.g. 25,37,49,50,51,52,53]. In particular, organisations that emphasize cost strategies are supposed to require MA information that focuses on enhancing operating efficiencies and cost minimization (narrow scope of MA, [25]). Organisations that pursue differentiation strategies, on

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the contrary, mostly rely on external, future-oriented accounting information (broad scope of MA, [25]). With specific reference to health care, Pizzini [20] found that hospitals following a low-cost strategy need a more functional and sophisticated MA design because managers will require more articulated cost-oriented information to control costs [20,54]. On the other hand, hospitals following a differentiation strategy are expected to focus their resources on clinical care to the detriment of MA sophistication. On the basis of the above discussion, we put forward the following hypothesis:

H1: Strategies have a direct effect on the technical features of MA design (path 1-4), with cost-containment strategies encouraging MA sophistication.

- The link between organisational size and MA design

Contingency-based accounting research has examined the role of organisational size in MA design [e.g. 39,55,56], finding that size generally encourages MA sophistication, specialization, and use, for reasons of motive and opportunity. In terms of motive, larger organisations are more complex and must cope with greater control issues. In terms of opportunity, they have access to greater resources and can benefit from economies of scale resulting from more functional and sophisticated MA designs. Accordingly, the following hypothesis is proposed:

H2: Organisational size has a direct effect on the technical features of MA design (path 2-4), with greater organizational size encouraging MA sophistication

- The link between Region and MA design

As described in Section 2, jurisdiction over health care in Italy has been largely devolved to the 21 Regions. As a consequence, the performance objectives and management practices of individual health-care organisations will strongly be affected by Regional policies and guidelines. The Regional environment thus becomes an important context element for MA design. Particularly relevant is the presence of Regions which, due to their critical financial performance, have been partially stripped of their autonomy and subjected to financial recovery plans under strict Central Government oversight. The relationship between the presence of financial recovery plans and MA design, however, cannot be signed *a priori*. On the one hand, financial recovery plans emphasise

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the need for functional and refined MA. On the other hand, the Regions under financial recovery plans are usually those that have traditionally disregarded the need to develop decent managerial tools and practices. In conclusion, we posit that:

H3: Regional policies have a direct effect on the technical features of MA design (path 3-4), with financial recovery plans encouraging MA sophistication

<u>MA use and its determinants</u>

According to Otley (57, p.122) the effectiveness of the management accounting system adopted by an organization depends on "the appropriateness of its technical characteristics to the particular organizational and environmental circumstances" but also on "the way in which organisational participants make use of the information it provides" [57, p. 122].

Despite recognizing the importance of accounting and control systems use [32,57,58,59], the empirical literature has devoted little attention to its determinants [54]. We posit that the use of MA for decision-making depends directly or indirectly on a number of variables including contextual, technical and individual level variables.

- The links between contextual variables and MA use

The contextual variables themself can influence the use of the MA information.

From management accunting research, evidence suggests links between strategy and MA use. For example, Chenhall and Langfield-Smith [47] found that the use of management accounting system varied according to the strategy pursued. In principle, health-care organizations pursuing a cost-based strategies are expected to make a more intensive use of MA information because they require more information for monitoring costs and respond to growing pressure to control costs.

However, different strategies should require changes to control configurations [51] to ensure that the effectiveness of the MCS is achieved. This in turn enables decision makers to improve their action choices with better informed effort. Hence, in addition to the direct effect of strategy on MA use, we posit that MA design mediates the relationship between the strategy pursued and MA use. Hence, the following research hypotheses are suggested:

H4: Strategies have a direct effect on MA use (path 1-6), with cost-containment strategies encouraging MA use

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H5: MA design mediates the relationship between strategies and MA use (path 1-4-6)

In addition, as an organization becomes larger, the need for managers to handle greater quantities of information increases to a point where they have to institute controls such as rules (Child & Mansfield, 1972). The larger the organizational size, the greater the reliance on formal controls and an emphasis on MA information to assist in taking and implementing decisions, not least because size captures much organizational complexity. As such, we expect that there will be a positive relationship between organizational size and the extent of use MA information. Hence, we posit that:

H6: *Organizational size has a direct and positive effect on MA use (path 2-6)*

- The links between MA design, top management satisfaction with MA, and MA use

Both MA design and management satisfaction with the information that MA provides can influence its use. On the one hand, the technical features of MA design will affect its ability to provide decision-makers with the information they need and, thus, MA use. To put it differently, if MA design is technically inadequate, the information that MA provides will not be used because it will be perceived as unable to support managerial decision-making [60]. Thus, the following hypothesis is developed:

H7: MA design has a direct and positive effect on MA use (path 4-6)

MA effectiveness in supporting decision-making has been shown to depend not only on the technical features of ma design, but also on MA's coherence with managers' mental models [61]. Management satisfaction with MA must consequently be viewed as an another important determinant of MA use. User satisfaction is the "extent to which users believe that the information system available to them meets their information requirements" [62]. User satisfaction includes an effective response towards the delivery of information [62,63] in that it reflects the user's feelings about the information system's usefulness [64]. We believe that user satisfaction is influenced by the technical features of MA design and, in turn, influences MA use. In addition, we posit that user satisfaction mediates the relationship between MA design and MA use. More specifically, if managers perceive that the information provided by their MA meet their information requirements

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they are satisfied with it, and will be more likely to use it for decision-making and control purposes [64,65,66]. Accordingly, we posit the following hypotheses:

H8: MA design has a direct and positive effect on satisfaction with MA (path 4-5)

H9: Satisfaction with MA mediates the relationship between MA design and MA use (path 4-5-6)

H10: Satisfaction with MA has a direct and positive effect on MA use (path 5-6)

Performance

- The link between MA use and performance

The ultimate purpose of MA implementation is to improve organisational performance, including financial performance. However, there is little empirical evidence of the positive relationship between MA characteristics and financial performance, because a large portion of MA benefits is qualitative and intangible [67].

The impact of MA on performance can be expected to depend on MA use [68,69,70,71]. To a large extent, performance depends on "the way in which organisational participants make use of the information" they receive [57], so much that "the use of control information can be more significant than the formal design of the control system" [40, p.274]. In addition, MA use can also be expected to act as a mediating variable linking MA design to performance. Following our choice to focus on financial performance, the following hypotheses are suggested:

H11: MA use has a direct positive effect on financial performance (path 6-7)

H12: MA use mediates the relationship between MA design and financial performance (path 4-6-7)

5. Methods

5.1 Data

To test the hypotheses, questionnaires were sent personally to the General Managers of all Italian public health-care organisations (n=265). Personalizing the survey was intended to increase the response rate [72,73].

Consistent with the research framework, the questionnaire was made up of four Sections addressing: (i) strategy, (ii) MA design, (iii) top-management satisfaction with MA, and (iv) MA use for decision-making. The questionnaire also included a cover letter explaining the purpose of the

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study and a preliminary section intended to collect data on the respondents and their organisations. Geographic location (Region), size, and financial performance were not addressed in the questionnaire as they could be gathered from official sources. A recall to the managers who had not answered within three weeks was then conducted using a combination of mail, email, and telephone [73].

A total of 131 questionnaires were returned, with a response rate of 49%. The approach suggested by Oppenheim [74] was employed to test for non-response bias. For all the variables in the questionnaire, we found no statistically significant differences in the mean scores between early and late responses.

Among respondents, operating revenues averaged m€ 388.55 (SD: 294.16). 41.4% were located in a Region under a financial recovery plan. The mean age of respondents was 53 years. The respondents had held their current positions for an average of 3.4 years. Roughly 40% of the respondents had a background in medicine; 10% were female[2].

5.2 Measures

The measures are described below.

Strategy. Following previous approaches to strategy measurement in health care [e.g. 75,76,77], we employed the measure developed by Miles and Snow [53]. Miles and Snow [53] developed this instrument to assess an organisation's overall strategic orientation. To this end, respondents were asked to indicate the degree of emphasis that their firms had given to prospector-type and defender-type strategic priorities. Consistent with Abernethy and Lillis [78], we used Miles and Snow's measure not to ascertain whether a health care organisation fits into the "prospector" or "defender" classification, but rather to assess the degree to which it is committed to quality service or efficiency/cost containment strategies. Thus, our questionnaire presented health-care managers with a brief description of each strategy and asked them to rate, on a seven-point Likert scale, which description better represented their organisations.

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[2] A correlation analysis of the respondents' demographic variables with the variables employed in the questionnaire was performed with the aim to detect potential spurious effects. No significant associations were observed.

Organizational size. In health care, size is often proxied by the number of beds. Italian public health-care organisations (especially ASLs, see footnote 1), however, perform significant outpatient activities. Size was thus measured by the total annual operating revenues of each health care organisation.

Region. Regional features and policies were summarized by a dummy variable for whether the Region was subject to a financial recovery plan.

MA design. MA design was measured according to the four dimensions identified in par. 4: (i) level of detail provided; (ii) ability to disaggregate costs according to behaviour; (iii) frequency of information reporting; and (iv) extent to which variances are calculated. To this end, we used the instrument developed by Pizzini [20] for US health care and using a seven-point Likert scale (from very low to very high) anchored at both ends.

Top management satisfaction with MA. Doll and Torkzadeh [65] identified five components of user satisfaction with information systems: content, accuracy, format, ease of use, and timeliness. For each component, they also identified a number of specific items. These items were slightly adapted to better fit the purpose and context of this study[3].

Use of MA for decision-making. Despite its importance, the concept of "MA use" has not been well developed in the management accounting literature. In order to investigate the extent to which General Managers use MA information for specific decision-making and control purposes, four questions were constructed (for example: "Please, rate your use of MA information in achieving lower costs" or "Please, rate your use of MA information in achieving higher efficiency"). Next to each statement, a seven-point scale was provided, ranging from "1" (strongly disagree) to "7" (strongly agree).

Performance. Performance is a multi-dimensional concept, whose attributes change over time, stakeholders, and organisations. In public organisations, moreover, defining and measuring performance is even more complex, because stakeholder expectations are heterogeneous, cover multiple issues, often produce a wide range of positions on each issue, shift rapidly over time, and are difficult to specify and prioritise. Within NPM-inspired reforms, however, the introduction of MA

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[3] In particular, the questions "Is the system user friendly?" and "Is the system easy to use?" were omitted, as they did not appear to be particularly useful in assessing General Managers' satisfaction with their MA

has generally been expected to improve the financial conditions of public health care organisations, not because public hospitals should pursue profit as their ultimate goal, but rather because financial viability is a prerequisite for the provision of adequate patient care. Improved financial performance can thus be viewed as a key outcome of MA adoption by public health-care organisations. In this study, operating expenses scaled by total operating revenues were employed to measure organisational financial performance.

5.3 Statistical analysis

The data were investigated by means of: (i) descriptive statistics bivariate analysis, (ii) confirmatory factor analysis (CFA), and (iii) structural equation modelling (SEM)[4].

According to the two step-approach recommended by Anderson and Gerbin [79], confirmatory factor analysis (CFA) was employed to measure the adequacy of the measurement model, while the structural equation model (SEM) was subsequently used to test the research hypotheses by aggregating the items reflecting a common construct (mean values of the variables). Robust maximum likelihood estimation was used both in CFA and SEM [80].

6. Analyses and results

6.1. Descriptive statistics and bivariate analyses

Table 1 shows means, standard deviations, and Pearson correlation coefficients for all the variables included in the study. Efficiency/cost-containment strategies show a significant, positive correlation with MA design (.31; p < .01), satisfaction with MA (.19; p < .05), and MA use (.41; p < .01). Organizational size is negatively correlated with performance (.21; p < .05). MA design is positively correlated with both satisfaction with MA (.69; p < .01) and MA use (.68; p < .01). Satisfaction with MA is positively correlated with MA use (.60; p < .01). MA use is positively correlated with performance (0.20; p < .05).

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[4] Smith and Langfield-Smith [90] advocate that SEM is particularly appropriate for modelling relations between environment, strategy, and organisational structure, because theory in this area is relatively established and a considerable body of knowledge exists. According to Iacobucci (91, p. 2) "SEM models can perform well, even with small samples (e.g., 50 to 100)". Similar sample sizes and statistical analysis have also been reported by other empirical studies in behavioral management accounting (see for example: 92).

Insert Table 1 here

6.2 Confirmatory factor analysis

CFA showed a Satorra-Bentler chi-square statistic of 355, returning a significant p-value. Bagozzi and Yi [81], however, noted that chi-square is very sensitive to sample size. Marsh et al. [82], moreover, criticised the relevance of chi square statistics for model evaluation and suggested the use of other goodness-of-fit measures. Among these, the chi-square to degrees of freedom ratio was 1.90 (df: 183). CFA fit indices were greater than the recommended value of 0.90 (NNFI=0.95; CFI=095; IFI=0.96). RMSEA and SRMR were respectively 0.08 and 0.07, showing an adequate model fit [83,84,85].

Table 2 presents the results of the robust maximum likelihood standardized loadings, the item reliabilities and the derivative statistics of composite reliability, the average variance extracted (AVE), and the correlation among the CFA factors.

Insert Table 2 here

The measurement model was evaluated for its reliability, convergent and discriminant validity. The single item reliability was greater than 0.50, thus supporting item reliability. Three indices from the measurement model provided strong support for the convergent validity of the scales. First, the standardized loadings were each significant ($p < 0.05$). Second, the composite reliability was greater than the recommended value of 0,70 for each scale as well as each variable's Cronbach alpha. Third, convergent validity was assessed analyzing the values of the Average Variance Extracted (AVE). All the values of AVE were greater than 0.5 [85]. These results suggest high internal consistency of the items comprising the various scales.

Discriminant validity of the three scales was assessed by comparing the AVE with the maximal squared correlations between the latent constructs [85]. The maximal squared correlation (0.64) between CFA factors (Table 5) was below the minimal AVE (0.66), thus satisfying the discriminant validity "criterion" of Fornell and Larker [85].

Procedural and statistical solutions were used to minimize the occurrence of common method bias (CMB) [86]. The procedural approach was related to the design of the questionnaire, whilst

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statistical solutions included Harman's single-factor test that was conducted by performing exploratory factor analysis (EFA) on all the items of the study. The examination of the unrotated factor structure revealed four factors with eigenvalues above one, which together explained 72% of the variance. The EFA results did not show a single dominant factor explaining a majority of the variance [86]. Therefore, CMB did not appear to represent a problem for this study.

6.3 Structural equation model

The analysis was carried out in three main steps.

In the first step, the full theoretical model shown in Figure 1 was tested, imposing the causal structure of the hypothesised model on the set of observed data. The Satorra-Bentler chi-square statistic was insignificant (8.81, p=0.36), the chi-square to degrees of freedom ratio was 1.10 (df: 8), and the values of the fit indices (NNFI=0.99; CFI=1; IFI=1; GFI=0.98; RMSEA= 0.03; SRMR= 0.04) showed that the structural model fitted the data. Table 3 presents the standardized path coefficients and p-values for the full causal model. Six of the ten causal paths specified in the full causal model were statistically significant although to a different extent (Table 3), with positive path coefficients: (i) strategy and MA design; (ii) strategy and MA use; (iii) MA design and MA use; (iv) MA design and satisfaction with MA; (v) satisfaction with MA and MA use; and (vi) MA use and performance.

Insert Table 3 here

In the second step, an additional confirmatory post *ad hoc* analysis was performed using nested models in order to identify the most parsimonious model [79]. The final structural model shown in Fig. 2 is the most parsimonious and excludes the non-significant structural paths from the initial full causal model. In the final model, the Satorra-Bentler chi-square statistic remained insignificant (13.88, p = 0.28), the chi-square to degrees of freedom ratio was 1.07 (df: 13), and the values of the fit indices (NFI=0.93; NNFI=0.99; CFI=1; IFI=1; GFI=0.96; RMSEA=0.03; SRMR=0.07) showed a good fit to the data. The chi-square difference between the two models, however, was not significant ($\Delta\chi^2_{(4)}$ = 5.07). The AIC (Akaike Information Criterion) value in the final model was 43, compared to 48 in the full causal model. The lower AIC value and the chi-square difference test

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results indicate that the final model represents the best fit to the data overall. Under the final model, the list of statistically significant paths did not change from the full initial model, nor changed the signs of their standardized coefficients (Table 4). Hence, hypotheses H1, H4, H7, H8, H10 and H11 were supported.

Insert Figure 2 here

Insert Table 4 here

In the third, final step, an analysis was conducted on standardized direct, indirect, and total effects in order to test hypotheses H5 and H9 (Table 5). The indirect effects were obtained via Lisrel output using the product of coefficients method (Table 6). The significance of indirect effects was determined with PRODCLIN software using the M-test for asymmetric confidence intervals [87]. Both hypotheses H5 and H9 were supported because the two indirect effects were statistically significant since the confidence interval did not include zero (Table 6).

Insert Table 5 here

Insert Table 6 here

6. Discussion and conclusions

This paper seeks to respond to the need for further research on the interaction between general NPM ideas and the specific instruments used to implement them in different countries [17]. Following Chenhall's call for more contingency-based research in the service and not-for-profit organisations [18], we focused on management accounting (MA) practices in Italian public health-care organisations. According to Contingency theory, we developed a theoretical model to investigate both the determinants of MA use and its effects on financial performance. More specifically, our model was intended to test: (i) the impact of three contingent variables (strategy, size, and Region) on MA design; (ii) the impact of MA design on MA use by health care managers, be this impact direct or mediated by manager satisfaction with their organisation's MA; and (iii) the direct relationship between MA use and financial performance, as well as the relationship between MA design and financial performance as mediated by MA use.

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With respect to the first issue (impact of strategy, size, and Region on MA design), only strategy was found to matter. Consistent with research carried out in the private sector and with the results obtained by Pizzini [20] for US hospitals, cost-containment strategies were found to encourage more sophisticated MA design probably because public health-care managers require more information for cost control purposes. This suggests that MA adoption by hospitals cannot be viewed as a merely ceremonial process [88,89]. On the contrary, hospitals seem to accept that MA can support the pursuit of strategies and to consciously invest on MA design when cost containment becomes their priority. Interestingly, no association was found between organisational size and MA design, possibly because public health-care organisations are all fairly large and must consequently cope with comparable decision-making and control issues. Similarly, no association was found between the relevant Region being subject to financial recovery plans and MA design, hopefully because financial recovery plans have forced the "weakest" Regions to invest in management tools and to partially catch up with the "best performers", at least in this regard.

With respect to the second issue (the relationship between MA design and MA use, be it direct or mediated by managers' satisfaction with MA), both direct and indirect impacts were found to be positive and statistically significant. In addition, MA use was also found to be encouraged by the pursuit of cost-containment strategies via the mediating role of MA design. Thus, contingency, organisational, and behavioural variables all seemingly come into play and complement one another to influence MA use. Interestingly, satisfaction with MA is strongly and directly influenced by MA design. Since satisfaction with MA can be considered a subjective measure of information system success in organisations [64], this result suggests that higher MA sophistication can influence the perceived effectiveness of MA although its use also depends upon the extent to which the health care organization focuses on cost-containment strategies .

Finally, with respect to the third issue (the impact of MA design and use on financial performance), no statistical significance was found for the direct and indirect relationships between MA design and financial performance. Conversely, a positive relationship was found between MA use and financial performance, although with weak statistical significance. These results confirm that it is not MA design per se that influences performance, but its use.

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7. Implications

The idea that the adoption of private-sector practices and techniques by public-sector organisations, *per se*, cannot be expected to improve performance, is not entirely new. In the existing literature, however, this result has often been attributed to a merely ceremonial introduction of management techniques [88,89]. We add to this literature and to management accounting research by: (i) suggesting the existence of a joint effect of contingency, organisational, and behavioural variables on MA use, and (ii) providing modest evidence of a positive relationship between MA use and financial performance.

These results are relevant from the viewpoint of both managers and policymakers.

From a managerial perspective, these results suggest that, to avoid a merely ceremonial introduction of MA, MA use should be encouraged through a two-pronged approach: (i) develop a technically sound MA, but also (ii) make sure that managers appreciate its qualities and learn to fully exploit its potential.

From a policy viewpoint, these results show a positive contribution of MA use to financial performance, thus supporting national and regional policies that encourage MA adoption. Admittedly, the statistical significance of this relationship is weak, but this is not particularly surprising. In general, as mentioned in Section 4, there is little empirical evidence of the positive relationship between MA characteristics and financial performance, because a large portion of MA benefits is qualitative and intangible. With specific respect to public and non-profit organisations, moreover, efficiency gains will generally be used not to increase net income, but rather to improve service quantity and quality, unless (as is the case for many Italian health-care organisations) financial conditions have become so critical that improving net income (i.e., reducing deficits) is indeed a key priority.

In other words, MA use may reasonably be expected to improve organisational performance in ways and along dimensions that do not meaningfully translate into better financial results. Our focus on financial performance - and the resulting exclusion from the model of variables that capture effectiveness-oriented initiatives - indeed represents the main limitation of this study.

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Future research could include these variables and focus on longitudinal studies in order to observe causal linkages between variables over longer periods of time.

Despite these limitations, this study has improved our understanding of the relationships between NPM ideas and results and has shed some light on the impact of reforms and policies currently under implementation in health care.

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Figure

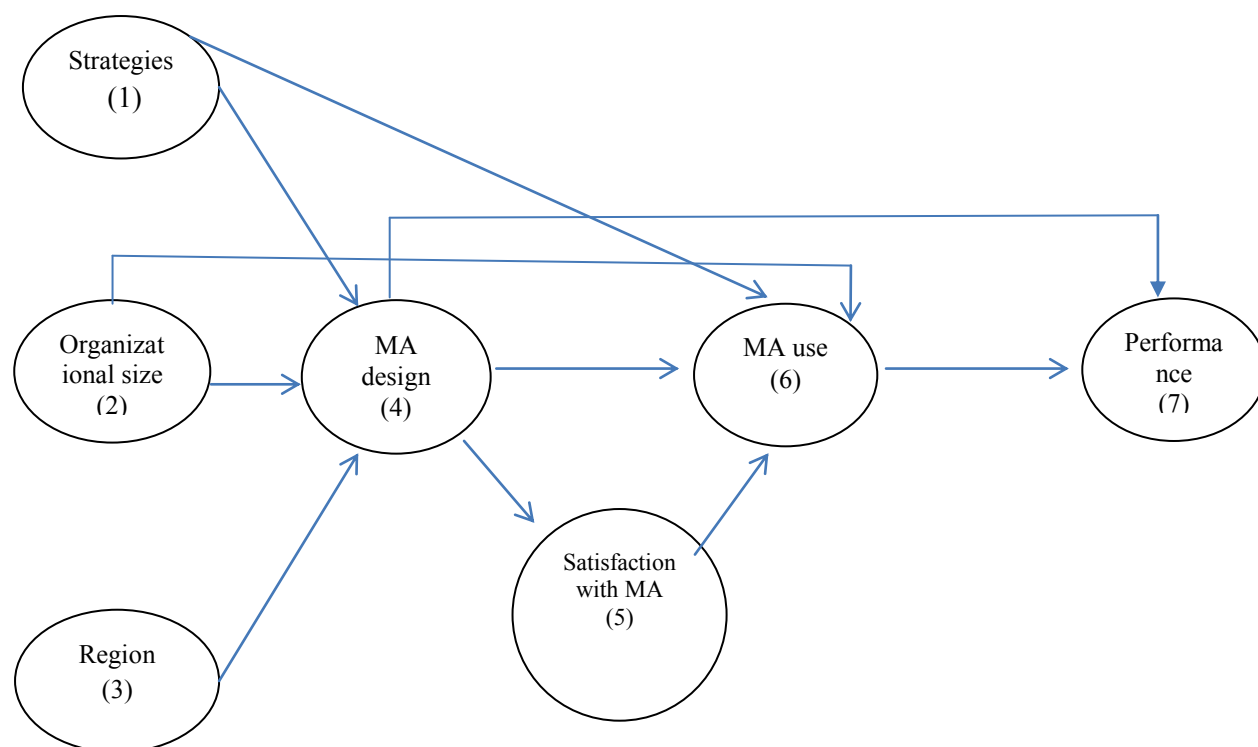**Fig. 1. The theoretical model**

Table 1. Descriptive statistics and correlation matrix for all measured variables

	Strategies	Organizational size (/1000)	Region	MAS design	Satisfaction with MA	MA use	Performance (/1000)
No. of item used	2	n.a.	n.a	5	10	4	1
Theoretical range and observed range	1-7	n.a.	n.a.	1-7	1-7	1-7	n.a.
Mean	5.19	388555	n.a	4.25	4.64	4.58	420639
Standard deviation	0.83	294158	n.a.	1.1	1.1	1.0	305098
Correlation matrix							
Strategies	1						
Organizational size	-.23	1					
Region	-.01	-.18	1				
MA design	.31 (**)	.01	-.13	1			
Satisfaction with MA	.19 (*)	.03	-.06	.69 (**)	1		
MA use	.41 (**)	.01	-.17	.68 (**)	.60 (**)	1	
Performance	.04	-.21 (*)	.81	.12	.10	.20(*)	1

* p < 0.05 **p < 0.01 n.a.: not applicable

Table 2 Results of confirmatory factor analyses and CFA correlation

Factor	Item	Standardized loading[a]	Item reliability	Composite reliability	Average variance extracted
1. Strategy				0.91	0.83
	1.	0,91	0,83		
	2.	0,92	0,85		
2. MA satisfaction				0.96	0.68
	1.	0,85	0,72		
	2.	0,84	0,71		
	3.	0,90	0,81		
	4.	0,84	0,71		
	5.	0,76	0,58		
	6.	0,73	0,53		
	7.	0,85	0,72		
	8.	0,85	0,72		
	9.	0,80	0,64		
	10.	0,83	0,69		
3. MA design				0.91	0.66
	1.	0,71	0,50		
	2.	0,73	0,53		
	3.	0,76	0,58		
	4.	0,79	0,62		
	5.	0,78	0.61		
4. MA use				0.92	0.74
	1.	0,73	0,53		
	2.	0,58	0,34		
	3.	0,82	0,67		
	4.	0,76	0,58		

Cronbach's alpha coeffient and correlaton[b] among CFA factors						
	Cronbach's alpha	**1**	**2**	**3**	**4.**	
1. **Strategy**	0.89	1				
2. **MA satisfaction**	0.95	0.71	1			
3. **MA design**	0.85	0.74	0.80	1		
4. **MA use**	0.80	0.59	0.46	0.64	1	
[a] All of standardized loadings are significant [b] All correlations are significant						

Table 3. Maximum likelihood estimates for full causal model (n=112)

Independent Variable	Dependent Variable	Path	Path Coefficients
Strategy	MA design	1-4	0.39 **
Size	MA design	2-4	-0.25
Region	MA design	3-4	-0.06
Strategy	MA use	1-6	0.26 **
Organizational size	MA use	2-6	-0.17
MA design	MA use	4-6	0.39 **
MA design	Satisfaction with MA	4-5	0.76 **
Satisfaction with MA	MA use	5-6	0.27 *
MA use	Performance	6-7	0.23 ***
MA design	Performance	4-7	0.13

* p < 0.05 **p < 0.01 ***p < 0.001

Table 4. Maximum likelihood estimates for parsimonious causal model (n=112)

Independent Variable	Dependent Variable	Path	Path Coefficients
Strategy	MA design	1-4	0.38 **
Strategy	MA use	1-6	0.23 **
MA design	MA use	4-6	0.44 **
MA design	Satisfaction with MA	4-5	0.76 **
Satisfaction with MA	MA use	5-6	0.26 *
MA use	Performance	6-7	0.22 ***

* p < 0.05 **p < 0.01 ***p < 0.10

Table 5. Decomposition of the total effect for parsimonious causal model

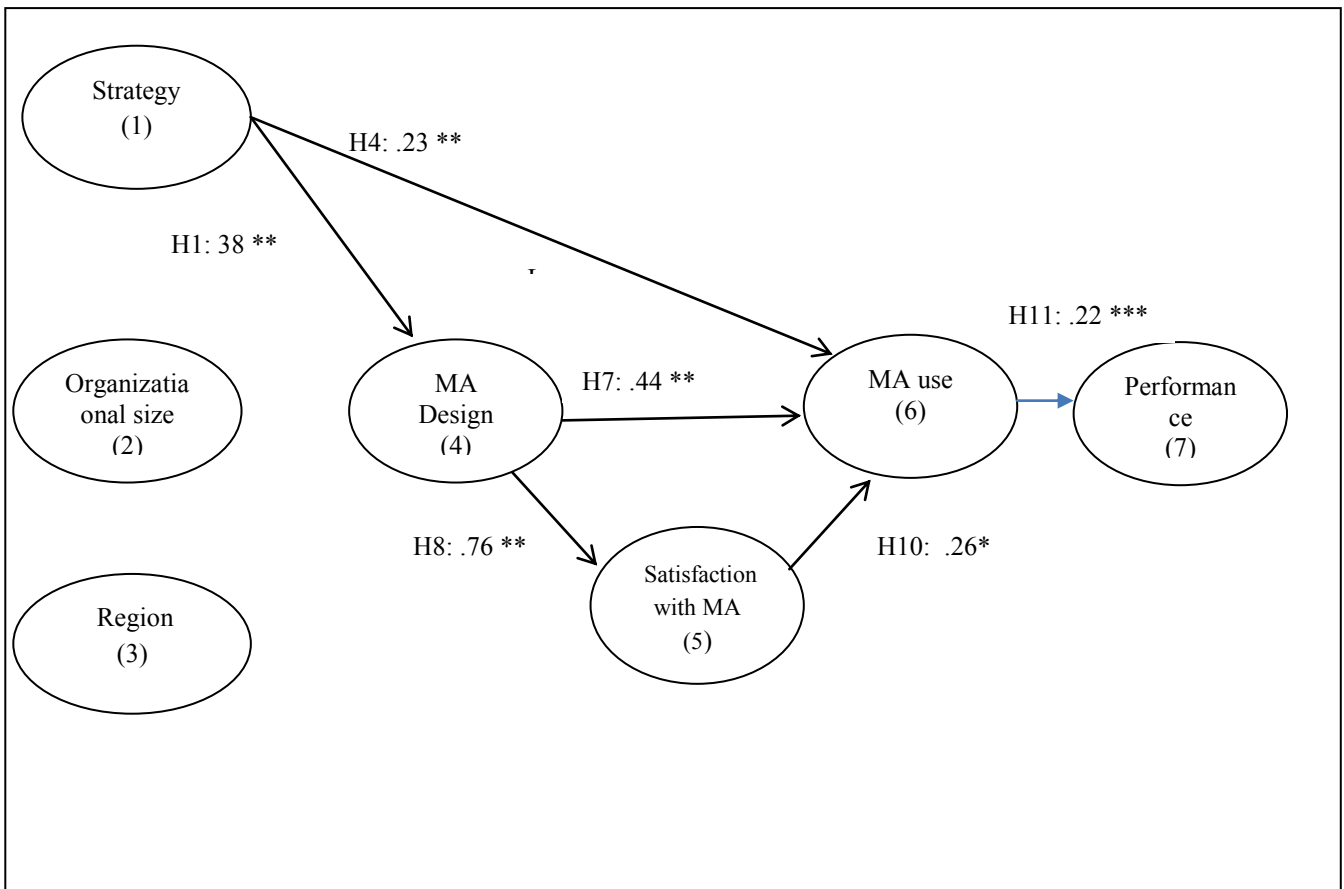| Independent Variable	Dependent Variable	Path	Total Effect	Direct Effect	Indirect Effect
MA design	MA use	4-5-6	0.64 **	0.44 **	0.20
Strategy	MA use	1-4-6	0.48**	0.23 **	0.25

* p < 0.05. **p < 0.01.

Table 6. Asymmetrical intervals with Prodclin of indirect effects for parsimonious causal model

	Lower	Upper	Indirect Effect
MA design --> Satisfaction with MA --> MA use	0.011	0.193	0.20*
Strategy --> MA design --> MA use	0.0046	0.425	0.25*

*Significant indirect associations (zero is not within the CI) are marked with an asterisk.

Figure 2. Significant path coefficients for the most parsimonious model

* p < 0.05. **p < 0.01. ***p < 0.10