

Stakeholders' Information Needs, Cost System Design, and Cost System Effectiveness in Dutch Local Government

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Abstract: This study examines the relationships between stakeholders' information needs, cost system design, and cost system effectiveness in local government, using a dataset of survey responses from 71 Dutch municipalities. Three cost system design characteristics are examined: (a) the complexity and (b) the inclusiveness of cost systems, and (c) their understandability for non-financial internal users. These characteristics are shown to be only partly related to each other, and to differ in the extent to which they are related to the information needs of internal and external stakeholders, as well as to three cost system effectiveness characteristics.

Keywords: stakeholders' information needs, financial reporting regulations, cost system design, cost system effectiveness, local government

INTRODUCTION

A major topic in the field of management accounting concerns the extent to which the design of cost systems is related to the context in which these systems are being used. An important element of this context that appears to influence the level of 'sophistication' of such systems, is the extent to which organizations take into account the information needs of internal and external stakeholders when designing a system. In the second half of the 1980s, Johnson and Kaplan (1987) claimed that, at least among US private sector organizations,

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the design of cost systems had become dominated by financial reporting regulations, and that this had led to deficiencies in the information that such organizations used for managerial decision-making purposes. A subsequent series of studies has examined this claim, and found little evidence of a generally held belief that financial reporting dominates management accounting (e.g., Hopper et al., 1992; Joseph et al., 1996). At the same time, however, Joseph et al. (1996) also found evidence that the management accountants who responded to their survey used integrated financial and management accounting systems, and had little discretion in the content of their management reports.

Research among public sector organizations shows mixed results. Pilcher and Dean (2009) have recently replicated the Joseph et al. (1996) study in an Australian local government context, and found similar results. In other governmental settings, however, research has shown that the design of cost systems generally tends to be dominated by the information needs of external stakeholders (e.g., Lapsley and Wright, 2004). In addition, contrary to custom among private sector organizations, in which the level of 'sophistication' of cost systems is usually mainly determined by the information needs of internal stakeholders (e.g., Kaplan and Cooper, 1998), research has also shown that it is satisfying external stakeholders' information needs which leads to the usage of more 'sophisticated' cost systems in governmental organizations (Geiger and Ittner, 1996). Our current understanding of how the information needs of internal versus external stakeholders affect the design (and, in turn, the effectiveness) of cost systems in governmental organizations is still limited, however, and prior studies argue that the literature would benefit from additional research in this area (cf. Geiger and Ittner, 1996; Lapsley and Wright, 2004).

In this study, we examine these, and related, issues in a Dutch local government context. Since 2004, Dutch municipalities have faced a somewhat ambiguous situation, which may have an effect on the design of their cost systems and (as a result) the usefulness of their information for different stakeholders. On the one hand, due to changes in financial reporting regulations in 2003, municipalities now have freedom in how they design their cost system and how they provide financial information in their financial reports. On the other hand, however, they are still required by law to provide full cost information to central government (i.e., Statistics Netherlands) in a prescribed and detailed format, and to ground some municipal tariffs (such as for building permits) on full cost information for the services provided. Dutch legislation does not prescribe how overhead costs should be allocated for these purposes. *A priori*, one would expect municipalities to have adapted their cost system to their own, internal information needs, especially since the fiscal crisis, when the prospect of severe financial cut-backs should have increased further their desire for insight into their costs, in particular overhead costs.

The objective of this study is, therefore, to provide empirical evidence on the relationships between stakeholders' information needs, cost system design, and cost system effectiveness in Dutch local government. A dataset consisting of survey responses from 71 municipalities is used to test these relationships, controlling for the influence of organizational and managerial factors.

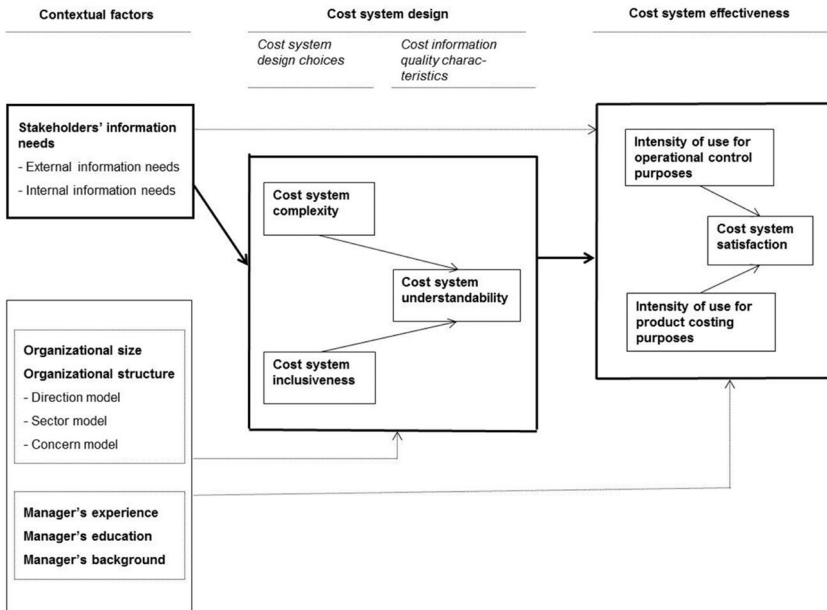
This paper contributes to the literature on the design of cost systems in at least two ways. First, it extends the literature on how the extent to which governmental organizations aim to meet their internal and external stakeholders' information needs affects the design (and, in turn, the effectiveness) of their cost systems. Using survey data from units of the US Federal Government, Geiger and Ittner (1996) have provided evidence that units using cost system output to satisfy external requirements tend to implement more 'sophisticated' cost systems than units without external requirements, but are not more likely to use cost system data for internal purposes. Their statistical tests suffer from a number of data limitations, however, and Geiger and Ittner therefore argue that the literature would benefit from additional testing of these relationships employing more sophisticated survey instruments. This study provides these tests and in doing so builds on the work of Brierley (2008), by focusing on three cost system design characteristics that closely reflect the three main definitions of 'cost system sophistication' he identified: (a) the complexity and (b) the inclusiveness of cost systems, and (c) their understandability for non-financial internal users. It, thereby, also fully incorporates these recent developments in the literature on cost system design choices. Second, it extends the literature on the purposes for which cost systems are used in practice, and on how usage for these purposes is related to the design of cost systems (cf. Kaplan and Cooper, 1998; Schoute, 2009). Specifically, this study identifies two dimensions of cost system intensity of use, which are identical to those identified by Geiger and Ittner (1996): intensity of use for operational control and for product costing purposes. Next, it tests to what extent these dimensions are related to the three cost system design characteristics and to how satisfied senior financial managers are with their municipalities' cost system.

The remainder of this paper is structured as follows. The next section discusses background and hypothesis development. The third section describes the research methods used. The fourth section presents and discusses the results. The final section summarizes and concludes.

BACKGROUND AND HYPOTHESIS DEVELOPMENT

Figure 1 shows the conceptual research model describing the variables and the relationships examined in this study.¹ In the following subsections, we provide background on Dutch local government, review recent literature on cost system design, and develop the research model and our hypotheses.

Figure 1
Conceptual Research Model



Background on Dutch Local Government

In the Netherlands, municipalities are considered the most important and visible level of sub-national government in the Dutch decentralized unitary state (Hendriks and Tops, 2003). They have an autonomous position and can initiate local policies that they consider important for the local community. In Dutch municipalities, both internal and external stakeholders of the cost system and the information that it provides, can be distinguished. Verbeeten (2011) has shown that financial managers, partly acting as intermediaries for other managers, as well as general and operational managers, are important internal users of cost information, as they need it for operational control and product costing purposes. General and operational managers are, for example, usually accountable for meeting the budget targets, making accurate and timely cost information highly desirable. Also, financial and operational managers are usually jointly responsible for making recommendations to political decision makers for determining selling prices and/or user fees.

Since 2004, Dutch municipalities are required to provide a detailed overview, the so-called Iv3 matrix, to Statistics Netherlands. This overview contains full

cost prices (including allocated overhead costs) and the components of these for a prescribed set of functional activities.² Central government uses this information to determine the allocation of funds among the municipalities. In addition, this information is used by supervisory bodies and provided to Eurostat. Another reason why it is important for Dutch municipalities to organize their cost allocation systematically is because they can be asked by a legal court to prove that their revenues for certain services (such as issuing building permits) do not exceed the related costs. The detailed prescriptions for municipalities concerning the Iv3 information are in sharp contrast with the financial reporting regulations in force since 2004, which release the municipalities from the obligation to report according to a standard format and to use a specific cost allocation method. In daily practice, municipalities vary to a large extent in how they report costs and revenues. This variation not only has to do with the number of products and programs for which costs and revenues are reported, but also with the allocation of overhead costs. Some municipalities have chosen no longer to allocate overhead costs to their products and programs, but instead to present them as a separate program (Hogendorf, 2010).

Just before the start of our study in 2010, an intensive discussion arose among practitioners about how to deal with the tension between on the one hand the freedom in methods of financial reporting, and on the other hand the regulations with regard to providing information to external stakeholders. Some thought that these regulations in fact obliged municipalities to allocate overhead costs in their formal cost system, whereas others argued that this allocation could also be done in a system outside the formal cost system (e.g., using an (Excel) spreadsheet) (see Budding, 2010 vs. Hogendorf, 2010). Over 200 practitioners participated in seminars and workshops about this topic, and a leading professional journal (*B&G*) published four articles on this subject in 2010. This attention illustrates the somewhat ambiguous situation that Dutch municipalities face.

Cost System Design

Kaplan and Cooper (1998) argued that as organizations tend to use their cost system for multiple purposes, essentially they need multiple cost systems. In practice, however, the large majority of organizations have only a single cost system, from which different information is extracted for different purposes (e.g., Drury and Tayles, 2005). In defining and measuring the design of cost systems, the literature has shifted from focusing on the adoption versus non-adoption of ABC (e.g., Bjørnenak, 1997; Gosselin, 1997) to focusing on the level of complexity or 'sophistication' of cost systems, especially in terms of the applied overhead absorption procedures. Abernethy et al. (2001) were the first to view cost system design choices as varying along three dimensions, which together form a continuum of what they refer to as 'cost system sophistication':

the number and nature of cost pools, and the nature of cost allocation bases. Similarly, based on three related dimensions, Drury and Tayles (2005) viewed cost system design choices as varying along a continuum of what they refer to as 'cost system complexity': the number of cost pools, and the number and nature of (different types of) cost allocation bases. Recent surveys, therefore, have operationalized cost system design choices mainly in terms of the complexity of the applied overhead absorption procedures, based on the number of cost pools and cost allocation bases used in the cost system (e.g., Drury and Tayles, 2005; Al-Omiri and Drury, 2007; Schoute, 2009).

Recently, Brierley (2008) has examined, both conceptually and empirically based on field and survey data, the notion of 'cost system sophistication'. He criticized the literature for still being too narrow in defining and measuring this concept. Based on field study interviews with British management accountants, he identified 16 different definitions of 'cost system sophistication'. In categorizing these definitions, Brierley distinguished between those that are concerned with the *calculation* of product costs and those that are concerned with the *use* of product costs. Given that 'sophistication' can be defined in so many different ways, he argued that the attention paid to the treatment of overhead costs in product costs is overstated and that other (more narrow) definitions of this concept, in particular in terms of the inclusiveness of product costs and their understandability by non-accountants, are also important and should also be examined. In this study, we therefore focus on three cost system design characteristics that closely reflect the three main definitions of 'cost system sophistication' identified by Brierley: cost system complexity (based on the number of cost pools and cost allocation bases); cost system inclusiveness (the extent to which overhead costs are allocated to major types of cost objects); and cost system understandability. Following Brierley, we expect that a higher level of 'cost system sophistication' in terms of its complexity and/or inclusiveness will typically go at the expense of its understandability. However, whereas Brierley focuses on the understandability of the cost system and the information that it provides, for non-accounting staff, we explicitly focus on the understandability for users of this system without a financial-economic education. We do so because we believe that although in practice these aspects will often be strongly related, having less knowledge of financial-economic instruments (such as cost systems) may be a more important obstacle for interpreting and understanding cost information than someone's current position in the organization. Therefore, we focus on the extent to which the cost system and the information that it provides, are understandable for (what we refer to as) non-financial internal users. Cost system complexity and cost system inclusiveness belong to the first category Brierley identified, whereas cost system understandability belongs to the second. In our research model, we accordingly divide these characteristics into two categories, which we respectively label 'cost system design choices' and 'cost information quality characteristics'.

Stakeholders' Information Needs and Cost System Design

Given that the large majority of organizations has only a single cost system, the design of these systems is at least partly determined by the financial reporting regulations with which these organizations have to comply, and sometimes also by other demands for financial information from external stakeholders that these organizations are required to meet. In this respect, there is a clear difference between private and public sector organizations, in the sense that the latter are generally faced with more regulations and more external demands for detailed financial information. Partly, this is due to the fact that the external user group of their financial information tends to be relatively broader and more powerful (e.g., Carvalho et al., 2012). As a consequence, in public sector organizations the design of cost systems will generally be determined by the information needs of external stakeholders relatively more than is typically the case for private sector organizations, where the design of cost systems is usually mainly determined by the information needs of internal stakeholders (e.g., Kaplan and Cooper, 1998). Indeed, research has shown that in governmental settings the design of cost systems generally tends to be dominated by the information needs of external, as opposed to internal, stakeholders (e.g., Lapsley and Wright, 2004). In addition, research has shown that it is satisfying these external stakeholders' information needs which leads to the usage of more 'sophisticated' cost systems in governmental organizations. For example, using survey data from 59 units of the US Federal Government, Geiger and Ittner (1996) found that units using cost system output to satisfy external requirements tend to implement more 'sophisticated' cost systems than units without external requirements, but are not more likely to use cost system data for internal purposes.

Given the changes in the financial reporting regulations in 2003, Dutch municipalities likely differ in the extent to which they adapt their cost system to internal and external stakeholders' information needs. Overall, we expect that when municipalities put more emphasis on satisfying the information needs of external stakeholders, their cost system will be more complex and inclusive, because external stakeholders typically ask to be provided with relatively detailed, full cost information. The extent to which they do so may not only influence the complexity and inclusiveness of their cost system, however, but also other design features. Some examples of these are the specific choices concerning which cost pools and/or cost allocation bases to use, which cost objects to use, which overhead cost categories to allocate and to which cost objects, and the terminology that is used for these design features. As such, when municipalities aim to meet their external stakeholders' information needs to a greater extent, this may hinder them in designing their cost system in such a way that it provides information that is easily understandable for its internal users, in particular for internal users that have relatively limited knowledge of financial-economic instruments. This may especially be problematic when a

municipality takes the prescriptions of the Iv3 matrix as a template for the design of its cost system.³ Accordingly, we hypothesize that:

Hypothesis 1: External information needs are positively related to (a) the complexity and (b) the inclusiveness of cost systems, and negatively related to (c) their understandability for non-financial internal users.

On the other hand, when municipalities put more emphasis on satisfying the information needs of internal stakeholders, it is the specific needs that determine whether a more (or less) complex and/or inclusive cost system is necessary. The more they do so, however, the more important it becomes that the cost system and the information that it provides, are easily understandable for non-financial internal users. This incentivizes municipalities to pay more attention to this issue, by basing the specific choices concerning the design features of their cost system, and the terminology that is used for these features, more upon internal motivations rather than external requirements. This is even more important when the cost information is used for benchmarking activities, which is rather popular among Dutch municipalities. In such cases, cost information from different municipalities (with different cost systems) is compared. The less understandable one's own cost information, the harder it will be to compare this information with other municipalities. Overall, we therefore have no reason to expect cost systems to be more complex and/or inclusive, but we do expect them to be more understandable for non-financial internal users, when municipalities aim to meet their internal stakeholders' information needs to a greater extent. Accordingly, we hypothesize that:

Hypothesis 2: Internal information needs are not related to (a) the complexity and (b) the inclusiveness of cost systems, and positively related to (c) their understandability for non-financial internal users.

Interrelationships Among Cost System Design Characteristics

Brierley (2008) argued that the three types of 'cost system sophistication' are likely to be interrelated. We especially expect both cost system complexity and cost system inclusiveness to be (negatively) related to cost system understandability, as most cost allocations create a certain degree of ambiguity (cf. Modell, 2002), for example, concerning the nature, origin and/or fairness of the allocated costs. This will especially be the case for non-financial internal users of the cost information, as these are typically not closely involved with their calculations and usually have relatively limited knowledge of financial-economic instruments. This ambiguity will probably increase as the applied overhead absorption procedures become more complex and/or as they are used to allocate a larger part of all overhead costs. Also, due to 'government-specific' factors, such as the heterogeneity and non-quantifiability of outputs and monopolistic supply conditions (cf. van Helden, 1997), it may well be even greater in governmental

than in private sector organizations. We do not expect cost system complexity and inclusiveness to be related to each other, however. After all, both a low and a high level of overhead costs may be allocated to major types of cost objects by using a small, but also by using a large number of cost pools and cost allocation bases. Accordingly, we hypothesize that:

Hypothesis 3: The (a) complexity and (b) inclusiveness of cost systems are negatively related to their understandability for non-financial internal users.

Cost System Design and Cost System Effectiveness

Given the difficulty of isolating and showing the financial performance effects of using different cost systems (Al-Omiri and Drury, 2007), we define and operationalize cost system effectiveness in terms of outcome measures relating to (a) the intensity of use of the cost system for different purposes, and (b) the level of satisfaction of senior financial managers of the municipalities with the cost system. The specific purposes for which a cost system is used are important because the normative literature strongly argues that the design (i.e., the level of ‘sophistication’) of a cost system should differ, depending on its intended purposes, in order to be optimal (Kaplan and Cooper, 1998; see also Schoute, 2009). With regard to these purposes, we follow Geiger and Ittner (1996) and distinguish between usage for operational control purposes, such as to manage activities and/or programs, and usage for product costing purposes, such as to determine selling prices and/or user fees. The normative literature argues that usage for typical operational control purposes generally requires a more complex cost system than usage for typical product costing purposes. This is based on the fact that for operational control purposes an understanding of what causes costs to occur is important, which is much less the case for product costing purposes (Kaplan and Cooper, 1998; Schoute, 2009). On the other hand, for product costing purposes it is relatively more important that all relevant costs are included, as cost-based prices will, for example, be used to determine selling prices and/or user fees and for inventory valuation. In our research setting, it may be particularly important to include all relevant costs as Dutch municipalities are entitled by law to establish freely the selling prices for a (limited) number of specific services, as long as the revenues generated by these services do not exceed full costs (Groot and Budding, 2004). We therefore expect that when municipalities’ cost systems are more complex, they will probably be intended and used more intensively for operational control purposes. Similarly, we expect that when these cost systems are more inclusive, they will probably be intended and used more intensively for product costing purposes. We do not have any particular reason to expect the complexity of cost systems to be associated with their intensity of use for product costing purposes, however; nor do we have any particular reason to expect the inclusiveness of cost systems to be associated with their intensity of use for operational control purposes. We also do not

expect the complexity or inclusiveness of cost systems to be associated with our third proxy for cost system effectiveness, the level of satisfaction of senior financial managers of the municipalities with the cost system, as more complex and/or more inclusive cost systems are not by definition 'better'. Accordingly, we hypothesize that:

Hypothesis 4: The complexity of cost systems is (a) positively related to their intensity of use for operational control purposes, (b) not related to their intensity of use for product costing purposes, and (c) not related to the level of satisfaction with the cost system.

Hypothesis 5: The inclusiveness of cost systems is (a) not related to their intensity of use for operational control purposes, (b) positively related to their intensity of use for product costing purposes, and (c) not related to the level of satisfaction with the cost system.

As far as our third cost system design characteristic (understandability for non-financial internal users) is concerned, we do not expect it to be associated with intensity of use for either operational control or product costing purposes. Although it may act as a 'hygiene factor', in the end it is the information needs and the specific decisions that are taken based on this information which determine how intensively the cost system is used, instead of just how understandable this information is for non-financial internal users. On the other hand, however, we do expect this design characteristic to be associated with how satisfied senior financial managers are with their cost system. These managers are typically involved in the design and well-functioning of these systems, and will therefore generally be more satisfied when their cost system and the information that it provides, are easier to understand for all of its users, including non-financial internal users such as non-financial managers and aldermen. Accordingly, we hypothesize that:

Hypothesis 6: The understandability of cost systems for non-financial internal users is (a) not related to their intensity of use for operational control purposes, (b) not related to their intensity of use for product costing purposes, and (c) positively related to the level of satisfaction with the cost system.

Interrelationships Among Cost System Effectiveness Characteristics

Overall, we expect that when cost systems are used more intensively for different purposes, in our case operational control and product costing purposes, the users of these systems will be more satisfied with them (Schoute, 2009). This will be even more so the case for the respondents to our survey, who all occupy a senior-level financial management position in their municipality, as they not only are important users of the information that these systems provide (partly acting as intermediary for non-financial managers and aldermen), but are also typically

involved in the design and well-functioning of these systems. Accordingly, we hypothesize that:

Hypothesis 7: The intensity of use of cost systems for (a) operational control purposes and (b) product costing purposes are positively related to the level of satisfaction with the cost system.

RESEARCH METHODS

Sample and Data Collection

The data used in this study are from a multi-purpose survey, supported by the FAMO (an association of financial managers working in Dutch governmental organizations), and conducted in the period December 2010–February 2011. The target population for this study was 426 Dutch municipalities, which included all 430 municipalities at the time of research except the four largest. These were excluded because each has special legal, administrative and financial arrangements with the central government which do not apply to other Dutch municipalities (cf. Groot and Budding, 2004). A 16-page questionnaire was mailed to a senior-level financial manager of the municipalities. In order to obtain their names and addresses, we used the member list of the FAMO. We selected only those members who were working as a ‘concern controller’ or ‘chief financial officer’. For the non-FAMO members we contacted the municipalities by phone to ask for the name of the most appropriate respondent. Many recommendations from Dillman’s (2000) Tailored Design Method were followed. The questionnaire was extensively pretested with three management accounting faculty colleagues and three practitioners with extensive knowledge of costing practices in Dutch local government, to assess and enhance understandability and content validity, which led to some small changes in the questionnaire. The procedure consisted of, at the most, four moments of contact. First the respondents were sent a questionnaire; two weeks later a reminder postcard; four weeks later a replacement questionnaire; and finally, two weeks later a reminder fax. Together with the questionnaire and the replacement questionnaire, the respondent was sent an accompanying letter explaining the objectives of the study and guaranteeing confidentiality, and a postage-paid return envelope.

A total of 87 municipalities returned the questionnaire, of which one was unusable. As a result, the overall usable response rate was 20.2%. To investigate the possibility of non-response bias, the respondents were compared to the non-respondents in terms of size (measured as the natural log of their number of inhabitants) and regional representation. The results show that, on average, the municipalities that responded have a similar number of inhabitants and are from similar regions as the municipalities that did not respond. Second, an early-late respondents analysis, with early and late respondents respectively defined as having sent back the initial or the replacement questionnaire, shows no significant differences in means (or proportions) for the variables examined

in this study, also suggesting the absence of non-response bias. The average respondent is 46.5 years of age, has been working for his/her employer for 11.5 years, and has 15.5 years of experience in his/her current or in a similar position (with his/her current or another employer). Also, 97.7% of the respondents have at least a bachelor degree, and 56.5% have at some time during their career worked in the private sector. All respondents occupy a senior-level financial management position in their municipality (with job titles such as 'head of the department of finance', 'controller', or 'senior policy advisor'), and are important users of the information that the cost system of their municipality provides (partly acting as intermediary for non-financial managers and aldermen). In Dutch municipalities, such employees are usually not involved in (or in charge of) doing the administrative work ('keeping the records'), but instead use data from the administrative system for different types of financial analyses and for internal and external financial reporting. They will typically be involved in the design of the cost system, however, which is often part of the administrative system. For the analyses reported in this paper, due to missing data, the available number of observations is less than the overall sample. The final sample left after using listwise deletion for handling missing values comprised 71 cases.

Measures

This section describes all the variables examined in this study and the measurement instruments used to measure them.⁴ Most instruments are multi-item, use five-point Likert-type scales, and are taken or adapted from earlier studies. For all multi-item measurement instruments exploratory factor analysis (using principal axis factoring and an oblique rotation (Direct Oblimin)) is initially used to examine scale dimensionality.

Stakeholders' Information Needs. *Stakeholders' information needs* was measured by asking respondents, on a five-point scale ranging from 1 (not at all) to 5 (to a very great extent), to indicate the extent to which seven factors play a role in decisions about significant changes in the cost system of their municipality. These factors, which reflect typical information needs of internal or external stakeholders, were partly based upon prior research (e.g., Lapsley and Wright, 2004), and partly derived from discussions with practitioners and publications in professional journals. As expected, factor analysis revealed that, after dropping two items due to low communality values, two dimensions, labelled 'external information needs' (*EXT_NEEDS*; $\alpha = 0.74$) and 'internal information needs' (*INT_NEEDS*; $\alpha = 0.78$), together explain 73.9% of the variance in the five items.

Cost System Design. In this study, we build on the work of Brierley (2008) and focus on three cost system design characteristics that closely reflect the three definitions of 'cost system sophistication' he identified. The operationalization of

Brierley's first definition, referred to as *cost system complexity* (*CS_COMPL*) in this study, was based on two questions in which respondents were asked to indicate the number of cost pools and cost allocation bases used in their municipality's cost system (cf. Drury and Tayles, 2005; Schoute, 2009). Following Schoute (2009), both were measured using a $\log_2 N$ scale, since the influence of both the number of cost pools and the number of cost allocation bases on cost system complexity was posited to be nonlinear.⁵ A composite scale was constructed by adding the two $\log_2 N$ scores for each municipality. The operationalization of Brierley's second definition, referred to as *cost system inclusiveness* (*CS_INCLUS*) in this study, captured the extent to which overhead costs are allocated to three major types of cost objects: (a) organizational units, (b) activities and/or programs, and (c) selling prices and/or user fees. In the questionnaire, for each of three overhead cost categories – corporate, sector and department overhead – respondents were first asked to indicate *whether* the cost category in the cost system of their municipality is allocated to other organizational units. Next, for each of the three overhead cost categories, respondents were asked, on a five-point percentages scale, which was later re-coded into a five-point scale ranging from 1 (0-<25%) to 5 (completely (100%)), *to what extent* the cost category is allocated to other organizational units. In the questionnaire, the same questions were also asked for the allocation of the three overhead cost categories to activities and/or programs, and to selling prices and/or user fees. Scores reflecting the extent to which overhead costs are allocated to (a) other organizational units, (b) activities and/or programs, and (c) selling prices and/or user fees, were constructed by calculating for each of these three major types of cost objects the weighted average over *only* the cost categories *that are allocated* (and thus distinguished) in a municipality's cost system.⁶ A composite scale for cost system inclusiveness was then constructed by taking the average of the resulting scores for each of the three major types of cost objects.⁷ Finally, Brierley's third definition, referred to as *cost system understandability* (*CS_UNDERST*) in this study, was measured with a single 'global' question asking respondents, on a five-point scale ranging from 1 (not at all) to 5 (to a very great extent), to indicate the extent to which the cost system of their municipality is understandable for users of this system without a financial-economic education (i.e., for what we refer to as non-financial internal users).

Cost System Effectiveness. *Cost system intensity of use* was measured by asking respondents, on a five-point scale ranging from 1 (not intensively) to 5 (very intensively), to indicate how intensively their municipality's cost system is used for each of eight widely used purposes. The eight purposes were taken from Geiger and Ittner (1996) and Innes and Mitchell (1995). As expected, factor analysis revealed that, after dropping one item due to a low communality value, two dimensions together explain 71.4% of the variance in the seven items. These dimensions are identical to those identified by Geiger and Ittner (1996), and are respectively labelled 'intensity of use for operational

control purposes' (*CS_INTENS_OPER*; $\alpha = 0.87$) and 'intensity of use for product costing purposes' (*CS_INTENS_PROD*; $\alpha = 0.77$). *Cost system satisfaction* (*CS_SATISF*) was measured using an instrument developed by Ittner et al. (2003). Respondents were asked, on a five-point scale ranging from 1 (not at all) to 5 (to a very great extent), to indicate the extent to which they agree with three statements with regard to their level of satisfaction with the cost system. Similar to Ittner et al. (2003), factor analysis reveals that one dimension explains 89.6% of the variance in the three items ($\alpha = 0.94$).

Control Variables. The *organizational size* (*ORG_SIZE*) of the municipalities was measured as the natural log of their number of employees. In order to measure *organizational structure*, respondents were asked to indicate which of the following three classifications best describes the organizational structure of their municipality: Direction model, Sector model or Concern model. These models differ in terms of the level of de-/centralization: the Direction model is the most centralized (i.e., in this model managers of divisions have little decision-making authority), whereas the Concern model is the most decentralized (i.e., in this model managers of divisions have much decision-making authority) (van Helden, 1997; Groot and Budding, 2004). Two dummy variables are used to capture this construct (*SECT_Dum* and *CONC_Dum*). The three characteristics of the senior financial manager (i.e., the respondent) for which we control are: (1) his/her years of experience in his/her current or in a similar position (with his/her current or another employer) (*MAN_EXPER*); (2) whether or not he/she has a (post-)graduate degree (*MAN_EDUC*); and (3) whether or not he/she has at some time during his/her career worked in the private sector (*MAN_BACKGR*).

RESULTS AND DISCUSSION

Descriptive Statistics and Correlations

Table 1 presents the descriptive statistics and correlations for the main variables. As observed in Table 1, on average, the municipalities' cost systems are used about equally intensively for operational control purposes as for product costing purposes ($M = 2.000$, $SD = 0.918$ versus $M = 2.171$, $SD = 1.067$; $t(70) = 1.401$, $p = 0.166$), and the senior financial managers are 'to some extent' satisfied with their municipalities' cost system ($M = 3.122$, $SD = 0.909$). Of these three cost system effectiveness characteristics, *CS_INTENS_OPER* and *CS_INTENS_PROD* are significantly positively correlated, and *CS_SATISF* is significantly positively correlated with *CS_INTENS_OPER*, but not with *CS_INTENS_PROD*. On average, the municipalities' cost systems are 'to some extent' understandable for non-financial internal users ($M = 2.746$), and there is substantial variation in the three cost system design characteristics ($SD = 2.192$, 1.478 and 1.118, respectively). Of these design characteristics, *CS_INCLUS* and *CS_UNDERST* are significantly negatively correlated, whereas *CS_COMPL* is significantly correlated with neither *CS_INCLUS* nor *CS_UNDERST*. With

Table 1
Descriptive Statistics and Correlations

<i>Variables</i>	<i>Mean</i>	<i>SD</i>	<i>CS_COMPL</i>	<i>CS_INCLUS</i>	<i>CS_UNDERST</i>	<i>CS_INTENS_OPER</i>	<i>CS_INTENS_PROD</i>	<i>CS_SATISF</i>
<i>CS_COMPL</i>	6.352	2.192	1.000	0.020	-0.155	0.195	0.108	0.175
<i>CS_INCLUS</i>	2.794	1.478	0.040	1.000	-0.248**	0.368***	0.467***	0.038
<i>CS_UNDERST</i>	2.746	1.118	-0.156	-0.270**	1.000	-0.009	-0.140	0.392***
<i>CS_INTENS_OPER</i>	2.000	0.918	0.272**	0.320***	0.019	1.000	0.487***	0.340***
<i>CS_INTENS_PROD</i>	2.171	1.067	0.161	0.461***	-0.125	0.473***	1.000	0.109
<i>CS_SATISF</i>	3.122	0.909	0.282**	0.022	0.317***	0.358***	0.087	1.000
<i>EXT_NEEDS</i>	3.338	0.917	0.199*	0.073	-0.138	0.152	0.070	0.278**
<i>INT_NEEDS</i>	3.023	0.833	0.022	0.068	0.124	0.259**	0.098	0.244**
<i>ORG_SIZE</i>	5.294	0.907	0.422***	0.207*	-0.301**	0.188	0.182	0.094
<i>SECT_Dum</i>	0.211	-	-0.100	0.100	-0.130	0.023	0.047	-0.032
<i>CONC_Dum</i>	0.070	-	0.158	0.120	0.162	0.314***	0.137	0.369***
<i>MAN_EXPER</i>	15.944	10.574	0.125	0.015	0.150	0.116	-0.097	0.109
<i>MAN_EDUC</i>	0.254	-	-0.094	0.207*	-0.159	0.149	0.273**	-0.091
<i>MAN_BACKGR</i>	0.535	-	-0.083	0.168	-0.009	0.223*	0.200*	0.022

Notes:

N = 71; ***, **, * indicate significance at the 0.01, 0.05 and 0.10 levels (two-tailed), respectively. The means, standard deviations, and correlations for the multi-item constructs are for scales in which all items are weighted equally. The parametric (Pearson) correlations are presented below the diagonal; the nonparametric (Spearman) correlations are presented above the diagonal.

regard to the relationships between the cost system design and cost system effectiveness characteristics, *CS_COMPL* is significantly positively correlated with *CS_INTENS_OPER*, and *CS_INCLUS* is significantly positively correlated with *CS_INTENS_PROD*. *CS_INCLUS* is also significantly (positively) correlated with *CS_INTENS_OPER*, however. Similarly, not only *CS_UNDERST* is significantly positively correlated with *CS_SATISF*, but *CS_COMPL* as well.

For the contextual factors, the results show that, on average, external information needs play a significantly larger role in decisions about significant changes in the municipalities' cost systems than internal information needs ($M = 3.338$, $SD = 0.917$ versus $M = 3.023$, $SD = 0.833$; $t(70) = 2.761$, $p < 0.01$) (cf. Lapsley and Wright, 2004). This indicates that the historical dominance of external stakeholders' information needs on cost system design in Dutch local government continues, despite the changes in the financial reporting regulations in 2003. Of these stakeholders' information needs, *EXT_NEEDS* is significantly positively correlated with *CS_COMPL* and *CS_SATISF*, whereas *INT_NEEDS* is significantly positively correlated with *CS_INTENS_OPER* and *CS_SATISF*. Finally, the correlations with (several of) the control variables stress the importance of controlling for their influence in the empirical analyses.

PLS Path Modelling

Given the complexity of the research model in relation to the sample size of the study, we use partial least squares (PLS) to estimate simultaneously the measurement models (relating the latent variables to their indicators) and the structural model (relating the latent variables to each other).⁸ We use SmartPLS 2.0 for the analysis (Ringle et al., 2005), and bootstrapping to compute *t*-values of coefficients ($n = 250$).⁹ First, we report the measurement model estimates, and then turn to the structural model estimates and hypothesis tests.

Measurement Model Results

PLS generates several statistics to test the reliability and validity of latent variables with two or more indicators (see Table 2). Table 2 provides several indications that the reliability of the measurement models is adequate (Hair et al., 2011). First, the composite reliability for each latent variable exceeds the recommended cut-off of 0.70, indicating adequate internal consistency reliability. Second, almost all factor loadings for the indicators exceed the recommended cut-off of 0.70, indicating adequate indicator reliability. Similarly, Table 2 also provides several indications that the validity of the measurement models is adequate (Hair et al., 2011). First, all AVE values are higher than 0.50, which means that all latent variables explain more than half of their indicators' variance, indicating sufficient convergent validity (cf. Fornell and Larcker, 1981). Second, all latent variables meet the Fornell-Larcker criterion for discriminant validity at the construct level, which postulates that a latent variable shares more variance with its assigned indicators than with any other

Table 2
Measurement Model Estimates

<i>Constructs / Items</i>	<i>Loadings</i>	<i>Composite Reliability</i>	<i>Average Variance Extracted</i>
External information needs (<i>EXT_NEEDS</i>)		0.881	0.787
Instructions received from the central government	0.933		
The requirements due to Iv3	0.839		
Internal information needs (<i>INT_NEEDS</i>)		0.860	0.675
Meeting requests for information from managers	0.925		
Required homogeneity (comparability) due to benchmarking activities	0.840		
Changes (an increase or decrease) in the need for cost reduction	0.681		
Intensity of use for operational control purposes (<i>CS_INTENS_OPER</i>)		0.908	0.664
Budget execution (budgetary control)	0.844		
Measure performance of activities and/or programs	0.842		
Budget formulation	0.826		
Manage activities and/or programs	0.820		
Determine possibilities for cost reduction	0.736		
Intensity of use for product costing purposes (<i>CS_INTENS_PROD</i>)		0.896	0.811
Determine selling prices and/or user fees	0.906		
Inventory valuation (e.g., land development)	0.895		
Cost system satisfaction (<i>CS_SATISF</i>)		0.963	0.895
To what extent does the cost system of your municipality meet your expectations?	0.958		
To what extent does the cost system of your municipality compare to your concept of an 'ideal' cost system?	0.954		
To what extent are you overall satisfied with the cost system of your municipality?	0.927		

Note:

N = 71.

latent variable in the structural model. Finally, all indicators' loadings with their associated latent variable are higher than their loadings with all the remaining latent variables (i.e., the cross-loadings; untabulated), indicating discriminating validity at the indicator level. Taken together, these results demonstrate that the measurement models tested are both reliable and valid, and thus that the structural model may be analysed.

Structural Model Results

Table 3 presents the structural model results of applying PLS path modelling to estimate the research model.¹⁰ As observed in Table 3, the R^2 s vary between

Table 3
Structural Model Estimates

<i>Variables</i>	<i>CS_COMPL</i>	<i>CS_INGLUS</i>	<i>CS_UNDERST</i>	<i>CS_INTENS_OPER</i>	<i>CS_INTENS_PROD</i>	<i>CS_SATISF</i>
<i>EXT_NEEDS</i>	0.228* (1.854)	0.033 (0.394)	-0.249* (-1.873)	0.016 (0.245)	-0.012 (-0.173)	0.268* (1.791)
<i>INT_NEEDS</i>	0.009 (0.101)	0.133 (1.143)	0.219* (1.751)	0.246** (2.355)	0.095 (1.044)	0.019 (0.160)
<i>CS_COMPL</i>			-0.032 (-0.359)	0.210* (1.757)	0.168 (1.461)	0.168 (1.422)
<i>CS_INGLUS</i>			-0.239** (-2.102)	0.175 (1.547)	0.392*** (3.232)	0.020 (0.281)
<i>CS_UNDERST</i>				0.078 (0.961)	0.009 (0.111)	0.368*** (2.784)
<i>CS_INTENS_OPER</i>						0.219* (1.706)
<i>CS_INTENS_PROD</i>						-0.051 (-0.629)
<i>ORG_SIZE</i>	0.534*** (4.703)	0.222* (1.793)	-0.333** (-2.209)	0.055 (0.601)	-0.048 (-0.486)	0.104 (0.978)
<i>SECT_Dum</i>	0.044 (0.537)	0.031 (0.414)	-0.124 (-1.227)	-0.039 (-0.385)	-0.133 (-1.185)	0.099 (0.906)
<i>CONC_Dum</i>	-0.028 (-0.659)	0.030 (0.287)	0.251** (2.540)	0.176* (1.830)	0.063 (0.770)	0.180 (1.542)
<i>MAN_EXPER</i>	0.114 (1.207)	0.087 (1.019)	0.120 (1.380)	0.154* (1.675)	-0.083 (-0.998)	-0.044 (-0.606)
<i>MAN_EDUC</i>	-0.264** (-2.115)	0.121 (1.173)	0.085 (0.893)	0.151 (1.257)	0.255** (2.020)	-0.137 (-1.146)
<i>MAN_BACKGR</i>	0.105 (1.367)	0.228* (1.786)	-0.062 (-0.754)	0.280** (2.505)	0.121 (1.346)	0.059 (0.751)
R^2	0.295	0.136	0.290	0.363	0.318	0.404
Q^2	0.312	0.132	0.311	0.188	0.281	0.306

Notes:

$N = 71$, Cell statistics are standardized coefficients and t -values. *** ** * indicate significance at the 0.01, 0.05 and 0.10 levels (two-tailed), respectively. As recommended by, for example, Hair et al. (2011) and Henseler et al. (2009), we used the options 'path weighting scheme' (as weighting scheme during the PLS procedure) and 'individual sign changes' (to deal with sign changes during the bootstrapping procedure) for our analysis.

13.6% and 40.4%, showing adequate model fit for all endogenous latent variables. Also, the Stone-Geisser Q^2 values vary between 0.132 and 0.312 and are thus all larger than zero, which also indicates that their explanatory variables adequately predict the endogenous latent variables.

For the hypothesized effects of external stakeholders' information needs, we find support for H1a, which predicts that external information needs (*EXT_NEEDS*) are positively related to the complexity of cost systems (*CS_COMPL*), but not for H1b, which predicts a similar effect on their inclusiveness (*CS_INCLUS*). For internal stakeholders' information needs, given that the effects of *INT_NEEDS* on *CS_COMPL* and *CS_INCLUS* are not significant, the results support both H2a and H2b, which predict that internal information needs are related to neither the complexity nor inclusiveness of cost systems. This indicates that municipalities use more complex, though not necessarily more inclusive, cost systems when external information needs play a more important role in decisions about significant changes in these systems, but that internal information needs do not seem to affect such decisions. Overall, these results are consistent with suggestions from institutional theory, which indicate that governmental organizations often implement more 'sophisticated' cost systems to satisfy external requirements, and not so much for meeting their internal stakeholders' information needs (Geiger and Ittner, 1996; Verbeeten, 2011). Finally, given that *EXT_NEEDS* is negatively related to cost system understandability (*CS_UNDERST*) and *INT_NEEDS* positively, the results provide support for H1c and H2c, and indicate that cost systems are less understandable for non-financial internal users when the interests of external stakeholders play a more important role in decisions about significant changes in these systems, but more understandable when internal information needs play a more important role in such decisions. These results clearly reflect that municipalities have to balance (often) conflicting demands with respect to meeting their internal and external stakeholders' information needs.

With respect to the hypothesized interrelationships among the three characteristics of cost system design, the results indicate that the complexity of cost systems is not related to their understandability for non-financial internal users (not supporting H3a), whereas the inclusiveness of such systems is negatively related, showing that less inclusive cost systems are easier to understand for non-financial internal users (supporting H3b). Apparently, as the applied overhead absorption procedures are used to allocate a larger part of all overhead costs, there is more ambiguity concerning the nature, origin and/or fairness of the allocated costs, especially for non-financial internal users of the cost information, as these are typically not closely involved with their calculations and usually have relatively limited knowledge of financial-economic instruments (such as cost systems). The non-significant effect of *CS_COMPL* may be caused by the fact that using a larger number of cost pools and/or cost allocation bases in the cost system may not only increase ambiguity, but may also decrease it, to the extent that it enhances the consistency between the complexity of the fundamental

work processes in, and the structures of, an organization, and the complexity of its cost system that aims to capture those processes and structures.

For the three cost system design characteristics, we find support for all hypothesized effects on the three characteristics of cost system effectiveness (H4, H5 and H6).¹¹ Thus, as predicted, *CS_COMPL* is positively related to *CS_INTENS_OPER*, *CS_INCLUS* is positively related to *CS_INTENS_PROD*, and *CS_UNDERST* is positively related to *CS_SATISF*, whereas all other effects are not significant. Combined, these findings thus indicate that municipalities use more complex, though not necessarily more inclusive, cost systems when these systems are used more intensively for operational control purposes. When these systems are used more intensively for product costing purposes, however, municipalities use more inclusive, though not necessarily more complex, cost systems. These different purposes thus clearly put different demands on cost system design characteristics. The finding that cost system understandability is positively associated with how satisfied the senior financial managers are with their municipalities' cost system emphasizes that these managers clearly keep an eye on the interests of internal stakeholders of the cost system and the information that it provides, such as non-financial managers and aldermen.

With respect to the hypothesized interrelationships among the three characteristics of cost system effectiveness, the results indicate that the intensity of use of the cost system for operational control purposes is positively related to how satisfied the senior financial managers are with their municipalities' cost system (supporting H7a), whereas the intensity of use for product costing purposes is not related (not supporting H7b). Apparently, these managers find it relatively more important that their municipalities' cost system is used intensively for operational control purposes than for product costing purposes.

Finally, of the control variables, organizational size (*ORG_SIZE*) is positively related to the complexity and inclusiveness of the municipalities' cost systems (*CS_COMPL* and *CS_INCLUS*), and negatively to their understandability for non-financial internal users (*CS_UNDERST*), whereas for organizational structure, *CONC_Dum* is positively related to *CS_UNDERST* and *CS_INTENS_OPER*. These findings for organizational structure indicate that non-financial internal users in municipalities that are structured as a Concern model find the cost system easier to understand than their counterparts in municipalities that are structured as a Direction model (cf. van Helden, 1997), and that cost systems are used more intensively for operational control purposes in more decentralized municipalities. Overall, these findings are consistent with those of prior studies (e.g., Al-Omiri and Drury, 2007; Groot and Budding, 2004; Verbeeten, 2011), and stress the importance of controlling for these organizational variables. Of the managerial characteristics, *MAN_EDUC* is negatively related to *CS_COMPL* and *MAN_BACKGR* positively to *CS_INCLUS*, suggesting that cost systems are less complex when the senior financial manager holds a (post-)graduate degree, and more inclusive when this manager has a private sector background. This latter characteristic is also positively related to *CS_INTENS_OPER*, just as

MAN_EXPER, whereas *MAN_EDUC* is positively related to *CS_INTENS_PROD*. These findings suggest that municipalities use their cost system more intensively for operational control purposes when the senior financial manager is more experienced and/or when this manager has a private sector background, and more intensively for product costing purposes when this manager holds a (post-) graduate degree.

CONCLUSIONS

This study examines the relationships between stakeholders' information needs, cost system design, and cost system effectiveness in local government, using a dataset of survey responses from 71 Dutch municipalities. Since 2004, these municipalities have faced a somewhat ambiguous situation, which may have an effect on the design of their cost systems and (as a result) the usefulness of their information for different stakeholders. On the one hand, they now have freedom in how they design their cost system and how they provide financial information in their financial reports. On the other hand, however, they are still required by law to provide full cost information to central government (i.e., Statistics Netherlands) in a prescribed and detailed format, and to ground some municipal tariffs on full cost information for the services provided. We build on the work of Brierley (2008) and focus on three cost system design characteristics that closely reflect the three main definitions of 'cost system sophistication' he identified: (a) the complexity and (b) the inclusiveness of cost systems, and (c) their understandability for non-financial internal users. Overall, our results show that these characteristics are only partly related to each other, and that they differ in the extent to which they are related to the information needs of internal and external stakeholders. This supports Brierley, in his argument that there are multiple sides to the (too broad) concept of 'cost system sophistication' and that progress can be made by studying different models of different (more narrow) definitions of this concept.

Concerning the issue of how the extent to which governmental organizations aim to meet their internal and external stakeholders' information needs affects the design (and in turn, the effectiveness) of their cost systems, we find that despite the changes in the financial reporting regulations in 2003, the historical dominance of external stakeholders' information needs on cost system design in Dutch local government continues. We also find that the more a municipality aims to meet its external stakeholders' information needs, the more complex its cost system is. These findings are consistent with prior evidence from other governmental settings (cf. Geiger and Ittner, 1996; Lapsley and Wright, 2004). Also, given that external information needs are negatively associated with cost system understandability, and internal information needs positively, and that both external information needs and cost system understandability are positively associated with the level of satisfaction with the cost system of the senior financial manager who responded to the survey, the results also reflect

that municipalities have to balance (often) conflicting demands with respect to meeting their internal and external stakeholders' information needs. These findings are probably (at least partly) due to the somewhat ambiguous situation that Dutch municipalities face. Future research is thus needed to examine whether these findings also hold in other governmental settings, and to examine the relationships of other contextual factors with cost system design choices in such settings.

Concerning the purposes for which cost systems are used in practice, and how usage for these purposes is related to the design of cost systems, we identify two underlying dimensions of cost system intensity of use: intensity of use for operational control and for product costing purposes. These dimensions, which are identical to those identified earlier by Geiger and Ittner (1996), are hypothesized and found to be differently related to the three cost system design characteristics. Where cost system complexity is positively related to their intensity of use for operational control purposes, cost system inclusiveness is positively related to their intensity of use for product costing purposes. These different purposes thus clearly put different demands on cost system design, reinforcing the importance of purposes of use as cost system design criteria (cf. Kaplan and Cooper, 1998; Schoute, 2009).

As with any study, the findings of this study are subject to a number of potential limitations. Because cross-sectional research can establish associations, but not causality, the direction of effects cannot be established with certainty. Also, there may be omitted variables which may bias the results. Another issue that may potentially influence the findings is measurement error. This especially applies to the measurement of cost system understandability, as this variable has been measured using a single 'global' question. Note, however, that two of our main variables, cost system complexity and cost system inclusiveness, and all control variables have been measured using objective measures, and that all other (perceptual) measures show adequate reliability and validity statistics. Another issue is that the survey data were obtained from one key informant per municipality, each of whom occupied a senior-level financial management position. Although such respondents are likely to be knowledgeable about their municipalities' costing practices, their positions may have led to common method bias. Also, despite the fact that they often act as intermediaries for non-financial managers and aldermen, and as such are a linking pin between the administrative system and these users of cost information (with whom they frequently have contact about this information), our respondents may not be fully aware of the understandability of the cost system and the information that it provides, for non-financial internal users. This may have biased the relationships that we have found with this construct. Future research may want to obtain this information directly from these users themselves, and develop more sophisticated instruments to measure this complex phenomenon. Finally, there is the issue of generalizability. The sample size of this study is rather limited, especially in relation to the complexity of the research model. Although

comparisons with the population show that the sample is representative in terms of size and regional representation, it may be biased with respect to other (unknown) variables. Despite these potential limitations, we believe that this study presents a step further in our understanding of cost system design and its relationships with other variables, in particular in the context of governmental and non-profit organizations.

NOTES

- 1 As shown in Figure 1, since organizational size and structure have frequently been argued and shown to be related to cost system design and effectiveness, and may also be related to stakeholders' information needs, we control for their influence in the empirical analyses. Additionally, we also control for three characteristics of the senior financial managers of the municipalities that were the respondents to the survey, especially because the extent to which they are satisfied with their cost system is the final dependent variable in the model.
- 2 This regulation was needed because from 2004 onwards, the municipalities were released from the obligation to report according to a standard format but the central government still needed financial information that could be consolidated and compared among municipalities. In fact, the set of prescribed functional activities under Iv3 is an extended version of the set of functional activities that was prescribed under the financial reporting regulations in force before 2004.
- 3 For example, because the (36) cost categories (e.g., labor, depreciation and energy costs) prescribed by the Iv3 matrix may not fully correspond to the categories distinguished by the municipality, but also because the cost objects prescribed by the Iv3 matrix are the (96) functional activities, whereas for the financial reporting these are the products and programs chosen by the municipality itself.
- 4 A document containing all measurement instruments used is available from the authors upon request.
- 5 The number of cost pools and cost allocation bases indicated by the respondents were transformed into \log_2 scores by taking the \log_2 of the highest number in each response category. On average, the municipalities' cost systems had 9-16 cost pools ($M = 4.310$, $SD = 1.670$) and 3-4 cost allocation bases ($M = 2.042$, $SD = 0.917$). The average composite CS_COMPL score is, therefore, 6.352 ($SD = 2.192$) (see Table 1).
- 6 Note that otherwise an artificial association with the 'organizational structure' variable(s) would have been created, as, by definition, sector overhead is irrelevant for municipalities that are structured as a Direction model.
- 7 For example, suppose that a municipality allocates 75- < 100% of its corporate overhead (and none of its sector and department overhead) to other organizational units, 0- < 25% of its corporate overhead and 100% of its department overhead (and none of its sector overhead) to activities and/or programs, and none of its corporate, sector and department overhead to selling prices and/or user fees. In that case, the composite CS_INCLUS score is 2,333 ($= [(4 + 0 + 0) / 1 + (1 + 0 + 5) / 2 + (0 + 0 + 0)] = [4 + 3 + 0] / 3$). On average, the municipalities allocated 50- < 75% ($M = 2.538$, $SD = 2.210$) of their overhead costs to other organizational units, 75- < 100% ($M = 3.775$, $SD = 1.770$) to activities and/or programs, and 25- < 50% ($M = 2.070$, $SD = 2.088$) to selling prices and/or user fees. The average composite CS_INCLUS score is, therefore, 2,794 ($SD = 1.478$) (see Table 1). Given that 'other organizational units' are a less obvious (final) cost object than either 'activities and/or programs' and 'selling prices and/or user fees' (and in some instances may also function as cost pools as part of the overhead absorption procedures), all analyses have also been conducted using a composite scale reflecting only (b) activities and/or programs, and (c) selling prices and/or user fees. The correlation between the two composite scales is high ($r = 0.887$), and PLS model estimations using this alternative measure for CS_INCLUS show similar results to those reported in this paper.
- 8 The basic PLS algorithm follows a two-stage approach (e.g., Hair et al., 2011). First, the latent constructs' scores are estimated via an iterative, four-step process. Next, OLS regressions are

- used to estimate the outer weights/loadings and path coefficients for the *partial* models in the measurement models and the structural model. While for some *partial* models our ratio of observations to independent variables is rather low, it is always higher than the minimum recommended by statisticians when regression-based analysis is used (e.g., Hair et al., 1998).
- 9 This number of bootstraps is lower than we would have liked to use. However, using a higher number of bootstraps constantly led to estimation problems (singular matrices), caused by the fact that only five municipalities (7.0%) in the final sample ($N = 71$) are structured as a Concern model. As an additional robustness check, the research model was therefore also analyzed using a series of OLS regression models (i.e., based on asymptotic p -values as opposed to p -values obtained from bootstrapping), based on the (unstandardized) latent variable scores obtained using the PLS algorithm. All conclusions concerning the hypotheses remain the same as those reported in this paper, except for H7a, as the association between *CS_INTENS_OPER* and *CS_SATISF* loses significance.
 - 10 Given the different nature of cost system understandability compared to the other two cost system design characteristics, as a robustness check, we have also analyzed the research model without this variable. PLS model estimations of this alternative model show similar results for all remaining variables and relationships to those reported in the paper. As another robustness check, we have also analyzed the research model without the control variables. PLS model estimations of this alternative model show similar results to those reported in this paper, except for H4c and H5b, as the associations between *CS_COMPL* and *CS_SATISF*, and *CS_INCLUS* and *CS_INTENS_OPER*, become significant.
 - 11 Given that most of these hypothesized relationships may involve not only a direct, but also one or more indirect effect(s), an alternative, complementary way of testing them is by looking at the total effects as opposed to the direct effects that are reported in Table 3. Overall, we observe a slight shift of explained variance from the variables of interest to the control variables, but all conclusions concerning these specific hypothesized relationships remain the same as those based on the direct effects, except for H4a, as the total effect of *CS_COMPL* on *CS_INTENS_OPER* is (just) insignificant ($p = 0.110$).

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