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ORIGINAL ARTICLE

Error Culture, Auditors' Error Communication, and the Performance of the Auditee: A Study Among German Local Public Sector Auditors

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Abstract In the course of financial and value for money audits, public sector auditors are facing different types of errors: accounting and economic errors, respectively. This study examines the relations between error culture in public sector audit organizations, auditors' communication of accounting and economic errors, and performance of the auditee. The analyses of survey data from German local public sector auditors show that a strong error culture within the audit organization positively affect the auditors' communication of errors to the auditee, regardless of the error type. Additionally, a strong error culture positively mediates the performance of the audited institution through the auditors' communication of economic errors. This implies that it is important for public sector audit organizations to build a strong error culture. In addition to its practical contrition, the study provides novel theoretical insights as it demonstrates that the error management of one organization (audit entity) matters for the performance of another organization (audited entity).

Keywords Error communication · Financial audits · Partial least squares-structural equation modeling · Value for money audits

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1 Introduction

Auditors are expected to search for *accounting errors* to ensure that accounting and financial reporting are compliant with regulations and present a "true and fair" view of an auditee's financial position. While the work of private sector auditors ends with providing an independent assurance of the credibility of accounting information and a going-concern opinion (DeFond et al. 2002; Carson et al. 2013), public sector auditors' tasks go further. Due to budget constraints, citizens' demand for improvements in efficiency and effectiveness in public administration and public service provision and because of regulatory requirements, efficiency considerations should be also relevant for public administrations (Rosengart et al. 2019). As a consequence, *value for money audits* have been established in most Western countries at different governmental levels (Hood et al. 1998; Parker et al. 2019). Value for money auditing is a peculiarity of public sector audits and comprises looking for mistakes or misjudgements in the spending of public money that may lead to a loss of money, time and reputation or to any other financial crisis (Flesher and Zarzeski 2002; Gendron et al. 2007; Free et al. 2013). In this context, public sector auditors should search for *economic errors* due to incorrect decisions from an economic rationality (Evans and Patton 1987; Summa 2002; Arena and Jeppesen 2016; Weihrich 2018).

Error management theory is based on the idea that errors are an important starting point for (organizational) learning and (organizational) improvements (Frese 1991; Reason 1995; Van Dyck et al. 2005). Transferring this idea to the context of public sector auditing, auditors can enable learning from errors and improving the performance in the audited organization by revealing and explaining detected errors to the auditee. Accordingly, an active error communication of the auditors is an important prerequisite that auditees are aware of errors and can benefit from the detected errors. Consequently, they can improve the performance with respect to the workflows, reputation, efficiency, effectiveness, and quality of the public services delivered. In active error communication, the auditors inform their auditees about the underlying audit goals, communicate an error to the auditee, talk about an error with the person who is accountable for it and explain to him/her the scale of the error (Gronewold and Donle 2011).

Until now, research on public sector auditing has mainly focused on the value and usefulness of auditing as a democratic governance tool (Hay and Cordery 2018; Heald 2018; Johnsen et al. 2001; Reichborn-Kjennerud 2013). Hay and Cordery (2018), for example, explore the value of auditing in the public sector by reviewing the literature and history. They show several ways in which public auditing is valuable, for example, for agency, management control, accountability and governance (Hay and Cordery 2018). Similar, Gendron et al. (2007) investigates the process of how public sector auditors become recognized as experts for the assessment of performance goals and indicators of success, and a corresponding system of controlling and reporting. Reichborn-Kjennerud (2013) analysed survey data of public sector auditors in Norway to study auditors' perceived usefulness of value for money auditing. She finds that value for money auditing was seen as useful by a majority of the auditees. However, previous research has mainly neglected the performance of

the audited organisation, even this is a relevant issue because public sector auditors have been mobilized to assist in the pursuit of efficient public service provision (Lapsley and Pong 2000) and they are considered promoters of efficiency claims in public institutions (Monfardini and Maravic 2012; Fiebig and Zeis 2018). To close this research gap, the present study adopts the theoretical lens of error management theory to investigate whether the communication of accounting and economic errors of public sector auditors affects the performance of the audited entity as a consequence of learning from errors. This study also explores the error culture within the public sector audit organization as an antecedent of how public sector auditors communicate different errors to the auditee.

To address these issues, data were collected in a survey of German public sector auditors working in different local audit offices ("Rechnungsprüfungsämter"). Local audit offices are responsible for auditing the compliance of financial accounting as well as monitoring the expediency and profitability of activities in local governments (i.e., municipalities and counties). The study shows that in the public sector context, a strong error culture within the audit organization (i.e., errors are accepted as opportunities for improvement) has a positive effect on the public sector auditors' communication of accounting and economic errors to the auditee. Moreover, the study reveals that a strong error culture within the audit organization and the active communication of economic errors by the auditor have a positive effect on the performance of the audited entity. In this relationship chain, it is possible to demonstrate a mediating effect of error culture on performance via economic error communication.

The study adds to the literature about public sector auditing in different ways (e.g., Leeuw 1996; Gendron et al. 2007; Johnsen et al. 2001; Hay and Cordery 2018). First, the study helps to improve our understanding in how public sector auditors can assist in the pursuit of efficiency improvements in the public sector, by focusing on performance-related consequences of public sector auditing. Second, the study contributes to the literature from a conceptual point of view, as the specific error types (i.e., accounting and economic errors) that can be expected in the public sector audit process are taken into consideration. The findings highlight the important role of economic error communication in public sector auditing. Furthermore, the study contributes theoretically to the literature about error management in auditing (e.g., Gronewold and Donle 2011; Gold et al. 2014) by demonstrating that the error management of one organization (audit entity) matters for the performance of another organization (audited entity).

The remainder of this text is structured as follows: In Sect. 2, background information about public sector auditing in Germany is provided, and hypotheses are developed. Sections 3 and 4 describe the data collection, the method and the results of the study. Section 5 discusses the implications of the study and identifies avenues of future research.

2 Background and Hypotheses Development

2.1 Public Sector Auditing in German Local Governments and Different Error Types

In most democratic states, public sector auditing is a common practice that depends on national regulations (Pollitt et al. 1999). In the following, some organizational and legal specifics of public sector auditing in German local governments ("kommunale Rechnungsprüfung") are outlined to support the comparability of this study.

In Germany, auditing in local governments is usually conducted by local audit offices ("Rechnungsprüfungsämter"). Public sector audit offices monitor the compliance of government activities with law and regulations, including financial accounting (*financial auditing*), as well as the expediency and profitability of local activities (*value for money auditing*), and the audit results are reported to the council members and administrators.[1] Accordingly, public sector auditors have an important role in the local governmental governance system (Monfardini and Maravic 2012; Weihrich 2018). They act as classic external auditors as well as consultants and advisors. Therefore, they work both as internal management support and external supervisors. The expertise of public sector auditors is expected to contribute to the modernization of the public administration and improve public services provision (Richter 2018). However, auditors are legally obliged to maintain an independent relationship with their auditees (Fiebig and Zeis 2018). In this respect, auditing in local governments in Germany turns out to be client-oriented, and auditors add value as consultants of the municipal management (Monfardini and Maravic 2012). Such observations have also been made in other countries, for example, by Jacobs (1998) for New Zealand, Guthrie and Parker (1999) for Australia, Bowerman (1994) for the UK and Johnsen et al. (2001) for Finland and Norway, among others.

From the perspective of *financial* and *value for money auditing*, public sector auditors are faced with the *accounting* and *economic errors* of their auditees, respectively. For example, an accounting error can be a deviation of accounts and cash holdings of a machine for the automated payment and borrow process in a city library. In addition, the purchase and use of the machine can be a "poor" decision from an economic rationality (economic error) when the initial investment is very expensive and the usefulness of the machine is very low, as it can be operated only during the opening hours and in the presence of library staff. For public sector auditors, it is important to actively communicate and discuss such errors with the auditee in order to resolve the corresponding problems and improve efficiency and effectiveness in public service provision and administration (i.e., performance). The choice of how to handle errors depends heavily on the practices concerning the identification and correction of the errors within the audit organization—the so-called error culture (Van Dyck 1997; Van Dyck et al. 2005; Gronewold and Donle 2011; Gronewold et al. 2013; Gold et al. 2014). In the next sections, the relations

[1] Although value for money auditing is not mandatory in all federal states of Germany—the legal foundations for public sector auditing in Germany differ slightly among the 16 federal states—it is always at least defined as a "can-do" task (Monfardini and Maravic 2012; Fiebig and Zeis 2018).

between error culture, error communication and performance are elaborated from a theoretical perspective.

2.2 Error Culture and Error Communication

Error management theory states that an organizational error culture is recognized in the way an organization faces errors and in whether errors are accepted as opportunities or as threats. If an organization supports a high level of error culture, errors are resolved more quickly and openly, and they are more likely to be avoided in the future (Van Dyck et al. 2005). As a result, error learning can occur, and positive consequences, such as innovation and quality improvement, can be strengthened (Rybowiak et al. 1999; Edmondson 2004). To foster positive error consequences and minimize the negative consequences, organizations should, according to Frese (1991), accept errors as part of the working process and ask what should be done after an error has occurred. Organizational error culture appears in organizational error management (Van Dyck 1997); more precisely, it appears in the organization's error communication, error learning, error knowledge-sharing, cooperative helping in error situations, and in the detection, analysis and resolution of errors as early as possible (Coan 2002; Van Dyck et al. 2005).

An organization with a strong error culture has a positive attitude toward errors because it desires their positive consequences. The opposite is the case for an organization with an error prevention culture (weak error culture) (Van Dyck et al. 2005). The characteristic of an organization's error culture (strong or weak) becomes visible, for example, through the frequency of *error discussion*. It also depends on common practices such as *help among organizational members after errors occur* and *error analysis*. Moreover, peoples' willingness to *correct errors* characterizes a strong or weak error culture (Gronewold and Donle 2011; Rybowiak et al. 1999). Previous research has shown that organizations with a strong organizational error culture encourage error communication, the willingness to discuss errors and to ask for help in problematic situations (e.g., Frese 1991; B. Zhao and Olivera 2006; Ashkanasy et al. 2010). Furthermore, error anticipation in organizations with a strong error culture is high (Rybowiak et al. 1999), which promotes—among other things—error detection in the first place (B. Zhao and Olivera 2006). Thus, the positive consequences of a strong error culture are open error communication and discussion, early error detection and early error correction, which foster error learning and secondary error prevention in the future (Frese 1995). In contrast, organizations with a weak error culture pay more attention to the negative effects of errors (Reason 1995). In such organizations, people are concerned that they will be blamed for errors and that their mistakes will be held against them (Carmeli and Gittell 2009). Individuals who are afraid of sanctions and blame due to errors do not manage errors in a problem-solving way (Sitkin 1997; B. Zhao 2011; Gronewold et al. 2013; Putz et al. 2013). Accordingly, the positive consequences of errors cannot take place (Edmondson 2004; Frese and Keith 2015).

Gronewold and Donle (2011) focus on the effects of the error culture within audit organizations. They investigate whether a strong or weak error culture in the audit organization affects the auditors' predispositions toward managing their own

error and the errors of their auditees. They show that in audit organizations with a strong error culture, auditors manage their own errors and the errors made by their auditees more openly and actively. In contrast, in audit organizations with a weak and blaming error culture, auditors show less-open error management. Gronewold and Donle (2011) also address the auditors' management of errors made by their auditees. They thereby focus on the communicational aspect of error management, which implies that the auditors inform their auditees about audit goals, communicate errors to the auditee, and explain to the person who is accountable for the error the reasons that the error occurs.

In an experiment among private sector auditors, Gold et al. (2014) investigate the influence of different error types (in this case, execution and conceptual errors) on the auditors' predispositions toward reporting their own errors. They find that an open and strong error culture especially strengthens auditors' willingness to report their own execution errors and at least does not inhibit their willingness to report their own conceptual errors. These findings are consistent with the theoretical framework of error reporting (communication) by B. Zhao and Olivera (2006). A central idea of the framework is that error communication decisions involve a careful and purposeful assessment of the potential costs of communicating errors (including effort, fear of reprisal, damaged reputations and financial costs) against potential benefits (such as learning). Further, the framework states that the error reporting decision is affected by negative emotions (such as fear and guilt) that accompany individuals when they make an error. In an organization with a weak error culture, employees expect punishment, sanctions, and blame due to the occurrence of errors; thus, they reduce their communication and knowledge sharing about errors (Carmeli and Gittell 2009).

Based on error management theory and prior studies in the field of auditing, it can be assumed that public sector auditors working in organizations with a strong error culture accept errors as an opportunity for improvements in the audited organization, irrespective of the error type. Nevertheless, we argue that different communication costs (B. Zhao and Olivera 2006) occur for public sector auditors when they communicate different types (accounting and economic errors) of errors to the auditees. Communicating accounting errors to auditees is a typical task of auditors in private and public sector settings; therefore, we see only low costs for communicating this form of error. Especially in public administrations, which is a strong Weberian tradition, employees are highly influenced by a legalistic administrative culture (Rosengart et al. 2019). In this context, being confronted with accounting errors indicates that auditees are getting informed non-compliant actions, which must be corrected by them. Being socialized by a legalistic administrative culture, for auditees, it is not surprising to be confronted with accounting errors because it is a typical task in legalistic administrations to avoid or correct rule-breaking actions. As a consequence, auditees who inform about such actions will not have to fear a significant level of misunderstandings or denials when they actively communicate accounting errors to the auditees. Because a strong error culture enhances the focus on positive consequences of error management, it should motivate auditors to actively communicate these accounting errors. Based on these considerations, the following hypothesis is formulated:

H1a A strong error culture within the audit organization promotes the public sector auditor's accounting error communication to the auditee.

As mentioned, B. Zhao and Olivera (2006) show that error communication involves a careful and purposeful assessment of the potential costs of communicating errors. For public administrations with a Weberian administrative tradition, it can be assumed that the communication of economic errors to auditees introduces high (emotional) cots for public sector auditors, since they must fear to be confronted with high levels of denials and lacks of understanding by the auditees. Because of the legalistic administrative culture in their organizations, public servants are typically used to focus on legacy aspects and consequences of their actions, and they tend to neglect economic consequences of their decision making (Rosengart et al. 2019). In this context, it is much more demanding and costlier for auditors to actively communicate economic errors to the auditees. It can be argued that in this context, a strong error culture in the auditor's organization has a positive effect to motivate auditors to actively communicate economic errors to the auditee, even it is demanding for them. The reason is that auditors are motivated by a positive error culture to support their "clients" by actively communicating both accounting and economic errors. Public sector auditors know that reducing or stopping both error dimensions can have positive learnings effects in the audited organization, and it is part of their job (see OECD 1996; Pollitt 2003; English and Skærbæk 2007; Monfardini and Maravic 2012). Based on these considerations, we formulate the following hypothesis:

H1b A strong error culture within the audit organization promotes the public sector auditor's economic error communication to the auditee.

2.3 Accounting and Economic Error Communication and Auditees' Performance

In the organizational learning literature, errors are assumed to offer room for learning because they display deviations between the intended and actual outcomes of an action (Argyris 1992). This idea has been transferred to the error management literature. Van Dyck et al. (2005) argued that communication about errors is a pivotal requisite for the promotion of learning from errors. Error communication subsequently leads to innovation and performance improvement of the organization. Previous studies find a positive relationship between active error management, specifically communication, and a number of performance constructs within single organization (Rybowiak et al. 1999; Van Dyck et al. 2005; Putz et al. 2013; Frese and Keith 2015).

In the audit context, auditors are asked to identify errors, communicate them internally (i.e., within the audit team) and actively adequately manage these errors by reporting them to the auditee (Colbert 2002). Informing the auditee about errors and explaining the errors—in particular to the person who is accountable for it—contributes to error awareness in the organization where the error occurred. Therefore, it can be assumed that auditors' active communication of errors revealed during the audit process fosters learning from errors in the audited organizations

and contributes to performance improvements (Van Dyck et al. 2005; Putz et al. 2013). However, it can further be argued that the impact of learning on performance depends on the specific error type. Research on value for money auditing has underlined that an active communication and active discussion about *economic errors* with the auditee enhance the likelihood that audit work will contribute substantially to the improvement of the auditees' performance (Leeuw 1996; Johnsen et al. 2001; Monfardini and Maravic 2012; Parker et al. 2019): Having notice of "economic problems" is a prerequisite for improving the efficiency and effectiveness of public spending in the future.

Although communication about *accounting errors* could improve the information base for future decision making within organizations, the impact on organizational performance can be expected to be weaker than that from economic error communication, particularly since public management research has demonstrated that politicians' and public managers' use of accounting information for decision making is modest (see, e.g., Ho 2006; Van Helden 2016). Johnsen et al. (2001, p. 595) state that "compared to financial statement auditing, performance auditing has a more conspicuous connection to both performance improvement and day-to-day management processes in the municipalities and counties." The above discussion leads to the following hypotheses:

H2a The active accounting error communication of public sector auditors contributes to auditees' performance.

H2b The active economic error communication of public sector auditors contributes to auditees' performance.

H3 Public sector auditors' economic error communication has a stronger impact on auditees' performance than public sector auditors' accounting error communication.

Figure 1 in the result section summarizes the underlying research model.

3 Research Method and Variable Measurements

This study is based on a web survey (Couper et al. 2001) that was sent to German public sector auditors who are members of the "Institut der Rechnungsprüfer" (IDR), an association that unites public sector auditors in Germany and represents their interests. The association has 450 active members: three-quarters of the members are public institutions (primary local audit offices employing more than one public sector auditor), and one-quarter are personal members (IDR n.d.).

The survey was pretested with three public sector auditors, prior to the data collection, to check whether the questionnaire was understandable for the target population (Speklé and Widener 2018). For the data collection, the online questionnaire was sent via email to all active members of the IDR with the request that it is filled by only one public sector auditor within each local audit office. In addition, we

Table 1 Composition of the sample

Sample characteristics		
	Age	*Years of experience*
Mean	51	27.39
Median	53	27.50
Minimum	29	1
Maximum	65	49
Gender	*Frequency*	*Percent*
Female	41	33.88%
Male	77	63.64%
No answer	3	2.48%
Total	121	100.00%
Education		
Apprenticeship	1	0.83%
Secondary school	7	5.79%
Higher school	13	10.74%
University degree	90	74.38%
PhD	1	0.83%
No answer	9	7.44%
Total	121	100.00%
Position		
Head of an audit office	85	70.25%
Subordinate in an audit office	33	27.27%
No answer	3	2.48%
Total	121	100.00%
Audit office size	*Mean*	*Sd*
Number of employees	13.92	16.653

Number of respondents = 121; response rate = 28.27%

checked that we have just one auditor per audit office in our data sample.[2] Overall, 428 German public sector auditors received the link to the questionnaire, and 161 questionnaires were returned. Out of the returned questionnaires, 40 were removed from the final dataset because they contained answers that were systematically incomplete or because the respondents did not finish the survey at all. A total of 121 questionnaires remained for the final analysis, which corresponds to a representative rate of 28.27% of the underlying population (Couper 2000) and reflects a good response rate for an email-based survey study in Germany (Harzing 1997). In order to check for potential non-response bias, the responses of the first 25% were compared with the responses of the last 25% for the main data collection. A two-side *t*-test shows no significant difference in the responses to all items (all ps > 0.1). Table 1

[2] As every audit office has just one head, we could assume that every auditor in this position was working in a different audit office. Furthermore, we controlled for overlaps between heads of audit offices and subordinates as well as for overlaps within the group of subordinates, as we tested if the answers of the respondents matched on more than one attribute on audit office and audited municipality. If there was no match, we could assume that respondents belong to different audit offices.

displays an overview of the sample characteristics. The average respondent was 51 years old and had approximately 27 years of work experience in public sector auditing. The sample was composed of 63.64% men and 33.88% women; 2.48% did not report gender. Of the respondents, 75.21% had a university degree, and 70.25% were heads of an audit office. The average number of employees working in the surveyed audit offices was 13.92.

In the questionnaire, only items that had been applied in previous studies were used; to measure the latent variables. In the introduction to the survey, respondents were asked to think of the most recent audited organisation when answering the questions. The questionnaire can be found in the online appendix. All items of the latent variables were measured on a 7-point Likert scale ranging from (1) "always" or "strongly agree" to (7) "never" or "do not agree at all."

Corresponding to Becker et al. (2012) and Wetzels et al. (2009), the construct *Error Culture (EC)* of the public sector audit organization was inserted as a second-order construct formed by five first-order constructs that were, in turn, measured reflectively. Participants were asked to answer four questions each for the following five error dimensions: "analyse errors," "help each other in error situations," "discuss errors together," "learn from errors," and "correct errors." To capture these dimensions of *EC* in the public sector audit institution, the items by van Dyck et al. (2005) and Gronewold and Donle (2011) were used. These items capture individuals' perceptions of socially acceptable behaviors and values around error management within the audit organization (team). Because each of the five error dimensions are parts of *EC*, there is a formative relationship between these lower-order constructs and the higher-order construct *EC* (Becker et al. 2012).

Accounting Error Communication (AEC) and *Economic Error Communication (EEC)* were measured based on the scales developed by Gronewold and Donle (2011) and were adopted for the different error types (accounting and economic errors) and the public sector context. The associated items for *AEC* were "not inform auditee about additional procedures due to detected accounting errors," "not communicate detected accounting errors to the auditee," and "talk to auditee without telling the scale of detected accounting error." The associated items for *EEC* were "not inform auditee about additional procedures due to detected economic errors," "not communicate detected economic errors to the person who caused them," and "talk to auditee without telling the scale of detected economic error."

Public institutions' *Performance* in this article is defined following Speklé and Verbeeten (2014), via the number of innovations, the reputation of the public institution, the achievement of performance goals, and the efficiency and morale of the staff. Public sector performance is an ambiguous concept that cannot be easily measured with one general scale. Archival measures are rarely suitable because they usually represent only measurable aspects and are often not sufficiently documented or measured in the public sector (Song and Meier 2018). Because of these phenomena and because no archival data were available due to the anonymity of the survey, this study chose the well-established scale for measuring public sector performance developed by Van de Ven and Ferry (1980). Speklé and Verbeeten (2014) also adopted this scale in their research about the use of performance measurement systems in the public sector and validated their results with archival data (Bedford

and Speklé 2018). The public sector auditors in this survey were asked to rate the performance of the audited entity that they had in mind when answering the questions on error communication, compared to other similar units. They had to assess the amount of work, the quality of work, the number of innovations, the reputation of the unit, the achievement of performance goals, and the efficiency and morale of the staff. Thus, this scale works well to capture the performance of the audited entity indirectly via the knowledge and experience of the auditors.

Because all answers in the questionnaires obtained from the same person, common method bias could inflate the relationships in the research model (Podsakoff et al. 2003). To control for a possible common method bias *Public Service Motivation (PSM)* was used as a marker variable (Chin et al. 2013) and is measured as well with Likert scale items. Furthermore, PSM allow also to control for a spurious influence of more motivated participants in rating for example performance (Meier and O'Toole 2013). *PSM* has no theoretical relationship with the research question. *PSM* was measured on the scale according to Perry and Wise (1990) and Perry (1996). The results showing that it has no significant relationship to any variable in the model (see Table 6). Beside this, to additionally test a possible inflate influence of a common method bias, the variance inflation factors (VIF) were calculated. VIF test whether critical multicollinearity exists by simulating each construct as a dependent construct and indicating the amount that is explained by the remaining constructs. Because the critical threshold of 3.3 are not exceeded by any relationships indicating that there is no critical problem with common method bias (see Table 6; Kock 2015).

To analyse the data, partial least squares-structural equation modeling (PLS-SEM) with the software SmartPLS Version 3.3.2 (Ringle et al. 2020) was used. PLS-SEM is a variance-based structural equation using composites for construct measurements (Sarstedt et al. 2016). Composite modelling allows the modelling of formative as well as reflective measurement constructs. In this study, *AEC, EEC* and *Performance* are defined as formative measurements, as is the marker variable *PSM*. These constructs were defined as formative measures because different aspects of what is being measured are represented by the questions and therefore do not necessarily have to correlate (Nitzl and Chin 2017). For example, also a confirmatory tetrad analysis indicates a formative measurement of performance for our sample (Gudergan et al. 2008). Furthermore, it is advisable to use a composite modeling approach for not wide tested construct measurement to avoid potential misspecifications such as *AEC* and *EEC* (Hair and Sarstedt 2019).

Furthermore, PLS-SEM is an adequate tool for working with small sample sizes (Hair et al. 2011). A sample size of 92 participants for detecting medium effects for a statistical power of at least 0.8 at an α-level of 0.05 is at least necessary for this study with five items in the most complex formative construct measurement (Nitzl 2016). Hence, the sample of 121 on hand is large enough to detect the relevant effect. Since the number of missing values for each single item that is used for the construct measurement is maximally 4 and these missing values are not systematically missing, the mean replacement procedure was applied.

4 Results

The data analysis consists of the assessment of the reflective and formative measurements following a confirmatory composite analysis approach and the evaluation of the structural model by testing the path coefficients, the explanatory power and the mediating effects (Hair et al. 2017, 2020).

In the first step, the construct reliability and validity (Hair et al. 2017) as well as the discriminant validity of the reflective measurements are evaluated (Henseler et al. 2015). All critical values are fulfilled. Table 2 summarizes the values for the evaluation. Cronbach's alpha for the construct *Correction* was 0.773, reflecting an acceptable internal consistency. However, the loading of the item "Although we make mistakes, we stick to our goals" was slightly below the critical value of 0.7. Therefore, when this item "Cor4" was deleted, the Cronbach's alpha increased to 0.804. Because the PLS estimation algorithm requires the same number of items per construct for the higher-order construct, each item of the lower-order constructs with the lowest loading was also deleted (Becker et al. 2012). This means that items with a loading higher than 0.7 were also deleted. Therefore, "Analyse2" with a loading of 0.711, "Help1" with a loading of 0.822, "Disc3" with a loading of 0.782 and "Learn2" with a loading of 0.711 were deleted. Table 2 depicts that

Table 2 Estimation of the reflective measurement model

Items	Loading	Cronbach's alpha	rho_A	Composite reliability	Average variance extracted
Critical values	>0.7	>0.7	>0.7	>0.6	>0.5
Analyse	–	0.858	0.863	0.913	0.779
Analyse1	0.911	–	–	–	–
Analyse3	0.864	–	–	–	–
Analyse4	0.872	–	–	–	–
Help	–	0.828	0.831	0.897	0.744
Help2	0.870	–	–	–	–
Help3	0.852	–	–	–	–
Help4	0.864	–	–	–	–
Discussion	–	0.789	0.791	0.877	0.704
Disc1	0.839	–	–	–	–
Disc2	0.796	–	–	–	–
Disc4	0.880	–	–	–	–
Learning	–	0.786	0.813	0.873	0.697
Learn1	0.849	–	–	–	–
Learn3	0.798	–	–	–	–
Learn4	0.855	–	–	–	–
Correction	–	0.804	0.813	0.884	0.718
Cor1	0.866	–	–	–	–
Cor2	0.801	–	–	–	–
Cor3	0.873	–	–	–	–

The numbers in the labelling of the items represent the numbering of the survey questions in the Appendix

Table 3 Estimation of the multidimensional construct Error Culture (*EC*)

Multidimensional construct	Weight	*p*-Value	Variance inflation factor
Analyse	0.270	<0.001	2.616
Help	0.231	<0.001	2.390
Discussion	0.239	<0.001	2.708
Learning	0.219	<0.001	1.984
Correction	0.245	<0.001	2.166

P-values are two-tailed; 5000 bootstraps, bias-corrected

Table 4 Heterotrait-monotrait ration of the multidimensional construct Error Culture (*EC*)

	Analyse	Correction	Discussion	Help	Learning
Analyse	–	–	–	–	–
Correction	0.710	–	–	–	–
Discussion	0.855	0.726	–	–	–
Help	0.654	0.796	0.840	–	–
Learning	0.774	0.592	0.738	0.634	–

Table 5 Estimation of the formative measurement model

Formative measures	Weight	*p*-Value	Variance inflation factor
AEC1 → AEC	0.756	<0.001	1.335
AEC2 → AEC	0.174	<0.001	1.501
AEC3 → AEC	0.283	0.001	1.301
EEC1 → EEC	0.629	<0.001	1.411
EEC2 → EEC	0.232	<0.001	1.287
EEC3 → EEC	0.371	<0.001	1.380
Performance1 → Performance	0.091	0.138	2.463
Performance2 → Performance	0.243	<0.001	1.998
Performance3 → Performance	0.220	0.001	1.982
Performance4 → Performance	0.125	0.023	2.136
Performance5 → Performance	0.135	0.018	2.307
Performance6 → Performance	0.267	<0.001	1.902
Performance7 → Performance	0.214	<0.001	1.795
PSM1 → PSM	0.198	0.006	1.433
PSM2 → PSM	0.274	<0.001	1.582
PSM3 → PSM	0.309	<0.001	1.984
PSM4 → PSM	0.319	<0.001	1.400
PSM5 → PSM	0.251	<0.001	2.185

P-values are two-tailed; 5000 bootstraps; bias-corrected. The numbers in the labelling of the items represent the numbering of the survey questions in the Appendix

Table 6 Path coefficient results

	Path coefficients	*p*-Value	Variance inflation factor	Effect size (f^2)
EC → AEC	0.374	<0.001	1.196	0.149
EC → EEC	0.352	<0.001	1.196	0.133
AEC → Performance	–0.130	0.452	2.739	0.006
EEC → Performance	0.361	0.020	2.799	0.049
PSM → EC	0.001	0.708	1.257	0.059
PSM → AEC	0.136	0.196	1.196	0.017
PSM → EEC	0.173	0.056	1.196	0.029
PSM → Performance	0.164	0.160	1.119	0.027

P-values are two-tailed; 5000 bootstraps; bias-corrected

all reflective measurements fulfil the critical values regarding Cronbach's alpha, composite reliability and average variance extracted (Ringle et al. 2014).

The results for the higher-order construct *EC* are presented in Table 3. The range of VIF values for the lower-order constructs, which have a formative relationship to the higher-order construct *EC*, is below the critical threshold of 3.3 (Kock 2015). In addition, the weights are significant with all *p*s < 0.001.

The heterotrait-monotrait criterion is relatively new and turned out to work better to detect discriminant validity than the Fornell-Larcker criterion, as it shows a higher reliability (Henseler et al. 2015). As shown in Table 4, the critical value of 0.85 was not exceeded, which establishes discriminant validity.

The formative measurement model was assessed in the next step. As shown in Table 5, the values of the VIF for all items were below the critical value of 3.3. Furthermore, all the weights, except Perfor1 (0.098; 0.138; 2.463), were highly significant.

Given these results for the evaluation of the measurement models, the examination of the structural model estimation follows (Chin 2010). To evaluate the quality of the inner model, 5000 bootstraps, no sign-change and accelerated bias-correction were selected. The marker variable PSM has no significant effect on any construct in the model. Furthermore, the range of the VIF values for the inner research model is between 1.119 and 2.799. All the values for VIF are below the critical threshold of 3.3.

Table 6 presents the results for the full sample.

The effects of *EC* on *AEC* (0.377; <0.001) and on *EEC* (0.357; <0.001) are significant, as is the effect of *EEC* on *Performance* (0.357; 0.024). Thus, H1a, H1b, and H2b can be accepted. As the path coefficient of *AEC* to *Performance* is negative and not significant (–0.126; 0.472), H2a must be rejected. The effect sizes for the supported hypotheses are consistent with the size of path coefficients. The effect sizes lie between small and medium for these hypotheses (Cohen 1988). Additionally, we include educational background and age as control variables. Both has no significant influence; whereby educational background has a path coefficient of –0.111 (p = 0.112) and age has a path coefficient of 0.011 (p = 0.899) on performance. The other

relationships in the research model do not change in relative size and significance through the inclusion of this control variable (not reported).

For testing H3, the path coefficients of H2a (–0.126) and H2b (0.357) were compared using the bootstrapped standard errors. Because the difference between the path coefficients of H2a and H2b (0.483) is significant ($t(120) = 2.014$, $p = 0.023$, two-tailed), H3 can be accepted. Figure 1 shows the path coefficients' direct effects and the *p*-values as well as the results for H3. A *p*-value below 0.1 indicates a significant direct effect.

To test for mediation effects, we follow the steps recommended by Nitzl et al. (2016). A mediation effect is significant at a significance level of 0.1 (two-tailed test) if zero is not included in the confidence interval of an indirect effect. As shown in Table 7, there is a significant mediation effect between *EC* and *Performance* that is mediated by *EEC*. *AEC* does not significantly mediate this indirect effect. This means that the effect of *EC* on the dependent variable *Performance* is mediated by the variable *EEC*.

To determine the type of mediation, first, the indirect effect is tested, and afterwards, as this turns out to be significant [0.017; 0.231], the significance of the direct effect is tested too. Because the direct effect can also be confirmed to be significant [0.089; 0.425] and both effects point in the same positive direction, complementary partial mediation is supported (Nitzl et al. 2016). The total effect is the sum of the indirect effects and the direct effect and is significant [0.132; 0.453].

The complementary partial mediation indicates that the intermediate variable *EEC* positively confounds the relationship between *EC* within the audit organization and *Performance* of the audited entity (X. Zhao et al. 2010). Table 7 shows the bias-corrected confidence intervals for the total effect, the indirect effects and the direct effect.

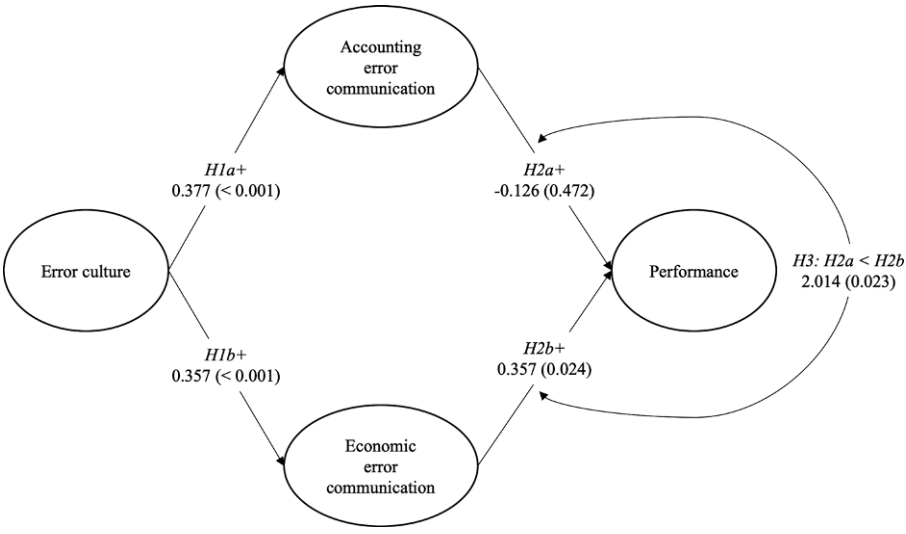

Fig. 1 Results of the full model

Table 7 Estimation of the mediating effect

Relations	Total effect		Indirect effect		Direct effect	
	Coefficient	95% confidence interval	Coefficient	95% confidence interval	Coefficient	95% confidence interval
EC → Performance	**0.313**	**[0.144; 0.460]**	–	–	**0.271**	**[0.098; 0.430]**
EC → AEC → Performance	–	–	–0.069	[–0.193; 0.026]	–	–
EC → EEC → Performance	–	–	**0.112**	**[0.013; 0.229]**	–	–

A path relation is significant at a significance level of 0.1 (two-tailed test) if zero is not included in the confidence interval; significant effects are bolded

5 Discussion and Conclusion

Auditing in the public sector is driven by public expectations of transparency and improvements in efficiency and effectiveness. For this reason, public sector auditors capture whether public institutions report financial positions in line with legal regulations and whether they are spending public money reasonably (Flesher and Zarzeski 2002; Gendron et al. 2007; Free et al. 2013). In this context, public sector auditors must manage two different types of auditee errors, accounting errors and economic errors. Using survey data from German local public sector auditors, this study explores the error culture within public sector audit organizations as antecedents of how public sector auditors communicate different errors to the auditee and the impact of error communication on auditees' performance.

The results show that a strong error culture has a positive impact on public sector auditors' error communication. This means that public sector auditors who work in an organization with a strong and open error culture communicate and inform their auditees about detected errors in a more intensive and better way. The opposite is true for organizations with a blaming and weak error culture. Therefore, the findings are in line with previous studies showing that organizations with a strong organizational error culture encourage error communication, the willingness to discuss errors and to ask for help in problematic situations (e.g., Frese 1991; B. Zhao and Olivera 2006; Ashkanasy et al. 2010). However, the present study adds new aspects to this literature by showing that a strong error culture also positively impacts error communication beyond organisational borders. Furthermore, in contrast to prior research on error culture (e.g., Gronewold and Donle 2011; Gold et al. 2014), this study focuses on public sector auditing and considers the accounting errors and economic errors that are relevant in financial audits and value for money audits, respectively. In line with the postulated hypotheses, the study shows that the error culture has a positive effect on auditors' communication of both error types.

However, this study finds that the error type matters for the impact of error communication on auditees' performance. The results show that auditors' economic error communication positively influences the performance of the auditee, while auditors' accounting error communication has no significant effect on auditees'

performance. The results suggest that auditors' communication of economic errors, revealed during the audit process, fosters learning from this type of errors (Van Dyck et al. 2005; Putz et al. 2013), which consequently contributes to performance-related organizational improvements. One possible explanation that accounting error communication does not have the same effect as economic error communication on organizational performance could lay in the different severity of the consequences of the two error types. There are reasons to assume that the consequences for public organisations are more severe in case of economic errors than in case of accounting errors: Economic errors often imply that public institution are perceived as inefficient by the general public. As a consequence, the risk that the managers of this public organisation are blamed by different stakeholder groups increases. Typically, managers want to reduce this risk and can be expected to take economic errors more seriously (Lindermüller et al. 2022). Therefore, the findings of the present study are in line with prior research on error management which found that more severe consequences of errors relate positively to error learning (Homsma et al. 2009). However, an explanation for the different effects of error types could also be that learning form accounting errors primarily improves the information base for decision makers outside the public organisation and not the organisational performance per se. In this case, more accurate accounting information is a not a significant driver for performance improvements of public sector organisations.

In addition, the findings show that public sector auditors' economic error communication mediates the relationship between the error culture within the audit organization and the performance of the audited entity. This finding of a complementary partial mediation through economic error communication illustrates the central role of economic errors in public sector auditing. The special task of public sector auditors—focusing also on economic errors, not just on accounting errors—is highly relevant for the performance of public institutions. It can be shown that a strong error culture in a public sector auditing organization and a positive economic error communication of the auditor have a positive impact on auditees' performance. This is an important theoretical contribution to literature about error management (Rybowiak et al. 1999; Fay and Frese 2001; Van Dyck et al. 2005; Putz et al. 2013; Frese and Keith 2015) and error management in auditing (e.g., Gronewold and Donle 2011; Gold et al. 2014), as it demonstrates that the error management of one organization (audit entity) matters for the performance of another organization (audited entity). It especially shows the importance of communication between two independent public institutions that are formally related by governmental regulations (i.e., the obligation to audit and to be audited). It thereby illustrates the relevance of communication as a "soft factor" in the inter-relations between public institutions.

This study also contributes to the literature about public sector auditing (e.g., Leeuw 1996; Lapsley and Pong 2000; Gendron et al. 2007; Johnsen et al. 2001; Hay and Cordery 2018), as it is the first study to emphasize the specific role of public sector auditors' error communication, especially highlighting the way public sector auditors communicate economic errors. The findings illustrate the central role of economic error communication on the performance of the auditee. This is highly relevant for NPM aspirations, which aim to improve efficiency and effectiveness in public administration and public service provision.

The findings also carry interesting and relevant practical implications for public sector auditors, public accountants, and policymakers. In general, public sector audit institutions should be highly interested in establishing a strong error culture and should view errors as an opportunity for improvements. In particular, it is important to establish and improve communication procedures in the inter-relations between auditor and auditee. If this mechanism works, it can positively affect the entire state, e.g., by saving taxpayers' money or improving the public service quality. Communication procedures can be improved, for example, by providing auditors sufficient space to explain the reasons and magnitude of errors to the counterpart. Furthermore, public institutions should recognize that they can greatly benefit from value for money auditing. More specifically, public institutions should recognize the added value of public sector auditors, who specifically check for economic errors. Therefore, it appears advantageous for public institutions to act cooperatively and give public sector auditors access to relevant documents, calculations, agreements, processes and workflows.

As in any study, this article suffers from limitations that may hinder generalizing the results. For example, the public sector auditors gave subjective answers, which may be determined by prejudice and therefore not be objective. However, to counteract this so-called social desirability, the marker variable PSM was included in the research model. Another limitation in this context is that the performance of the audited public institution is measured only indirectly via auditors' perceptions of their auditees' performance. Nonetheless, there are some telling advantages in the subjective evaluation of performance aspects (Kroll 2015). Responses to subjective questions reflect the factors influencing the decision-making process and organizational change (Kober et al. 2010). In contrast, the use of, for example, archival data to measure performance is also critical. Archival data about performance in the public sector can be influenced by many factors, which makes comparability difficult (Moers 2007). However, future research would be enriched by involving archival data in the analysis. Furthermore, the low coefficient of determination of the performance variable indicates that there are other relevant factors (e.g., auditing control systems), which explain the performance. Finally, we mainly use formative measurements in the research model. In contrast to reflective measurements, formative measurements offer only limited possibilities for assessing the reliability and validity of construct measurements (Diamantopoulos and Siguaw 2006).

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Declarations

Conflict of interest D. Lindermüller, I. Lindermüller, C. Nitzl and B. Hirsch declare that they have no competing interests.

Ethical standards The study meets the ethical standards of the corresponding author's research institution. *Patient consent statement*: We obtained informed consent before the participant took part in the survey.

References

Arena, M., and K.K. Jeppesen. 2016. Practice variation in public sector internal auditing. An institutional analysis. *European Accounting Review* 25(2):319–345.

Argyris, C. 1992. *On organizational learning*. Oxford: Blackwell.

Ashkanasy, N.M., C.P.M. Wilderom, and M.F. Peterson (eds.). 2010. *The handbook of organizational culture and climate*. Thousand Oaks: SAGE.

Becker, J.-M., K. Klein, and M. Wetzels. 2012. Hierarchical latent variable models in PLS-SEM: guidelines for using reflective-formative type models. *Long Range Planning* 45(5–6):359–394.

Bedford, D.S., and R.F. Speklé. 2018. Constructs in survey-based management accounting and control research: an inventory from 1996 to 2015. *Journal of Management Accounting Research* 30(2):269–322.

Bowerman, M. 1994. The National Audit Office and the Audit Commission: co-operation in areas where their VFM responsibilities interface. *Financial Accountability and Management* 10(1):47–63.

Carmeli, A., and J.H. Gittell. 2009. High-quality relationships, psychological safety, and learning from failures in work organizations. *Journal of Organizational Behavior* 30(6):709–729.

Carson, E., N.L. Fargher, M.A. Geiger, C.S. Lennox, K. Raghunandan, and M. Willekens. 2013. Audit reporting for going-concern uncertainty. A research synthesis. *Auditing* 32(1):353–384.

Chin, W.W. 2010. How to write up and report PLS analyses. In *Handbook of partial least squares: concepts, methods and applications*, ed. V. Esposito Vinzi, 655–690. Berlin: Springer.

Chin, W.W., J.B. Thatcher, R.T. Wright, and D. Steel. 2013. Controlling for common method variance in PLS analysis: the measured latent marker variable approach. In *New perspectives in Partial Least Squares and related methods*, 231–239. Heidelberg: Springer.

Coan, H. 2002. Risk, error and blame in organizations. A communication approach. *Corporate Communications: An International Journal* 7(4):232–240.

Cohen, J. 1988. *Statistical power analysis for the behavioral sciences*. Hillsdale: Erlbaum.

Colbert, J.L. 2002. Corporate governance: communications from internal and external auditors. *Managerial Auditing Journal* 17(3):147–152.

Couper, M.P. 2000. Web surveys: a review of issues and approaches. *The Public Opinion Quarterly* 64(4):464–494.

Couper, M.P., M.W. Traugott, and M.J. Lamias. 2001. Web survey design and administration. *The Public Opinion Quarterly* 65(2):230–253.

DeFond, M.L., K. Raghunandan, and K.R. Subramanyam. 2002. Do non-audit service fees impair auditor independence? Evidence from going concern audit opinions. *Journal of Accounting Research* 40(4):1247–1274.

Diamantopoulos, A., and J.A. Siguaw. 2006. Formative versus reflective indicators in organizational measure development: a comparison and empirical illustration. *British Journal of Management* 17:263–282.

Edmondson, A.C. 2004. Learning from mistakes is easier said than done. Group and organizational influences on the detection and correction of human error. *Journal of Applied Behavioral Science* 40(1):66–90.

English, L., and P. Skærbæk. 2007. Performance auditing and the modernisation of the public sector. *Financial Accountability & Management* 23(3):239–241.

Evans, J.H., and J.M. Patton. 1987. Signaling and monitoring in public-sector accounting. *Journal of Accounting Research* 25:130–158.

Fiebig, H., and A. Zeis. 2018. *Kommunale Rechnungsprüfung: Grundlagen – Aufgaben – Organisation*. Berlin: Erich Schmidt.

Flesher, D.L., and M.T. Zarzeski. 2002. The roots of operational (value-for-money) auditing in English-speaking nations. *Accounting and Business Research* 32(2):93–104.

Free, C., V.S. Radcliffe, and B. White. 2013. Crisis, committees and consultants: The rise of value-for-money auditing in the federal public sector in Canada. *Journal of Business Ethics* 113(3):441–459.

Frese, M. 1991. Error management or error prevention: two strategies to deal with errors in software design. In *Human aspects in computing: proceedings of the fourth international conference on human-computer interaction*, ed. H.J. Bullinger, 776–782. Amsterdam: Elsevier.

Frese, M. 1995. Error management in training: Conceptual and empirical results. In *Organizational learning and technological change*, ed. C. Zucchermaglio, S. Bagnara, and S.U. Stucky, 112–124. Berlin: Springer.

Frese, M., and N. Keith. 2015. Action errors, error management, and learning in organizations. *Annual Review of Psychology* 66(1):661–687.

Gendron, Y., D.J. Cooper, and B. Townley. 2007. The construction of auditing expertise in measuring government performance. *Accounting, Organizations and Society* 32(1–2):101–129.

Gold, A., U. Gronewold, and S.E. Salterio. 2014. Error management in audit firms. Error climate, type, and originator. *The Accounting Review* 89(1):303–330.

Gronewold, U., and M. Donle. 2011. Organizational error climate and auditors' predispositions toward handling errors. *Behavioral Research in Accounting* 23(2):69–92.

Gronewold, U., A. Gold, and S.E. Salterio. 2013. Reporting self-made errors. The impact of organizational error-management climate and error type. *Journal of Business Ethics* 117(1):189–208.

Gudergan, S.P., C.M. Ringle, S. Wende, and A. Will. 2008. Confirmatory tetrad analysis in PLS path modeling. *Journal of Business Research* 61(12):1238–1249.

Guthrie, J.E., and L.D. Parker. 1999. A quarter of a century of performance auditing in the Australian federal public sector: A malleable masque. *Abacus* 35(3):302–332.

Hair, J.F., and M, Sarstedt. 2019. Factors versus composites: Guidelines for choosing the right Structural Equation Modeling method. *Project Management Journal* 50(6):619–624.

Hair, J., C. Ringle, and M. Sarstedt. 2011. PLS-SEM. Indeed a silver bullet. *Journal of Marketing Theory and Practice* 19(2):139–152.

Hair, J., G.T.M. Hult, C. Ringle, and M. Sarstedt. 2017. *A primer on partial least squares structural equation modeling (PLS-SEM)*. Thousand Oaks: SAGE.

Hair, J., M.C. Howard, and C. Nitzl. 2020. Assessing measurement model quality in PLS-SEM using confirmatory composite analysis. *Journal of Business Research* 109:101–110.

Harzing, A.W. 1997. Response rates in international mail surveys: results of a 22-country study. *International Business Review* 6(6):641–665.

Hay, D., and C. Cordery. 2018. The value of public sector audit. Literature and history. *Journal of Accounting Literature* 40:1–15.

Heald, D. 2018. Transparency-generated trust. The problematic theorization of public audit. *Financial Accountability & Management* 34(4):317–335.

Henseler, J., C. Ringle, and M. Sarstedt. 2015. A new criterion for assessing discriminant validity in variance-based structural equation modelling. *Journal of the Academy of Marketing Science* 43(1):115–135.

Ho, A.T.K. 2006. Accounting for the value of performance measurement from the perspective of midwestern mayors. *Journal of Public Administration Research and Theory* 16(2):217–237.

Homsma, G.J., C. Van Dyck, D. De Gilder, P.L. Koopman, and T. Elfring. 2009. Learning from error: The influence of error incident characteristics. *Journal of Business Research* 62(1):115–122.

Hood, C., O. James, G. Jones, C. Scott, and T. Travers. 1998. Regulation inside government. Where new public management meets the audit explosion. *Public Money & Management* 18(2):61–68.

Institut der Rechnungsprüfer (IDR). Mitglied werden. https://www.idrd.de/mitglied-werden/. Accessed 22 Mar 2023.

Jacobs, K. 1998. Value for money auditing in New Zealand: Competing for control in the public sector. *The British Accounting Review* 30(4):343–360.

Johnsen, Å., P. Meklin, L. Oulasvirta, and J. Vakkuri. 2001. Performance auditing in local government: an exploratory study of perceived efficiency of municipal value for money auditing in Finland and Norway. *European Accounting Review* 10(3):583–599.

Kober, R., J. Lee, and J. Ng. 2010. Mind your accruals: perceived usefulness of financial information in the Australian public sector under different accounting systems. *Financial Accountability & Management* 26(3):267–298.
Kock, N. 2015. Common method bias in PLS-SEM: a full collinearity assessment approach. *International Journal of e-Collaboration* 11(4):1–10.
Kroll, A. 2015. Exploring the link between performance information use and organizational performance: a contingency approach. *Public Performance & Management Review* 39(1):7–32.
Lapsley, I., and C.K.M. Pong. 2000. Modernization versus problematization: value-for-money audit in public services. *European Accounting Review* 9(4):541–567.
Leeuw, F.L. 1996. Performance auditing, new public management and performance improvement: questions and answers. *Accounting, Auditing & Accountability Journal* 9(2):92–102.
Lindermüller, D., M. Sohn, and B. Hirsch. 2022. Negative media reporting and its effects on performance information use in public spending. *Public Management Review* 24(7):1024–1047.
Meier, K.J., and L.J. O'Toole. 2013. Subjective organizational performance and measurement error: common source bias and spurious relationships. *Journal of Public Administration Research and Theory* 23(2):429–456.
Moers, F. 2007. Doing archival research in management accounting. In *Handbook of management accounting research*, ed. C.S. Chapman, A.G. Hopwood, and M.D. Shields, 399–413. Amsterdam: Elsevier.
Monfardini, P., and P. Maravic. 2012. Municipal auditing in Germany and Italy: explosion, change, or recalcitrance? *Financial Accountability and Management* 28(1):52–76.
Nitzl, C. 2016. The use of partial least squares structural equation modelling (PLS-SEM) in management accounting research. Directions for future theory development. *Journal of Accounting Literature* 37:19–35.
Nitzl, C., and W.W. Chin. 2017. The case of partial least squares (PLS) path modeling in managerial accounting research. *Journal of Management Control* 28(2–3):137–156.
Nitzl, C., J.L. Roldan, and G. Cepeda. 2016. Mediation analysis in partial least squares path modeling. *Industrial Management & Data Systems* 116(9):1849–1864.
OECD. 1996. *Performance auditing and the modernisation of government*. Paris: OECD Publishing.
Parker, L.D., K. Jacobs, and J. Schmitz. 2019. New public management and the rise of public sector performance audit. *Accounting, Auditing & Accountability Journal* 32(1):280–306.
Perry, J.L. 1996. Measuring public service motivation. An assessment of construct reliability and validity. *Journal of Public Administration Research and Theory* 6(1):5–22.
Perry, J.L., and L.R. Wise. 1990. The motivational bases of public service. *Public Administration Review* 50(3):367–373.
Podsakoff, P.M., S.B. MacKenzie, J.-Y. Lee, and N.P. Podsakoff. 2003. Common method biases in behavioral research: A critical review of the literature and recommended remmedies. *Journal of Applied Psychology* 88(5):879–903.
Pollitt, C. 2003. Performance audit in western Europe: Trends and choices. *Critical Perspectives on Accounting* 14(1–2):157–170.
Pollitt, C., X. Girre, J. Lonsdale, R. Mul, H. Summa, and M. Waerness. 1999. *Performance or compliance? Performance audit and public management in five countries*. Oxford: Oxford University Press.
Putz, D., J. Schilling, A. Kluge, and C. Stangenberg. 2013. Measuring organizational learning from errors: Development and validation of an integrated model and questionnaire. *Management Learning* 44(5):511–536.
Reason, J. 1995. A systems approach to organizational error. *Ergonomics* 38(8):708–1721.
Reichborn-Kjennerud, K. 2013. Political accountability and performance audit: the case of the auditor general in Norway. *Public Administration* 91(3):680–695.
Richter, M. 2018. *Leitbild einer modernen kommunalen Rechnungsprüfung – Gutachten zur Bewertung der Beamtenstellen in der kommunalen Rechnungsprüfung*. Köln: Institut der Rechnungsprüfer (IDR). https://www.idrd.de/fileadmin/user_upload/idr/IDR_H_210_Gutachten_Leitbild_MRichter.pdf.
Ringle, C., D. Da Silva, and D. Bido. 2014. Structural equation modeling with the SmartPLS. *Brazilian Journal of Marketing* 13(2):56–73.
Ringle, C., S. Wende, and J.-M. Becker. 2020. SmartPLS 3 (Version 3.3.2). http://www.smartpls.de.
Rosengart, T., B. Hirsch, and C. Nitzl. 2019. The effects of legal versus business education on decision making in public administrations with a Weberian tradition. *Business Research* 2:455–478.
Rybowiak, V., H. Garst, M. Frese, and B. Batinic. 1999. Error orientation questionnaire (EOQ). Reliability, validity, and different language equivalence. *Journal of Organizational Behavior* 20(4):527–547.
Sarstedt, M., J. Hair, C. Ringle, K.O. Thiele, and S.P. Gudergan. 2016. Estimation issues with PLS and CBSEM. Where the bias lies! *Journal of Business Research* 69(10):3998–4010.

Sitkin, S.B. 1997. Learning through failure: the strategy of small losses. In *Organizational learning*, ed. M.D. Cohen, L.S. Sproull, 541–577. Thousand Oaks: SAGE.

Song, M., and K.J. Meier. 2018. Citizen satisfaction and the kaleidoscope of government performance: How multiple stakeholders see government performance. *Journal of Public Administration Research and Theory* 28(4):489–505.

Speklé, R.F., and F.H.M. Verbeeten. 2014. The use of performance measurement systems in the public sector. Effects on performance. *Management Accounting Research* 25(2):131–146.

Speklé, R.F., and S.K. Widener. 2018. Special forum on survey research. *Journal of Management Accounting Research* 30(2):1–2.

Summa, H. 2002. Definitions and frameworks. In *Performance of compliance? Performance audit and public management in five countries*, ed. C. Pollitt, X. Girre, J. Lonsdale, R. Mul, H. Summa, and M. Waerness, 11–29. Oxford: Oxford University Press.

Van Dyck, C. 1997. Error climate and management issues: Its links to organisational performance. In *Managerial behavior and practices: European research issues*, ed. R. Pepermans, A. Buelens, C.J. Vinkenburg, and P.G.W. Jensen, 107–116. Leuven Amersfoort: ACCO.

Van Helden, J. 2016. Literature review and challenging research agenda on politicians' use of accounting information. *Public Money & Management* 36(7):531–538.

Van de Ven, A.H., and D.L. Ferry. 1980. *Measuring and assessing organizations*. New York: Wiley.

Van Dyck, C., M. Frese, M. Baer, and S. Sonnentag. 2005. Organizational error management culture and its impact on performance: A two-study replication. *The Journal of Applied Psychology* 90(6):1228–1240.

Weihrich, D. 2018. Performance auditing in Germany concerning environmental issues. *Sustainability Accounting, Management and Policy Journal* 9(1):29–42.

Wetzels, M., G. Odekerken-Schröder, and C. van Oppen. 2009. Using PLS path modeling for assessing hierarchical construct models: guidelines and empirical illustration. *Management Information Systems Quarterly* 33(1):177–195.

Zhao, B. 2011. Learning from errors. The role of context, emotion, and personality. *Journal of Organizational Behavior* 32(3):435–463.

Zhao, B., and F. Olivera. 2006. Error reporting in organizations. *Academy of Management Review* 31(4):1012–1030.

Zhao, X., J.G. Lynch Jr, and Q. Chen. 2010. Reconsidering Baron and Kenny: myths and truths about mediation analysis. *Journal of Consumer Research* 37(2):197–206.