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Article

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ACCOUNTING, CORPORATE GOVERNANCE & BUSINESS ETHICS | RESEARCH ARTICLE

The impact of the performance measurement system on the organizational performance of the public sector in a transition economy: Is public accountability a missing link?

Yen Thi Tran¹ and Nguyen Phong Nguyen^{1*}

Abstract: The performance measurement system (PMS) in the public sector has attracted the attention of many researchers around the world. Drawing on institutional theories, especially neo-institutional sociology, this study examines the mediating role of public accountability in the relationship between PMS and organizational performance in Vietnam's public sector. The research model and hypotheses were tested by SmartPLS3 software with 214 survey samples from accountants and managers working in public organizations in Vietnam. The results show that public accountability fully mediates the relationship between PMS and organizational performance. These results provide some theoretical and administrative implications for public organizations in Vietnam in applying PMS to improve public accountability and organizational performance.

Subjects: Business, Management and Accounting; Accounting; Public & Nonprofit Management

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PUBLIC INTEREST STATEMENT

This study provides insights into how to enhance the organizational performance of public sector organizations in emerging countries using the performance measurement system (PMS). However, connecting PMS to enhanced organizational performance is considered challenging without the presence of public accountability. Public accountability shows a clear assignment of responsibilities, a clear goal statement, and a focus on output performance and efficiency of the organization. It is also a mechanism to control public organizations' behaviors, ensuring they operate according to functions and have enhanced results, providing benefits for citizens and other stakeholders. Our study results indicate that public accountability can be a useful device for public sector organizations to connect PMS to better organizational performance. These results are beneficial for public sector organizations in developing countries while they are striving to implement a PMS to promote organizational performance by focusing on improving public accountability.

Keywords: performance measurement system; public accountability; organizational performance; Vietnam

1. Introduction

In recent years, public sector reforms have focused primarily on the design and implementation of performance measurement systems (PMS) (Cavalluzzo & Ittner, 2004; Modell, 2001, 2004, 2009). In particular, the emergence of a new public management (NPM) doctrine has increased interest in performance measurement techniques and management accounting innovations (Johansson & Siverbo, 2009). The majority of researchers have stated that management accounting can help focus and enhance organizational change because it supports the design of performance measurement methods (Chenhall & Langfield-Smith, 1998).

Furthermore, a series of management accounting techniques have been introduced to enhance the ability to accurately measure results that support change management, such as balanced scorecards (Kaplan & Norton, 2001), benchmarking (Kouzman, 1999), and total quality management (Dewhurst, 1999). These techniques focus on linking processes across operations with business strategies. The most straight forward approach to developing an innovative PMS is to use the integrated set of financial and non-financial performance measures (Cavalluzzo & Ittner, 2004). Accordingly, the PMS can be used for many purposes, such as planning, making decisions, comparing results, informing stakeholders, and promoting accountability (Behn, 2003). Moreover, the ultimate goal of the PMS is to provide reliable and valuable information about the results, thereby finding solutions to improve performance. The question is: How have public organizations around the world measured their results, and does the organization's current PMS bring the expected benefits to stakeholders?

The role of performance measurement has been one of the most widely studied topics in public accounting literature in the past decades (Broadbent & Guthrie, 2008). It is receiving increasing attention as public organizations try to implement new measurement systems to support their goals (Cavalluzzo & Ittner, 2004). Therefore, current literature shows that many studies have been interested in designing, implementing, and updating PMS in public organizations in both developed and developing countries (Akbar et al., 2012; Bourne et al., 2000; Ohemeng et al., 2018). However, few public organizations have developed PMS, and even fewer use these systems to improve decision making (Julnes & Holzer, 2001). Therefore, many researchers have focused on finding factors that influence PMS application in public organizations (Julnes & Holzer, 2001). Several factors were found in previous literature, such as organizational and technical factors (Cavalluzzo & Ittner, 2004; Sofyani et al., 2018), organizational culture (Henri, 2006), and competition (Lee & Yang, 2011). Recently, researchers (Lee & Yang, 2011; Spekle & Verbeeten, 2014; Verbeeten, 2008) have given more attention to the impact of PMS on organizational performance. However, not many researchers discuss the impact of PMS on organizational performance through the mediating role of public accountability. In the public sector, organizational operations are funded primarily by the state budget, so public accountability is essential for stakeholders. Therefore, the mediating role of public accountability is the research gap found in the literature review. This gap is important, especially for the public sector in developing countries where there are many notable institutional characteristics, such as low institutional capacity, limited stakeholder participation, high levels of corruption, and informality (Mimba et al., 2007). Therefore, providing evidence of the effect of PMS on organizational performance through public accountability is very important for public organizations in developing countries to improve their institutional characteristics.

The study of the PMS in the public sector attracts institutional theories, especially neo-institutional sociology (Brignall & Modell, 2000; Modell, 2009). Neo-institutional sociology is paramount because public organizations often have to provide outcome information to a range of stakeholders to maintain their legitimacy; they must comply with regulations and respond to other

institutional pressures (Modell, 2009). Moreover, managers in the public sector realize they have to measure their performance results to demonstrate their accomplishments for internal and external stakeholders (Kloot, 1999). Accordingly, the PMS provide information to stakeholders to enhance control and accountability and reduce information asymmetry (Behn, 2003).

Moreover, competitive pressure in neo-institutional sociology forces managers to enhance the PMS to allow the public sector to compete equally with the private sector (Modell, 2001). Therefore, the public sector needs to have better PMS to measure comprehensive quantitative and qualitative results. Performance measurement refers primarily to performance indicators of efficiency, effectiveness, and equity that are intended to improve rational decision-making in public organizations (Johnsen, 2005). Thus, the neo-institutional sociology theoretical framework shows the close link between PMS, public accountability, and performance in public organizations (Frumkin & Galaskiewicz, 2004). However, previous empirical studies examining this link are lacking.

This study extends these efforts to study PMS from an institutional theoretical perspective, especially neo-institutional sociology, in the process of interacting with public accountability and organizational performance to provide valuable additional insights. In general, this study aims to test the direct effect of the PMS on organizational performance and the indirect effect of the PMS on organizational performance through public accountability. The interface between PMS and public accountability is an essential study topic for the chosen context of Vietnam's public sector. Vietnam is one of Asia's developing economies; it is striving to become a socialist-oriented market economy. Currently, Vietnam is implementing many critical financial reforms, including financial autonomy mechanisms, to increase public organizations' autonomy to use public assets effectively. Accordingly, result measurements will be necessary for public organizations to know how the results have been achieved, thereby finding appropriate solutions to improve results. The PMS will also provide stakeholders with useful performance information to evaluate the effectiveness of using public resources, i.e., improving public accountability (Akbar et al., 2012).

In Vietnam, and in many other emerging economies where there is no mandatory regulation on PMS applications for public organizations, this research is even more meaningful. At present, most public organizations in Vietnam measure mainly financial results, with little focus on non-financial results. To promote advanced PMS use in public organizations, evidence of their positive effects on public accountability and organizational performance must be provided. Therefore, this study aims to clarify the understanding of these positive effects in the public sector of Vietnam's developing economy. Furthermore, this study is expected to contribute to the public management accounting literature and provide evidence of the relevance of neo-institutional sociology (DiMaggio & Powell, 1983) in the context of public finance reform in a developing country. In summary, this study will provide useful governance implications to help managers in organizations recognize the positive impact of adopting and implementing the appropriate PMS to improve public accountability and organizational performance.

The structure of the article consists of five sections. Following the introduction (Part 1), Part 2 presents background theories and the research hypotheses. Part 3 presents the research method, and Part 4 presents the research results. Part 5 provides the theoretical and management implications as well as the limitations of the study and proposes an orientation for future research.

2. Literature review

2.1. Underpinning theory

Recent NPM doctrine reforms, based on the concept of competitive markets and the application of private sector management techniques, have led to significant changes in the management of public organizations (Hood, 1995). For example, NPM encourages public organizations to adopt new PMS in the process of setting goals, evaluating performances, and providing incentives to help organizations achieve effectiveness (Spekle & Verbeeten, 2014). However, with over 30 years of

running the NPM doctrine, Hood and Dixon (2015) found the effects of NPM to be complicated, both positive and negative, depending on the institutional context of each country. Therefore, the recent literature in public governance research discusses many of the institutional aspects of NPM (Brignall & Modell, 2000; Tallaki, 2019).

Institutional theories are considered critical views in organization and management theory (Modell, 2009). Previous studies divide them into two streams: the old institutional economic theory and the new institutional social theory (Tallaki, 2019). The old institutional economic theory focuses on the processes of change within organizations (Barley & Tolbert, 1997; Burns & Scapens, 2000), and the new institutional social theory uses concepts like legalization to explain the pressure of outside organizations (DiMaggio & Powell, 1983; Meyer & Rowan, 1977). Neo-institutional sociology is clarified by DiMaggio and Powell (1983), who distinguish the two types of isomorphisms that occur in public organizations: competitive and institutional. In particular, competitive isomorphism refers to the impact of market forces regarding efficiency and says that public organizations should choose cheaper, better, or more efficient ways to work (Modell, 2001). Therefore, PMS will become more necessary for public organizations that provide competitive services. Moreover, organizations that operate for an extended period will be more competitive than newly established organizations because of available advantages. Therefore, competition and organizational age are considered the control variables that affect public organization performance in the context of PMS (Gomes et al., 2017).

Institutional isomorphism refers to the impact of external organizations, including international organizations, the government, superior agencies, and other public organizations' stakeholders. It develops according to three mechanisms: coercive, mimetic, and normative (Tallaki, 2019). Accordingly, institutional isomorphism requires public organizations to apply PMS to provide performance information to stakeholders to enhance control and assess accountability (Akbar et al., 2012). At the same time, it helps reduce information asymmetry between stakeholders and public organizations (Behn, 2003). Furthermore, neo-institutional sociology is an alternative basis for exploring the premises, impeding a wider conception of performance in public sector organizations (S. Modell, 2001). Therefore, many studies have used neo-institutional sociology to clarify public organizations' PMS application largely because they have been under pressure from stakeholders (Brignall & Modell, 2000; Modell, 2001, 2009); performance information needs to be provided for public accountability evaluation and performance management (Halachmi, 2002; Kloot, 1999). In summary, the relationship between PMS, public accountability, and performance is supported through neo-institutional sociology (Han, 2020; Modell, 2009).

2.2. Hypothesis development

2.2.1. The effect of PMS on organizational performance

The wake of NPM reforms in the public sector implies a transition to an enhanced emphasis on the performance of governance and control (S. Modell, 2001). Furthermore, under competitive pressure, with increasing financial autonomy, many public organizations are forced to make changes to effectively use existing public resources (Brignall & Modell, 2000). Accordingly, a range of private sector management accounting practices are applied widely in public institutions; applying contemporary management accounting practices can improve their performances (Nuhu Nuraddeen & Appuhami, 2016). Specifically, management accounting plays an important role in developing PMS (Chenhall & Langfield-Smith, 1998). The PMS can serve a variety of purposes within organizations (Spekle & Verbeeten, 2014), such as planning activities, evaluating performances, communicating goals, and formulating strategies. Furthermore, Julnes and Holzer (2001) found that PMS is intended as a means to make better decisions; by quantifying goals and measuring whether or not they are achieved, organizations reduce and eliminate ambiguity and confusion about goals and have cohesion and concentration in pursuing their mission (Van Veen-Dirks, 2010). As such, the PMS helps provide input for decision making, as well as for executive decisions, which, in turn, affect the performance of the

organization (Verbeeten, 2008). In summary, public organizations using the appropriate PMS will gain useful information to accurately recognize results; they will identify the causes of outstanding problems as well as solutions to improve results (Spekle & Verbeeten, 2014). Recently, Gomes et al. (2017) provided empirical evidence on the positive impact of PMS on organizational performance in Portuguese government agencies. Therefore, this study suggests the following research hypothesis:

Hypothesis 1 (H₁): Performance measurement systems have a positive impact on organizational performance.

2.2.2. The effect of PMS on public accountability

Based on the new institutional theory, namely coercive isomorphism, public organizations are forced to have public accountability with stakeholders to ensure transparency and efficiency in using public resources (Akbar et al., 2012). To meet public accountability, organizations must provide sufficient information to stakeholders, especially on performance indicators (Catasús & Grönlund, 2005). A PMS provides information that can be used by various parties for diverse purposes, intended to assess the organization's public accountability (Johnsen, 2005). Typical benefits associated with the instrumental cybernetics perspective, as found in accounting and agency theories, are enhanced control and accountability and reduced uncertainty and information asymmetry. Therefore, performance information is necessary for accountability, and financial and accounting information is often emphasized when determining accountability (Hyndman & Anderson, 1995). In addition, from an internal control perspective, the PMS is designed to monitor the implementation of organizational plans, determine when plans fail, and show how to improve them (Atkinson et al., 1997). Kloot (1999) realizes performance measurement also promotes accountability, particularly in the public sector. Moreover, Halachmi (2002) notices that more public institutions around the world are applying PMS to establish greater accountability; accountability performance measurements consider resources that have been economically used as intended. Based on the above arguments, the following hypothesis is proposed:

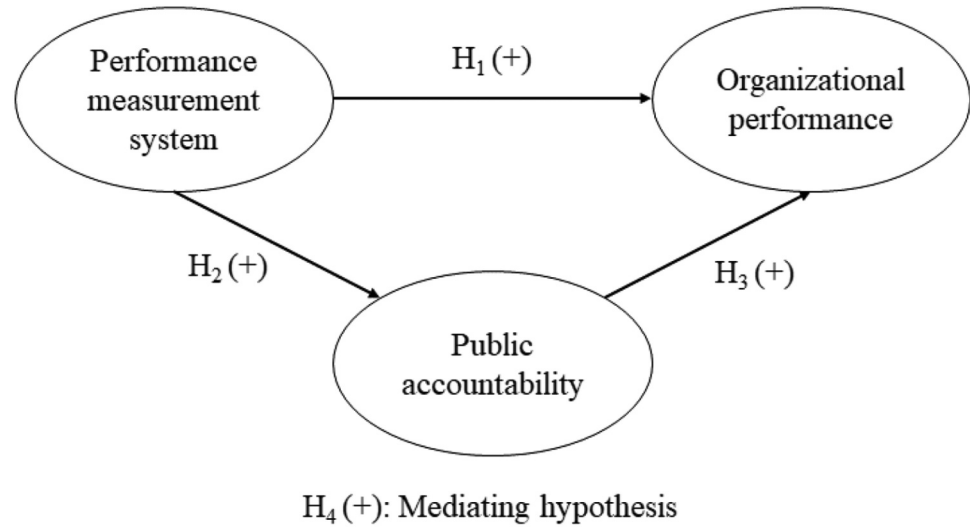
Hypothesis 2 (H₂): Performance measurement systems have a positive impact on public accountability.

2.2.3. The effect of public accountability on organizational performance

The NPM doctrine focuses primarily on increasing an organization's public accountability, represented by the manager (Behn, 2003), requiring a clear assignment of responsibilities, a clear goal statement, and a focus on output performance and efficiency. Accordingly, an important premise is that better organizational performance will come from effective public accountability (Christensen & Læg Reid, 2014). Moreover, under institutional pressure, the pressure on public sector managers to implement good public accountability is increased, driving the organizations to achieve higher results (Keerasuntonpong et al., 2019). In other words, public accountability is a means to control public organizations' behaviors, ensuring they operate according to functions and have enhanced results, providing benefits for citizens and other stakeholders. Many public organizations are trying to implement good public accountability to improve performance (Han, 2020). Most researchers suggest effective public accountability processes will raise legitimacy awareness, limit fraud and corruption, and increase the responsibility of government institutions; they will also improve citizens' understanding of why performance goals cannot be achieved and, ultimately, build trust among stakeholders (Halachmi & Holzer, 2010; Lindquist & Huse, 2017). Bouckaert and Peters (2002) propose that organizational performance in the public sector refers to satisfaction, which is tied to the beliefs of employees and other stakeholders such as citizens, politicians, and donors. Therefore, the following hypothesis is proposed:

Hypothesis 3 (H₃): Public accountability has a positive effect on organizational performance.

Figure 1. Theoretical model.



2.2.4. The mediating role of public accountability for the relationship between performance measurement systems and organizational performance

Based on the new institutional social theory under the NPM framework (Tallaki, 2019), organizations need to have accountability with stakeholders about the use of public resources. This is achieved through the quality assurance of the annual reports published by public organizations (Coy & Dixon, 2004; Tooley & Hooks, 2010). Accordingly, a PMS is considered an important tool of public organizations to provide performance information to users when evaluating public accountability to monitor the performance of public organizations (Kloot, 1999). This puts pressure on public organizations to operate with better results (Halachmi, 2002). In sum, by creating useful performance information, PMS will increase the effectiveness of public accountability (H2), and implementing good public accountability will increase the confidence of stakeholders, and therefore, improve organizational performance (H3). Accordingly,

Hypotheses 4 (H₄): Public accountability mediates the relationship between PMS and organizational performance.

The theoretical model and corresponding hypotheses are shown in Figure 1.

3. Methodology

3.1. Sampling and data collection

There are a large number of public sector organizations in Vietnam, about 143 thousand organizations (General Statistics Office, 2018); 400 samples were chosen following the convenient method (non-random). This sampling method is quite popular because researchers can select objects within reach to ensure positive results (Hair et al., 2014). There were two criteria for selecting samples to ensure they could understand and answer the entire questionnaire: a minimum working experience of 3 years and an adequate knowledge of PMS. Survey data was collected from public organization accountants and managers in Vietnam. The sampling criteria provided respondents with experience and knowledge related to our research objectives, contributing to data reliability. Before sending the questionnaire to the potential informants, it was pilot-tested for wording and comprehension with ten chief accountants at public units; then, the 400 surveys were sent either directly or via email. The survey time was from September 2019 to December 2019. As of December 2019, there were 214 valid responses; 126 responses came from direct questionnaires, and 88 were received via email, giving a high total

Table 1. Sample characteristics

Measure	Item	Percentage
Job position	Senior manager	54.7
	Chief accountant	29.4
	Accountant	8.9
	Mid- and low-level managers	7.0
Work experience	Under 3 years	0.0
	From 3 to 5 years	22.4
	From 6 to 10 years	32.7
	Over 10 years	44.9
Type of organization	Administrative agencies	43.9
	Public service units	53.3
	Other socio-political organizations	2.8
Organizational field	Administration	33.2
	Education sector	43.4
	Health sector	12.3
	Other sectors	11.1
Competition	Yes	30.8
	No	69.2
Age	Mean (SD) min/max	27.69 (16.39) 4/98
Employees in organization	Mean (SD) min/max	79.95 (160.62) 3/1,500

Note: N, Total number of respondents (N = 214).

response rate of 53.5%. In this study, SmartPLS software was used, so the sample size of 214 is appropriate (Hair et al., 2017). The sample characteristics are shown in Table 1.

As shown in Table 1, out of 214 respondents, 54.7% were senior managers, 29.4% were chief accountants, 8.9% were accountants, and 7.0% were mid-and low-level managers. The majority of respondents (77.6%) had over five years of experience, showing the respondents have experience and knowledge on research issues and could reliably represent the organization while answering the survey questionnaire. In terms of public organizations, the highest percentage of public-service units was 53.3%. Administrative agencies also accounted for a high proportion (43.9%) of the population. Other socio-political organizations were scarce (2.8%). In terms of organizational fields, the education sector accounted for the highest proportion (43.4%), followed by public administration (33.2%), the health sector (12.3%), and other sectors (11.1%). These results are consistent with the structure of the public sector in Vietnam (General Statistics Office, 2018), indicating that the sample is relatively representative of the public sector organization population. Furthermore, Table 1 shows only 30.8% (66 public organizations) believed that other organizations compete with them. Thus, competition among public organizations in Vietnam is low. In terms of size, the survey sample had an average of eighty full-time employees. Furthermore, the average organizational tenure was over twenty-seven years—a reasonably long time to establish and develop an adequate PMS.

3.2. Measures

In this study, pre-developed, reliable, and valid scales were used to measure the variables. Each variable was assessed using multiple items, and most items were measured on a fully anchored, five-point semantic scale. The research model had three primary research constructs with a total of 20 items. First, the PMS was known; public organizations use performance indicators to set and measure levels of performance (Johnsen, 2005). In this study, PMS was measured following the scale adapted from Cavalluzzo and Ittner (2004). This instrument has also been used by Gomes et al. (2017) and

Verbeeten (2008). Each item was measured by a five-point Likert-type scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

Next, public accountability represented the total current performance and the effects of future public unit operations, both of interest to citizens and stakeholders (Eivani et al., 2012). The public accountability scale was inherited from Mack and Ryan (2006) and included eight items. Respondents were asked to evaluate the effectiveness of public accountability according to information presented in financial statements provided by the entity, based on a five-point Likert scale, ranging from 1 (ineffective) to 5 (very effective).

Finally, the scale for the organizational performance in the public sector was adopted from the study of Van de Ven and Ferry (1980), which included seven observed variables. This scale showed the overall unit operation results, including quantitative performance (quantity, goal attainment, and efficiency) and qualitative performance (quality, innovation, reputation, and morale). This scale is widely used in current studies and is accepted in the academic field; many authors have used it for their research when measuring the performance of public organizations, such as Dunk and Lysons (1997), Nitzl et al. (2018), Verbeeten (2008), Verbeeten and Speklé (2015), and Williams et al. (1990). When measuring performance, respondents self-assessed the performance of the units in which they were working alongside the performance of other units in the same field, based on a five-point scale from 1 (much lower than average) to 5 (much higher than average).

In addition, control variables were used for organizational performance, including competition and organization age. The competition of public organizations was adopted by Gomes et al. (2017); competition is a dichotomous variable that reports whether other organizations deliver similar products or services and whether they compete. This scale has two values: 1—if there are competitors to an organization and 0—if not. Organization age was measured following Glisson and Martin (1980) and counted the number of years the organization has operated.

4. Research results

4.1. The indices of the measurement model

To assess the overall measurement model, SmartPLS 3 was used to test the reliability and validity of the latent variables in the conceptual model. The results of the indices of the measurement model are shown in Tables 2 and 3. First, the internal consistency reliability of the scale was checked. As shown in Table 2, the Cronbach's alpha coefficients were between 0.84 and 0.90; the CRs of the latent variables ranged from 0.88 to 0.92. Therefore, the scales used in the model were highly reliable.

Next, the convergent validity was assessed through the outer loadings of the indicators and the average variance extracted (AVE). As shown in Table 2, the load values of most observed variables (from 0.63 to 0.88) were higher than the cut-off value of 0.50 (Hulland, 1999). All corresponding t-values of the observed variables (ranging from 8.65 to 59.28) were also satisfactory because they were larger than 2.54 and statistically significant at the 1% level. Further, the AVE values of all latent variables were higher than 0.50 (ranging between 0.59 and 0.61). Therefore, all observed variables and scales exhibited convergent validity (Hair et al., 2017).

Finally, several criteria were used to evaluate the distinctive value of the primary measurement variables in the research model. Hair et al. (2017) affirm that the discriminant validity of the scale should be evaluated using three criteria: the Fornell–Larcker criterion, the cross-loadings, and the Heterotrait-Monotrait (HTMT) test. The results of the data analysis are given in Table 3.

The first criterion for evaluating the discriminant validity of the measurements was set by Fornell and Larcker (1981). Table 3 shows that the square roots of the AVE for the primary constructs ranged between 0.77 and 0.78—well above the corresponding bootstrapped correlations between

Table 2. Scale items and latent variable evaluation

Latent variables	Mean	Std. Deviation	Outer loading	T-test
<i>Performance measurement system</i> (CB = 0.84; CR = 0.88; AVE = 0.60)				
1. My organization has performance measures that indicate the number of products or services provided	3.73	0.72	0.83	24.83
2. My organization has performance measures that indicate the operating efficiency	3.51	0.77	0.74	12.51
3. My organization has performance measures that indicate customer satisfaction	3.45	0.87	0.70	11.71
4. My organization has performance measures that indicate the product or service quality	3.97	0.68	0.77	23.05
5. My organization has performance measures that indicate the outcome effects	3.86	0.69	0.83	31.52
<i>Public accountability</i> (CB = 0.90; CR = 0.92; AVE = 0.59)				
1. To determine if the organization has operated in the best interest of the community	3.78	0.70	0.78	21.62
2. To determine if the organization has conducted its operations effectively	3.80	0.62	0.87	27.02
3. To determine if the organization has conducted its operations efficiently	3.84	0.67	0.76	19.66
4. To decide if resources used as intended	3.76	0.74	0.79	24.03
5. To determine effect of current operations on future generations	3.55	0.77	0.75	18.37
6. To determine if public money used appropriately	3.80	0.74	0.80	22.04
7. To determine the effect of current operations on future funding	3.63	0.74	0.75	16.42
8. To make representations for funding	3.86	0.68	0.63	8.65
<i>Organizational performance</i> (CB = 0.89; CR = 0.92; AVE = 0.61)				
1. The quantity or amount of work produced	4.00	0.72	0.70	16.66
2. The quality or accuracy of work produced	3.99	0.74	0.80	32.86
3. The number of innovations or new ideas by the unit	3.35	0.82	0.69	16.75
4. Reputation of “work excellence”	3.71	0.76	0.72	17.28
5. Attainment of unit production or service goals	3.98	0.73	0.86	44.21
6. Efficiency of unit operations	3.99	0.74	0.88	59.28
7. Morale of unit personnel	4.10	0.76	0.79	24.55

Notes: CB: Cronbach's Alpha; CR: Composite reliability; AVE: Average variance extracted.

these constructs (from 0.37 to 0.67). This result indicates the discriminant validity of the measurements. Moreover, all outer loadings on the associated construct indicators were higher than any cross-loadings on other constructs, demonstrating the discriminant validity of the scales.

This study notably employed the HTMT test, which is more stringent than that of Fornell and Larcker (1981), to evaluate discriminant validity (Henseler et al., 2015). Table 3 indicates that the HTMT values ranged between 0.40 and 0.74, values significantly below 0.85, providing evidence of discriminant validity. In sum, the results of the measurement model evaluation showed that the three structures were measured by appropriate scales and were suitable for testing hypotheses within the structural model.

Table 3. Construct means, standard deviations, and correlations

Variables	Performance measurement system	Public accountability	Performance
Performance measurement system	0.78		
Public accountability	0.67**	0.77	
	0.74		
Performance	0.37**	0.48**	0.78
	0.40	0.52	
Mean	3.70	3.75	3.87
Standard deviation	0.75	0.71	0.75

Notes: First value = Correlation between variables (off diagonal); Second value (italic) = HTMT ratio; Square root of AVE (bold diagonal); **: Correlation is significant at the 1% level (two-tailed t-test).

4.2. Common method bias

Podsakoff et al. (2003) argue that when questionnaires rely on a single respondent for their completion, common method bias may arise, which can lead to flawed results. This study sought to mix the order of the questions and used different scale types, which can reduce the likelihood of common method bias (Lindell & Whitney, 2001). Harman’s one-factor test has been used by researchers in the empirical stage to address the issue of common method variance (Podsakoff et al., 2003). Therefore, the statistical method was applied using SPSS 22.0 software to conduct Harman’s single-factor test for common method bias. The analytical results showed that Harman’s single-factor accounted for only 43.35% of the total variance extracted from the entire model, smaller than the threshold of 50.0%. Therefore, common method bias is not a severe problem in this study (Podsakoff et al., 2003).

4.3. Hypotheses testing results

First, this study examined the corresponding variance inflation factor (VIF) values of the independent variables to check for potential multicollinearity issues (O’Brien, 2007). Specifically, inner VIF values for each relationship between variables in the proposed model were calculated to detect potential multicollinearity. The results indicated that the inner VIF values ranged from 1.00 to 1.84 and were much lower than the threshold of 5.0 (Hair et al., 2017), confirming that the study does not have a problem with multicollinearity.

The strength and significance of each path in the structure model were assessed to test the proposed hypotheses. Table 4 reports the indicators used to evaluate the predicted suitability of individual paths, including the coefficient β and the t-value. The R^2 was also computed, adjusted for each endogenous structure. Indicators were calculated based on 3,000 bootstrapping samplings. The results in Table 4 show that the adjusted R^2 coefficient of the two dependent variables was higher than the minimum threshold of 0.10 (public accountability was 0.44, and performance was 0.23). Therefore, the proposed research model is suitable for the collected data (Hair et al., 2017).

H_1 conjectured that PMS positively affects the performance of public organizations in Vietnam; if public organizations apply PMS successfully, they can assess their performance results accurately, so they will find useful solutions to improve their performance. This hypothesis is not confirmed because the coefficient β for the path from PMS to performance is 0.081 and is, therefore, not accepted ($t = 1.029$). This result is not the same as the studies of Gomes et al. (2017) and Spekle and Verbeeten (2014). However, this result is in line with the study by Halachmi (2002), which stated that PMS could contribute to better accountability and productivity. However, that does not mean that it can serve both at the same time. This result had

shown that when public accountability appeared, the direct effect of PMS on organizational performance turns to insignificant ($\beta = 0.081$; $t = 1.029$).

H₂ proposed that PMS has a positive influence on the public accountability of public organizations in Vietnam; if a public organization enhances the application of appropriate PMS, it would help provide useful information for stakeholders to evaluate public accountability accurately. The results in Table 4 reveal that this hypothesis was supported with a high statistical significance at the 0.01 level ($\beta = 0.667$; $t = 15.739$). Our results support Kloot's (1999) findings. Moreover, under institutional pressures, public organizations in Vietnam have adopted PMS to provide information to stakeholders to strengthen control and public accountability. Thus, this result supports the neo-institutional sociology theory (Modell, 2009).

H₃ proposed that public accountability has a positive effect on the performance of public organizations in Vietnam. This hypothesis was supported with a high statistical significance at the 0.01 level ($\beta = 0.403$; $t = 4.941$). This result implies that public organizations that increase their accountability and are responsible for their financial and non-financial results will improve their performance. Thus, this result negates Dubnick's view that accountability could diminish organizational performance (Dubnick, 2005). However, this result is found to be consistent with prior studies in the context of emerging economies (e.g., Christensen & Læg Reid, 2014; Han, 2020).

Finally, H₄ proposed the indirect impact of PMS on organizational performance with public accountability as the mediating variable. The PLS-SEM method was used and followed the recommendation of Hair et al. (2017) to use the bootstrap technique to distribute samples and examine indirect effects. According to Hair et al. (2017), the two directly relevant impacts must be significant to confirm the mediating effect; if public accountability is a mediating variable between PMS and performance, the direct impact of PMS and public accountability and the direct impact of public accountability and organizational performance must be significant. Therefore, the significance levels of H₂ and H₃ were examined. The testing results in Table 4 show that the indirect effect of PMS on performance was verified with a high level of reliability ($\beta = 0.269$, $t = 4.460$). The direct effect of PMS on organizational performance was not accepted in this study. Thus, public accountability is a full mediator for the relationship between PMS and organizational performance. These results support the superiority of NPM and management ideas where diffused all over the

Table 4. Hypothesis testing results

Hypothesis	Dependent variable	Public accountability		Performance	
		β	t-value	β	t-value
Direct effects					
H1	PMS			0.081	1.029
H2	PMS	0.667	15.739***		
H3	Public accountability			0.403	4.941***
Control variable	Competition			-0.071	1.116
	Organizational age			0.116	1.989*
Indirect effects					
H4	PMS—> Public accountability—> Performance: $\beta = 0.269$, t-value = 4.460***				
Adjusted R ²		0.44		0.23	

Notes: ***, *: Correlation is significant at the 1% and 10% level respectively (two-tailed t-test). N = 214. Results based on bootstrapping with 3,000 generated samples. PMS = Performance measurement system; Competition (dummy; 1 = Other organizations deliver similar products or services, and the organization is in competition with them; 0 = The organization is not in competition with other organizations).

world (Tallaki, 2019). Therefore, the potentialities of PMS and public accountability for performance improvements and how to implement PMS should be a concern of public managers in Vietnam and other transition economies.

4.4. Additional-testing results

In addition to evaluating the R^2 values of all endogenous constructs, the change in the R^2 value when a specified exogenous construct is omitted from the model can be used to evaluate whether the omitted construct has a substantive impact on the endogenous constructs. This measure is referred to as the f^2 effect size and is increasingly encouraged by journal editors and reviewers (Hair et al., 2017). The f^2 effect size enables the relevance of constructs to be analyzed in explaining selected endogenous constructs. Results of 0.02, 0.15, and 0.35 are interpreted as small, medium, and large f^2 effect sizes, respectively (Hair et al., 2017). The analysis results of the f^2 effect sizes of two endogenous constructs (public accountability and organizational performance) are presented in Table 5. The results show that public accountability is most affected by PMS ($f^2 = 0.803$), and organizational performance is most affected by public accountability ($f^2 = 0.119$). Therefore, these results show the vital role of PMS in public accountability.

The suitability of the model was also assessed. To simultaneously evaluate the fitness of both the inner structural and outer measurement models for the data, the standardized root mean squared residual (SRMR) value of the composite model was calculated, following Henseler et al. (2016). Hu and Bentler (1998) recommend that the SRMR be below 0.08; in this test, the SRMR was 0.07, indicating a good model fit.

5. Discussion

5.1. Implications for scholars

Research on the PMS in public sector organizations in developed and developing countries is one of the most popular research topics in the public management literature (Ohemeng et al., 2018). In this study, we apply NPM and neo-institutional sociology theories to explain the impact of PMS on public accountability and organizational performance in Vietnam's public sector. The PMS helps public organizations control results and make appropriate adjustments to improve organizational performance (Spekle & Verbeeten, 2014). Accordingly, this study provided empirical evidence to help clarify the impact mechanism of PMS on organizational performance in the context of Vietnam's public sector—an emerging and developing economy. The positive and direct impact of the PMS on the results does not exist in the presence of public accountability; the PMS indirectly affects organizational performance through public accountability. As such, this study provided empirical evidence for the positive effect of the PMS on public accountability, supporting the view of Kloot (1999). Furthermore, this study provided more empirical evidence for the judgment of Christensen and Læg Reid (2014) that the efficient implementation of public accountability is an essential prerequisite to improve organization performance (Han, 2020). Therefore, the study has contributed by confirming that public accountability is significant for improving the performance of public organizations. This study added insight into how the PMS contributes to better public accountability and organizational performance and provided empirical evidence for the view of Halachmi (2002) for the positive effect of PMS on both public accountability and performance in public organizations.

Table 5. The f^2 effect size value of all endogenous constructs

Constructs	Public accountability	Organizational performance
Performance measurement system	0.803***	0.005
Public accountability		0.119**
Competition		0.007
Age		0.017

Notes: ***: large f^2 effect size; **: medium f^2 effect size.

Finally, the findings from this study supported the NPM theory (Hood, 1995) and neo-institutional sociology theory (DiMaggio & Powell, 1983) in the context of a developing country, and they will further motivate many public financial reforms following internationalization in countries such as Vietnam (Tran, 2014). This study showed that public organizations, under competitive and institutional pressures (Modell, 2009; Tallaki, 2019), are trying to apply progressive management accounting practices when measuring organizational performance to provide useful performance information to users. Performance information will be a practical tool by which users can monitor the activities of public organizations and evaluate public accountability (Kloot, 1999). This process creates specific pressures that force public organizations to try to improve their performance. Therefore, this study helped clarify the applicability of neo-institutional sociology regarding the indirect effect of the PMS on organizational performance through the full mediating role of public accountability in the context of a developing economy.

Furthermore, Vietnam has no specific regulations on the application of PMS. Nevertheless, under the institutional pressures from stakeholders, recently, many public organizations have paid attention to the application of PMS to strengthen public accountability and improved organizational performance. Thus, the impact of NPM theory (Hood, 1995) and neo-institutional sociology theory (DiMaggio & Powell, 1983) has spread to nations around the world, including developing countries like Vietnam.

5.2. Implications for managers

The study presented some administrative implications for managers of public organizations not only in Vietnam but also in other developing countries. With the provision of empirical evidence for the positive effect of PMS on public accountability and organizational performance, public organizations need to be concerned with the application and implementation of modern PMS. This is even more significant for the public sector in Vietnam and other developing countries where the PMS has not been specified and required. Managers need to be aware of the importance of using good PMS, including quantitative and qualitative performance measurements (Atkinson et al., 1997). Then, managers need to commit to using performance information to motivate them to apply and maintain the PMS (Nitzl et al., 2018). Next, training on performance measurement techniques for employees is essential for accurate performance information (Cavalluzzo & Ittner, 2004). Technical issues need special attention, so the process of measuring results can be faster and easier. Accordingly, public organization managers need to enhance the application of information technology in operational management as well as performance measurement. Moreover, with the financial autonomy mechanism recently taking place in Vietnam, public organizations should pay more attention to performance measurements in both quantitative and qualitative terms. For example, public organizations need to measure product quality or customer satisfaction to understand customer needs, finding solutions to meet customer needs, enhance revenue, and develop.

In addition, this study provided evidence of the full mediating role of public accountability in the relationship between PMS and performance in public organizations. Therefore, public organizations wanting to improve performance need to have proper public accountability (Han, 2020) in addition to applying the appropriate PMS. To do this, managers in public organizations need a strong commitment to transparency, efficiency, and good governance (Johari et al., 2018). Notably, the need for implementing public accountability for good governance and improving performance is even more urgent for developing countries than it is for developed countries (Kim, 2009). Next, public organizations need to be responsible to their stakeholders and account for current performance and the effects of future public unit operations (Coy & Dixon, 2004). In short, public organizations in Vietnam, and emerging markets in general, need to pay more attention to designing relevant public accountability mechanisms, conditions, and contexts to improve organizational performance.

5.3. Limitation and suggestions

There are certain limitations to this study. First, it was based on cross data using survey questionnaires completed at a particular time. A research design encompassing a long period with data

for variables collected at different points in time could better explain the causal relationships proposed by the model. Moreover, since these results are based on cognitive measurements, but each questionnaire was used to collect data from a single participant, an apparent correlation among variables may arise, generated by their common source (Lindell & Whitney, 2001). This study tried to overcome common method bias by designing the contents of the questionnaire so respondents could not guess the relationships between variables. However, Harman's single-factor test was insufficient for eliminating the issue of common method bias. The dependent and independent variables should be measured using different sources to provide more convincing research results (Podsakoff et al., 2003). For example, organizational performance could be measured by managers, while PMS and public accountability could be rated by accountants.

Moreover, this study only focuses on clarifying the impact of PMS on public accountability and organizational performance; further studies may explore the factors that influence the PMS of public organizations. Some important organizational factors follow the uncertainty theory (Akbar et al., 2012), which future researchers could study as human resource capacity (Cavalluzzo & Ittner, 2004), management commitment (Johari et al., 2018), top management support (Ragu-Nathan et al., 2004), organizational culture (Henri, 2006), or competition (Lee & Yang, 2011). Therefore, future studies could incorporate the cause and effect variables of PMS into the same research model.

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