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Applying Public Sector Scorecard and Technology Acceptance Model on Higher Education Performance Management in Developing Countries - A SEM Analysis

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ABSTRACT. Despite the widespread application of the Public Sector Scorecard (PSS) in several countries, the intention to embrace this management framework varies significantly across these regions. This study aims to investigate the factors affecting PSS adoption in a developing country to provide a comprehensive understanding of the uptake. A quantitative methodology utilizing a cross-sectional survey, based on a questionnaire derived from previous research and administered to employees at public universities (PUs), was analyzed using Structural Equation Modeling. The findings of this study may assist PUs' administrators in implementing a suitable framework to assess and monitor organizational performance, allocate resources, formulate strategies, and enhance service delivery for users and stakeholders. Furthermore, it could provide references for policymakers in pursuing effective strategies for PU control.

1. Introduction

Performance measurement has been cardinal to the operation and advancement of all kinds of organizations [1] and has been considered as a subject which has attracted an increasing engrossment among both practitioners and scholars since the mid-1980s ([2]-[6]). Performance measurement has turned out to be a ubiquitous component of the public sector organization (PSO) worldwide which has been made used of within sectors as diverse as policing, public education and healthcare ([7]-[8]). Higher education plays a paramount part in serving the requirement of society and becomes the indispensable factor for society to survive and thrives [9] and thus makes a huge contribution to the national economic and social development [10]. Nevertheless, public universities (PUs) have been considered as complex institutions with a range

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of inputs and outputs as well as a variety of stakeholders [11]. Apart from performing the primary responsibilities like teaching and doing research, PUs also undertakes many other tasks which results in numerous difficulties in evaluating their activities during operations [12]. Based on the demands of managing the organizational operation in the way of savings in the confines of restrained resources; thus, higher educational administrators have been supposed to minimize input resources or maximize educational outputs to assure the perfect performance for sustainable development of institutions [13]. Accordingly, PUs must make an effort in conducting strategic planning and organizational management in an effective manner. This thus raises an urgent claim on an efficient and effective measurement and management framework application during their operation [14].

Surprisingly, the application of performance measurement and performance management within the PSO has been still a controversial matter due to its intricate characteristic [15]. Admittedly, the difficulties in conducting as well as the appearance of unintended consequences during measuring the organizational performance measurement has been growing dramatically ([16]-[18]). In particular, an exhaustive review on performance measurement has covered with the conflicting point of view on its applicability ([19]-[21]). Accordingly, the lack of expected improvements in performance, accountability, transparency and quality of services in PSOs have been generated through conducting performance measurements ([22]-[24]). On the other hand, scholars have emphasized the unresolved problem with formulating performance measures ([23]; [25]; [26]; [16]) which is due to the shortage of satisfactory overall performance measurement paralleling to the financial performance measurement of private organizations in combination with the intangible nature of public services [27].

This is because organizational performance measures have been notoriously hard to formulate in the context of PSO [28]. Similarly, evaluating the performance of PUs seems to be a difficult task. Particularly, numerous PUs face significant challenges due to the absence of an efficient and effective management structure that fulfills the demands and expectations of their stakeholders [29]. Notably, it has been well -regarded that PSO should measure and communicate its performance to main stakeholders. Although performance measurement in PSO has to cope with numerous processes, outputs and outcomes, it would be difficult in addressing several dimensions and to satisfy multiple constituents [30]. While the Balanced Scorecard (BSC) has been utilized to set strategic objectives and align departmental activities in higher education institutions, its four perspectives fail to prioritize stakeholder interests, despite public universities having a diverse array of stakeholders [11]. Although a set of relevant internal and external stakeholders are determined and added into the BSC framework [31], BSC fails to reflect causal relationships and neglects the involvement of stakeholders. On the other hand, the limitations in integrating with the accounting information system along with the difficulties in applying BSC in organizations make BSC soon be replaced in the future [22].

Therefore, new perceptions in performance measurement which exceeds best practice have been demanded for organization [32]. In this regard, public sector scorecard (PSS) is measurement and management framework which is proposed to apply in the PUs. Owing to establishing improvement, innovation and learning culture, PSS is substantiated as an effective framework to reinforce organizations to perk up the outcomes for service users and stakeholders in an economic manner, and design measures of performance that assist them sharpen and guarantee quality without prevailing upon staff to reach arbitrary goals [33]. Nonetheless, the establishment and the effective application of performance measures have still challenged PSOs, especially the public higher education organization and thus become an issue requesting more systematic investigation [34]. Of these, critical seems to be the insight into determinants which resulted in the significant influence on the adoption and effective application of the performance measurement and management of this type of sector ([34]-[36]). Unfortunately, the comprehensive understanding of the adoption of a performance measurement and performance management system in PSOs, particularly in public higher education institutions, along with the factors affecting its successful implementation and utilization, has not garnered extensive scholarly attention [5]. To achieve optimal success in presenting solutions for PSS implementation in PUs, it is essential to identify the crucial success factors for PSS adoption in PUs. Consequently, the current research aims to address the following research questions.

- *RQ1. What are the critical success factors that influence the intention of PUs to implement PSS?*
- *RQ2. To what extent do these factors impact the PSS adoption intention among PUs?*

The remainder of this research is organized as follows, following the succinct introduction. Section 2 provides a comprehensive explanation of the theoretical input of the present study, which elucidated the research framework and the benefits of the PSS. Section 3 emphasizes the establishment of the research paradigm and the development of the hypothesis. Section 4 provides a more comprehensive comprehension of the research materials and methods used in this study. Section 5 is the primary episode in which the result analysis is illustrated. The final section emphasizes the primary conclusions that have been derived regarding the critical success factors of PSS adoption intention and the orientations for future work.

2. Theorical input

2.1. Research framework

a. Technology Acceptance Model (TAM)

Technology Acceptance Model (TAM), proposed by Davis (1989) [37] and Davis et al. (1989) [38] is adapted from the Theory of Reasoned Action, has been widely applied by many scholars and practitioners to determine users' intentions towards the adoption of new technology. The two particular beliefs are proposed in this model; perceived ease of use and perceived usefulness have directly positive effects on measured usage [39]). The staff are not ready for new

technology application almost all the time although they realize that it will improve their performance [38]. The users tend to apply a system grounded on the tradeoff between information quality and the expenditure to reach this information [40]. Both the academicians and the practitioners are suggested considering the two factors, namely perceived ease of use and perceived usefulness ([37]; [38]). Accordingly, perceived ease of use is defined as the extent to which a person considers that adopting a specific system will be free of physical and mental attempt whereas perceived usefulness is referred to the extent to which a person realizes that applying a specific system would gain his or her job productivity ([37]; [38]). The TAM model has been well-regarded as the first to illustrate that these psychological factors perceived are heart to motivate the staff to employ an advanced system.

b. Contingency theory

Contingency theory is generated from the sociological functionalist theories of organization structure carried out by Smith and Farquhar (2000) [41] and Chenhall (2003) [44]. Due to the fact that contingency theory utilized the behavioral aspect of an organization to illustrate the significant influence of contingent factors, including technology, culture, and the external environment, on the design and operation of organizations [43]. Given that performance measurement has also been triggered by such contingency factors as strategy and political environment, managerial information needs, organizational structures and information systems [44]. Hayes (1977) [45] presupposes that contingency theory can be employed to investigate organizational measurement and subunit measurement.

2.2. Public sector scorecard and its key characteristic driving successful performance measurement within public universities

PSS aims to cultivate a performance management culture centered on enhancement, innovation, and learning, focusing on achieving favorable outcomes for service users and stakeholders at a reasonable cost. It promotes performance methods that facilitate improvement and ensure quality without incentivizing staff to pursue arbitrary goals that compromise public service quality [33]. PSS covers seven aspects which can be modified upon the organizational features. Pertaining to the left position of the PSS consists of the outcomes, processes, and capabilities whereas the right side of PSS expounds a variety of elements [33]. Particularly, outcomes cover with the key performance outcomes which the PSO targets to accomplish, those requested by users and other paramount stakeholders, along with financial outcomes [33]. The processes embrace with one component, that is, service delivery which primarily concentrates on the substantial experiences of users and stakeholders [33]. The capabilities consist of innovation and learning, people, partnership as well as resources which are intensified by effective leadership [33].

The PUs' goal has been to set up its competitive advantage through achieving better performance in work, gaining the human capital value and therefore offer value to its key

stakeholders [47]. The process of designing the PSS attracts the involvement of several types of participants, namely the involvement of service users, organizational staff and key stakeholders. In particular, the customers of PSOs take part in the service delivery process [47]. In view of the rapid change of customer demands on the public service [47], the involvement of service users will put the experiences and understandings of the service user at the center of effective public service design and distribution [48] which will result in the effective outcomes and high quality of service delivery [49], [50]. The involvement of front-line staff and stakeholders is also vital to the organizational accomplishment [51]. The personnel will possess a thorough comprehension of the strategic objectives and organizational vision, whereas the stakeholders will consist of individuals or entities that will impact or be impacted by the organizational strategy [52]; [53]. Focusing on outcomes rather than inputs or outputs would steer the PUs towards appropriate objectives and enhance accountability [54].

On the other hand, identifying the outcomes sought by the organization, specifically regarding value for money, served as the foundation of PSS research, and this focus on outcomes would guide the entire PSS project, aiding the organization in achieving these objectives [33]. As stated by Modell (2005) [20], the PSO has been accused of wastefulness and inefficiency. The 'value for money' has turned out to be a front-page aspect of public sector management [22]; [55]. Thus, the PSS is comprised of process advancement within an overall performance management framework concentrating on the different outcomes requested the financial outcomes like value for money. Importantly, capability and organizational culture are critical success factors for reaping the outcomes required which are included in the PSS [33]. Furthermore, the PSS also integrates risk management into strategy map. This is due to leaders of PUs are under high pressure of the allocation of human resources over a wide range of operations within the organization in light of restrained financial resources, of these, administrative costs have been raised in a disproportionate way [56].

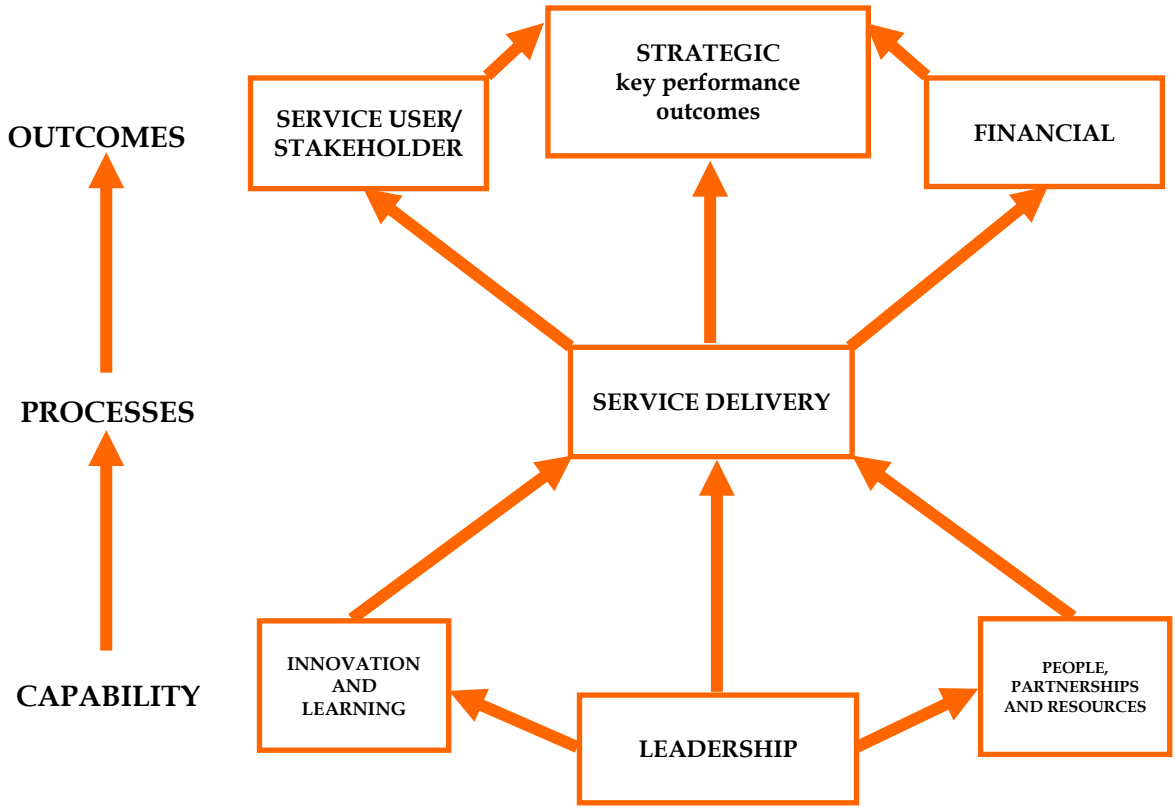

Figure 1. The public sector scorecard framework

(Source: Moullin, 2017 [33])

3. Hypothesis development and research model

3.1. Hypothesis development

Perceived ease of use is considered as one of the main beliefs in the framework of TAM and conceptualized as the degree to which a person believes that using a particular system would be effortless to use [37]. Thus, the PUs will be more likely to adopt PSS if they perceive it to be easy to operate and does not involve too much hassle to operate. Within the framework of TAM, users are predicated largely on their perceived usefulness of the system ([37]; [38]). In PSS adoption, the users will adopt this framework if they keep in view that the system will bring benefits such as using PSS enabling them to accomplish tasks more effectively, improving organizational performance and giving the organization greater control over the work. According to previous empirical research, perceived ease of use and perceived usefulness are not the only beliefs that mediate the impact of the external environment on attitude and intentions. Many scholars have focalized on the extension of TAM by including additional variables to enhance its specificity, predictability and explanatory power [57]. The perceived value is referred to the belief of an individual on the amount of benefit when acquiring a service [60]. The service users

typically wish to purchase products/services with those vendors who provide maximum value [61]. Indeed, the literature has proved that the perceived value of a product/service demonstrated a significantly positive impact on the purchase intention [60]. Given that perceived value has been considered even more imperative than satisfaction [61], in this study, the PUs have expectations when they adopt PSS, and the more their expectations are fulfilled, the more value they will regard for this framework.

The perceived security antecedent can be related to antecedents of security, such as verification, authentication, encryption, protection, and non-repudiation [58]. Thus, perceived security is specified as the subjective probability in user's eyes which his personal information will not be displayed, saved, or stolen [62]. All organizations are more and more becoming cautious about giving out information. In this research, PSS adoption will be taken into consideration of implementation when the PUs realize that all the organizational information will be free from being stolen or illegally utilized by others. Thus, the research hypotheses are postulated as follows.

- *H1. Perceived usefulness has a significantly positive effect on PSS adoption.*
- *H2. Perceived ease of use has a significantly positive effect on PSS adoption.*
- *H3. Perceived value has a significantly positive effect on PSS adoption.*
- *H4. Perceived security has a significantly positive effect on PSS adoption.*

Leadership has been well-acknowledged as one of the most determinants to revamp work efficiency in organizational operations [63]; [64] through the significant influence capability of leadership on the staff [65]. Leaders can give rise to organizational structure and formulate the organizational culture to lead to impact by means of different affairs, actions and services [66]. In other words, leadership can be treated as the main weapon of the organization as the leaders can reap the best success, namely accomplishing strategic goals and labor productivity through effective leadership. As such, leadership undoubtedly demonstrates the main role in the outcome of any organizational projects [64].

Indeed, as the top manager typically has a predominant position in determining the organizational strategy, organizational construction, and management systems establishment, their involvement has been supposed to be one of the most critical success factors for the adoption of innovations like the adoption of management technique [67]. For the PSO, the leader plays an important role in determining strategic performance and operating environment [68]. As PU is a component of PSO, the administrators in this type of organization also play the same parts. The positive influence from administrators will be much more effective in support for an innovation, positively impacting adoption. Especially, when administrator obtains good capabilities, they will recognize the usefulness, ease of use, value and security of the new measurement and management framework. Envisaging the important role of administrator in the PSS adoption intention in PUs, the following hypotheses are set-forth for verification.

- *H5. Administrator has a significantly positive effect on perceived usefulness.*
- *H6. Administrator has a significantly positive effect on perceived ease of use.*
- *H7. Administrator has a significantly positive effect on perceived value.*
- *H8. Administrator has a significantly positive effect on perceived security.*

The university staff have been well-acknowledged as a paramount asset which generates a significant contribution to the success of an organization pertaining to the degree of education services offered [69]. Therefore, the PUs has been supposed to spend most of their budgets on personnel due to their intensive labor and the overall organizational performance has been most likely to depend on this resource [70]; [71]. On the other hand, the development of information technology, organizational factors and contexts such as increased market competition, changing strategy, operational complexity and operational structural transformation have raised demands on adjusting the role of management accounting, especially management accounting staff. Therefore, management accountants are recommended to own a sound background of accounting knowledge, skills in designing financial information systems as well as skills in establishing and manipulating performance management systems to support the administrators in measuring and managing the organizational performance [72]. Accordingly, with excellent knowledge and experience, the management accountant will recognize the usefulness, ease of use of the new measurement and management framework. Envisaging the important role of accountancy resource in the PSS adoption intention in PUs, the following hypotheses are set forth for substantiation.

- *H9. Accountancy resource has a significantly positive effect on perceived usefulness.*
- *H10. Accountancy resource has a significantly positive effect on perceived ease of use.*

Internal communication is defined as a process that integrates diverse components to collectively encompass all forms of interactions among individuals, groups, or organizations. The internal communication concentrates on fundamentally establishing interconnection between individuals and groups, working at various degrees in particular areas of specialization within an entity in the effort to set up and maintain trust, offering timely and reliable information, bolstering decision processes and eliminating the barriers between dissimilar departments and thus devoting to motivation, especially in the period of change and stress [73]. Interdepartmental communication plays an indispensable part in an organizational accomplishment. To that end, the PUs are unable to employ PSS without extensive interdepartmental communication, as it would be impossible to customize and coordinate. Thus, the research hypotheses are posited as follows.

- *H11. Interdepartmental communication has a significantly positive effect on perceived usefulness.*
- *H12. Interdepartmental communication has a significantly positive effect on perceived ease of use.*

3.2. Research model

The research model, based on TAM and contingency theory, illustrates the critical success factors for the adoption of PSS in PUs, as shown in **Figure 2**.

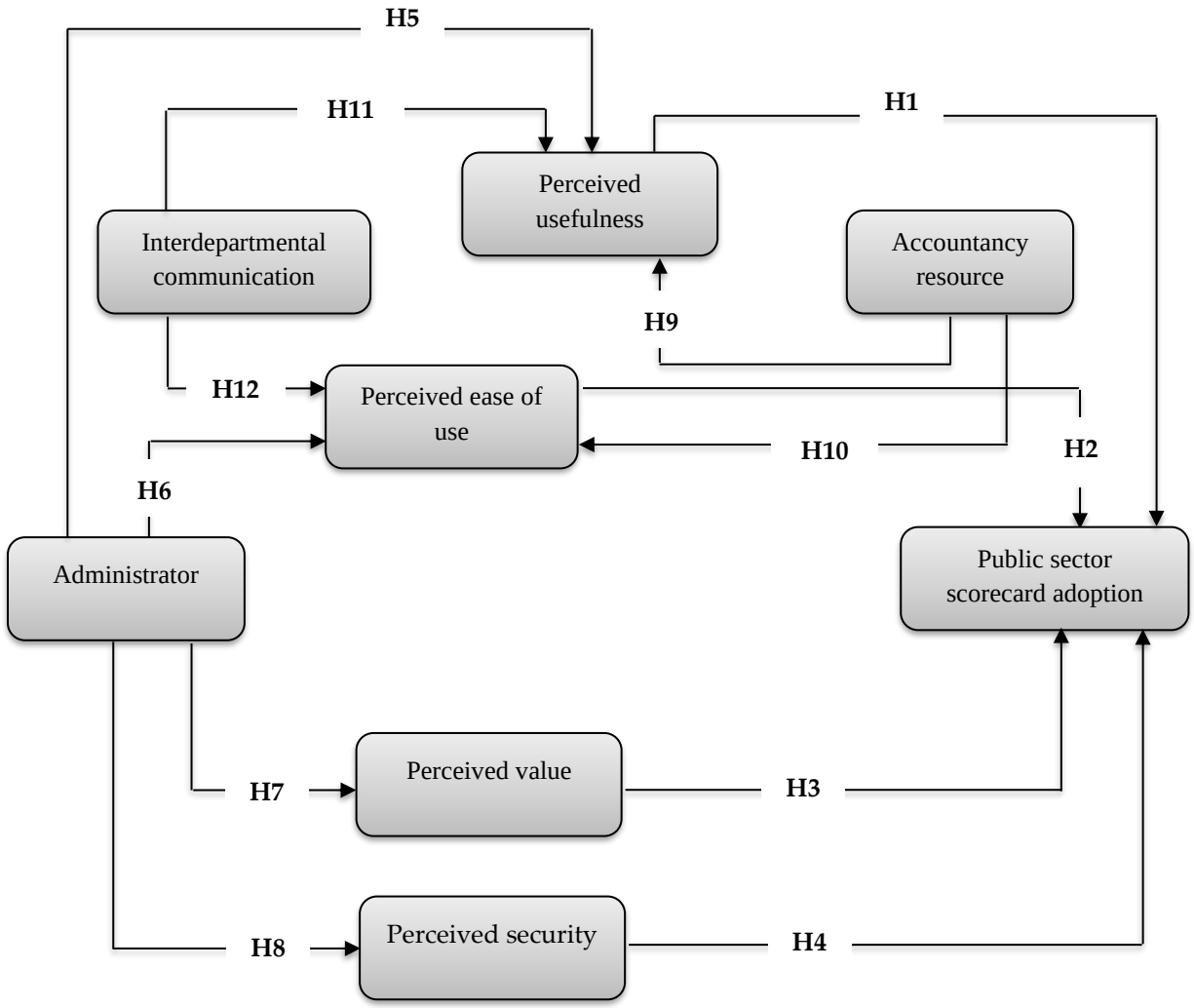

Figure 2. The hypothesized model

(Source: The researchers' recommendation)

4. Research material and methods

4.1. Target population and research sample collection

The Southern area was selected for this study to investigate the critical success factors influencing the intention to adopt PSS, owing to its pivotal role in Vietnam's economic development. Given that PSOs are required to demonstrate the utmost adherence to legal standards during their operations, and that PU constitutes a component of PSOs. Consequently, nearly all PUs in Vietnam may utilize the findings of this study as a reference. A survey

questionnaire was employed to gather the required data. This study utilized convenience sampling and snowball sampling methods in the survey. Upon the application of structural equation modeling (SEM) for analytical methods, it may pertain to various overall fit indices and the selection of the suitable strategy. Sivo et al. (2006) [75] recommended a "critical sample size" of 200 to ensure adequate statistical power for data analysis. The questionnaires were administered from November 2019 to February 2020 and were collected personally by the researchers. The 241-complete response achieved in this study satisfied the extensive criteria for the required sample size established by prior researchers. Consequently, the survey sample was deemed typical of the entire population, and the findings from this sample pertained specifically to the intention to use PSS in PUs in Southern Vietnam.

4.2. Measures and the questionnaire

The questionnaire was split into two parts; the demographic profile comprised of gender, age, career, year of experience, etc. and constructs measurements in five-point Likert-scale [76] which ranged from strongly disagree (1) to strongly agree (5). The theoretical constructs of the proposed model were presented in detail as follows:

- *Perceived usefulness*. This research employed 3 items which were proposed by Davis (1989) [37], Davis et al. (1989) [38].
- *Perceived ease of use*. There were 4 items employed in this study which were established from those proposed by Davis (1989) [37], Davis (1993) [77].
- *Perceived value*. This research employed three items which were endorsed by Liu et al. (2015) [78].
- *Perceived security*. The criteria employed to evaluate the perceived security were taken as reference from the contributions of Flavián and Guinalíu (2006) [79].
- *Administrator*. The measurement scales for administrator embraced of 4 dimensions of outcomes drawn from the findings of Koske and Muturi (2015) [80].
- *Accountancy resource*. The measurement scales for assessing accountancy resources in the research were inherited from the explorations of Radhakrishna and Raju (2015) [81].
- *Interdepartmental communication*. This research utilized 3 items which were suggested by Covin and Slevin (1991) [82]; Jaworski and Kohli (1993) [83].
- *Public sector scorecard adoption intention*. The measurement scales for evaluating the PSS adoption intention were designed from the investigations of Davis et al. (1989) [38]; Davis (1993) [77].

4.3. Techniques for data analysis

The preliminary filtering of each scale was performed by means of item-total correlations (Cronbach's Alpha) and exploratory factor analysis (EFA) through employing SPSS 26.0. A two-step SEM technique, measurement model and structural model, were applied to corroborate the reliability and validity of the measures before investigation into the structural relationship between constructs with the support of AMOS 26.0.

5. Result and discussion

5.1. Descriptive results

The statistical data indicated that the majority of respondents were female, while males constituted only 39.83 percent. The number of respondents in the accounting and administrative departments was 97 and 94, respectively, while approximately 50 respondents were employed in the quality assurance and curriculum development department. The participants held bachelor's degrees (27.80 percent) and master's degrees (72.20 percent). Approximately 55.19 percent of respondents possessed over 9 years of job experience; 38.59 percent of respondents had job experience ranging from 6 to fewer than 9 years, while 6.22 percent had less than 6 years of experience. The age of the respondent was as follows: 7 respondents aged 20 to under 30; 94 respondents aged 30 to under 40; 71 respondents aged 40 to under 50; and 69 respondents aged 50 to 60.

5.2. Assessment of convergent validity

There has been a requirement to validate the measurement model of latent constructs for unidimensionality, validity, and reliability prior to establishing the structural model ([84]-[87). Accordingly, unidimensionality was attained when the factor loading of all items surpassed a minimum value of 0.6 [87]. In addition, the construct validity was corroborated by examining the convergent validity and discriminant validity. As stated by Peter (1981) [88], convergent validity was evaluated by assessing the construct loadings and construct reliability. The standardized loadings of each construct were significant and surpassed threshold value of 0.50 [89]. Pertaining to the construct reliability, coefficient alpha was traditionally computed to gauge the internal consistency reliability of the measures [90] and was recommended to exceed the degree of 0.7 [93]. Moreover, in order to evaluate the construct reliability, all values of the composite reliability (CR) must be greater than the suggested value of 0.7 [92]; [93] and the average variance extracted (AVE) values must surpass the proposed value of 0.50 [94]. The result depicted in Table 1 illustrated that the convergent validity for all constructs was achieved.

Table 1. Results summary of measurement model.

Variables	Items	Factor Loadings Ranges	Cronbach's Alpha	AVE	Composite Reliability	Inference
Administrator	BGH	0.698 - 0.818	0.849	0.589	0.851	Retained
Accountancy resource	NLKT	0.694 - 0.855	0.865	0.620	0.867	Retained
Interdepartmental communication	TTNB	0.746 - 0.798	0.825	0.618	0.829	Retained
Perceived usefulness	NTHI	0.725 - 0.793	0.809	0.591	0.812	Retained
Perceived ease of use	TDSD	0.696 - 0.893	0.867	0.692	0.870	Retained
Perceived value	NTGT	0.724 - 0.856	0.835	0.630	0.836	Retained
Perceived security	NTBM	0.658 - 0.842	0.880	0.598	0.880	Retained
Public sector scorecard adoption intention	VD	0.745 - 0.807	0.811	0.591	0.812	Retained

5.3. Assessment of discriminant validity

The square root of AVE for each latent variable must exceed all other correlation values among the latent variables. The outputs exhibited in Table 2 illustrated the good discriminant validity of the hypothesized model.

Table 2. Results of discriminant validity.

	NTBM	NLKT	BGH	TDSD	NTGT	TTNB	VD	NTHI
NTBM	1							
NLKT	-0.017	1						
BGH	0.118	0.253	1					
TDSD	0.136	0.275	0.293	1				
NTGT	0.198	0.167	0.248	0.121	1			
TTNB	0.061	0.267	0.187	0.363	0.188	1		
VD	0.145	0.153	0.187	0.323	0.373	0.165	1	
NTHI	0.064	0.367	0.265	0.112	0.169	0.318	0.320	1

5.4. Assessment of overall model fit

The generally lowest values for goodness of fit index (GFI), Tucker-Lewis index (TLI) and comparative fit index (CFI) were 0.90 [95] and GFI scores may fall below 0.95 in several studies, ranging from 0.774 to 0.923. The ratio of chi-square to degree of freedom ($\chi 2/df$) was requested to be below 3.0 [96]. The RMSEA value was suggested to be below the maximum value of 0.06 determined by [97]. The results in **Table 3** reported that measurement model and structural model met the Goodness of Fit requirements in the current context.

Table 3. Results of measurement and structural model analysis.

The goodness of fit measures	CMIN/DF	GFI	CFI	TLI	RMSEA
Recommended value	≤3	0.774≤x≤0.923	≥0.9	≥0.9	≤0.06
Measurement Model	1.435	0.883	0.947	0.955	0.043
Structural Model	1.502	0.872	0.939	0.946	0.046

5.5. Hypothesis verification

a. Hypothesis testing

The results analysis documented that NTHI demonstrated a positive and significant influence on VD ($\beta = 0.334$; $p = 0.002$), which supported H1. TDSD was indicated to have a positive impact on VD ($\beta = 0.237$; $p = 0.000$), thus supported H2. Additionally, NTGT was revealed to illustrate a significantly positive effect on VD ($\beta = 0.296$; $p = 0.000$), hence support H3.

Whereas, NTBM (β = 0.049; p = 0.452) was verified to have an insignificant effect on VD, consequently not supported to H4. Simultaneously, it was substantiated that BGH had an insignificant impact on NTBM (β = 0.137; p = 0.080), therefore not supported to H8. The findings also confirmed that BGH was positively and significantly (β = 0.121; p = 0.019) associated with NTHI. Therefore, H5 was supported. The results stressed that BGH was positively and significantly related to both TDSD (β = 0.229; p = 0.002) and NTGT (β = 0.254; p = 0.000). Thus, supported both H6 and H7. Besides, NLKT was verified to be positively and significantly related to NTHI (β = 0.214; p = 0.000) and TDSD (β = 0.186; p = 0.019). Consequently, H9 and H10 were supported. Furthermore, for H11 and H12, the observations proved a positive and significant relationships between TTNB and NTHI (β = 0.210; p = 0.003) as well as TTNB and TDSD (β = 0.415; p = 0.000). Thus, H11 and H12 were supported. The results of tested hypotheses were summarized in **Table 4**.

Table 4. Structural coefficients (β) of the proposed model.

Hypothesis No	Relationship			Estimate	S.E.	C.R.	P	Inference
H1	VD	<---	NTHI	0.334	0.109	3.074	0.002	Supported
H2	VD	<---	TDSD	0.237	0.068	3.457	0.000	Supported
H3	VD	<---	NTGT	0.296	0.073	4.031	0.000	Supported
H4	VD	<---	NTBM	0.049	0.065	0.752	0.452	Rejected
H5	NTHI	<---	BGH	0.121	0.052	2.340	0.019	Supported
H6	TDSD	<---	BGH	0.229	0.074	3.072	0.002	Supported
H7	NTGT	<---	BGH	0.254	0.077	3.295	0.000	Supported
H8	NTBM	<---	BGH	0.137	0.078	1.748	0.080	Rejected
H9	NTHI	<---	NLKT	0.214	0.057	3.759	0.000	Supported
H10	TDSD	<---	NLKT	0.186	0.079	2.354	0.019	Supported
H11	NTHI	<---	TTNB	0.210	0.071	2.951	0.003	Supported
H12	TDSD	<---	TTNB	0.415	0.103	4.041	0.000	Supported

b. Post-hoc analysis

The Bootstrapping process was applied with the effort to assess the statistical significance for each path coefficient [98]. In this study, the Bootstrapping technique was conducted with a sum of 1,500 observations sourced from the sample. Alternatively, the selected bias-corrected Bootstrapping was with 95 percent confidence intervals in the estimation of the proffered model.

Based on the findings in Table 5, the PSS adoption in PUs was influenced by such components as BGH, NLKT, TTNB, NTHI, TDSD and NTGT.

Table 5. Results of Bootstrapping estimation.

Hypothesis No.	Relationship			Bootstrap estimation				Discrepancy		
				Estimate	Mean	SE	SE (SE)	Bias	SE (Bias)	CR
H1	VD	<---	NTHI	0.234	0.229	0.074	0.001	-0.004	0.002	-2.0
H2	VD	<---	TDSD	0.254	0.257	0.070	0.001	0.003	0.002	1.5
H3	VD	<---	NTGT	0.308	0.306	0.075	0.001	-0.002	0.002	-1.0
H5	NTHI	<---	BGH	0.173	0.171	0.085	0.002	-0.001	0.002	-0.5
H6	TDSD	<---	BGH	0.215	0.215	0.080	0.001	0.000	0.002	0.0
H7	NTGT	<---	BGH	0.247	0.249	0.074	0.001	0.002	0.002	1.0
H9	NTHI	<---	NLKT	0.283	0.283	0.082	0.001	-0.001	0.002	-0.5
H10	TDSD	<---	NLKT	0.163	0.163	0.082	0.002	0.000	0.002	0.0
H11	NTHI	<---	TTNB	0.225	0.225	0.081	0.001	0.000	0.002	0.0
H12	TDSD	<---	TTNB	0.294	0.287	0.077	0.001	0.000	0.002	0.0

6. Conclusion

6.1. Research contribution

The matters of PSO's performance measurement are analyzed performance measurement frameworks which are hard to modify for this type of sector because these organizations are directed to the processes rather than the results. On the other hand, it has been very critical for the PSO to evaluate their performance systematically to ameliorate the organizational management and to gain the satisfaction of society with offered services and their availability [99]. Through focusing on shedding light on the constituents of the PSS framework and detailed descriptions on the advantages of PSS adoption, this research provides comprehensive understanding on the appropriateness of PSS adoption in PUs which makes a significant devotion to measuring the PUs' performance systematically and constantly to revamp the organizational management and to enhance the satisfaction of society. As such, the PSS has been considered as an integrated service improvement and performance management framework which focuses on three main elements namely capability, processes and outcomes [33]. Notably, this framework has been supposed to allow PSO to adjust in correspondent with the organizational conditions and contexts [33]. On the other hand, the observations of this research enrich the body of public sector performance measurement literature, especially in the context of PU in the developing countries. Importantly, far-reaching has seemed to be the insights into the critical success factors and effective application of a performance measurement in PSO [35]; [36]. Therefore, the findings of the present study fulfill the gap of lacking research works conducted to exploit the performance

measurement application in the PSOs as well as the critical success factors of its successful design, implementation and application [5]. Furthermore, the findings of this research can be taken as references for several countries belonging to the Asia region due to the geo-economic development conditions and the same size of geo-economic flow between the countries in Asia region [100]. Finally, these empirical findings can give rise to numerous implications for both the PUs' administrators and policymakers in seeking the efficient and effective approaches to achieve the wide consensus on adoption the new management and measurement framework [101].

6.2. Research implications

a. Academic implications

The observations of this study add value to the existing empirical research since fewer of the existing research in context of Vietnam in particular and developing countries have explored this such model. This is because they aid the insight of the intention to adopt PSS through collecting the point of view of different departments in PUs to establishing the sound platform for the conclusions in this study. As such, this research reinforces the hypotheses about the importance of the perceived factors on PSS adoption intentions. The findings shed light on the significance of the three dimensions namely perceived ease of use, perceived usefulness, perceived value which seemed to play a vital role in the forming PSS adoption intentions formation in PUs. Consequently, the use of successful acceptance models such as TAM in this study is corroborated to be relevant and respectable to employ. What's more, the observations are considered as a contribution to the body of knowledge on performance measurement and management adoption intention. Concretely, the findings prop up the view that the intention to adopt PSS is influenced by administrator and accountancy resource. Finally, this study reveals that interdepartmental communication demonstrates a significant impact on PSS adoption intentions. In a nutshell, this research can be regarded as reference research to instruct future scholars in this specific area.

b. Practical implications

The administrators are recommended to recognize the advantages of PSS adoption to achieve the highest effectiveness and efficiency during operation. Given that special resources and expertise regarding PSS adoption are the most vital components, administrators should consider and implement proper advantages of these resources in an appropriate approach to enhance the performance in the current business environment, where sustainability requirements are constantly changing and developing. Importantly, despite the benefits that PSS adoption offers to potential users, the administrators are recommended to make use of the feedback service user and key stakeholder to identify the most critical risks in order to handle them immediately. Although training for the employees is always important, administrators are encouraged to gain their abilities and competence through continuous learning and the training needed for specific

jobs. Furthermore, financial support from sponsoring businesses can directly allow PUs to overcome the new challenges of PSS application. PUs can take a primary part in administering university- enterprise relationships through finding the best researchers to initiate innovation and to support sharing of knowledge. Finally, the findings also offered policy makers a chance to take the necessary steps to strengthen the principles and guidance help the PUs applying PSS in an efficient and effective manner.

c. Limitations and agenda for further research

This study still suffered from several limitations. The first limitation of this research lied in the relatively small sample size. In this regard, it raises a claim on the larger sample size in the future work. Secondly, because the data of this research was collected from those who were working in specific departments, given this study's limited scope, further research may generalize this study's sample to the respondents of other positions. Thirdly, the problem which arose from the data collection approaches was recommended to be addressed by further work. Fourthly, the cross-sectional research technique raises questions regarding the relationship between intention and actual usage; thus, a longitudinal analysis that considers the progression of PSS adoption over time should be implemented. Subsequently, more research should incorporate NTBM to reassess its influence on the adoption of PSS in other areas of PSO.

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