IOSR Journal of Business and Management (IOSR-JBM)
e-ISSN:2278-487X, p-ISSN: 2319-7668. Volume 28, Issue 4. Ser. 3 (April. 2026), PP 83-91
www.iosrjournals.org

Evolving A Measurement Scale For Evaluating Tax Administration Efficiency In Yemeni Tax Authority

Mohammed Mahdi Obaid
College Of Administrative Sciences, Seiyun University, Seiyun, Hadhramout, Yemen

Abobakr Ramadhan Al-Harethi
College Of Administrative Sciences, Seiyun University, Seiyun, Hadhramout, Yemen

Abstract
For governments, inefficient tax administrations are causing them to lose a substantial amount of revenue. In the first place, responsibility for collecting taxes due on tax administrators by following relevant regulations and laws in a way that instills confidence in taxpayers through the implementation of an effective tax administration system. The present study seeks to authenticate relevant and dependable measurement scales designed for evaluating the efficacy of tax administration efficiency (TAE). Thus, an adapted questionnaire comprising five items was administered to 505 tax employees to tax authority. All the items have been verified by eight experts' reviewers' statements as follows, three (3) academicians in the area of accounting, and two (2) auditors in the Yemeni tax authority. Additionally, three (3) tax employees in the Yemeni tax authority and one (1) academic in the field of the Arabic language further refined this questionnaire to ensure its accuracy and validity. The evaluation of the reliability and validity of the measures for TAE was conducted through Confirmatory Factor Analysis (CFA) using SPSS version 23 and Smart PLS version 3. The results indicate that the suggested scale for TAE meets both validity and reliability criteria. Therefore, decision-makers, practitioners, and researchers have the flexibility to employ this scale for evaluating TAE across diverse tax authorities worldwide. This study broadens the scope of existing literature and introduces innovative concepts in the field. As a result, the validated scale will assist tax administrations in formulating policies to enhance efficiency in tax administration, thereby contributing to increased government revenues.

Keywords: *Measurements scale, TAE, Yemeni tax authority.*

Date of Submission: 20-04-2026 Date of Acceptance: 30-04-2026

I. Introduction

The primary function of a tax administration is to levy and collect taxes owed to the state in an appropriate amount and at the lowest possible public expenditure. Alternative goals of tax administration include efficient collection and administration of taxes, implementation of tax policy, and promotion of investment (Rahman, 2009, Obeid e al., 2026). TAE is achieved when tax administrators can boost government income while concurrently reinstating taxpayers' trust through the proactive and effective implementation of tax regulations. (Baurer, 2005). Tax evasion, described as mostly illegal and socially bad behavior, is encouraged by a lack of sound tax policy (Houston & Tran, 2001). The effectiveness of the tax system is determined by the TAE in generating revenue (Nyabwengi & K'Akumu, 2019). When comprehensive strategies are implemented to promote voluntary tax compliance, tax administration can be said to be efficient. Nevertheless, inefficiencies in tax administration can render certain tax systems ineffective, often acting as a deterrent to voluntary tax compliance (Musah et al., 2026).

Nevertheless, inefficient tax administration can be caused by a variety of factors. For instance, insufficiently trained personnel, absence of accountability, transparency gaps, subpar record-keeping, limited autonomy, service quality deficiencies, and instances of corruption. (Ogbonna, 2011). Other factors contributing to the inefficiency of tax administration include a lack of accountability, and a lack of defined administrative tactics (United Nations, 2000, Obaid et al. 2022). Tax administration inefficiency predominantly impacts developing nations. For instance, these countries often face challenges such as inadequate internal controls, insufficient internal and external monitoring, and the absence of robust codes of conduct (Baurer, 2005).

Ineffective tax administration is most prevalent in developing nations, this necessitates additional investigation due to its significance in rising government incomes and taxpayer compliance. Recent empirical research on TAE has focused on the factors that influence it. Other research focuses on the influence of TAE on individual taxpayers and the resulting decrease in non-performing assets in banks (Amanuel, 2021; Aziz & Al_Harethi, 2018; Muaen, 2016; Shagari, 2014; Abiola & Asiweh 2012; Jimenez & Barrilao, 2001; Gonzalez & Miles, 2000). In addition, some researchers have conducted an empirical analysis of TAE (Lewis, 2006; Hyun,

Moon, & An, 2001; Maekawa & Atoda, 2001; Jha et al., 1999; Jha & Sahni, 1997; Hunter & Nelson, 1996). However, tax employees' perception of TAE has not undergone critical examination.

To address this gap, this research aims to develop and validate relevant and reliable measurement scales for evaluating TAE from the perspective of tax employees. To that purpose, this study fills a gap in the current literature by developing a valid and accurate measurement scale for estimating tax employees' perceptions of TAE.

II. Literature Review

Tax administration literature has originated from various corners of the world, with a focus on different aspects. For instance, the significance of TAE in enhancing the investment climate is well-documented (Shagari, 2014). The author also emphasized that it contributes to economic growth. TAE enables a government to create increased revenue through appropriate rates of tax (Rahman, 2009). Furthermore, it plays a crucial role in reducing costs and delivering improved benefits to both citizens and businesses (OECD, 2011). Tax administration is characterized as a pivotal component of the government organizational organizations entrusted with the responsibility of implementing tax policies in a given nation (Abiola & Asiweh, 2012). Additionally, Garde (2004) stressed that TAE encompasses various facets, including tax policy administration, the adoption of modern and effective tax procedures, and the employment of eligible employees (OECD, 2025).

The literature concerning TAE remains limited, despite its crucial role in motivating taxpayers to contribute more and bolstering government income. Furthermore, enhancing TAE can be achieved by the employment of robust tax laws, well-crafted policies, taxpayer incentives, employee motivation, unwavering government commitment, and the establishment of autonomous administrative structures (Joon & Kim, 2011).

A tax organization is deemed efficient when it possesses a streamlined system capable of efficiently harnessing all available resources to generate government revenue (Schlotterbeck, 2017). Consistent self-assessment of tax management measures, employees, and confirming components is imperative for sustaining efficiency within tax management (Tennant & Tennant, 2007). Assessment of the comparative effectiveness of tax collection agencies employing a three-step estimation process and utilizing OECD data to measure internal TAE (Alm & Duncan, 2014). Their research revealed that OECD member countries generally demonstrate high performance in tax collection, while non-OECD states tend to exhibit lower levels of efficiency in this regard.

Abandoning unnecessary tasks and identifying and documenting the time required for each work process can prove beneficial for tax management in terms of optimizing work procedures and enhancing operational efficiency and resource allocation (Pētersone & Ketners, 2017).

The success of a tax system hinges not only on its structural design but also on the effectiveness and efficiency of its administrative policies and implementation (Lasheras & Herrera, 1991). Consequently, it is essential to consider taxes from the perspective of both tax structure and the performance of tax management (Villar-Rubio et al., 2017).

In various countries, tax management faces challenges in terms of efficiency. For example, tax management in Russia is both inefficient and costly, necessitating a modernization of the system and structure of tax administration (Ponomarev et al., 2018). Conversely, the Slovak Republic has witnessed significant improvements in TAE due to customs and tax reforms (Dobrovic et al., 2018). Meanwhile, emerging European countries have laid strong foundations for TAE, although a comprehensive assessment of its strengths and weaknesses in this region is lacking (Crivelli, 2019).

Furthermore, the design of a tax administration system should prioritize the encouragement of voluntary tax compliance, the reduction of fraud, the rectification of potential misrepresentations in taxpayers' returns, and the strict adherence to tax regulations (González & Rubio, 2013).

From the preceding discussions, it is evident that TAE plays a pivotal role in nation-building by fostering income initiation and enhancing the investment climate. To achieve an efficient tax system, each tax system must be carefully crafted to minimize avoidance (Yusuf & O'Connell, 2012). An ineffective tax system not only diminishes government income but also deters investors and promotes tax evasion and avoidance. Thus, there is an imperative for efficient tax administration, considering the confidence of taxpayers and the promotion of voluntary compliance.

It is crucial to emphasize the pertinent metrics employed in assessing TAE within this study. To illustrate, the first item revolved that the Yemen Authority has efficient tax administration of tax collection. TAE hinges on the presence of a proficient tax collection process (Alm & Duncan, 2014). The second item of investigation delved into the existence of suitable infrastructure for TAE. This question aimed to determine if taxpayers are well-informed about the infrastructure measures instituted by tax administration, which can facilitate TAE. Typically, when there is adequate infrastructure, one can anticipate heightened efficiency (Olatunji et al., 2009). Hence, a robust organization can promote TAE. The third item item asked was Yemen Authority has well-trained employees for TAE. It is critical to recognize that well-trained employees significantly contribute to enhanced efficiency within an organization (Hassan, 2012). Consequently, when tax administration employs well-trained

employees, one can expect an improvement in TAE. The fourth item asked was that the generated tax revenue by my organization has been impressive due to TAE. Prior reports have indicated that TAE leads to a rise in administration income (Rahman, 2009). Lastly, the item allocated to tax administration in Yemen is progressive in nature.

Generation of Item Pools

This step of the procedure is to create a set of items that fully represent the conceptual domain of the construct. The items were adapted from the studies of Shagari (2014); Aziz & Al-Harethi, (2018); Ya'u et al. (2020), and Amanuel (2021). They focus on small taxpayers' branch offices in the case of Amanuel, on oil and gas companies in the case of Ya'u, Saad, and Mas'ud, and individual taxpayers, as in the instance of Aziz & Al-Harethi and on the tax officials in the instance of Shagari. Therefore, in this study, the items are adjusted to examine the TAE among tax employees in the Yemeni Tax Authority. The previously used measures were found to be valid and reliable in measuring the TAE with a CA of 0.597, 0.795, and 0.825 for Shagari, Aziz & Al-Harethi, and Ya'u, Saad, and Mas'ud respectively. Table 1 displays the initial and revised sets of items.

Table 1
Original and Adjusted Items

Authors	Measurements	Intended respondents	Adjusted measures	Intended respondents
Shagari (2014)	"My organization has a well trained staff for efficient tax administration". "My organization has adequate infrastructures for efficient tax administration." "Income generated from tax revenue by my organization has been impressive due to efficient tax administration." "In my view, our tax system has an efficient collection process."	Tax officials	Yemen Authority has an efficient tax administration of tax collection. Yemen Authority has adequate infrastructure for efficient tax administration. Yemen Authority has well-trained employees for efficient tax administration. Generated tax revenue by my organization has been impressive due to efficient tax administration. The tax administration in Yemen is progressive in nature.	Tax employees
Aziz & Al- Harethi, (2018)	"Income tax collection is efficiently administered." "Tax administration in Hadhramout is efficient." "Tax system and tax administration in Yemen are efficient. Tax administration in Yemen is positively efficient, simple and effective."	Individual taxpayers.		
Ya'u, Saad and Mas'ud (2020).	"Tax authorities have well-trained and experienced staff for efficient tax administrations." "Tax authority has adequate infrastructure for efficient tax administration." "The tax authority can generate more revenue from taxpayers, due to their, impressive and efficient tax administration approach." "Tax authority has an efficient tax administration process."	Oil and gas companies		
Amanuel (2021)	"In my view, our tax system has an efficient collection process." "Income generated from tax revenue by my office has been impressive due to efficient tax administration." "My office has adequate infrastructure for efficient tax administration." "The office has well-trained staff for efficient tax administration." "Tax administration is done within the intended cost budget." "Tax revenue collected in my office meets the intended revenue target."	small taxpayer's branch office		

Sources: (Amanuel, 2021; Ya'u, Saad & Mas'ud, 2020; Aziz & Al- Harethi, 2018; Shagari, 2014)

The researchers revised the questions to find items that could be used to measure the construct under study. This method is consistent with the research of Manaf et al. (2016) and Mohammad (2013). As can be seen in Table 1. A total of five items were identified as likely indicators to measure tax administration efficiency. To validate the TAE measurement tools and determine their reliability, a quantitative study was conducted with 505 Yemeni tax employees to obtain a thorough comprehension of the contextual factors.

III. Research Methodology

Stage One Content Validity

In the current phase, we evaluated five adapted items using the content validity procedure following the guidance provided by Engström et al. (2018). The study suggests that experts with substantial expertise in the constructs under investigation and specialization in scale construction should perform an expert review and evaluation of the content validity of the item pools. This process is essential to determine whether each question in the questionnaire is both crucial and appropriate for assessing the construct, as recommended by Saunders et al. (2011). Primarily, the current study developed a questionnaire featuring a five-point Likert-type scale to gauge the level of understanding regarding TAE within the Yemeni Tax Authority.

The questionnaire underwent a verification process by a language expert proficient in both English and Arabic to ensure that it effectively conveyed the study's intended message to the respondents. Subsequently, the researcher distributed the questionnaire for evaluation to three (3) academic experts specializing in accounting and two (2) auditors within the Yemeni Tax Authority (YTA). Additionally, three (3) tax employees from the YTA and one (1) academic specializing in the Arabic language played a crucial role in further refining the questionnaire to guarantee its accuracy and validity. These experts placed strong emphasis on the need for the survey instrument to be concise, easy to respond to, and easily understandable. They diligently assessed the items for any construction errors, flow, ambiguity, and sequencing issues.

Stage Two Pilot Study

During this stage, pilot research was managed to enhance the validity and reliability of research instruments, as recommended by Creswell (2012). In line with Hulley's perspective (2001), the pilot study serves as an initial examination conducted by the researcher to assess the feasibility, duration, and anticipated costs associated with estimating an appropriate sample size for the study. It also plays a vital role in refining the study format before embarking on the primary research. Additionally, Altman et al. (2006) underscored the pivotal role of a pilot study, highlighting that it can reveal structural and design imperfections in the study. Furthermore, it can identify errors in the formulation of questions, the choice of measurement metrics, and the clarity of instructions. Consequently, this preparatory phase should precede the commencement of the main research project.

Therefore, following the advice of Hill (1998) and Isaac and Michael (1995), who recommend having a sample size of between 10 and 30 responses earlier performing an investigative factor investigation a total of 30 copies of questionnaires were handed out to 30 tax employees. To mitigate the risk of sample choice bias and sample specification error, as underscored by Heckman (1979), it is imperative to steer clear of self-choice by individuals and the choice by analysts. Non-random sample choice can introduce sample selection bias (Berk, 1983). By these principles and to minimize sample choice bias and error, the pilot study in this research employed simple random sampling. Initially, a set of five items was employed for a pilot test that had been adjusted by expert recommendations. As previously mentioned, a five-point Likert scale was utilized, ranging from 1 (lowest score) to 5 (highest score), aligning with the study of Hinkin et al. (1997). Through simple random sampling and with the assistance of the present study team, 30 fully completed questionnaires. For a scale to attain reliability, the scores should satisfy specific threshold criteria., as outlined by Vellis (1991). In general, the used statistic of reliability is internal consistency, as noted by Pallant (2011). Hair et al. (2010) specifically stated that items with values of the items-to-overall-total correlation greater than 0.70 have to be considered.

Table 2
Cronbach's Alpha of the Study Variables

Variables	N. of items	Cronbach's Alpha (CA)
TAE	5	0.827

CA value of 0.827, in alignment with Hair et al.'s (2010) guidance, falls within the category of strong reliability. This signifies the robust validity and reliability of the items used for measuring the construct. Therefore, CA exceeds the established threshold.

Stage Three Final Stage

During the present phase, the survey was performed to collect the necessary data, and the analysis was performed using SPSS-23 and PLS-SEM 3. The final set of questionnaires was distributed among 505 tax employees in Yemen. A total of 311 questionnaires were collected, representing a response rate of 61.5%. After excluding five questionnaires based on missing data, i.e. outliers, or a lack of variation in responses, the valid sample size was reduced to 306 respondents. The sample size for the present research was established through simple random sampling. This method was chosen because it has historically been employed in studies to facilitate the analysis of a dataset and to evaluate the factors of interest, as noted by Olken and Rotem (1986). A study also emphasized that one justification for choosing simple random sampling in the research is when the entire population under research is known. In descent with this rationale, the present study had access to information on tax employees from the Yemeni Tax Authority. While it's important to acknowledge that simple random sampling does not guarantee error-free sampling, it significantly reduces errors, especially in larger samples, as highlighted by Linder et al. (2001).

The study's population consisted of approximately 505 tax employees, and as previously mentioned, their information was sourced from the Yemeni Tax Authority. To prevent sample choice bias, questionnaires were distributed to statements of all these tax employees, effectively treating the entire population as the sampling frame. This approach ensured that every member of the population had an equal opportunity to be included in the survey. After a series of follow-ups, a total of 311 questionnaires were collected, accounting for 61.5% of the population. This comprised the ultimate sample, chosen randomly from the population., as all respondents had an equal chance to participate in the survey. To assess the measurements and verify internal consistency reliability among tax employees, both EFA and CFA were handled, starting with the initial items. The subsequent stage involved CFA and EFA to explore and confirm the measurement properties, as recommended by Johari et al. (2011) and Worthington & Whittaker (2006).

Therefore, at this stage, conducting EFA becomes essential to comprehend the extent to which each element is accounted for by the underlying items. In pursuit of this goal, Principal Component Analysis and Varimax rotation were utilized. Additionally, CFA, internal consistency reliability assessment and assessment of convergent validity of the items were carried out. Internal consistency reliability measures the level to which items measuring the construct are interrelated within the structural model. In this context, three statistical measures were applied to assess the reliability of internal consistency of the items related to environmental regulation: (1) CA, (2) Composite reliability (CR), and (3) Indicator reliability (IR). The established thresholds for these measures are as follows: an IR of 0.7 or higher (Hair et al., 2010), a CA of 0.7 or higher (Nunnally, 1978), and a CR of 0.7 or higher (Hair et al., 2010).

Data analysis

The purpose of this research is to develop a valid and accurate rating scale for TAE among tax employees, which is presently lacking in the literature. For a thorough assessment of the unidimensionality of a construct, the analysis starts with EFA and CFA as recommended by Anderson and Gerbing (1988). PLS-SEM 3 and SPSS 23 were used for the analysis. Table 3 provides an overview of the EFA.

Table. 3 *EFA*

Items	Factor 1	Communalities
TAE1	0.783	0.613
TAE2	0.718	0.515
TAE3	0.711	0.505
TAE4	0.797	0.635
TAE5	0.732	0.536
Total Eigenvalues 2.804 Total Variance Explained 56.084 KMO 0.827 Sig. 0.000		

NB: TAE stands for Tax Administration Efficiency

Kaiser-Meyer-Olkin (KMO)

The exploratory factor analysis for the items to be implemented is shown in Table 3. In addition, screening tests were performed and finally, two variables were identified based on eigenvalues greater than 1. The eigenvalue for factor 1 was 2.804, while factor 2 had a value of 0.66. From this conclusion, just factor 1 is meaningful, and items categorized under factor 1 correspond to TAE. Item loadings, CA, CR, and average explained variance as a measure of convergent validity were used to maintain the EFA and to verify item validity and reliability, as indicated in the following table.

Table 4 *CFA*

Items	TAE 1	TAE 2	TAE 3	TAE 4	TAE 5
Indicators	0.780	0.730	0.726	0.790	0.730
Cronbach 0.807 CR 0.860 AVE 0.565					

NB: C R stands for CR; AVE.

Table 4 displays the findings of the confirmatory factor analysis, which indicate that the items are reliable and valid for the structure. The loading values of the indicators are all more than 0.7 as recommended by (Hair et al., 2014), which shows that items are strongly loaded to explain the constructs. CA and CR, two of the most used metrics to assess the reliability of the items for the primary structure, are both higher than the criterion of > 0.7 as recommended by (Hair et al., 2014). Finally, average variance, the majority commonly used criterion for determining convergent validity, was above the required value of 0.5 as recommended by (Hair et al., 2016). This shows the convergence of items in elucidating TAE.

Table 5
Items for Measuring TAE Effectiveness that are Valid and Reliable in the Final Version.

No.	Items
1	Yemen Authority has an efficient tax administration of tax collection.
2	Yemen Authority has adequate infrastructure for efficient tax administration.
3	Yemen Authority has well-trained employees for efficient tax administration.
4	Generated tax revenue by my organization has been impressive due to efficient tax administration.
5	The tax administration in Yemen is progressive in nature.

IV. Discussion

As illustrated in Table 3, EFA and screen tests were taken out, resulting in the extraction of three factors. Conversely, just one factor was retained and established on an Eigenvalue exceeding 1. Within the second factor, all loadings fell lower than a significant threshold of 0.5 (Kaiser, 1970; Kaiser, 1974). In contrast, in Factor 1, every item was statistically significant and loaded higher than 0.5, accounting for 56.084 percent of the variance. Notably, Factor 1 displayed an Eigenvalue of 2.804, reaffirming its high significance and alignment with the concept of TAE. Consequently, the factor analysis outcome suggested that Factor 1 should be retained. Furthermore, the Kaiser-Meyer-Olkin (KMO) test was conducted to assess the sampling adequacy, with a cutoff value of KMO set at ≥ 0.6 (Kaiser, 1970). In the present research, the KMO score was 0.827 at a significant level of 0.000, indicating a strong measure of sampling adequacy. Additionally, as indicated in Table 3, CFA was shown to confirm the internal consistency, validity, and reliability of the items.

To affirm the validity and reliability of the items, a CA analysis was performed, yielding a CA of 0.807, surpassing the threshold of ≥ 0.70 as suggested by Nunnally (1978). This signifies the reliability of the items in measuring the targeted structure. IR assessments were also performed, with each item exhibiting an IR of ≥ 0.70, meeting the criteria outlined by Hair et al. (2010) for adequate IR. Furthermore, the CR was determined to be 0.860, exceeding the threshold of ≥ 0.70, as recommended by Hair et al. (2011 & 2013), signifying a high level of internal consistency reliability in assessing TAE among Yemeni tax employees. Moreover, the Average Variance Extracted (AVE) was calculated to be 0.565, surpassing the threshold of ≥ 0.50, as outlined by Hair et al. (2011; 2012; 2013). This indicates the substantial convergent validity of the items. According to the results of the present analysis, the scale used to measure compliance with environmental regulations, comprising five items, has satisfactorily demonstrated validity and reliability, making it suitable for future research applications. Drawing from insights provided by Linder et al. (2011), the findings of this study can be generalized and utilized in diverse environments.

V. Conclusion And Implications

This paper introduces a reliable and valid measurement scale for assessing TAE among tax employees in Yemen. The analysis results confirm the scale's validity and internal consistency reliability. The pursuit of TAE is a global concern that garners the consideration of stakeholders worldwide. Inefficient tax administration systems have a particularly pronounced impact on developing countries, given the complex interplay of political, social, and economic disparities. So, enhancing TAE stands as a critical facet of policymaking in these developing nations. Achieving the TAE system necessitates ongoing and thorough reviews of tax policies and their agile implementation to address contemporary challenges in tax administration. Policymakers should also take into account the perspectives of various shareholders when presenting new tax policies or fortifying current ones.

This is essential to mitigate the adverse consequences of policy performance on a nation's social, economic development, and political. One such negative outcome of tax policy operation is the creation of tax havens, which provide an opportunity for certain individuals or firms to move their business operations to

countries with more favorable tax policies. In many developing nations, firms are subject to substantially higher tax rates than self-employed individuals. As a result, companies may be inclined to express their perspectives on the TAE process. This feedback can be invaluable for officials to make requisite adjustments to tax policies, preventing the encouragement of tax haven nations, which could have enduring social, political implications, and economic.

This study fills a critical gap by validating a reliable and valid measurement scale for assessing tax employees' perceptions of TAE. Methodologically, previous research has predominantly employed AMOS and SPSS for positive factor analysis, as seen in studies by Brown and Ki (2013), Mas'ud et al. (2017), and Adamu and Muhammad (2019. In contrast, the present study utilized both PLS and SPSS for positive factor analysis. Specifically, the adapted measurement scale met the requests for internal consistency through indicator loadings, CA, and CR, as well as convergent validity via AVE. Consequently, this research makes a valuable methodological contribution and provides measures that can be used in future research with diverse samples. Ultimately, the scale can serve as a tool for policymakers worldwide, aiding them in making informed investment decisions, particularly concerning presented tax policies, as favorable tax policies can attract investment. The results of this study demonstrate the provision of a reliable scale that can assist policymakers in crafting robust tax policies aimed at promoting TAE on a global scale.

The measurements developed can be readily adapted or adopted by fellow scholars to accommodate various environments. Scholars have the flexibility to employ a scale as an independent variable, mediator, or moderator to examine the impacts and outcomes of tax organization policies, which can aid officials in shaping robust and more favorable tax policies. The reliable and valid measures established in the present research will offer invaluable support to potential investigators in this field, enabling them to replicate the present study in different countries for comparative analysis. In future research concerning TAE, scholars should consider expanding the scale by incorporating additional items that fully align with their contextual and conceptual requirements. Furthermore, this research represents a considerable stride in making a reliable and valid scale on TAE accessible. This scale can assist policymakers, researchers, and other stakeholders in this pivotal domain, offering deeper insights into the potential influences of active tax organization policies on performance. It can also serve as a tool for policymakers to reassess their strategies and formulate new policies aimed at attracting increased investment and enhancing government revenues.

One potential limitation of the present study is its exclusive focus on tax employees. Future research may broaden its scope to explore different fields. While the present study employed SPSS and PLS, future researchers could consider using alternative statistical tools, such as the AMOS, to validate the reliability and validity of the methods.

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