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RESEARCH ARTICLE

Taxing Artificial Intelligence: Value Impacts and Governance in the Tax Sector (Study in Indonesia and Malaysia)

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ABSTRACT

Purpose - This research aims to examine whether the implementation of Artificial Intelligence (AI) in the public sector influences public score and organizational governance, particularly in the field of taxation. Theoretical framework - Previous research has indicated that the implementation of artificial intelligence (AI) in the public sector is influenced by public scores and organizational governance (Chen et al., 2023). However, no survey research has been conducted on public sector employees' perspectives regarding the implementation of AI. Design/methodology/approach - This study utilizes a questionnaire instrument to gather perspectives from a sample of 197 tax practitioners in Indonesia and Malaysia related to the adoption of artificial intelligence (AI) in the field of taxation. Findings - There is a significantly positive relationship between public score and organizational governance when it comes to considering the implementation of AI in the field of taxation. Research, Practical & Social implications - The findings of this study hold significant implications for both regulatory bodies and scholars in the field. It is recommended that further studies be conducted, employing samples from other countries and considering additional variables that may impact the adoption of artificial intelligence (AI) in the taxation sector. This approach is necessary to ensure that taxpayers are capable of using AI to fulfill their tax responsibilities and exercise their entitlements.

INTRODUCTION

Artificial Intelligence (AI), frequently referred to as artificial intelligence, offers the capacity to provide substantial advantages; nevertheless, it is also accompanied by societal challenges (Butcher & Beridze, 2019). Artificial Intelligence (AI) constitutes a domain of research and practical implementation that possesses the potential to exert a substantial influence on public policy and services across multiple domains. It is anticipated that in the forthcoming years, there exists the potential to achieve time savings of approximately one-third for government personnel. This would enable them to transition from engaging in monotonous chores to undertaking work that holds significant value (Berryhill et al., 2019).

Furthermore, artificial intelligence (AI) has the potential to be utilized across a multitude of domains, encompassing the public sector as well. The utilization of artificial intelligence (AI) in the public sector has a range of advantages, such as enhanced efficiency and effectiveness in expediting the processing, interpretation, and reasoning of vast quantities of data (Wirtz et al., 2019). Governments have the potential to utilize artificial intelligence (AI) in order to enhance policy formulation and decision-making processes, foster improved communication and interaction with citizens and communities, and augment the efficiency and effectiveness of public services. Although the potential advantages of artificial intelligence (AI) are substantial, attaining them is a formidable challenge. Nevertheless, the utilization of artificial intelligence (AI)

by governmental entities continues to fall behind that of the private sector. The domain of AI is complicated and demands significant effort to comprehend, while the objectives and circumstances inside the government sphere are distinctive, hence giving rise to numerous obstacles.

Despite the insufficient amount of study conducted thus far, artificial intelligence (AI) has emerged as a prominent and expanding concern within the realm of government. One of the central objectives of the public sector involves the advancement and enhancement of legislation and policies, the provision of public goods and services to individuals and citizens, and the creation and ongoing maintenance of the requisite tools, resources, and frameworks to facilitate the execution of responsibilities by civil officials (Berryhill et al., 2019; Rashis et al., 2023). In particular, the utilization of artificial intelligence (AI) in the field of taxation is primarily motivated by the swift advancements in technology and the growing imperative to enhance the efficacy of tax data collection and processing. Artificial intelligence (AI) has the potential to assist in a diverse range of tasks, including the collection, management, and analysis of tax data, the prediction of potential tax non-compliance, and the optimization of techniques for tax collection.

The utilization of artificial intelligence (AI) could provide numerous advantages for public sector entities, which are primarily responsible for taxation. The Malang City Government, in collaboration with the Malang City Regional Revenue Agency (Bapenda), has implemented various strategies to enhance tax collection efficiency. These measures encompass the periodic updating of regional tax data, the establishment of system integration, the organization of the Tax Awareness Festival, the implementation of Sambang Kelurahan, and the utilization of E-SKPD and E-SPTPD, among other initiatives. Nevertheless, the endeavors undertaken thus far have generated limited outcomes, as evidenced by the regional tax revenues and PAD accomplishments that have yet to attain their full potential, as depicted in **Table 1**.

Table1. Malang City Regional Tax Realization 2020-2022

Year	Target	Realization	Percentage
2020	425,000,000,000	351.659.920.903	82.77%
2021	462,000,000,000	430.226.323.451	93.12%
2022	566,000,000,000	547.446.866.621	96.72%

Source: Malang City Regional Revenue Agency (Data processed, 2023)

Table2. Malang City PAD Realization 2020-2022

Year	Target	Realization	Percentage
2020	32,371,417,403	491.189.243.955	92.26%
2021	14,067,445,482	603.795.666.883	98.33%
2022	718,028,603,480	715.621.401.156	99.66%

Source: Malang City Regional Revenue Agency (Data processed, 2023)

One potential metric for assessing the level of regional financial capacity is the amount of regional income, with particular emphasis on the Regional Own-Source income (PAD) (Miswati Gultom et al., 2020). The suboptimal realization of PAD (Pendapatan Asli Daerah) and regional taxation is believed to stem from a misalignment between public scores and the application of artificial intelligence (AI). In alternative terms, there is a prevailing belief that the utilization of artificial intelligence has yet to reach its maximum potential. Hence, it is imperative to comprehend and effectively govern the intricate relationship between public score and artificial intelligence (AI) in order to mitigate adverse outcomes and prioritize the enhancement of public score.

Thus far, scholarly literature has predominantly focused on normative and exploratory analyses pertaining to the utilization of artificial intelligence (AI) within the public sector. This domain presents numerous challenges in terms of public policy, alongside uncertain and unforeseeable outcomes arising from the implementation of AI. While governments and society stand to gain significant advantages from AI adoption, it is crucial to acknowledge the potential negative repercussions, such as the emergence of "algorithmic bias" whereby AI systems exhibit discriminatory tendencies when making consequential determinations for societal progress (Valle-Cruz et al., 2019). One of the primary obstacles in the governance of public score regards to the imperative of enhancing transparency. This necessitates the identification and rectification of biases within both the development of AI algorithms and the decision-making processes. One potential approach to enhancing governance standards involves the implementation of regulatory measures and conducting audits to evaluate and mitigate the influence of bias, which can have adverse effects on public scores (Chen et al., 2023). Prior studies have examined the influence of artificial intelligence (AI) on several public scores, including but not limited to equality, human autonomy, efficiency, and effectiveness. However, there is currently a lack of a systematic and thorough understanding of the correlation between artificial intelligence (AI) and public score, particularly in the context of AI system development.

Hence, it is imperative to conduct study on the application of artificial intelligence (AI) in the field of taxation in order to comprehensively comprehend the possibilities and obstacles entailed in employing this technological innovation. This study aims to offer valuable insights to both academia and government regarding the effective utilization of artificial intelligence (AI) in taxation. It seeks to enhance the efficiency and effectiveness of the tax system by identifying and addressing challenges. Additionally, this study explores the broader implications of AI systems in the public sector, extending beyond the narrow focus on efficiency, effectiveness, and profit that is typically associated with the private sector.

This study categorizes several components of the research into the following sections. The following section provides a comprehensive analysis of the key concerns surrounding artificial intelligence (AI) in the public sector, with a particular focus on taxation, accomplished by critically examining pertinent scholarly literature pertaining to the subject matter. The subsequent part provides an explanation of the research methodology employed in this study. The next one discusses the outcomes of data processing utilizing the methodology expounded upon in the preceding section. Ultimately, the concluding part serves to summarize the main findings and derive research-based conclusions, while also emphasizing the potential applications.

2 LITERATURE REVIEW

3. 2.1 Artificial Intelligence (AI)

According to the definition provided by the High-Level Expert Group on Artificial Intelligence of the European Commission (2019b), artificial intelligence (AI) is characterized as a system that demonstrates intelligent behavior through the analysis of its surroundings and the subsequent execution of actions, while possessing a certain level of autonomy, all with the purpose of attaining specific objectives. According to the CSSF (2018), within the financial industry, artificial intelligence solutions are perceived by the Luxembourg regulatory authority as tools that concentrate on a restricted range of intelligent tasks and are employed to assist people in the decision-making process. According to the British government, artificial intelligence is a multidisciplinary research domain encompassing various fields such as philosophy, logic, statistics, computer science, mathematics, neuroscience, linguistics, cognitive psychology, and economics. It involves the utilization of digital technology to develop systems that possess the ability to perform tasks typically associated with human intelligence. This technology draws inspiration from the functioning of the human nervous system and body, enabling it to perceive, acquire knowledge, engage in logical thinking, and execute tasks (Stone et al., 2022). Therefore, artificial intelligence is capable of performing tasks that were traditionally carried out by people, such as perceiving, learning, abstracting, and reasoning (Dwivedi et al., 2021).

4. 2.2 Taxing Artificial Intelligence

Artificial intelligence (AI) is generating significant interest due to its potential in enhancing government services and facilitating interactions with citizens, particularly in intricate policy and service areas.

Concurrently, the potential integration of artificial intelligence with governmental systems elicits significant apprehensions over its implications for accountability, governance, and its influence on societal dynamics (Berryhill et al., 2019).

The existing body of research on the application of artificial intelligence (AI) in the tax industry remains limited, however a number of relevant studies have been conducted. The deployment of artificial intelligence (AI) encompasses a diverse range of methodologies employed across different organizational contexts. Nevertheless, in a broader sense, artificial intelligence (AI) is widely regarded as a transforming force capable of enhancing the efficiency and efficacy of procedural operations inside an organizational framework (Ririh et al., 2020). The consideration of efficiency and effectiveness plays a prominent role as fundamental societal values in the context of AI applications. In relation to issues of governance, government authorities have noted the potential adverse effects that artificial intelligence (AI) may have on transparency. Furthermore, they have emphasized the possibility of a reduction in discretionary authority as a result of automation. Government authorities also observed that there was a failure to fully address societal values beyond efficiency (Chen et al., 2023).

Hence, it can be asserted that the utilization of artificial intelligence (AI) within public sector entities has the potential to enhance operational efficiency and efficacy, encompassing governmental bodies operating in the field of taxation. The primary objective of this study is to examine the perspectives of tax authorities, specifically personnel of the Malang City Bapenda and the Malaysian Domestic Products Institute (LHDN), regarding the utilization of artificial intelligence (AI) in governmental administration, with a particular emphasis on the taxation sector. The determination of the future utilization of AI is dependent on the perspective presented by researchers.

5. 2.3 Public Score in the Tax Sector

Government officials hold varying perspectives regarding the potential influence of artificial intelligence (AI) implementation inside the government sector on public scores. The research findings employ the methodology proposed by Bannister and Connolly to examine the impact of artificial intelligence on public ideals (Chen et al., 2023). This research has incorporated the examination of three distinct categories of public score: task-oriented, service, and social. In light of the ongoing advancements in artificial intelligence (AI), a valuable methodology for comprehending the influence on societal values involves an examination of the perceived capacity of AI to assist in bringing up transformational changes (Sun & Medaglia, 2019). Referring to the aforementioned explanation, the first hypothesis can be formulated as follows:

H1: *Public score has a significant positive effect on the use of Artificial Intelligence in the taxation sector.*

6. 2.4 Governance in the Tax Sector

The establishment of public service standards plays a crucial function within the realm of public sector performance. Setting public service standards is an integral component of public sector management (Sellang et al., 2020). Public service standards are often regarded as the basic benchmarks of performance that a government agency within a public sector company must adhere to. In order to assure the attainment of public service standards, it is imperative for each service unit to develop Minimum Service Standards (SPM). The concept of good governance is often seen as a means to enhance the quality of government performance, hence leading to improved service delivery to the community (Lestari et al., 2019).

Government authorities assert that the utilization of artificial intelligence (AI) within the realm of governance, with a major focus on enhancing efficiency and effectiveness, will have significant implications for crucial public scores. Additionally, the survey findings indicate that the public's perceived values that would be impacted encompass heightened levels of decision-making and responsibility towards society, facilitated by an accountable framework. In this context, the term "accountable" refers to the principle of ensuring openness in the disclosure of information pertaining to the advancement of algorithms and the utilization of data within artificial intelligence (AI) systems. The implementation of transparency measures represents a crucial milestone in mitigating the adverse consequences associated with the utilization of artificial intelligence within governmental contexts (Chen et al., 2023). Referring to the aforementioned explanation, the second hypothesis can be formulated as follows:

H2: *Organizational governance in the taxation sector has a significant positive effect on the use of Artificial Intelligence in the taxation sector.*

The model utilized in this study is depicted in **Figure 1**, in accordance with the formulated hypothesis:

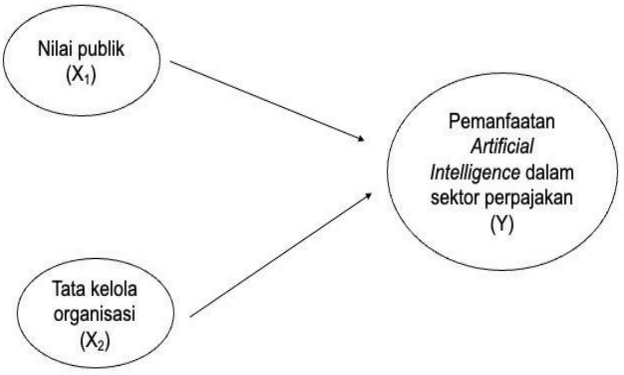

Figure1. Research Model. Source: Processed by Researchers, 2023

3 METHODOLOGY

The study was conducted utilizing a quantitative methodology. This study utilizes data from the tax authorities' standpoint in Indonesia and Malaysia. In order to procure the data utilized in this study, a questionnaire was employed as the primary instrument, which was disseminated through both online and offline channels. The questionnaire utilized in this study was derived from a pre-existing research mapping framework that examined perceptions of AI utilization in the public sector. This framework was published in a systematic literature review conducted by Chen et al. (2023). The decision to adopt this instrument was based on the fact that the taxation sector falls within the purview of the public sector. This adoption process categorizes public scores into three distinct sub-indicators, specifically duty orientation, service orientation, and social orientation.

A survey instrument was distributed to the entirety of tax authorities in Indonesia and Malaysia for a duration of one month. The execution of this stage is conducted through two methods: online using Google Form and offline through direct interaction with tax officials. The survey encompasses the entire population of tax officials in both Indonesia and Malaysia. All members of the study team participated in this phase, with the objective of enhancing the accessibility of respondents. The researchers conducted regular follow-up procedures to gather data from a total of 197 participants. This sample included 53 respondents from tax authorities in Malaysia and 144 respondents from tax authorities in Indonesia. The acquired data is subsequently analyzed via the SmartPLS software application.

Table3. Descriptive statistics

	Mean	**Median**	**Min**	**Max**	**Standard Deviation**	**Excess Kurtosis**	**Skewness**
X1.1.1	4,208	4,000	1,000	5,000	0.788	6,044	-1,954
X1.1.2	4,183	4,000	2,000	5,000	0.888	-0.274	-0.806
X1.2.1	4.122	4,000	2,000	5,000	0.887	-0.446	-0.681
X1.2.2	4,411	5,000	1,000	5,000	0.934	3,326	-1,851
X1.2.3	4,310	4,000	1,000	5,000	0.855	4,559	-1,870

X1.3.1	4,061	4,000	1,000	5,000	0.932	1,383	-1.106
X1.3.2	3,964	4,000	1,000	5,000	0.963	0.745	-0.925
X1.3.3	4,223	5,000	1,000	5,000	0.983	1,565	-1,368
X1.3.4	4,274	5,000	2,000	5,000	0.882	0.274	-1,059
X2.1.1	4,041	4,000	1,000	5,000	1,007	0.683	-1,044
X2.1.2	4,310	4,000	1,000	5,000	0.855	4,559	-1,870
X2.1.3	3,924	4,000	1,000	5,000	0.806	3,174	-1,328
X2.1.4	4,234	4,000	2,000	5,000	0.853	0.259	-0.964
X2.1.5	4,066	4,000	1,000	5,000	1,028	0.477	-1,066
X2.1.6	4,076	4,000	1,000	5,000	1,103	0.032	-0.997
X2.1.7	3,746	4,000	1,000	5,000	1,098	0.013	-0.735
Y1.1	3,893	4,000	1,000	5,000	0.979	2,774	-1,584
Y1.2	4,142	4,000	1,000	5,000	0.929	3,856	-1,819
Y1.3	4,254	5,000	2,000	5,000	0.943	0.221	-1.113
Y1.4	4,152	4,000	1,000	5,000	0.996	0.512	-1,087

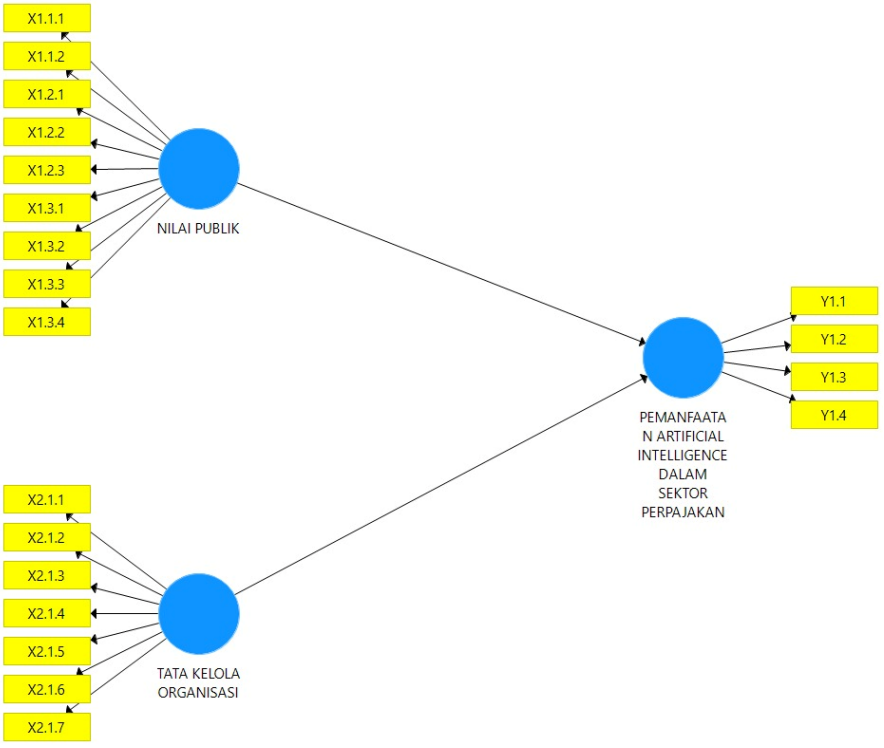

Figure 2. Research Construct Model

4 RESULTS

Prior to accomplishing hypothesis testing, it is imperative to assess the reliability of the available data. The assessment of validity is conducted by examining the external loading. Validity testing in the SmartPLS program was conducted by examining the loading factor and square root of average variance extracted (AVE) data. The loading factor serves as the initial evaluation of the measuring model or outer model. To meet the criteria of the loading factor, indicators must possess a value exceeding 0.7 in order to be deemed valid. Therefore, all variable constructs included in this study are deemed valid and can be analyzed to conduct hypothesis testing.

Table 4. Validity Test (Loading Factor)

	Public Score	Utilization of Artificial Intelligence in the Tax Sector	Organizational Governance
X1.1.1	**0.758**		
X1.1.2	**0.785**		
X1.2.1	**0.754**		
X1.2.2	**0.854**		
X1.2.3	**0.807**		
X1.3.1	**0.776**		
X1.3.2	**0.814**		
X1.3.3	**0.752**		
X1.3.4	**0.746**		
X2.1.1			**0.813**
X2.1.2			**0.828**
X2.1.3			**0.768**
X2.1.4			**0.833**
X2.1.5			**0.735**
X2.1.6			**0.787**
X2.1.7			**0.762**
Y1.1		**0.893**	
Y1.2		**0.870**	
Y1.3		**0.924**	
Y1.4		**0.907**	

Source: Processed by Researchers, 2023

The construct validity test findings (Loading Factor) are displayed in **Table 3**, indicating that all components in the questionnaire exhibit results exceeding 0.70. Therefore, this questionnaire is deemed appropriate for utilization as a survey instrument. **Figure 2** presents the outcomes of the construct validity assessment.

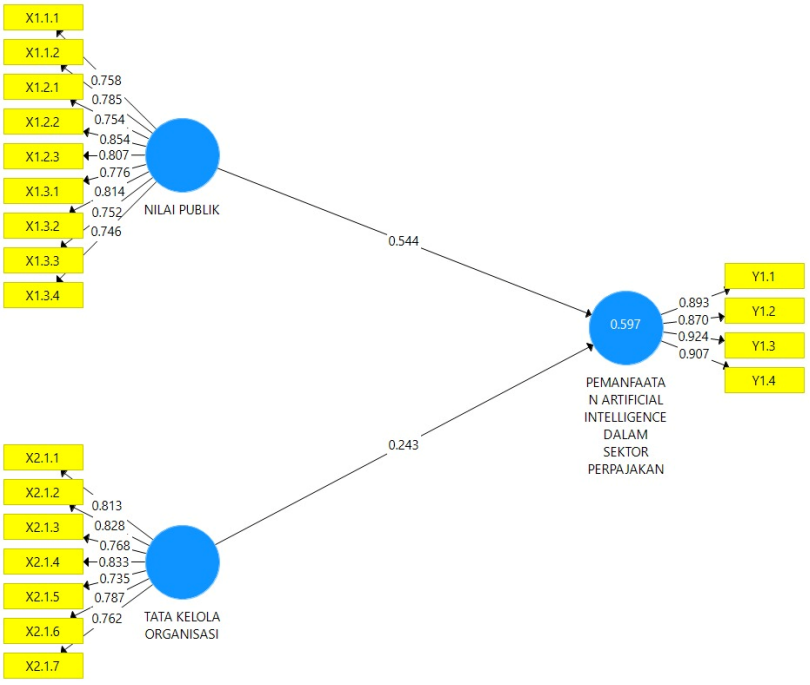

Figure 3. Loading Factor Results

An alternative approach for assessing the reliability of data involves examining the square root of the average variance extracted (AVE) value. The AVE, or average variance extracted, represents the average value of the variation in the construct variable. The objective of the study is to determine the extent to which variance is influenced by measurement error. In order to successfully pass the AVE test, it is necessary for the AVE value to exceed 0.5. According to **Table 4**, all constructs included in the research model exhibit an AVE value that exceeds 0.5. Hence, all constructs inside this study model have satisfied the necessary criteria.

Table 5. Average Variance Extracted (AVE)

	Average Variance Extracted (AVE)
Public Score	**0.614**
Utilization of Artificial Intelligence in the Tax Sector	**0.807**
Organizational Governance	**0.624**

Once the validity of the variable items has been established, the subsequent step involves testing its reliability. Reliability testing can be conducted by assessing the composite reliability and Cronbach's Alpha coefficients. A construct is considered to have high reliability when the composite reliability value (ρc) exceeds 0.8. On the other hand, if the value of ρc is greater than 0.6, the construct is described to be fairly reliable. Table 6 demonstrates the construct's high reliability, as evidenced by the composite reliability score exceeding 0.8.

Table 6. Composite Reliability

	Composite Reliability
Public Score	**0.935**

Utilization of Artificial Intelligence in the Tax Sector	**0.944**
Organizational Governance	**0.921**

Cronbach's Alpha can also be utilized to enhance the reliability test. A Cronbach's Alpha score exceeding 0.6 indicates that the responses provided by the participants on the questionnaire, as a means of measurement, can be deemed reliable. If the value of Cronbach's Alpha is less than 0.6, it indicates that the reliability of the respondents' answers is deemed to be low (unreliable). The reliability of the responses provided by the respondents, utilized as a metric, is demonstrated in **Table 7**.

Table 7. Cronbach's Alpha

	Cronbach's Alpha
Public Score	**0.921**
Utilization of Artificial Intelligence in the Tax Sector	**0.920**
Organizational Governance	**0.900**

The validity and reliability of the data and constructs within the study model have been acknowledged, thus necessitating the further examination of the hypothesis. Prior to accomplishing hypothesis testing, it is imperative to assess the research model's capacity to address the hypothesis through an examination of the R^2 value. The R^2 value requirements can be broadly categorized into three classifications: significant ($R^2 \geq 0.67$), moderate ($0.33 \leq R^2 < 0.67$), and poor/ weak ($R^2 < 0.33$). According to Table 8, the study model demonstrates the capability to address the hypothesis, as evidenced by the R^2 value of 0.597.

Table 8. R-Square (R2) Value

	R Square	**R Square Adjusted**
Utilization of Artificial Intelligence in the Tax Sector	0.597	0.593

In order to examine hypotheses using SmartPLS, the estimation for path coefficients table is utilized. The present study employed a bootstrapping approach for conducting the testing. The test results obtained through the implementation of the bootstrapping technique are presented in **Table 9**.

Table 9. Hypothesis testing

	Original Sample (O)	**Sample Mean (M)**	**Standard Deviation (STDEV)**	**T Statistics (|O/STDEV|)**	**P Values**
Public Score -> Utilization of Artificial Intelligence in the Tax Sector	0.544	0.549	0.135	4,035	**0,000**
Organizational Governance -> Utilization of Artificial Intelligence in the Tax Sector	0.243	0.240	0.122	2,003	**0.046**

Public Score of the Use of Artificial Intelligence in the Tax Sector

Based on the findings presented in **Table 9**, the observed P values indicate statistical significance below the threshold of 0.05. This significance level is considered significant as it falls below the conventional alpha level of 0.05, corresponding to a 95% confidence interval. Consequently, it can be concluded that a significant relationship exists between the Public Score and the Use of Artificial Intelligence in the tax sector. The result

of 0.544 suggests a positive (preferable) score, indicating a considerable positive link with the Public Score, confirming that the first hypothesis is **accepted**.

Organizational Governance Regarding the Use of Artificial Intelligence in the Tax Sector

Table 9 presents the findings on Organizational Governance regarding the implementation of Artificial Intelligence within the taxation sector. The statistical analysis reveals a P value of 0.046, which is considered significant as it falls below the conventional threshold of 0.05. Hence, it can be hypothesized that a notable correlation exists between Organizational Governance and the Utilization of Artificial Intelligence within the field of taxation. The obtained value of 0.243 signifies a positive number, thereby suggesting that there exists a substantial positive association between Organizational Governance and the variable under investigation. Consequently, it is inferred that the second hypothesis is accepted.

5 CONCLUSIONS

In conclusion, this study focuses on the perspective of public sector personnel towards the implementation of artificial intelligence (AI) within the tax sector. This study addresses unresolved inquiries that have not been adequately explored in prior research, specifically the absence of empirical investigations focused on the employee's viewpoint. The findings of this study indicate that the Indonesian and Malaysian tax authorities prioritize the incorporation of public scores and organizational governance when applying artificial intelligence (AI) in the taxation sector.

The findings of this study hold significance for both professionals in the concerned field and academics. In the context of deploying artificial intelligence (AI) in the tax sector, regulators, as practitioners, might investigate these two factors. The focal point of this study is related to the concerns of tax officials regarding the implementation of artificial intelligence (AI) within their professional domain. Hence, prior to implementing AI in the field of taxation, it is imperative to effectively mitigate these risks. The consequences for scholars are to the expansion of prior research on the utilization of artificial intelligence in the domain of taxation. This research can serve as a valuable resource for academics aiming to explore the tax authorities' perspective within the subject.

The present study is limited by the potential lack of data generalization. Due to the large number of tax authorities in both countries, the available data may not be sufficient to generalize the perspectives of all tax authorities regarding the utilization of artificial intelligence in the tax sector. Therefore, it is recommended that further studies be conducted to enhance and broaden the sample size. Moreover, further studies could include various factors that might impact the viewpoint of tax authorities when adopting artificial intelligence in sectors other than the taxation.

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