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BEYOND AUTOMATION: UNLEASHING THE FUTURE OF ARTIFICIAL INTELLIGENCE IN INDONESIAN TAX ADMINISTRATION

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ABSTRAK

Many governments, including Indonesia, consider Artificial Intelligence (AI) as an essential tool for promoting economic growth and improving national competitiveness. However, the rate of AI adoption remains sluggish and the Indonesian Tax Administration is either not completely ready for AI adoption. This paper investigates the early stage of Artificial Intelligence's (AI) function in Indonesian Tax Administration using the Technology Acceptance Model (TAM). The researcher explores tax administrator's perceptions, attitudes, ease of use, usefulness, intentions to use, and system utilization. An in-depth qualitative interview with four tax administrators shed light on the formation of AI through two technologies: Business Intelligence (BI) and chatbots. The research highlight diverse views on AI's ease of use due to unclear definitions, emphasizing the need for a shared understanding aligned with the national AI strategy. AI's perceived usefulness is recognized while varied attitudes toward AI adoption underscore the significance of training and data quality management. The informants revealed positive intentions for AI integration, particularly in compliance analysis and taxpayer supervision. While acknowledging limitations, future research must involve a wider variety of AI applications and a more diverse participant cohort in order to address the unique aspects of AI integration in taxation.

Keywords: ***Artificial Intelligence (AI), Tax Administration, Business Intelligence (BI), Chatbots***

INTRODUCTION

The integration of Artificial Intelligence (AI) in tax administration systems has rapidly gained momentum worldwide, including in Indonesia. As an intelligent machine that responds similarly to humans, AI consists of intelligence, business, research, and programming for solving business problems, is superior to symbolic programming and other human solutions (Taghizadeh, et al., 2013). On the other hand, Greenman (2017) stated that AI is utilised in problem-solving involving choices and decisions based on logical steps, making it a potential area to be further investigated in a business context, and this technology is able to identify and extract essential terms through automatic processing (Raphael, 2015).

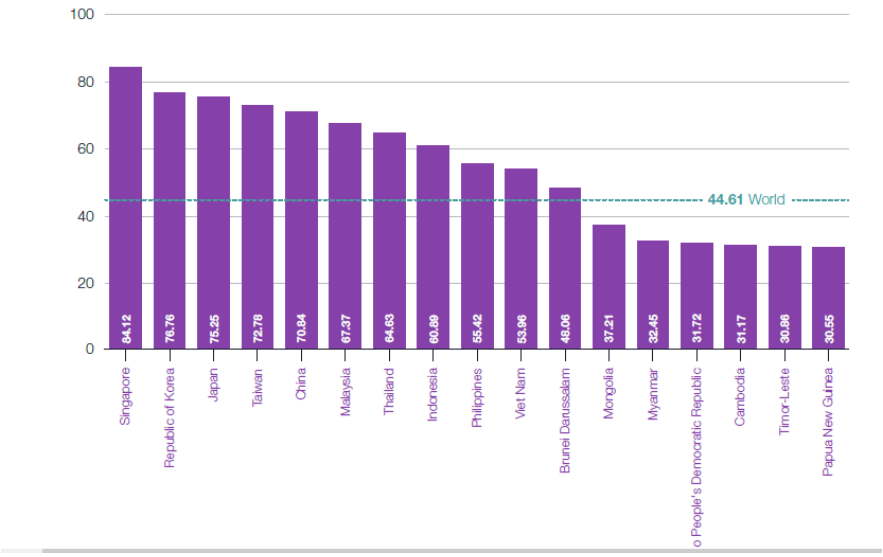

Figure 1. Oxford 2022 Government Readiness Index

According to a 2018 report by McKinsey & Company, AI has the potential to add $13 trillion to the global economy by 2030 (World Bank, na). At least fifty governments have devised an AI strategy or are in the process of doing so. However, the rate of AI adoption is uneven, and the majority of countries are either not prepared to adopt AI or are in its earliest phases. Oxford 2022 Government AI Readiness Index reveals that Indonesia's index of 60.89 is ranked 8th in South and East Asia below Singapore (84.12), Korea (76.76), Japan (75,26), Taiwan (72.76), China (70.84), Malaysia (67.37), and Thailand (64.63). Therefore, Indonesia launched National strategy of AI 2020-2045: AI Towards Indonesia Vision 2045, especially in the financial sector, consists of exploration, optimization, and business transformation from the revenue and cost side, as well as customer experience and good corporate governance (BPPT, 2020).

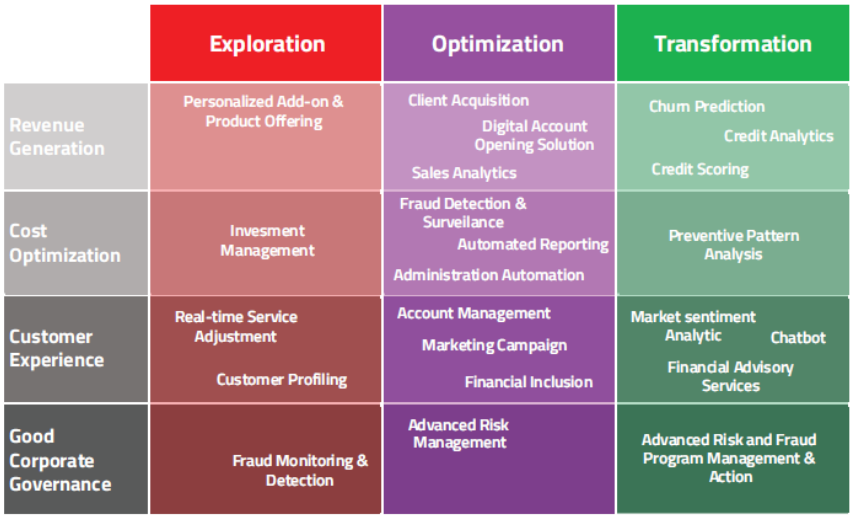

Figure 2. National Framework of AI in the Financial Sector

This paper's primary objective is to discuss the use of technology to automate the decision-making of various business processes in the tax administration in Indonesia. For the development of this problem, two types of artificial intelligence (AI) applications were considered: business intelligence

(BI), which consists of the smartweb and ability to pay (ATP) application, and the chatbots which are designed to address taxpayer's questions via a chat system.

Compliance risk management (CRM) is a process of managing taxpayer compliance risk that is carried out in a systematic, measurable, objective, and repetitive manner to form a risk engine to support decision-making at the DGT more efficiently and effectively (DGT, 2021). Currently, DGT has implemented CRM by the Director General of Taxes Circular number SE-24/PJ/2019 concerning the Implementation of Compliance Risk Management in Extensification, Supervision, Audit, and Collection Activities at the Directorate General of Taxes. However, along with the need to accelerate the implementation of compliance risk management in all business processes at DGT, it is necessary to add additional implementation of compliance risk management with the support of business intelligence.

Business Intelligence by definition, is a technique that combines architecture, information technology tools, and databases for collecting, storing, managing data, and knowledge management with data analysis tools to present useful information for planners and decision-makers, in this case, the DGT have started it via smartweb and ATP app (DGT, 2021). While, SmartWeb is an application based on graph analytics that is capable of presenting group taxpayer relationships in the form of a network, information on High Wealth Individual Taxpayers and their group companies, information on Beneficial Owners and Ultimate Beneficial Owners, as well as indications of non-compliance risks (DGT, 2021). In addition, Ability to Pay (ATP) is an application formed through a data analytics process that is used to provide descriptions and/or predictions of the level of ability to pay taxpayers (DGT, 2021). The implementation of business intelligence is intended to automate and maintain added value to the compliance risk management process. These additions and improvements are made to encourage more effective and efficient services, supervision, and law enforcement.

In addition, chatbots are part of the AI implementation that has taken place. When taxpayers or the public access the www.pajak.go.id page, a live tax chat feature will be found (Swastiko, 2023). This feature makes it easier for taxpayers or the public to communicate when experiencing difficulties in solving tax problems (DGT, 2021). As the need for tax information increases, taxpayers are starting to frequently complain about the long queues at the live chat service. This is because many taxpayers consult regarding tax information that is basic and general in nature. Responding to these problems, DGT has developed consulting services via automated chat, namely by presenting virtual assistants or chatbots (Swastiko, 2023). This chatbot is directly integrated with the live chat service. The answers given by this chatbot are standardized. If there are questions that are not resolved with the chatbot, they will be forwarded to the Kring Tax agent (Swastiko, 2023).

Although the Indonesian Directorate General of Tax has adopted AI in the early stages of implementing business intelligence (BI) processes and chatbots, very little is known about the implementation of this new artificial intelligence in the tax administration. This lead us to pivotal questions: How does the integration of Artificial Intelligence (AI) in tax administration systems, influence the efficiency, effectiveness, and acceptance of the Indonesian Tax Administration? What factors derived from the Technology Acceptance Model (TAM) play a pivotal role in shaping the successful implementation and utilization of AI-driven technologies in these areas?

METHOD

The research employed a qualitative approach, conducting in-depth interviews with 4 (four) experienced tax administrators who have firsthand experience with AI technologies in the Indonesian Tax Administration. The purpose of this qualitative study was to obtain a comprehensive understanding of the implementation of AI in the Indonesian Directorate General of Taxation from the user's perspective, with a particular emphasis on business intelligence (BI) and chatbots application.The key informants of data for this study were two DGT's senior business process analysts, one DGT's Officer of Information and Complaint Service, and one Account Representative, all of whom were stationed in Jakarta, Indonesia. The inquiry was conducted in Jakarta, Indonesia, between July and August of 2023.

Informant	Code
Senior Business Process Analyst	**SBA 1**
Senior Business Process Analyst	**SBA 2**
Officer of Information and Complaint Center	**OIC**
Account Representative	**AR**

The author uses the Technology Acceptance Model (TAM) in this study. TAM is a theory of information systems that seeks to develop a model of how users wish to adopt and utilize technology. TAM is a modification of Theoretical Action (TRA) that has been adapted specifically to the model of receiving information systems from consumers. Davis (1989) created this model in 1986 by adding two major components to the TRA model. Perceived usefulness and perceived usefulness are the two primary components (Hamrul, 2015). Following are images and explanations of the research methodologies utilized in this study.

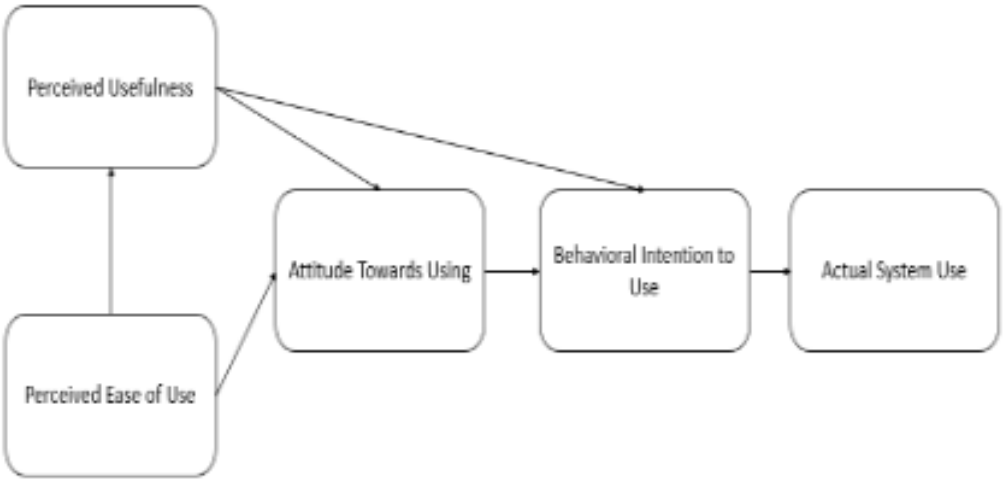

Figure 4. Technology Acceptance Model, Davis (1989).

The TAM method comprises the following five constructs:

Perceived ease of use. Usability is defined as a measure of trust in computers that are easy to understand and use, perceived usefulness of technology as the degree to which a person believes that technology is easy to understand, and the degree to which a person believes that usability can reduce the effort required to complete a task using a particular system (Wibowo, 2008).

Perceived usefulness. Perceived efficacy is the degree to which a technology is perceived to be advantageous to its users. Several indicators, including increased performance, ease of work, and overall technology benefits, can be used to measure perceived utility. One of the characteristics of the TAM model evaluated in the study is its usability (Davis, 1989).

Attitude towards use. Davis (1989) defines attitudes towards the use of TAM as acceptance or rejection of the system as a consequence of its implementation in the workplace.

Behavioural intention to use. Behavioral intention to use refers to the propensity to continue utilizing a technology. It is possible to anticipate a user's level of computer technology usage based on his or her attitude and level of interest in the technology. For instance, the desire to add supporting peripherals, to continue using the product, to influence other users, etc. (Davis, 1989).

Actual System Use. It is the actual implementation of the system. Davis (1989) defines the actual use of a system as some form of external psychomotor response as measured by the actual user.

The interviews were conducted using a semi-structured format to gather rich and detailed insights from the participants. The data collected from the interviews were analyzed thematically, identifying common patterns and themes related to AI adoption and usage. Guided interviews and document evaluation were employed as data collection techniques. The interview was then conducted and recorded via telecommunications media. The document review was conducted by looking through tax regulations and journals for relevant facts.

The researcher utilised triangulation data validity testing techniques to confirm the accuracy of the data, including triangulation methods, which compare information to ensure there were no errors in data collection; and theory of triangulation, which compares information with useful theoretical perspectives.

Variable	Indicators	Symbol	Source
Perceived Ease of Use	Easy to use Easy to understand	EOU1 EOU2	SBA1, SBA2, OIC, AR
Perceived of Usefulness	Makes work easier Beneficial	POU1 POU2	SBA1, SBA2, OIC, AR
Attitude Towards Using	Sense of acceptance Feeling of rejection	ATU1 ATU2	SBA1, SBA2, OIC, AR
Behavioral Intention to Use	Believe of AI integration Motivation to use the AI	BITU1 BITU1	SBA1, SBA2, OIC, AR
Actual System Use	Frequency Using Personal Experience	ASU1 ASU2	SBA1, SBA2, OIC, AR

Figure 5. Research Indicators

RESULT AND DISCUSSION

Based on the indicators that have been compiled, I develop a questionnaire with several statements related to the use of AI Tax for tax officers from the perspective of Technology Acceptance Model (TAM) to obtain direct user responses. The following is the output of the interview that has been generated.

1. Perceived Ease of Use

When the author asks about how easy or difficult is it to interact with and use an AI-enabled system especially the implementation of business intelligence (BI) and chatbot services, SBA2 stated that until now, he is not aware of any AI technology used in DGT services (EOU2). He stated that chatbot is not an AI technology.

> "A chatbot is only in the form of algohythm, such as if taxpayers chat "hello", the chatbot will reply by greeting and listing what services can be provided. If the taxpayer's problem cannot be resolved by the chatbot, the question will be transferred to officers at the Information and Complaint Service Office (KLIP) or Kring Pajak".

Furthermore, AR stated that, "It is very difficult to use AI because the rules are many and constantly changed" (ATU2). Another response from OIC explained that,

> "From the user side, use is quite easy, it's just that sometimes you need to choose the right keywords to be able to get the right answer" while SBA1 said that "At first it takes some habituation, if you are used to it, it must be very easy" (EOU1).

The author assumes that the variation of answers comes from an unclear definition of AI itself. Based on BPPT's national AI strategy, how to define AI is one crucial issue that has to be agreed upon amongst stakeholders.

2. Perceived of Usefulness

When it came to perceived usefulness, SBA1 as a key informant stated that

> "It is very useful especially since tax administration has a variety of data (eg. Big Data) that must be managed, one of the good Big Data management can be done using AI and including machine learning as a part of AI tool that will help service and supervision to Taxpayers" (POU1). However, the informant highlighted,
>
> "First and foremost is the basic coding of how AI "learns". AI systems require a lot of data in their development, so that AI "learns" using a variety of existing data so that the factor that can provide the reliability of the AI system is big and accurate data" (POU2)

Along with this, OIC agreed that "The application of AI technology in the development of DGT Chatbot services will greatly help streamline time and human resources" (POU2). The informant also responded that,

> "From the agent side, AI technology will be able to "filter" the number of services that will be served directly by humans that during this time some question topics are often asked repeatedly so that agents serve similar questions many times." (POU2).

The OIC defined chatbots as "Quite accurate, for example, keywords in interacting must be right to be able to get the appropriate answer" (pou2). On the other hand, AR feels "Not satisfied since there are still many applications in DGT that often error" (ATU2).

3. Attitude Towards Using

From the perspective of Attitude Towards Using, SBA1 acknowledge that "Socially, no colleague or employer has yet encouraged the use of AI in work." (ATU2). He also stated that until now, he has not seen any AI technology that has been developed in tax administration at DGT. In addition, Attitude towards using AI can be supported by,

> "More qualified server preparation in storing and managing Big Data, and the management of Big Data itself into more structured data so that AI or machine learning can understand these data and manage them into data that can be used in decision making by tax employees." (ATU1)

The key informant provides the logic that understanding the importance of accurate and quality data at the Tax Office as feedback that can be a data enrichment to manage, so the need for training on Data Quality Management is not only at the Head Office but also in the Tax and Regional Offices.

> On the other hand, OIC resumed that in her work unit,
>
> "The use of AI technology is very much supported. Chatbot development is always monitored and expected to be implemented optimally. The related team also continues to synergize in adding an answer repository for the development of the DGT chatbot". (ATU1)

The informants mentioned that although she will use the BI and chatbots in the future state, the pitfalls raise that "The information conveyed is quite helpful but still too general" (ATU2). In addition, AR does not believe since there are still many applications in DGT that have a lot of errors and lack of manually implemented by humans who are integrated systems, for example in payment registration (ATU2).

SBA2 stated that although she is not yet a frequent user of the system that uses AI in DGT, she stated that,

> "Certain jobs such as data and information collection, AI utilization is strongly encouraged, but certain activities and tasks such as deeper analysis and decision making still require real human judgment." (ATU2). She mentioned preconditioned that "It is necessary to make the necessary regulations, governance, and norms/guidelines related to infrastructure, resources, and training".

4. Behavioral Intention to Use

SBA2 stated that she intended to use it since she believes AI will be embedded and integrated into the tax administration system. She highlights that,

> "Inevitably the administrative system must keep up with other administrations and with the business world. In terms of increasing revenue, the utilization of AI will help tax administration to analyze and supervise compliance and ensure that those who must enter the tax system" (BITU1).

The informants believed that AI will increasingly play a role because it is a useful tool for the implementation of work, for example answering generic questions through chatbots, doing automated service work, providing analysis and information related to taxpayers and industry.

OIC stated agreed that,

> "Over time technology is getting more advanced and sophisticated" and "is expected to help reduce clerical and repetitive work so that employees can focus more on the core work at DGT" (BITU1).

On the other hand, SBA1 stated that he intends to use it since DGT is one of the agencies that has leading technology and is integrated with various other agencies. SBA1 stated that,

> "With this integration, better data management is needed. AI can be utilized in the management process. For example, the emergence of AI to create animated images, make journals or essay writing, to do automatic video editing just by making certain keywords in AI applications" (BITU2).

SBA1 stated four benefits of AI. First, On the service side, AI can provide quick solutions to taxpayer's problems such as answering frequently asked questions without having to wait for long queues on live chat or call "Kring Pajak". AI can provide solutions to the problem of filling out tax returns and pre-population data so that taxpayers have received data filled in according to the data they have (proof of deduction, tax payment proof (SSP), list of assets from third parties, list of debts from third parties, etc (BITU2).

Second, on the supervisory side, AI can provide potential taxpayers that need to be explored based on tax returns and third-party data automatically. Third, on the examination side, AI can provide input in the form of an audit plan that is on the potential and risks of financial statements, tax return data, and third-party data so that the audit can run effectively and efficiently. Lastly, for the law enforcement side, AI can provide suggestions on how to resolve dispute cases that are being experienced by tax officers.

5. Actual System Use

From the "actual system use" aspect, the author concludes that the actual use of AI in DGT is not quite obvious due to a lack of awareness and regulations. AR stated that he "rarely use the chatbot, since it is only normative information available and most taxpayer's will want to directly connect with the person or agent who operates the livechat" (ATU2, ASU1, ASU2). While SBA1 mentioned,

> "Until now I have not seen any AI technology that has been developed in my work (ASU1). At this time, there is a lot of inaccurate data that can provide shortcomings in AI, such as taxpayer's not reporting correctly their tax returns, filling in incomplete or non-standardized registration data such as abbreviated writing" (ASU2).

SBA2 informed that,

> "I am not currently a CRM-BI user (ASU1), but will utilize CRM BI products in the processes I am working on for future business process improvements. I once used the Kring Pajak chatbot to ask for tax info." (ASU1, ASU2).

Lastly, OIC stated that,

> "Currently I do not use chatbot services very often, just occasionaly to trying (ASU1). From the developer side, dynamic regulatory changes, especially in DGT, must be accompanied by continuous updating of repository data. The update process that is not done will reduce the accuracy of chatbot answers" (ASU2).

CONCLUSIONS

This paper discusses the role of Artificial Intelligence (AI) in the Indonesian Tax Administration through the lens of the Technology Acceptance Model (TAM). First, regarding Perceived Ease of Use and Definition Clarity, the study revealed diverse perceptions of using AI-enabled systems, driven by unclear AI definitions. Establishing a shared AI definition is vital, as clarified by BPPT's national AI strategy. Second, in terms of Perceived Usefulness and Data Quality, respondents recognized AI's value in managing Big Data and streamlining tax administration. Data accuracy emerged as crucial for AI's reliability.

Along with this, attitudes toward AI adoption varied. To foster support, emphasis on training, data quality, and structured preparation is crucial, both at the head office and tax offices. Furthermore, positive intentions emerged for integrating AI into tax administration, especially in improving compliance analysis and taxpayer supervision. Lastly, limited AI use resulted from awareness gaps and regulations, underscoring the need for continuous efforts to enhance AI-based solutions' accuracy.

Our research underscores AI's potential in Indonesian Tax Administration's Business Intelligence (BI) and chatbot services. Additionally, our study introduced fresh insights into diverse attitudes toward AI. Emphasizing training and data quality emerged as crucial for fostering positive organizational cultures. Challenges in actual system use underscore the continuous efforts needed for effective AI implementation.

Despite its insights, our study acknowledges limitations, focusing primarily on BI and chatbot services and having a restricted respondent pool. To address this, future research should explore broader AI applications with a diverse range of participants. Understanding whether limitations stem from methodology, sampling, or organizational factors will drive further advancements.

In conclusion, our study underscores AI's transformative potential in Indonesian Tax Administration. Addressing limitations is essential to ensure successful AI integration, ultimately leading to better decision-making, enhanced efficiency, and improved taxpayer experiences.

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