J-GADS: Journal of Governance and Applied Data Science
Vol. I, No. 1, 13 March 2026, pp. 7-12

Utilization of Generative Artificial Intelligence in Regional Tax Business Processes in the Samarinda City Government

Dody Novandi

Komplek Kantor Walikota Samarinda, Samarinda (75131), Indonesia
dodysamarinda@gmail.com

(Received 5 March 2026, Accepted 11 March 2026, Available Online 13 March 2026)

Abstract: The information technology platform developed by the Samarinda City Government for regional tax management still faces significant limitations. The system cannot yet perform automatic data analysis, and taxpayer consultation services remain manual, leading to long queues and extended waiting times. This study aims to explore the potential application of Artificial Intelligence in the regional tax sector of Samarinda. Using a literature-based approach with qualitative and descriptive methods, the research analyzes perspectives from various sources. The findings suggest that AI technology can act as a catalyst for innovation, enabling the optimization of regional tax collection in accordance with Good Governance principles. AI provides insights that support more rational and harmonious decision-making, while also offering opportunities to strengthen the AI Power City program, which is part of the Mayor of Samarinda's strategic agenda

Keywords: Artificial Intelligence, AI Power City, Good Governance, Regional Tax.

1. Introduction

The implementation of regional governance by regencies and municipalities within the current framework of Regional Autonomy must be accompanied by strong regional financial support to ensure the effective implementation and realization of local government agendas through regional development activities. The readiness and financial capacity of local governments are considered crucial and must be strengthened through various efforts, one of which is optimizing the growth of Regional Original Revenue.

In accordance with the mandate of Law of the Republic of Indonesia Number 1 of 2022 concerning Financial Relations between the Central Government and Regional Governments (HKPD), Regional Original Revenue (PAD) refers to revenue earned by regencies/municipalities derived from various local revenue sources. PAD consists of several components, one of which is local taxes [1].

Local taxes represent mandatory contributions from the public to the treasury of regency/municipal governments based on applicable regulations. These contributions are compulsory in nature, do not provide direct compensation to taxpayers, and are allocated for regional interests aimed at promoting public welfare. Pursuant to Law No. 1 of 2022 on HKPD, the types of taxes to be collected by regency/municipal governments include: Rural and Urban Land and Building Tax (PBB-P2); Duty on the Acquisition of Land and Building Rights (BPHTB); Certain Goods and Services Tax (PBJT), which covers Food and/or Beverages, Electricity, Hotel Services, Parking Services, and Arts and Entertainment Services; Advertisement Tax; Groundwater Tax (PAT); Non-Metallic Minerals and Rocks Tax (MBLB); Swiftlet Nest Tax; Motor Vehicle Tax Surcharge (Opsen PKB); and Motor Vehicle Title Transfer Fee Surcharge (Opsen BBNKB).

Local taxes in Samarinda City constitute one of the primary sources of PAD and serve as a significant component of the Samarinda Municipal Regional Revenue and Expenditure Budget. To support local tax administration, the Government of Samarinda City has provided supporting infrastructure in the form of information technology platforms, including information systems and databases. These systems are utilized internally by regional apparatus organizations responsible for tax management as well as by taxpayers in Samarinda City.

Based on observations of the use of information systems for local tax management within the Samarinda City Government, certain weaknesses have been identified. Specifically, the existing technological platform has not yet

been capable of performing automated data analysis. The current manual data analysis process results in low efficiency and limited accuracy.

Furthermore, in terms of local tax consultation services, the Samarinda City Government still relies on a direct interaction model between service officers and taxpayers. Several limitations arise from this manual consultation system, including restricted service hours, which may lead to long queues and extended waiting times for taxpayers seeking assistance and information.

Considering these conditions, the Samarinda City Government needs to further develop its existing local tax information technology platform into an intelligent system to enhance efficiency. Such a system should be capable of performing automated data analysis and generating recommendations. To address the limitations of manual consultation services, it is also necessary to develop an online consultation technology platform capable of providing rapid and efficient assistance without spatial and temporal constraints.

Currently, society is experiencing the era of the Industrial Revolution 4.0, in which the utilization and advancement of information technology significantly influence various dimensions of life, including local tax administration. One of the most rapidly growing technological platforms today is Artificial Intelligence (AI). As a complement to human decision-making, AI can reduce subjective judgment and personal estimations that are not data-driven[2]. The adoption of AI presents a potential solution to address the challenges of improving local tax management within the Samarinda City Government. AI can be implemented to analyze patterns in local tax data, detect potential anomalies, and predict taxpayer characteristics.

Referring to research conducted by Zhou in 2019, AI technology is capable of supporting problem-solving within the taxation sector and standardizing tax-related characteristics, thereby minimizing subjective decision-making [2]. According to Wellcode.IO (2019), as cited in Saifudin & Rahmawati (2020)[3], the implementation of machine learning an integral component of AI technology can facilitate the collection and processing of data into useful information, particularly because taxation systems are highly dynamic and subject to frequent regulatory changes in order to adapt to evolving conditions [3]. Furthermore, the application of Artificial Neural Network (ANN) algorithms combined with Particle Swarm Optimization (PSO) has been shown to improve prediction accuracy in estimating Regional Original Revenue (PAD) in Gorontalo City, based on PAD data from 2011–2013 [4].

Considering the aforementioned facts and problem descriptions, the researcher is motivated to conduct a study entitled "The Utilization of Generative Artificial Intelligence in Local Tax Business Processes in the Samarinda City Government." This study aims to examine the potential application of Artificial Intelligence in the local tax sector within the Samarinda City Government. The research employs a qualitative approach using a descriptive qualitative method.

2. Method and Experimental

The method employed by the author in this study is qualitative in nature, utilizing a literature review approach that generates descriptive data derived from books, academic journals, AI learning platforms, and other relevant sources. This method is commonly referred to as the "naturalistic research method," as the research activities are conducted within natural settings, and both the data collected and the analytical processes are predominantly qualitative in character [5]. The selection of a qualitative research method is grounded in a data processing model that is comprehensively elaborated, applying one of the key characteristics of qualitative research, the transferability of theories derived from previous studies[6].

The data utilized in this study consist of secondary data sources. These secondary data include books, scholarly journals, AI learning platforms, and other relevant materials related to the research object under analysis [5]. The literature was critically reviewed and synthesized to establish a foundational framework for examining the phenomena addressed in this study.

The data collection technique implemented by the researcher is the literature study method, which involves gathering data from various sources such as books, documented facts, academic research journals, online media articles,

and other relevant materials [5]. The collected data were subsequently analyzed using a descriptive approach to examine the utilization of Artificial Intelligence in local tax administration.

The research process was conducted by systematically reading, identifying, diagnosing, and analyzing diverse sources, including books, documented evidence, scholarly journal articles, online media publications, and other pertinent references. The analytical mechanism applied in this study is the descriptive method, through which the researcher seeks to describe and interpret existing facts, emerging perspectives, ongoing activities, observed impacts or consequences, and developing trends [5].

3. Results and Discussion

After reviewing various sources, including books, documented evidence, research journals, online media articles, and other relevant references, findings indicate that the utilization of Artificial Intelligence (AI) in the taxation sector during the Industrial Revolution 4.0 era has the potential to generate significant and positive impacts on local tax management within the Samarinda City Government. To support a more agile governance model, the integration of AI should be initiated and embedded into the existing service systems.

Several conceptual initiatives for implementing AI technology platforms that can be replicated or further developed to enhance local tax management in Samarinda City are outlined as follows:

A. The Use of Chatbots in Local Tax Consultation Services

Chatbots represent one of the prominent innovations produced by AI technology platforms. Through the integration of conversational interfaces and Natural Language Processing (NLP) technology, chatbots are capable of understanding and responding to human language in a natural manner.

Enhancing public understanding of local taxation in Samarinda City is a crucial element in fostering tax compliance awareness. Therefore, taxpayers require a virtual assistant capable of understanding local tax regulations in order to support informed decision-making.

A chatbot can function as a virtual representative of local tax consultation officers in Samarinda City by guiding citizens, responding to taxpayers' inquiries, and providing recommendations based on recurring keywords or commonly encountered issues. With the advantages of AI chatbot technology, the Samarinda City Government can deliver rapid and accurate support and information to taxpayers without time and location constraints, thereby reducing the workload of service officers and improving overall service quality.

Based on the capabilities of NLP and chatbot technology, the AI-based consultation workflow that can be designed by the Samarinda City Government is as follows:

1. Taxpayers access the chatbot system developed by the Samarinda City Government.
2. Taxpayers submit questions in text or voice format through the chatbot system.
3. The chatbot analyzes the text or voice input to understand the inquiry.
4. After generating a response based on the standardized local tax service database of the Samarinda City Government, the platform provides answers to taxpayers in text or voice format.

The findings of this study are consistent with several prior studies: 1) The implementation of AI chatbot technology in the Kring Pajak 1500200 contact center has improved service capabilities [7], and 2) The use of chatbots in the taxation sector, as part of the financial services industry, is expected to increase. According to data presented by Emarketer, 43% of financial service clients prefer utilizing chatbots to resolve issues before engaging directly with corporate services [8].

B. The Utilization of Machine Learning as an AI Platform to Develop a Taxpayer Compliance Detection System

With the operational implementation of information systems supporting local tax administration and reporting in the Samarinda City Government, large-scale databases have been automatically generated. These accumulated local tax databases provide opportunities for further exploration by transforming the system into an AI-based platform capable of identifying patterns and generating automated recommendations.

Machine learning capabilities can assist the Samarinda City Government in developing technology to predict taxpayer compliance levels and local tax revenue potential based on historical data. Various methods demonstrated in previous studies have shown the capacity to process large datasets into meaningful information, thereby producing valuable insights for data-driven local tax business process strategies.

Classification techniques focus on analyzing behavioral patterns and attributes of previously defined groups. This scheme enables the classification of new data by utilizing historical datasets as training and testing data, generating rules that serve as parameters for predicting taxpayer compliance levels. The resulting classification rules may take the form of conditional formulas, which can be integrated into existing information system programming languages to support the development of features that provide automated compliance status recommendations for taxpayers in Samarinda City.

The implementation of a taxpayer compliance detection system offers several benefits to the Samarinda City Government:

1. Enabling early detection of taxpayer compliance levels, allowing relevant regional apparatus organizations (OPD) to formulate appropriate strategies to improve compliance; and
2. Serving as a more effective control mechanism to reduce fraud or tax avoidance activities.

These findings align with several previous studies: 1) The Directorate General of Taxes (DJP) of the Indonesian Ministry of Finance has begun implementing machine learning for predictive analytics to support Compliance Risk Management (CRM) [9]. CRM aims to detect taxpayer compliance profiles and generate target lists for tax identification number (NPWP) registration [10], 2) Research applying the Naïve Bayes algorithm demonstrated its effectiveness in predicting hotel taxpayer compliance levels in Pasuruan City [11], and 3) The combination of Naïve Bayes and k-fold validation achieved a predictive accuracy rate of 99.43% in assessing public understanding and compliance with Land and Building Tax (PBB) in Dames Damai Village, East Lombok Regency [12].

C. The Utilization of Data Mining as an AI Platform for Estimating Local Tax Revenue Potential

In addition to classification techniques for predicting taxpayer compliance levels, another method that can be implemented by the Samarinda City Government to estimate potential local tax revenue realization is regression analysis. A commonly used regression technique is simple linear regression, which predicts the value of one variable based on another variable. The output of linear regression analysis is a mathematical formula used for estimation purposes.

Referring to the workflow of linear regression algorithms, the stages for predicting local tax revenue are as follows:

1. Determining the historical time range of local tax revenue realization data.
2. Identifying parameters influencing local tax revenue realization.
3. Normalizing the dataset to ensure variables with different scales share comparable value ranges, resulting in a transformed dataset.
4. Determining the proportion of training and testing datasets.
5. Conducting the learning process using the designated dataset.
6. Generating a predictive model in the form of a formula used to calculate projected local tax revenue based on predetermined targets.

The initiation of regression-based methods for estimating local tax revenue potential provides several benefits:

1. Early detection of potential revenue realization relative to established targets;
2. The ability to compare estimated revenue realization with existing potential;
3. Identification of zones with high and low tax potential; and
4. The design of more precise and realistic revenue target compositions.

These findings are consistent with prior research: 1) Data mining methods have been successfully applied to predict local tax performance in West Bandung Regency using revenue data from 2015–2022 [13], and 2) The combination of linear regression algorithms with PAD realization datasets from the Samarinda City Government (fiscal years 2017–2021) produced a predictive model for estimating local tax revenue realization [14].

4. Conclusion

Based on the results and discussion, the researcher draws several conclusions as follows:

1) The utilization of AI technology platforms can serve as an innovation enabler for the Samarinda City Government in optimizing local tax enhancement efforts, representing a concrete step toward the realization of Good Governance.
2) Machine learning and data mining, as branches of AI technology platforms, can be leveraged by the Samarinda City Government to analyze large volumes of local tax data, predict taxpayer compliance levels, and estimate potential tax revenue realization automatically, quickly, and accurately. These technologies are capable of recognizing patterns by learning from historical data, thereby generating insights that make decision-making more rational and consistent.
3) Implementing an AI technology platform opens up opportunities as a supporting initiative for the AI Power City program, which contributes to realizing the work agenda of the Mayor of Samarinda

In light of these conclusions, this study suggests that the Samarinda City Government should begin focusing on initiating the use of AI technology platforms in local tax management and integrating them into existing information systems.

Acknowledgment

The authors would like to express their sincere appreciation to the AI Creation Research Institute (Lembaga Riset AI Creation, LRAC) for providing research facilitation and support related to the application of SEM-PLS in this study.

Author Contribution

As the author, I would like to express my gratitude to those who have supported the preparation of this research journal, namely: Head of the Samarinda City Regional Revenue Agency.

References

[1] Pemerintah Indonesia, “Undang-Undang Nomor 1 tahun 2022 tentang Hubungan Keuangan Antara Pemerintah Pusat dan Pemerintahan Daerah (HKPD),” Jakarta, Lembaran Negara Republik Indonesia Tahun 2022 Nomor 4, 2022.

[2] M. Wulandari, “Penerapan Artificial Intelligence Dalam Pengawasan Pajak,” Pajakku. https://www.pajakku.com/read/62f47380a9ea8709cb18b9d1/Penerapan-Artificial-Intelligence-Dalam-Pengawasan-Pajak. Diakses: 22 Feb. 2026.

[3] Saifudin, M. A. Rahmawati, “Digitalisasi Administrasi Perpajakan: Implementasi di KPP,” Jurnal HUMMANSI, vol. 5, no. 2, hal. 69-80, Juni 2020.

[4] Drajana, I.C.R., “Model Artificial Neural Network Berbasis Particle Swarm Optimization Untuk Prediksi Pendapatan Asli Daerah (PAD),” Jurnal Penerapan Ilmu-ilmu Komputer, vol. 5, no. 1, pp 1-10, Juli 2019.

[5] M. Yahya, P. T. Otomotif, and W. T. Elektro, “Implementasi Artificial Intelligence (AI) di Bidang Pendidikan Kejuruan Pada Era Revolusi Industri 4.0”, dalam *PROSIDING SEMINAR NASIONAL,* Makassar, Indonesia, 2023, hal. 190-199.

[6] A. Fury Puspita, M. K. Rusydi, L. Purwanti, and I. Artikel, “Peran Big Data dalam Membangun Smart City untuk Sistem Perpajakan Daerah,” Jurnal Riset dan Aplikasi: Akuntansi dan Manajemen, vol. 6, no. 2, pp. 171–184, Maret 2023.

[7] L. Swastiko and A. Fauzi, "IMPLEMENTASI TEKNOLOGI CHATBOT PADA CONTACT CENTER KRING PAJAK 1500200: DAMPAK TERHADAP KAPASITAS LAYANAN," Jurnal Akuntansi dan Manajemen Bisnis, vol. 3, no. 1, hal. 111-120, Juni 2023. [Online]. Available: www.pajak.go.id

[8] Widyawicara, "Manfaat, Implementasi, dan Prediksi Tren Chatbot untuk Layanan Jasa Keuangan," Widyawicara. https://widyawicara.com/manfaat-implementasi-dan-prediksi-tren-chatbot-untuk-layanan-jasa-keuangan/. Diakses: 22 Feb. 2026.

[9] D. Kurniati, "Efisiensi Administrasi Pajak, DJP Terus Optimalkan Teknologi AI," DDTC https://news.ddtc.co.id/berita/nasional/1795121/efisiensi-administrasi-pajak-djp-terus-optimalkan-teknologi-ai. Diakses: 22 Feb. 2026.

[10] Sukada, I.W., "Implementasi Compliance Risk Management (CRM) Dalam Rangka Ekstensifikasi", dalam Simposium Nasional Keuangan Negara, Jakarta, Indonesia, 2020 hal. 876-891.

[11] R. Dimas Adityo and H. Miawarni. "Evaluasi Kepatuhan Wajib Pajak (Hotel) dalam memanfaatkan aplikasi Pelaporan Pajak Online Berbasis Algoritma Naive Bayes Classifier (Studi Kasus : Dinas Pendapatan Kota Pasuruan Jawa Timur)". dalam *E-Proceedings KNS&I STIKOM Bali*, Denpasar, Indonesia, 2017, hal 647-653.

[12] Zur'aini, Yahya, Samsu, L.M., "Implementasi Algoritma Naive Bayes Untuk Memprediksi Tingkat Kpatuhan Wajib Pajak di Desa Dames Damai," Jurnal Pengembangan Rekayasa Informatika dan Komputer, vol 1, no 2, pp 64-77, Desember 2023.

[13] M. Ramdhani, F. R. Umbara, R. Ilyas, "Prediksi Capaian Bulanan Pajak Daerah Kabupaten Bandung Barat Menggunakan Metode Logistic Regression," Journal of Information System Research (JOSH), vol. 5, no. 4, pp. 881–890, Juli 2024.

[14] T. T. Wulansari and D. Novandi, "Implementasi Linear Regression Untuk Estimasi Realisasi Pendapatan Asli Daerah Pemerintah Kota," *Progresif: Jurnal Ilmiah Komputer*, vol 19, no.1, pp. 21-28, Januari 2023.