

Promoting The Application of Artificial Intelligence (AI) in Public Finance Management in Vietnam

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ABSTRACT

Artificial intelligence (AI) has emerged as a key instrument to assist nations in modernizing public administration, particularly in the area of public finance management, in the context of the global digital revolution. AI can help identify financial fraud, streamline the public auditing process, and increase the effectiveness of budget revenue and expenditure. With a focus on examining the function and present state of AI application in Vietnamese public financial management, this paper demonstrates that there are still numerous obstacles to overcome in terms of data infrastructure, human resources, and institutions. Therefore, in order to establish the conditions necessary for AI to play an efficient and long-lasting role in Vietnam's public finance, the article has suggested ways to encourage its implementation in public finance management in that country today.

Keywords: *Artificial Intelligence (AI), Public Finance, Public Finance Management, Tax Management*

1. INTRODUCTION

Artificial intelligence (AI) is creating strong changes in many fields, especially in public finance management. The application of AI not only helps optimize processes but also improves efficiency and quality of work. In fact, AI is not only a trend but also a great opportunity to help Vietnam advance further on the world digital economic map. In particular, for state management, mastering this technology also helps improve management processes, reduce administrative procedures, especially in the field of public finance. In the context of strong digital transformation globally, artificial intelligence (AI) is increasingly proving its important role in improving the effectiveness of state management. Public finance is a field that requires high accuracy, transparency and efficiency and is currently becoming one of the key areas for the application of artificial intelligence.

AI not only helps automate traditional processes, but also supports strategic decision-making based on big data, enhancing the ability to monitor, forecast and prevent risks in budget management, revenue, expenditure, auditing, and public investment analysis. From an operational perspective, AI can fully support the professional work of each cadre and civil servant as a virtual assistant. AI can help state agencies provide customer support services, respond to legal documents or provide policy guidance automatically. In some cases, AI can replace humans in many stages, only needing to control at key points. In the financial sector, we can completely use AI to monitor compliance with tax and customs policies or forecast revenue and expenditure sources. The application of AI helps ensure transparency and fairness in implementing public financial management activities.

However, to effectively apply AI to public financial management, it requires synchronous preparation of tools, knowledge, human resources, environment, etc. to operate together. Meanwhile, in Vietnam, these factors have not yet met those requirements, there are still many limitations, inadequacies and difficulties. This article aims to analyze and evaluate the current status of AI application in public financial management in Vietnam, thereby proposing solutions to promote AI application to promote its positive role, improve the effectiveness of public financial management in Vietnam in the coming time.

2. RESEARCH METHODS

To conduct this research, the group of authors used the following methods:

- Synthesize and analyze academic documents, reports of authors, international organizations (WB, IMF, OECD), Governments of countries and legal documents related to technology application and digital transformation in public financial management.
- Analyze the current status of public financial management model applications at public financial management agencies (such as the Tax Department, State Treasury, State Audit, etc.), to evaluate the effectiveness and replicability.
- Study the practical effectiveness, implementation difficulties, and propose improvements from pilot models.
- Synthesize opinions from experts in the fields of finance, technology and public management to evaluate feasibility and propose policies suitable for Vietnam's reality.
- Propose solutions to develop AI applications systematically, suitable for the current organizational structure and institutions in Vietnam.

3. FINDINGS AND DISCUSIONS

3.1 The Role of Artificial Intelligence in Public Financial Management

According to Russell & Norvig (2020), artificial intelligence (AI) is “the study of how to make machines intelligent, especially intelligent computer programs”.

Artificial intelligence (AI) is a field of computer science. AI is the intelligence of machines (Machine Intelligence) created by humans, a product of science and technology to make machines have the capabilities of human intelligence and intelligence (McCarthy, 1998). This is one of the core elements of the 4.0 industrial revolution, contributing to creating a breakthrough in production capacity, improving national competitiveness, and promoting sustainable economic growth.

In Vietnam, the term Artificial Intelligence is defined in Decision No. 127/QĐ-TTg dated January 26, 2021, artificial intelligence is an important foundational technology in the process of national digital transformation, especially in the public sector (Prime Minister, 2021). AI is currently one of the important technology fields that the Government is interested in developing, with the goal of gradually turning Vietnam into an innovation center, developing AI solutions and applications in the Top 4 of the ASEAN region and in the Top 50 of the world. The reason why Vietnam sets this goal and even higher in the future is because of the great role of AI in all areas of socio-economic life in general and the field of public financial management in particular, which are:

- Improving operational efficiency: Automating processes, reducing administrative costs, increasing processing speed.
- Transparency and accountability: AI helps increase the ability to monitor, control and make public financial data transparent.
- Data-driven decision making: Financial agencies can use AI to make reasonable management policies, based on big data analysis and intelligent forecasting models.
- Forecasting state budget revenue and expenditure: AI supports more accurate forecasting of state budget revenue and expenditure through machine learning models. AI can analyze historical data combined with macroeconomic, social, and policy factors to develop forecasting models of state budget revenue and public expenditure, helping financial agencies to be proactive in planning and operating the state budget.
- Support in tax management: AI contributes to building management models, exploiting information, identifying and analyzing risks to promptly detect unusual behaviors, providing maximum support to taxpayers, minimizing risks of tax fraud prevention, thereby contributing to improving the effectiveness and efficiency of tax management.
- Controlling revenue and sales on e-commerce platforms.

- Manage and monitor public spending through supporting real-time spending data analysis, detecting abnormalities or signs of spending for the wrong purposes or exceeding the budget.
- Early warning of financial risks in budget spending units.
- Detect fraud and prevent corruption through behavioral analysis and anomaly detection. Through machine learning algorithms, AI can detect abnormal behavioral patterns in the process of financial transactions, payments, bidding, and public procurement.
- Support financial auditing and inspection when AI is applied to process large amounts of audit data, identify key points that need to be focused on, helping to increase efficiency and accuracy in public auditing. AI can automate auditing processes and analyze documents in financial auditing and inspection.
- Optimize public debt management and public investment when the AI system helps evaluate investment efficiency, analyze public debt risks, thereby supporting management agencies to develop appropriate fiscal strategies.

3.2 Legal framework for the application of artificial intelligence in public financial management in Vietnam

The Vietnamese legal system has gradually completed the legal framework to comprehensively regulate public financial management activities. On the basis of the promulgated legal framework on public financial management (including the system of Laws and sub-law documents such as: Law No. 83/2015/QH13 dated June 25, 2015 of the National Assembly on the State Budget Law; Law No. 20/2017/QH14 dated November 23, 2017 of the National Assembly on Public Debt Management; Law No. 58/2024/QH15 dated November 29, 2024 of the National Assembly on Public Investment; Law No. 15/2017/QH14 dated June 21, 2017 of the National Assembly and Consolidated Document No. 06/VBHN-VPQH dated September 16, 2024 on Management and Use of Public Assets; Law No. 55/2019/QH14 dated November 26, 2019 of the National Assembly on State Audit; Law No. 44/2013/QH13 dated November 26, 2013 of the National Assembly on Practicing thrift and combating waste; Decree No. 163/2016/ND-CP on guiding the State Budget Law, Decree No. 91/2022/ND-CP on Public Debt Management; ...) the application of science and technology, especially AI in the public finance sector requires an appropriate legal framework, both facilitating innovation testing and ensuring transparency, efficiency and information security. Currently, Vietnam has issued a number of relevant legal documents and policies as follows:

- Law No. 67/2006/QH11 dated June 29, 2006 of the National Assembly on Information Technology and the National Strategy for Digital Government Development. This law lays the foundation for the application of information technology in the public administration sector, including budget management, public investment and public assets. Digital Government is an important pillar to help deploy AI into public management activities systematically.
- Law No. 20/2023/QH15 dated June 22, 2023 of the National Assembly on Electronic Transactions): Expanding the scope of regulation for public activities, including public finance, allowing the use of digital signatures, digital records, and digital data in the entire management process. Creating a legal basis for digitization, automation, and integration of public financial data.
- Decision No. 942/QĐ-TTg dated June 15, 2021 of the Prime Minister on Approving the Strategy for e-Government Development towards Digital Government for the 2021-2025 period: This Decision sets out the requirement to develop an integrated platform, data analysis, and artificial intelligence in the operations of financial and budgetary agencies.
- Decision No. 127/QĐ-TTg dated January 26, 2021 on Approving the National Strategy on Research, Development and Application of Artificial Intelligence to 2030: Orientation for AI development in key areas, including the public sector, especially emphasizing the role of AI in financial and budgetary management and administration. Encourage testing of AI models in the public finance sector such as forecasting budget revenue and expenditure; monitoring public debt, and smart auditing.
- Decree No. 59/2022/ND-CP dated September 5, 2022 of the Government on Electronic Identification and Authentication: Supporting identity authentication in public financial transactions on digital platforms, facilitating AI to operate on authentic and legal data.

- Resolution No. 57-NQ/TW dated December 22, 2024 of the Politburo on breakthroughs in science, technology, innovation and national digital transformation.

The current legal framework has focused on publicity, transparency and increased financial decentralization. However, in the context of digital transformation and high-tech application, legal regulations on data management, artificial intelligence (AI), protection of public financial information, etc. have not kept up with the requirements of innovation. This is a gap that needs to be filled to facilitate modern public financial management models.

3.3 The state of artificial intelligence implementation in Vietnam's public financial management

In recent times, the application of AI in public financial management has not only helped improve processes but also increased transparency and efficiency in state management. AI can support the professional work of officials and civil servants as a virtual assistant. AI has the ability to provide customer support services, respond to legal documents or provide policy guidance automatically, helping to reduce workload and increase work efficiency (Le Hong Quang, General Director of MISA). AI has been and is being applied in many fields and public management agencies such as tax management activities of the General Department of Taxation, treasury management activities at the State Treasury, auditing activities at the State Audit, etc.

3.3.1. Application of AI in tax management activities of the General Department of Taxation.

In recent times, the tax sector has actively applied technology, especially artificial intelligence (AI) and big data analysis (Big Data) to improve the efficiency of tax management and prevent fraud. In risk management, the tax sector has deployed a big data analysis system in automatic tax refund classification, helping to detect unusual behaviors and provide risk warning chains in tax management. In tax refund work, the implementation of electronic invoices helps to enhance the ability to monitor, detect fraud, compare invoices and value-added tax declarations, thereby closely controlling tax refund consideration (Pham Quang Toan, Director of the Department of Information Technology, General Department of Taxation).

The tax sector has also applied many measures to prevent tax losses in e-commerce. Currently, there are about 102 foreign suppliers such as Meta (Facebook), Google, Tiktok, Netflix, Google... that have declared and paid taxes through the industry's electronic information portal. Accumulated from March 2022 (when the information portal for foreign suppliers was put into operation), foreign enterprises have paid over 18,600 billion VND. (Ho Duc Phoc, 2024).

In addition to increasing support for taxpayers, the tax sector has focused on analyzing large databases of taxpayers through data sources collected from tax declaration and payment records, electronic invoice systems, thereby identifying areas with high tax risks and large revenue potential to develop topics for inspection, examination, and prevention of budget losses. During the year, the tax authority conducted 62,932 inspections and examinations at taxpayers' offices; examined 525,792 tax declarations at the tax authority. The total amount of money recommended for handling through inspections and examinations was VND 62,726 billion, equal to 102% compared to the same period in 2023. Also thanks to the synchronous implementation of many tax debt management solutions, in 2024, tax authorities at all levels collected VND 61,227 billion in tax arrears, an increase of 33.2% compared to the same period last year. (General Department of Taxation, 2024). Next, the General Department of Taxation coordinated with agencies, organizations and unions to promote the installation and use of the eTax Mobile application. Accordingly, 100% of enterprises used electronic invoices with over 11.48 billion electronic invoices issued; Over 2.3 million accounts have registered for the eTax Mobile electronic tax application, 3.6 times higher than in 2023. In November 2024, the General Department of Taxation applied AI Chatbot on Virtual Assistant to support taxpayers. To date, the system has received and processed 30,000 questions with 4,500 registered users. This system integrates more than 100 sets of laws, specialized laws, guidance documents and integrated administrative procedures, thereby building more than 15,000 sets of bilingual content to provide information to questioners automatically, accurately and quickly (Mai Hoa, 2025). The Tax sector has also operated an electronic information portal for foreign suppliers and for households and individuals to register, declare and pay e-commerce tax, and do business on digital platforms; Applying artificial intelligence and big data to invoice management, tax refunds, inspections, etc. As a result, e-commerce tax collection continued to grow strongly, reaching 116 trillion VND, an increase of 20% over the same period. In particular, with the

implementation of the temporary exit suspension measure, the Tax sector has recovered 4,289 billion VND for the State budget, greater than the total revenue of the 3 provinces with the lowest revenue (General Department of Taxation, 2024).

In 2024, the General Department of Taxation applied AI (artificial intelligence) to control electronic invoices and analyzed tax data of businesses, helping the tax sector collect more than 4,700 billion VND. Thereby, many purchase and sale invoices of the same item and product line were discovered, but the units sold them at unusual prices. The tax authority requested to provide explanatory documents. If the unit does not have documents or does not provide an explanation, it will be put on the tax risk list. Any unit that uses invoices from units on this list is also at risk. "With the support of AI, the tax industry can analyze invoices up to F5, F7... Thanks to that, in 2024, the industry identified 79,000 businesses that had to check invoices, over 4,400 businesses were no longer operating at the address, more than 501 businesses were investigated and collected more than 4,700 billion VND" (Le Thi Thuy, 2024).

In addition to the above activities, the application of AI in tax management in other activities such as inspection, examination, international cooperation, and internal work has also been deployed and achieved many positive results.

3.3.2. Application of AI at the State Treasury.

With the goal of forming a treasury operating based on digital data by 2030, in addition to administrative reform and modernization of business activities, the State Treasury (KBNN) continues to modernize information technology, research and apply chain technology and AI technology to Treasury operations.

Accordingly, implementing Project No. 06 of the Government on developing applications of population data, identification and electronic authentication to serve national digital transformation in the period of 2022 - 2025, with a vision to 2030, the State Treasury has provided utilities to pilot remote digital signature technology, helping budget spending units not to depend on USB token devices (digital signatures), allowing biometric verification (face or fingerprint), preventing lending of USB tokens to enhance security; piloting data connection with electricity, water and telecommunications service providers to proactively pay for budget spending units according to the electronic authorization of the unit in Hanoi and Ho Chi Minh City.

In addition, the State Treasury has coordinated with a number of technology partners to research and test artificial intelligence (AI) technology in professional activities such as consulting, responding to policies and laws in the treasury sector; support and operation fields; risk management fields. At the same time, deploy an electronic storage system, gradually replacing paper storage, starting from storing records and documents of State budget expenditures, moving towards digitization and electronic storage according to the roadmap for promulgating and perfecting legal regulations on electronic storage.

Along with the above activities, the State Treasury has initially deployed AI in data analysis and automation of business processes. However, the implementation is still partial and lacks synchronization due to limitations in technology infrastructure, data and institutions.

3.3.3. Applying AI in auditing activities at the State Audit Office.

In the auditing field, AI is applied to perform activities such as data mining and processing, risk assessment, fraud detection, predictive analysis, automation of routine tasks, document review and compliance, etc. Accordingly, the State Audit Office (SA) has developed and issued many fundamental mechanisms and policies as a basis for implementing information technology (IT) activities, especially the "Development strategy and overall IT architecture of the SAV for the period 2019-2025, vision to 2030", including the application of AI in auditing. In fact, the SAV's IT infrastructure has been built and developed synchronously, the Data Center meets technical standards according to regulations. The SAV has initially audited IT systems and national databases based on AI; forming a new audit field based on AI, organizing systematic and wide-ranging reconciliation and inspection of BD. The State Audit Office has also built a shared database for the entire system, especially the list of audited units with more than 70,000 units at 4 administrative levels; is implementing electronic data connection and exchange with the Ministry of Finance, the Ministry of Planning and Investment; the State Bank; Vietnam Social Security. The team of IT specialists is young, has received basic training, many of whom have deep and broad knowledge in the field of AI application (Nguyen Quan Hai, 2024).

In addition to the achieved results, the State Audit Office still faces a number of challenges such as: The legal system and management documents in the IT field are not yet synchronized, especially there are no sub-law documents guiding to ensure the legal environment for accessing and exploiting data on national databases and electronic data of ministries, branches and localities; connecting, sharing, exchanging electronic data with audited units; lack of mechanism for collecting, standardizing, and updating data periodically. Technical infrastructure, data infrastructure, and software systems supporting audit activities have not met the needs of deploying a smart management platform system, creating a foundation for the process of converting traditional auditing methods to modern auditing methods based on digital data; lack of application software to support audit planning and implementation. Human resources with good IT skills are still lacking and weak.

3.4 The Challenges and Difficulties of Implementing Artificial Intelligence In Vietnam's Public Financial Management

The public finance management policy system still has many shortcomings and is not yet synchronized; the information technology system of the sectors (Tax, Audit, Treasury) has been invested but has not yet kept up with the requirements for building e-Government, Digital Government; there are still complaints and lawsuits that have not been completely resolved, causing frustration and affecting the investment and business environment. (Nguyen Van Thang, Minister of Finance).

- Lack of synchronous and quality data infrastructure.
- Public finance data is still scattered, unstandardized and difficult to connect.
- Lack of human resources who understand both AI and public finance management. Public human resources have not been properly trained in AI and digital technology.
- Clear legal framework and technical standards. Incomplete legal corridor.
- Risks of ethics, privacy and data security.
- Lack of mechanisms to promote innovation in the public sector.

3.5 Solutions for developing AI applications in public finance management in Vietnam today

- The Government needs to build a synchronous data infrastructure, develop an open, centralized public finance database with real-time analysis capabilities. Establish technical standards for financial data, ensuring interoperability between systems.

- The Government needs to complete the legal framework, focus on reviewing, proposing amendments and supplements, building and perfecting the system of legal documents on taxes in accordance with the new organizational model and management requirements, creating a transparent and clear legal framework; both facilitating all entities and closely managing, preventing loss of revenue and loss of public financial resources. Accordingly, it is necessary to:

+ Issue legal regulations related to AI deployment in the public sector, including AI ethics, data privacy and legal liability.

+ Develop a specialized legal framework that directly regulates the use of AI in public finance management, including:

- . Regulations on financial data standards for AI.
- . Technical standards for AI algorithms in budget analysis.
- . Controlled testing mechanism (AI sandbox) in the public sector.
- . Legal liability when AI detects and handles errors in public finance.
- . Protect citizen data when AI accesses tax, asset and budget information.

This is a gap that needs to be filled soon to ensure that AI is applied effectively, transparently and under control in the public finance sector, which is highly sensitive and closely linked to public trust.

- Develop digital human resources through organizing digital skills training for finance sector staff; integrate AI knowledge into training programs for civil servants and public employees and deploy them periodically.

- Strengthen public-private cooperation by creating conditions for technology enterprises to participate in providing AI solutions for the public sector. At the same time, it is necessary to support testing (sandbox) and pilot implementation of AI application models.

- There is a need for AI tools to support civil servants in each specific task, when streamlining personnel according to Resolution No. 18-NQ/TW of the 12th Central Executive Committee on continuing to innovate and streamline the political system's apparatus to be streamlined, effective and efficient. If each civil servant has a specialized AI assistant to help them do their work, productivity and quality of work will double.

- For workers, it is necessary to change their mindset and approach technology in a more proactive way because AI can replace humans in some jobs, even narrow the scope of current jobs as well as create many new occupations and job opportunities. Workers should be prepared by equipping themselves with knowledge, skills and especially learning how to master AI.

4. CONCLUSION

Artificial intelligence is an important tool to modernize public financial management, contributing to building an effective, transparent and adaptable public administration in the digital age. Vietnam needs to soon develop a comprehensive strategy on AI application in the public finance sector, focusing on data, institutions, human resources and cooperation between stakeholders. The policy recommendations outlined in the article are the foundation for orienting sustainable and substantive development in the future./.

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