

AI Powered Decision Support Systems in Government Financial Management: Transforming Policy Implementation and Fiscal Responsibility

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Abstract

With the continuous deepening of China's comprehensive deepening of reform, the further integration of technology and governance is accelerating. Artificial intelligence technology is ushering in a comprehensive outbreak, and the overall strategy of economic development must be transformed during the "14th Five-Year Plan" period. However, at present, the efficiency of policy implementation has become the top priority. Under the situation of full competition, the time window must be accurately picked. Once the opportunity is delayed, the initiative is easy to fall out of the hands. And it is difficult to maintain the advantages of sustainable coalition peculiarities and fiscal responsibility promotion. If timely and effective measures are not taken, the original development path may be blocked. Against this background, how to further intensify the allocation of public resources and accelerate the construction of decision support systems to improve the efficiency of policy implementation, maximize equity effects, and promote fiscal responsibilities is to be focused.

With the increasing complexity and increasing number of financial decisions, the traditional methods have been difficult to meet the needs of practical applications. The need for scientific, quantitative analysis, and decision-making technologies have evolved to financial decision support systems that incorporate technology with financial decision-making. Financial Decision Support System (FDSS) is a support system to provide financial decision-making on the basis of a computerized system of financial data processing and decision-making techniques. Supported by the data storage, statistical analysis, and financial analysis methods, it is possible to quickly understand the current operation of enterprises through the financial decision-making system, judge the development trend of enterprises, and provide scientific and objective basis for the enterprise decision-making with a view to helping enterprises to make better financial decisions. Since the 1980s, with the development of computer technology, intelligent development of the financial decision support system has sprung up. The combination of AI technology with the financial decision support system can further improve the flow of internal systems, making it more intelligent, more scientific. The application of AI technology has provided broader options for the development of financial decision support systems. On this basis, the artificial intelligence-based financial decision support system has evolved.

Keywords: AI, decision support systems, government financial management, policy implementation, fiscal responsibility, AI in Government Finance, Fiscal Policy Optimization, Decision Support Systems (DSS), Public Sector Financial Management, AI for Fiscal Responsibility, Data-Driven Policy Implementation, Automated Budget Forecasting, Government Financial Analytics, AI for Public Sector Transparency, Smart Government Budgeting.

1. Introduction

Recent government reforms have altered the financial governance landscape and financial systems in many countries are becoming increasingly complex. While governmental decision-making cycles shrink, fiscal practitioners must ensure increasing efficiency in fiscal practices to improve accountability. Effective financial management also requires the collaboration of actors with diverse roles, such as ministries, budget users, oversight, and state audit institutions and, in recent years, international organizations have also come to play a significant part in harmonizing national fiscal practices. Yet, this cooperation is traditionally challenged by sovereignty-based reasoning. The transformation brought about by this link act in the

processes of financial governance calls for the development of interdisciplinary understandings of how to enhance it. There is ample scope in public administration but also in related areas like political science, management studies, or economics to study the evolution and effects of new methods of financial governance. In comparative budgeting and accounting research, scholars across the disciplines should increasingly collaborate so as to obtain a full understanding of the implications of quantifying the fiscal matters of accounting and budgeting processes of government. The objective of this text is to provide insights into the development and effects of a new form of governmental activity that on the one hand attempts to standardize fiscal practices across national borders, and on the other hand, seeks to adapt fiscal practices to transformed governance requirements. In the process of extensive literature review is

conducted to link existing concepts of policy transfer, convergence, pressures etc., to a financial management perspective and suggestions for further research are put forth.

To that end, this special issue presents a sample of interesting experiences from different countries and on various topics. They reflect how the underlying emphasis in public financial management is shifting towards a more holistic view of the system, and how governments are actively harnessing innovative instruments to effect change. Started by conventional budgetary reforms, public financial management systems in many countries are reformed comprehensively and continuously. Meanwhile, an increasing number of developing countries have also adopted electronic and information technologies in government, promising the improvement of service delivery, enhanced transparency and accountability, as well as economic growth. This special issue aims to raise broader issues that are at the interplay of these trends, presenting experiences from different contexts. More specifically, the papers address the crystallization of multi-year budgeting in developed countries as a tool to enhance budgetary transparency; the continuing tension between the 'old' and 'new' paradigm of financial management information systems; the development of financial New Public Management; the potential pitfalls and the effectiveness of a Financial Management Information System-assisted program budgeting reform in a developing country; and the issues and challenges of building a large-scale Financial Management Information System in a Chinese province.

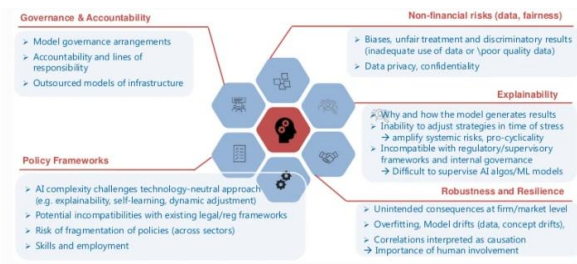


Fig 1: Financial technology decision support systems

1.1. Background and Rationale

Financial management in governments has a long history. To manage revenues, expenditures, debt, and assets, governments have established certain systems that have gradually evolved. With the rapid development of the economy, the growth of population and urbanization, and the transformation of the social structure, in the context of the government's comprehensive, open, and rule-based compliance, the traditional general treasure house management model has become increasingly outdated.

Traditional financial management systems cannot fundamentally solve these problems, and have exposed many problems, such as inconspicuous objectives, inelastic means, no scientific basis, and no real-time basis. There is an understanding that the cybersecurity and surveillance state are fundamentally in tension if not mutually exclusive, especially when it comes to the rule of law and aspects of privacy. Designing lawful and ethical responses to deepening government investment in AI is crucial, but efforts to date are “centred on individual AI technologies or datasets, like facial recognition or biometric data.” This approach is not enough because it fails to take into account the “broader processes of design, deployment, and oversight of smart operations,” for example in urban planning, poverty alleviation, and taxation offices. These “AI-Powered Decision Support Systems” (AIDSS) seek to harness the insights of big data and AI to “transform fundamentally the ability of bureaucrats to manage” policy implementation and fiscal responsibility, while also ensuring that public funds are spent “effectively, efficiently, in accordance with the budget taken as voted, ethically, and without corruption”.

Finance and financial management are the core competitiveness of the operation of government and enterprises. In order to manage and control finance and financial management, it is necessary to collect all kinds of information in time and to analyze and process it effectively. The decision support system (DSS) just meets this need. The financial DSS (F-DSS) was designed for financial management, providing decision-making consultation on all financial aspects. In recent years, with the application of information technology, many financial DSS have been created and used in practice. The financial DSS can assist financial managers in making decisions effectively. Managing financial management controls better under the new situation.

Equ 1: AI Forecasting for Fiscal Performance

$$y_t = f(x_{t-1}, x_{t-2}, \dots, x_{t-n}) + \epsilon_t$$

Where:

- y_t is the predicted revenue/expenditure at time t .
- x_{t-i} are historical data points influencing the model
- ϵ_t represents random error or residual noise.

1.2. Research Objectives

The main objectives of this research are: to prepare a review on how AI-powered and AI-driven Decision Support Systems (DSSs) can enhance government financial policy

implementation and management practices for adjusting to fiscal regulations and macro policy goals, to evaluate and review potential benefits and challenges formed when government financial auditing agencies start employing AI-powered DSSs in their auditing and policy management processes, and to identify which critical factors need to be properly addressed when the relevant actors engage in these activities. The most highlighted issue will concern how AI-Powered DSSs will fit government practice and then economic feasibility, improved legality, and other various facets of government financial improvement regarding fiscal responsibility and macro policy objectives will be scrutinized. This review intends to blend literature review with a handful of real cases or experiences in robust and established systems in developed or developing nations, although results to be reflected on proper intention, investments, and further case studies for each separate issue.

Recent years have witnessed increased discussions considering how emerging technologies, often known as the Fourth Industrial Revolution, such as AI can greatly impact the existing system of government financial auditing and the management of sovereign wealth. Those discussions range from how a single financial management tool like a smartphone can help low-income consumers to better manage their social benefits or control state-owned resources management illegalities to how a national economic policy monitoring software system can help with timely policy adjustment when warning signals in market fluctuation or natural risks arise. However, most studies still remain at the hypothetical conjecture stage on future changes of these governance systems. As a continuation of previous reviews to bridge a literature gap on existing AI related government financial practices, in particular on macro policy support, this will review how AI-DSSs can help governments to better perform and manage altogether this set of diverse activities, and to evaluate how they handle specifically the budgetary mechanism to boost fiscal revenue and expenditure to be adjusted against fiscal regulations and macro policy goals. From this perspective, 53 scientific articles and papers published within the last 10 years have been understood in terms of how their feasible results fit government practices and their economic practicality. It has been discovered that relatively significant improvements in tax revenue were shown, even though dubious issues such as heterogeneity bias and no accuracy change were also present. For proper investment, both the necessity of cooperation in data provision and system implementation should be taken into account.

2. The Role of AI in Government Financial Management

Information autonomy has enabled financial managers to produce tens of spreadsheets every year. Each country's public institutions alone have generated fiscal tables exponentially as the number of individual governments has grown. These colossal volumes are transformed into financial statistics or policy-relevant information depending on how they are used. For the best use of information, it is not preferable to deliver piles of print-outs to managers. Mechanisms must be devised to retrieve the right information sources in an easy and timely manner. One smart mechanism is the A.I. tool developed at the World Bank which they called smart script. This system tracks users' workload, periodically and when invoked by the user, and analyzes specific tasks to provide a delicious menu of lists that summarize, analyze, and benchmark data on that task. This paper uses data from the Land Management Index database to investigate the sorry state of decision support on land matters, and then introduces a smart script to demonstrate the positive results that can be achieved using this type of A.I. tool.

Over the last decade or so, there has been rapid growth in the attention to governance, public finance, and fiscal decentralization. In most cases, it was scarcity of resources that induced this demand. Policy-makers and politicians, development partners, researchers, and outside analysts began asking for more and better data to guide their growing interest in the sector. Public administrations have responded by being much more open about their work and achievements. This has meant that financial managers became much more accountable. At the same time, information technology permitted the diffusion and exchange of information to all these parties but also introduced a stress factor by making available an almost endless amount of information. Yet the financial services decision support and reporting systems that organizations have developed lag far behind the state of the art. handcrafted.

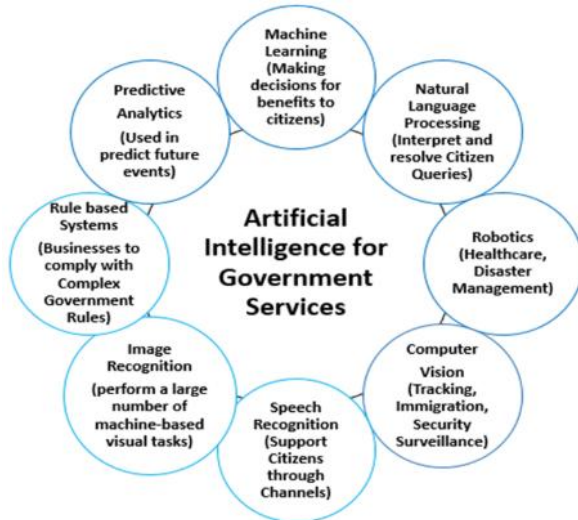


Fig 2: Role of Artificial Intelligence for Government

2.1. Overview of AI Technologies

This subsection provides a broad introduction to the AI technologies supportive of government financial management. It introduces foundational technologies (FTs) and discusses their functionalities for the financial context. More advanced technologies that are built upon FTs are included as well. For each AI technology (AIT), its functionalities along with example applications and the financial context are discussed. This subsection is not a comprehensive guide of existing AITs, and an ever-evolving landscape of AIT is highlighted by summarizing related literature and discussing AIT developments in US federal agencies (FA). Governments' use of AI in financial management lags behind that of the private sector (PS). This CA has examined policy implementer opinions (PIO) on the use of AI in the regulated community (RC), aiming to determine a more detailed sense of how AI is impacting financial operation at the State level. The research found that some financial operations-focused positive impacts seem likely to accrue to State regulators. On the policy implementation side of government (GOV), PIO agreed that the use of AI-based financial systems would likely streamline current practices.

Adjusted states and regulated entities (RE) could well experience a greater benefit than do FA from the implementation of AI systems. It may be premature to expect financial operations at the State level to be largely automated. However, opportunities for AI to become more involved in State financial operations likely exist. In general, there is support for expanding the use of AI in such operations, though it appears that some elements of financial operation may reject AI use. The comments PIO offered help to identify the specific areas of financial operation which

could most benefit from AI investigation. It is recommended that future efforts concentrate on (1), sharing successful AI financial practices, and (2), connecting FA with better tech-resourced representatives of the RE. Organizing an AI best practices-sharing consortium of RE representatives could stimulate the development of AI-compliant financial systems at the State level and better inform FA of the current technological capacities of their REs in this area.

2.2. Benefits and Challenges

The adoption of AI solutions is widely known as an effective mechanism to address various governance issues. The same holds for government financial management (GFM), where AI-based decision support systems promise to significantly improve policy implementation and fiscal responsibility. The dual nature of AI solutions in GFM takes a central rationale in this discussion: AI's benefits as well as the challenges for its successful adoption. A balanced view is taken by simultaneously presenting the benefits and challenges of AI in GFM, paving the way for informed discussions among various stakeholders in government financial management.

The deployment of AI-led decision support systems for forecasting financial events or asset prices has been the subject of extensive research, especially in the financial market sector. AI models have been tested to provide convincing empirical evidence that AI significantly improves the accuracy of financial forecasting. As a case in point, the interest in applying AI models for analyzing budget execution data is rising among finance ministries. Enhanced by cutting-edge data processing technologies, AI models are tested to improve the capacity of forecasting the monthly pattern of government revenue or expenditure, hence guiding policy makers on timely and proper financial policy responses. Secondly, multi-agent AI systems, such as modeling complex interactions among behavioral rules and adaptive expectations, have the potential to improve the capacity of economic policy making agencies to assess country risks, thereby improving the capacity of a higher-income country to counter crises symmetrically to lower-income countries. As a third case, AI has been tested to design an agent-based model that captures the policy properties of the responsible banking sector and the fiscal authority. Indeed, the economy is composed of an agent-based model that can lead up to a fully endogenous one, including the financial sector. These models can be exploited throughout a scenario analysis of different fiscal measures to assess the potential effectiveness and efficiency of debt consolidation strategies. Enhanced by benchmarking exercises, results provide insights for policy discussion in choosing the optimal strategy to follow. This case study also provides the rationale for an extensive cooperation and sharing of AI technologies between fiscal authorities and central banks. At the same time, it highlights the bottlenecks

to be overcome. These can be significantly alleviated through an active intervention of international financial institutions.

3. Decision Support Systems in Financial Management

The concept of Decision Support Systems (DSS) and their importance are discussed in the context of financial management. DSS can be thought of as “intelligent” tools to facilitate the generation and synthesis of vast amounts of financial information, so that they can analyse and model past trends and possible future scenario effects before planning and policy are formulated and implemented. These systems support the development of future financial and resource processes and help analyse ‘what if’ or prospective issues with important financial consequences. Their adaptation in financial management is widespread including in government operations, policies, and ex-ante and ex-post evaluation happen.

Definition of DSS in the financial context is made and the scope of the financial context is outlined. The functionality and future of DSS and reasons why it is a key tool that facilitates enhanced accountability, transparency, and fiscal governance are discussed. Essentially Decision Support Systems (DSS) can be thought of as computer-based “intelligent” mechanisms to support decision-making that assist the managers of the system in developing alternative financial and budgetary information for quantitatively analysing the effects of future decisions on them. This approach to such systems fosters the analysis of a vast amount of financial data and acts as a tool for users. More importantly, these “intelligent” mechanisms go even further, using models developed for the past financial and budgetary behaviors to forecast future trends. Thus, these sophisticated tools can engage a variety of inquiries with different financial and budgetary scopes. It could be used in a comprehensive control setting by identifying and analysing the effectiveness of a large variety of policy measures in a given financial or budget scenario, or be used in the early phases of the elaboration of the economic packages by examining the future scenarios of different parameter requests by stakeholders. There is a growing use of these intelligent DSS in governments either as a response to financial crises or structural adjustments, as a preventive measure or in the context of an adequate environment.

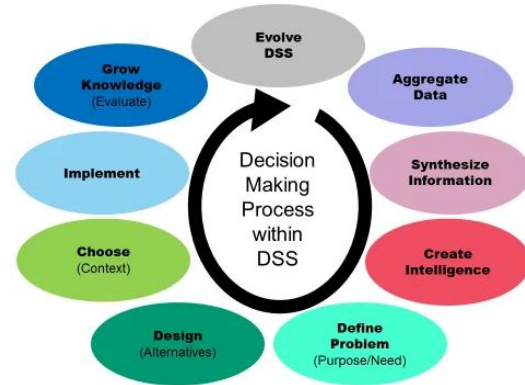


Fig 3: Decision Support Systems

3.1. Definition and Functionality

Decision support systems (DSS) are interactive software-based systems intended to support decision-making activities or provide assistance in modelling. They can be employed throughout an organization, having different levels of decision-makers as intended users. DSS are normally utilized by senior management, focusing on the major strategic and policy issues. A typical DSS contains a modeling tool, which implements the computational model of the decision-making problem and a user interface, which enables the decision-maker to communicate with the system. A DSS consists of: data management subsystem, model management subsystem and user interface subsystem. Intelligent DSS integrates intelligent systems or artificial intelligence technologies to enhance decision providing capability by examining the decision problem in real time, detecting, and processing relevant and non-relevant information, decision alternates and suggestion based on user demand.

Once considered exclusive to the private sector, decision support systems are increasingly gaining acceptance in the public domain as a means of making the machinery of government operations more efficient and accountable to taxpayers. The automation of complex calculations, simulations, and database searches is seen as a powerful way to support better-informed decision-making, with automated audit trails promoting both fiscal transparency and accountability. Decision support systems that generate policy options for political decision-makers have the potential to transform policy-making from the current practice of “cut and try” to a more “anticipatory” and “evidence-based” process. A DSS can also be employed in “issue-oriented duty-distribution,” specifying the department or agency that must take what steps, when, to accomplish the implementation of proposed policy measures. Next, publicly available data regarding government revenue and spending are integrated as input. The DSS collapses them into two parameters: the targeted budget balance and its growth rate.

3.2. Key Components

A DSS system in financial management is composed of data management components, model management components, knowledge management components, and a user interface component. It handles the flow of financial data into the system from which financial models are built. The data management component has sub-components which can identify things like internal consistency checks in financial data and sampling financial data for model building. Financial data form the foundation of DSS in managing the finances of any government organization. Exercises such as preparing a budget and projecting revenues become easy when good financial data are maintained. Financial data also needs to be accurate and so the data management component has internal consistency checks to find inconsistencies in financial data which can occur due to incorrect coding or data entry errors. At the same time, financial data can become very voluminous and not all data is relevant so the component needs to expose the government's financial data at an adequate level of detail to the user interface and model management components to ensure that relevant data are used to build models. It is likely that earlier generated financial data have become stale and so the component also samples a portion of most recently updated financial data for use by the model-building components. Providing crucial summary information, financial data are displayed in both the form of tables and charts.

There are various techniques for performing this exercise but it is required with limitations. There is a brief mention of how these exercises are usually done; analyzing economic trends and estimating elasticities, the rest of the exercise is repetitive with different numbers for assessing how various changes impact government revenues. For example, how much of an increase in tax rate on a particular source of revenue is required to offset a specified decrease in revenue from that source? This focuses on a few types of applications that can be helpful for doing such an exercise. Model management entails the use of financial models for performing the exercise above. Indeed the use of models for preparing the budget is quite common and widely encouraged. Four types of models are used for building financial models which have an entire model building process. Building models can be quite an intensive exercise and requires sending and receiving terabytes of data so instead a menu of models is provided. It is highlighted that a DSS is not a replacement of the expertise and intuition of staff economists familiar with the data and specialized in financial management.

Equ 2: Risk Management and Optimization

$$\min_{\theta} \left(\sum_{t=1}^T (r_t(\theta) \cdot x_t - \text{Loss}_t) \right)$$

Where:

- $r_t(\theta)$ represents the return from financial decisions .
- x_t is the financial decision made at time t .
- Loss_t is the risk associated with the decision at time
- T is the time horizon of the forecast.

4. Case Studies and Examples

Case studies and examples will reinforce the practical implications of the theoretical concepts so far. It will also be an opportunity to hear “the stories”, a first-hand account of how things either worked out, or miserably failed as hoped.

Context: Change in the national currency unit from k1000 to k1. With more too-many digit problems. Objective: Correct urgent smallish mistakes in executing policy. Outcome: Other unintended too-many digit problems got fixed along the way.

Context: Struggle with budget execution and commitment controls. Objective: Full automation of government (and later all public) accounts at the Bank of Zambia. Outcome: Fiscal management got a lot more effective; credited it for the upgrade.

Context: significant historical moment of post-soviet freedom. Young, ambitious policy-maker heading newly minted department. Objective: Two of them (information society, administrative reform) Outcome: Policy was duly transformed. Estonia is now often cited as one of the early e-gov success stories.

Bajeti: Kwacha Trilogy: better public finance management. Bwalya: Kwacha Trilogy: project had to grow to succeed. Vera: Kwacha Trilogy: it can be dangerous to get carried away. Vihalemm, Leino, Ramist: GeGov Estonia: conflict with own minister. Godlewska-Mrowka: Budget Execution Reviewer: both failed.

Expectations for government AI projects. Complexity and novelty Equanimity and bureaucratic risk aversion. A theoretically very neat framework. The practical complexity of government AI projects and the pitfalls to which they are prone. Policy for low-risk AI in governments and others.



Fig 4: AI in Government Case Studies

4.1. Successful Implementations

Cambodia: Countdown to Financial Year-End In most governments, financial year-end procedures commonly stretch during the first months of the new calendar year. This period is characterized by growing urgency and expectation to achieve two outcomes: effective allocation of the remaining budget, and compliance with statutory expenditure deadlines. With a continuous accrual system and almost half of its overall budget disbursed in December alone, a national government in Cambodia launched a financial decision support system to address the inherent magnitudes and complexities of the challenge under its new Public Financial Management Reform Program. The implementation was a rare example of private sector leading the project management, with the steering committee ranging from the Minister of Economy and Finance to penultimate line staff, sourcing a specialized vendor. Beginning with a monitoring dashboard, on-time compliance quickly quintupled. So successful was the application to the second PFMRP cycle, everyone across the different administrations were already thinking the government will do it again - signal significance to the vendor and other parties.

Indonesia: Strengthening the Financial Data Transparency Policy There are over 500 thousand villages within the archipelago of Indonesia. Constrained by historically decentralized systems, elements like accounting standards and reliable systems have not been widely implemented at the lowest tier of public administration. Following the breakthrough policy integration of the Village Fund Allocation covering fiscal years 2015–2019, all village financial transactions were no longer cash-based and entirely passed through official bank accounts – triggering opportunities through extensive financial data they generated. The Ministry of Finance developed the Village Financial Data Transparency Drive program, with an artificial intelligence capability facilitating it to provide village governments with weekly scores of detailed transparency performance. Success stories include the detection of an embezzlement collaboration between an individual village’s cadres and a third-party company using the indicated marks. The affected region’s Governor immediately ceased the practices, adopting 21 consecutive resignations.

Korea: Maintenance of Financial Records via Machine Learning The Republic of Korea provides an illustrative example of the mutual relationship between AI and traditional technologies in optimizing government systems, showcasing a simple and effective process to maintain financial records via a machine learning capability. The implementation revealed the importance of the following: a broadly approached financial management and investment strategies, a clear and detailed planning for any new development, a succession of evaluation routines, inviting direct end-user feedback, and decisions to commit further upgrades and maintenance afterward. The focus is broadened afterwards to share lessons learned from representative instances of successful AI DSS in government financial management contexts, featuring diverse backgrounds and varying specificities regularly taking stock of associated broader concepts.

4.2. Lessons Learned

The case studies presented provide several insights on the challenges and lessons learned of employing AI. The following common challenges in using AI technologies in government financial management are observed: (a) structured and unstructured data integration, standardization, and architecture; (b) behavior change and programmed resistance to change; (c) preparing middle management and operational staff with “up-skilling” and “reskilling” before the full adoption of the AI DSS; (d) integration with other regulatory and administrative AI tools; (e) the need for differential publicity messages for politicians and public officers based on their knowledge level about AI technologies; and (f) issues about data confidentiality and cybersecurity of personal and sensitive data from external stakeholders. The lessons learned emphasize that the design and implementation of AI tools and practices need to be adaptable to each governmental situation, from the central to the local level, and according to the policy cycle. Governments typically have different institutional structures and their policy environments and economic and social challenges are different as well.

The AI-powered DSS design should consider the adaptability of both content and IT. Regarding the content, the tools, the algorithms, and the possible applications must consider the necessity of adhering in each case to different laws and with different intensity. As for the IT tools, the IT-legacy characteristics such as geographic coverage or capacity of altering databases must be taken into account. Jointly, it is important to build for a long term sustainability and resilience to different possible states of the art in the technology and in the AI legislation. Under this framework, it is recommended to co-design the AI tool with stakeholder participation at all policy cycles and to run pilot experiences to test the reliability of the AI DSS, as well as to collect the

necessary data and adjust the algorithms to match the forecasting power of the AI DSS with the needs of the administrators to design successful policies.

5. Impact on Policy Implementation and Fiscal Responsibility

The adoption of AI-powered decision-making support systems can have broad impacts on government, from improved policy implementation to fiscal responsibility. The latter involves creating more efficient processes and utilizing data-driven technologies to improve the accuracy of decision-making processes. As an early technological adopter, there is an opportunity for the government to have a significant impact on AI-related decision making in financial management. Adoption of AI may lead to a shift in roles for finance professionals.

For example, artificial intelligence-driven decision-making support systems can facilitate a greater emphasis on strategic advice regarding more complex transactions, rather than routine financial reporting tasks. Step-change enhancements in data processing and predictive analytics capabilities allow finance to monitor a greater number of transactions with enhanced detection. Large volumes of financial data are the target for manipulation in a truly huge volume of activity, so the AI system would add significant value. The ability to bring data sets together from multiple sources and interrogate structured and unstructured data in an effective way could facilitate the early identification of trends, outliers and anomalies. Rather than scrutiny of individual transactions post the event, financial and non-financial data would be interrogated to provide risk-based insights to inform the introduction of more informed policies. At a more general level, such AI systems can automate data aggregation and analysis, avoiding time-consuming spreadsheet interrogation of financial data to identify emerging areas of financial risk. These decisions can be supported with an audit trail of changes, adding transparency and credibility to the insights developed by finance.

A crucial element of improved financial management is the transition of finance roles from the traditional transaction verify-report-forecast style to building strategic partnerships and providing insightful advice to enhance accountability.



Fig 5: Understanding Fiscal Policy

5.1. Improved Efficiency and Accuracy

Government financial workflows are complex; however, many routine tasks can be automated by a machine learning algorithm. Machine learning has many applications in government financial management, from financial expenditure forensics to anomaly detection in accounting ledgers. Just as the Industrial Revolution in the 19th century changed manual labor, artificial intelligence technologies today are changing the way people work and live. It can be expected that in the next 10 – 20 years, artificial intelligence-based decision support systems will be widely used in government financial management to assist decision-making arrangements.

As everyone knows, artificial intelligence technologies have been maturing, and many productivity tools have already been put into work to improve efficiency and accuracy. For example, algorithms can run through large datasets in a short period of time and allow for timely intervention in a data-driven manner by governments. From 2010 to 2018, the state of Alaska saved \$2 million by using Exari, software based on artificial intelligence to draft contracts, to draw up two-way agreements in two hours. Oakland-based start-up company Neighborly is using algorithms to reduce the cost of raising funds for local governments in the US by bypassing investment banks. Paris, France, applied artificial intelligence algorithms in 2018 to reallocate resources in the transportation sector, resulting in 17% more operations without significantly increasing costs. Montréal, Canada, and Melbourne, Australia, use data analytics to develop predictive forecasting models to optimize the allocation of resources in public safety and public health. Turning to government finances, the Chinese Finance Department launched the Credit Rating System in 2017. It uses 25 indicators to evaluate the financial conditions of 31 provinces in China, and the results are disclosed in a color-coded heat map. In June 2018, Qinghai Province, Anhui

Province, Guangxi Zhuang Autonomous Region, and Guizhou Province, which all were rated red, received warning notices to prevent and mitigate financial risks. Also, the unanimous detection model of fraudulent fundraising projects was established based on the financial data of seven listed companies involved in illegal financial fundraising events, depicting the financial in and out of fraudulent fundraising events and the abnormal behavior of the listed enterprise's financial indicators before and after participating in illegal financial fundraising events.

5.2. Enhanced Transparency and Accountability

The adoption of Artificial Intelligence (AI) systems within government financial management has the scope to significantly transform the way policy is implemented and fiscal responsibilities are executed. This extends from budgeting and financial reporting to all facets of public financial management (PFM) including procurement, audits, compliance, and enforcement. The prioritization of aid and the allocation of government expenditure and fiscal strategies in a period of economic downturn, difficulty, pandemics, and unforeseeable crises prevalent to current conditions may be carried out more precisely, concentrating in this respect on the expectancy of a gradual diffusion of the use of these technologies amongst Least Developed Countries (LDCs).

It is argued that the adherence to the principles of good governance is inherently linked to the development of PFM, and can best be advanced by incorporating and broadening particular academic debate within the theoretical framework of political science. This approach is focused on the universal components of governance and assists in focusing attention on these aspects of the transformation of PFM which are most likely to bring about substantial benefits. The implementation of AI technologies on the transparency and accountability potentials of institutional changes in PFM is explored through a mix-method examination concentrated on recent developments and ongoing changes to public finances, engaging with scholarly texts discussing innovative theories on good governance, global trends in institutional development, and substantiating empirical observations with explanations drawing on the modern sector of the state. Central to the advancement of both financial and administrative institutions, generalizations are drawn on the influence of the growing governmental use of AI technologies on PFM and its similarities and divergence throughout LDCs nationally and globally.

Equ 3: AI-Optimized Tax Collection Model

$$T_t = f(\text{GDP}_t, \text{Tax Rates}_t, \text{Compliance Rate}_t)$$

Where:

- T_t is the total tax revenue at time t .
- GDP_t is the gross domestic product at time t .
- Tax Rates_t are the tax rates imposed at time t .
- Compliance Rate_t is the estimated tax compliance historical data.

6. Conclusion

As a conclusion, the preceding discussion laid out some of the arguments about transformative potential and challenges of AI-powered decision support systems in government financial management. It was found that various financial management functions of a government can be effectively integrated and enhanced by AI technologies and their associated intelligent systems. By doing so, policy implementation capacity can be greatly improved, thereby promoting fiscal responsibility and macroeconomic stability. Topics about improved efficiency fostering transparency and accountability were brought up, acknowledging their role in ensuring economic governance. As the concluding remark suggests, both transparency and accountability complement each other, and need to be in place for each other to be effective. While the general public, including the media, are traditionally more interested in transparency in the specific use of public resources, accountability tends to be associated with political decision-makers in the first place, who rely on professional advice of technical nature in making financial management decisions. Hence, the general public should have more interest in the capacity of a government in making use of financial advice, than in its ability to retrieve detailed financial information, for good or bad.

Despite its potential, the installation, integration, and maintenance of AI systems are not without challenges. Knowledge is costly, time-consuming, and often uncertain, especially in the early stage of innovation. Skilled analysts themselves are a scarce resource. In developing countries, a lack of financial data, on which intelligent systems depend, is not uncommon. In addition, following linearity, not all useful, policy relevant knowledge can be converted into an exact mathematical model, while the assumption of linearity is not universally valid. On the other hand, adhering to commonly accepted simplifying assumptions may not be possible in politically sensitive matters, like fiscal policy and public finance.

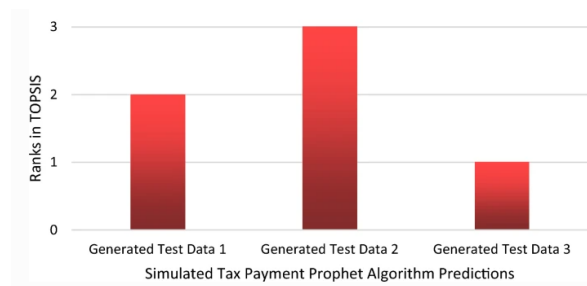


Fig : Financial technology decision support systems Journal of Electrical Systems

6.1. Summary of Findings

The rapid progress of artificial intelligence (AI) technology is expected to significantly enhance governmental financial management; however, AI adoption is at a nascent stage. This study proposes that AI integrated decision support systems have the potential to transform traditional government financial management, leading to better policy implementation and fiscal responsibility. A five-dimensional view is established to analyze how AI technology can positively influence the efficiency, accuracy, transparency, and accountability of the decision-making process. Original data collected from 65 respondents supports the above views and calls for further alignment of AI promotion with established policy goals. Based on the examination of five successful cases and theoretical frameworks, guiding measures are suggested. Attention to related challenges in order to ensure sustainable AI applications is advised.

AI technology has been widely accepted in the public and private sectors and has rapidly penetrated every sector since the mid-2010s. An impressive array of AI achievements have continuously been released globally. The year 2020 saw worldwide AI investment top \$46 billion. The rapid operationalization of AI technology has indefeasibly transformed various organizational models. Governments are following suit, striving to adapt to AI's capabilities. In this study, government financial management is taken as a prime example. Government financial management primarily covers the budget process, ranging from the drafting of budget requests by authorized agencies, the submission of budget requests to higher levels for examination, review, and approval, and finally, to the execution of approved budgets within a set time framework. Meanwhile, AI-generated budget documents would digitize the information and reduce human error. Thereby, the budget would be more error-tolerant in the final stage. Strategic financial management founded on data availability may lead to a more sensible and vigorous fiscal policy. Generally, financial management covers the entirety of decision-making related to a government's revenue and expenditure.

6.2. Future Directions for Research

This review aspires to contribute to a more nuanced understanding and engagement with recent literature on AI applications in the public financial management domain. Among the AI applications in government financial management aimed at supporting decision-making efforts, GOGFMs represent the more sophisticated and novel "new generation as pioneers" in their wider adoption of AI techniques. GOGFMs and thus a subset of "AI decision-making applications in public finance at a governmental level" have been increasingly promoted as part of technocratic efforts to modernize governance across the globe. In commercial and public sectors alike, AI application has been invoked as a panacea to increase both productivity (efficacy) and transparency (equity) of organizational procedures, with pioneers heralding potentially far-reaching ramifications on national economic efficiency and even international relations.

A nascent body of literature critically examines various GOGFM efforts, hypothesizing potentially far-reaching institutional and geopolitical shifts. Although those claims mostly remain speculative, such works demonstrate that AI applications and especially GOGFMs are subject to high expectations but also to profound socio political controversies. Informed by those studies and in conversation with them, this review seeks firstly to offer a more systematized presentation of the nascent AI in GOGFM literature, focusing on emerging trends and nascent theoretical insights. In light of current knowledge, possible venues for future research are then mapped out, emphasizing emerging hybrid methodologies and the importance of applying multi-disciplinary perspectives.

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