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How Can Artificial Intelligence–Driven Predictive Analytics Improve the Efficiency, Equity, and Accountability of Public Sector Resource Allocation in the United States?

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Abstract

This paper analyzes the potential of artificial intelligence (AI)-based predictive analytics to enhance efficiency, equity, and accountability in public-sector resource distribution in the United States. Rapid integration of AI technology in government facilities has enabled more data-driven, proactive decision-making, yet concerns remain about efficiency, equity, and accountability. This study adopted a quantitative research design based on secondary data of three official government sources in the United States: the 2024 Federal AI Use Case Inventory provided by the Office of Management and Budget (OMB), USAspending.gov, and the Government Accountability Office (GAO) Report GAO-25-107653. The data was analyzed using descriptive and analytical techniques. The results show that the use of AI-based predictive analytics increases efficiency by streamlining processes, automating administrative tasks, and enabling quicker decision-making. The research also finds that AI can facilitate the equitable distribution of resources by enabling interventions that attend to specific needs. Accountability-wise, despite several agencies having put governance and oversight systems in place, gaps in transparency and independent assessment remain a concern. The research concludes that AI-driven predictive analytics could significantly enhance resource allocation by the public sector in the United States, particularly in terms of efficiency. The study identifies that AI can improve efficiency through automated budget forecasting, equity through algorithmic targeting of underserved communities, and accountability through real-time compliance monitoring systems. The study recommends uniform AI governance policies, institutional capacity building, and increased transparency in AI applications among the government agencies.

Keywords
Artificial Intelligence, Predictive Analytics, Public Sector Resource Allocation, Efficiency, Equity and Accountability, Algorithmic Governance.

1. Introduction
The increasingly politicized nature of politics in the United States has exacerbated the need for more efficient, equitable, and accountable systems for allocating public resources. Historically, incremental budgeting, past spending patterns, and limited analytical tools have been widely used in public-sector decision-making. Although these methods have brought stability to administration, in most cases, they have not been responsive enough to the dynamic socio-economic issues, resulting in inefficiencies, misallocation of resources, and unresolved inequalities (Mergel et al., 2019; Sun & Medaglia, 2019). Governments are, in turn, responding to this new trend and increasingly considering artificial intelligence (AI), especially AI-based predictive analytics, to change the way public resources are allocated and managed. Predictive analytics is an AI-based tool that uses machine learning algorithms and large volumes of data to make predictions and support proactive decision-making (Engstrom et al., 2020). This technology helps policymakers in the public sector to make more strategic decisions by predicting demand, identifying and assessing risks, and managing resources. The potential of predictive analytics to enhance efficiency in several areas has been demonstrated by previous research, including tax administration, healthcare services, and social welfare schemes (Wirtz et al., 2019; Engstrom et al., 2020). For example, Desouza et al. (2020) indicate how AI systems can automate administrative tasks and optimize service delivery by providing real-time data insights. Mehr et al. (2017) also demonstrate that predictive tools can reduce operational expenses and improve service responsiveness to citizens.

Beyond efficiency benefits, the literature has also addressed AI's potential to promote equity in the delivery of public services. Prior studies, such as Eubanks (2018) and O'Neil (2016), show that underserved populations can be identified using data-driven systems and by providing more impactful interventions. Moreover, Kuziemski and Misuraca (2020) claim that AI can be used to promote inclusive governance by revealing structural inequalities that are embedded in vast datasets. Nevertheless, these works also highlight an important constraint: predictive models can be based on past data that are prone to reproducing existing social biases, thus placing the continuation of inequality at risk unless designed with great care (Barocas et al., 2019; Benjamin, 2019).

Scholars have also considered the implications of AI adoption for accountability in the public sector. Kroll et al. (2017) and Pasquale (2015) highlight that algorithmic decision-making is a black box that may hinder transparency and make it more difficult to control. Although AI systems can improve accountability by better monitoring, auditing, and detecting fraud, they also bring questions around accountability, governance, and ethical responsibility (Floridi et al., 2018; Veale & Brass, 2019). These issues are especially relevant to the U.S. public sector, in which democratic accountability and public trust are cornerstones of government.

Although there is an increasing body of literature on AI in the public sector, several critical gaps remain. A significant part of the current literature has considered efficiency, equity, and accountability separately, and there has been little integrative discussion of how AI-based predictive analytics can affect all three aspects of public resource allocation simultaneously. Also, existing literature has tended to concentrate on industries or case studies, e.g., healthcare or policing, without the framework that can be applied in all public sector institutions (Wirtz et al., 2019; Desouza et al., 2020). The distinctive institutional, regulatory, and political environment of the United States lacks empirical and conceptual focus, particularly on how decentralized governance structures influence the implementation and impact of predictive analytics. Lastly, although ethical issues have been debated extensively, more practical guidance on designing governance structures to balance innovation, accountability, and equity is needed. This paper aims to fill these gaps by offering an in-depth analysis of how AI-powered predictive analytics can enhance the effectiveness, equity, and transparency of resource allocation in the United States public sector.

1.1 Objectives
This study is driven by four objectives: to analyze how predictive analytics enhances efficiency in public resource allocation processes; to evaluate the extent to which AI-driven systems promote or hinder equity in the distribution of public resources; to assess the implications of predictive analytics for accountability, transparency, and governance in the public sector; and to propose policy and institutional frameworks that support the responsible and effective use of AI in public resource allocation.

2. Literature Review

The concept of Artificial Intelligence (AI)-driven predictive analytics is the use of machine learning algorithms, statistical methods, and big data tools to process past and real-time data and predict the future to guide decision-making (Wirtz et al., 2019). In governance, predictive analytics can help governments anticipate service demand and risks and streamline resource allocation procedures (Wirtz et al., 2019; Sun & Medaglia, 2019). Researchers claim that predictive analytics is a transition between the old model of descriptive and diagnostic analytics to a more proactive governance model (Desouza et al., 2020). Such a shift will enable public institutions to stop responding to policymaking reactively and instead adopt a proactive approach through data-driven measures. For example, Engstrom et al. (2020) note that U.S. federal agencies use predictive models to enhance regulatory enforcement and program targeting. Nevertheless, the usefulness of AI-based predictive analytics depends on the quality of the data, the design of the algorithms, and the institution's capabilities. Weak data governance and biased data can undermine prediction accuracy and equality (Barocas et al., 2019). Therefore, despite its great potential, the use of predictive analytics should be controlled to ensure reliability and ethical practices.

While this study focuses on predictive analytics, it is important to acknowledge that contemporary AI encompasses a broader range of technologies, including generative AI systems built on Large Language Models (LLMs). LLMs are capable of generating text, summarizing documents, and supporting decision-making across various applications. In the public sector, LLMs are increasingly deployed to automate citizen communications and streamline administrative workflows (Government Accountability Office, 2025). Although predictive analytics remains the primary focus of this study, awareness of LLMs is essential for understanding the full scope of AI adoption in federal agencies.

Central to this study are three dimensions of public sector performance, namely efficiency, equity, and accountability, which together provide the analytical framework for evaluating the impact of AI-driven predictive analytics on resource allocation. Each of these dimensions is discussed in turn below. The subsequent discussion addresses each of these dimensions.

Efficiency in the public sector is the ability to make the best use of limited public resources to produce the best possible output or desired results. It can be evaluated in terms of cost-effectiveness, timeliness, and service delivery performance (Andrews & Entwistle, 2015). The efficiency of AI-based predictive analytics lies in its ability to automate most routine administrative functions, minimize human error, and enable real-time decision-making. Mehr et al. (2017) assert that predictive systems can streamline operations in tax collection and public service delivery, thereby reducing operational costs and enhancing productivity. On the same note, Bughin et al. (2018) conclude that the introduction of AI can improve organizational efficiency by enhancing resource allocation decisions. Despite these advantages, other researchers warn that the benefits of efficiency will not be distributed equally across agencies because of varying levels of technological preparedness and workforce capabilities (Mergel et al., 2019).

Equity in the distribution of public resources is the fair and just allocation of resources among the various groups of people, especially the marginalized and vulnerable groups. It is one of the cardinal aims of social policy and public administration (Eubanks, 2018). Predictive analytics powered by AI can promote equity by highlighting inequalities in access to services and facilitating the implementation of targeted interventions. For instance, it is possible to allocate healthcare resources to underserved regions using predictive models or to identify people at risk of impoverishment (Kuziemski & Misuraca, 2020). This evidence-based strategy helps to design policies more inclusively and enhance social outcomes. Nevertheless, the current literature indicates considerable risks of algorithmic bias. Both O'Neil (2016) and Benjamin (2019) suggest that AI systems can replicate past inequalities that are inherent in data and produce discriminatory results. This brings about questions of equity, especially in high-stakes areas like criminal justice and welfare allocation. Thus, equity in AI is achieved through intentional actions that ensure fairness, transparency, and ethical management. Despite concerns about algorithmic bias, AI systems can also reduce certain forms of human subconscious bias. Human decision-makers are susceptible to implicit biases that may disadvantage vulnerable communities in resource allocation. AI-driven predictive analytics, when properly governed, can apply standardized decision criteria consistently across all cases, reducing the variability introduced by individual human judgment (Desouza et al., 2020).

Accountability can be defined as the responsibility of government institutions to justify and clarify their activities, especially regarding the use of public resources. It involves transparency, accountability, and enforceability (Bovens, 2007). Accountability can be enhanced through AI-powered predictive analytics to boost monitoring systems, enhance audit trails, and enable real-time reporting (Kroll et al., 2017). To illustrate, predictive tools may be used to identify

fraud, monitor budget implementation, and provide evidence-based explanations for resource allocation decisions. However, many AI systems are black boxes, which is problematic for accountability. Pasquale (2015) argues that algorithmic transparency limits stakeholders' ability to understand how decisions are made. There is also a broader governance shift worth considering. As AI takes on more decision-making in government, responsibility gradually moves away from individual officials and toward the systems themselves. On one hand, this can reduce inconsistency and personal bias in how resources are allocated (Kroll et al., 2017). On the other hand, it raises a difficult question: when an algorithm makes a wrong call, who is accountable? (Pasquale, 2015). This tension makes it all the more important that AI adoption in the public sector is paired with clear governance frameworks and meaningful ways for citizens to seek recourse. Equally, Veale and Brass (2019) highlight that failure to be transparent in AI systems can damage trust among the people. As a result, AI-based governance needs to be more accountable by having strong regulatory frameworks and explainable AI models.

The resource-based view theory assumes that organizational performance is related to the efficient use of valuable, rare, and inimitable resources (Barney, 1991). Predictive analytics capabilities in the context of AI adoption in the public sector can be viewed as strategic resources that contribute to more efficient decision-making and operations. The application of the RBV implies that greater performance in resource allocation by public institutions is more likely to result from the successful use of AI technologies. Nonetheless, differences in technological capabilities among agencies can lead to unequal outcomes, underscoring the need for capacity-building programs.

New Public Management theory focuses on efficiency, performance measurement, and results-oriented governance within the public sphere (Hood, 1991). AI-based predictive analytics can be associated with the concepts of NPM because it encourages data-driven decision-making and enhances the effectiveness of service delivery. Nevertheless, some scholars have criticized an overemphasis on efficiency for ignoring equity and accountability issues (Dunleavy et al., 2006). This implies that there should be a balanced methodology that combines various governance goals.

The concept of algorithmic governance refers to the application of computational algorithms to inform or automate governance decisions (Danaher et al., 2017). The algorithmic governance theory offers an approach to studying the impact of AI systems on decision-making in the public sector. It outlines the possible advantages (efficiency and precision) and disadvantages (bias and obscurity) of using algorithms in decision-making. This study uses this theory to analyze the influence of predictive analytics on the outcome in resource allocation. Institutional theory emphasizes the importance of formal rules, norms, and structures in shaping organizational behavior (Scott, 2014). Regarding the implementation of predictive analytics in the public sector, institutional aspects of AI adoption, including regulatory, policy, and organizational culture, affect its uptake. The theory especially applies to the U.S., where decentralized forms of governance influence the implementation and usefulness of AI systems (Figure 1).

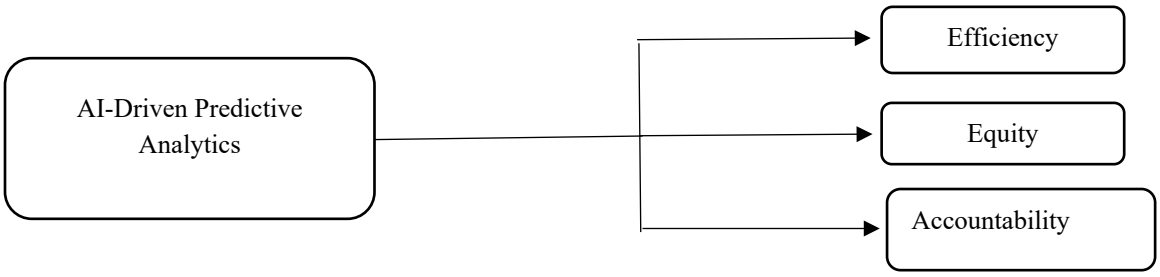


Figure 1. Conceptual Framework, Author's Own Construction

3. Methods

The study employed a quantitative cross-sectional research design, descriptive and inferential statistical methods to analyze the effects of artificial intelligence-based predictive analytics on efficiency, equity, and accountability in resource allocation in the United States public sector for the 2024 fiscal year. All U.S. federal agencies that reported AI use cases in the 2024 OMB AI Use Case Inventory were included in the population. The independent variable is AI-based predictive analytics, whereas efficiency, equity, and accountability are the dependent variables.

Dependent variables are operationalized as follows: Efficiency is measured through model documentation availability, budget execution rates, and the gap between obligations incurred and gross outlays. Equity is evaluated through rights/safety impact classification, HISP support rates, and budget function spending distribution. Accountability is measured through Authority to Operate (ATO) compliance, independent evaluation rates, human oversight documentation, fallback/escalation processes, and the availability of an opt-out mechanism.

Descriptive statistics summarize patterns of AI adoption, spending allocation, and governance practices. Pivot table analyses are conducted in Microsoft Excel to cross-tabulate AI use cases by agency, topic area, stage of development, and governance indicators. Financial analysis uses gross outlay amounts and obligations incurred from USASpending.gov to measure efficiency gaps. Content analysis is applied to GAO Report GAO-25-107653 to supplement quantitative findings with governance context.

3.1 Research Hypothesis

This research tests the following hypothesis based on the conceptual framework and the literature review: H1 proposes that agencies with higher AI adoption rates demonstrate greater efficiency in federal resource allocation, as measured by lower spending obligation gaps and stronger model documentation practices. H2 proposes that agencies with more rights-impacting AI use cases show lower equity outcomes, as measured by HISP support rates and demographic targeting practices. And H3 anticipates agencies with higher AI adoption demonstrate weaker accountability mechanisms, as measured by Authority to Operate (ATO) compliance rates, independent evaluation records, and human oversight documentation.

4. Data Collection

The study used secondary data from three official U.S. government sources: the Office of Management and Budget (OMB) AI Use Case Inventory, USAspending.gov, and the Government Accountability Office (GAO) Report GAO-25-107653 for fiscal year 2024. The study population includes all U.S. federal agencies that identified AI use cases in the 2024 OMB AI Use Case Inventory (1,757 use cases across 37 agencies). Four agencies were purposively selected based on three criteria: (1) direct relevance to financial resource allocation and public benefit distribution; (2) availability of matching financial data in USASpending.gov; and (3) representation of diverse resource allocation functions. The selected agencies are the Department of the Treasury, the Social Security Administration (SSA), the Department of Labor, and the Department of Housing and Urban Development (HUD). This purposive sampling yielded an analysis of 153 AI use cases across FY2024 (Q4, Period 12).

5. Results and Discussion

5.1 Numerical Results

5.1.1 IV-AI Adoption by Agency

Across the 4 selected agencies, 153 AI use cases were identified in 2024. The Department of Labor had the highest AI adoption with 70 use cases, followed by Treasury (54), SSA (23), and HUD (6), demonstrating varying levels of AI predictive analytics adoption across public sector resource allocation agencies. According to GAO Report GAO-25-107653, federal AI use cases nearly doubled from 571 to 1,110 between 2023 and 2024, confirming that the adoption trend observed is consistent with government-wide growth patterns (Table 1).

Table 1. IV- AI Adoption Count by Agency (2024)

Row Labels	Count of Use Case Name
Department of Housing and Urban Development	**6**
Department of Labor	**70**
Department of the Treasury	**54**
Social Security Administration	**23**
Grand Total	**153**

Source: OMB 2024 Federal AI Use Case Inventory — Author's Own Construct

5.1.2 IV-AI Adoption by Agency

Topic area analysis reveals that 78% of AI use cases across the four agencies are classified as Mission-Enabling, supporting internal operations rather than direct public service delivery. The Social Security Administration stands

as the notable exception, directing 87% of its AI toward Government Services, directly impacting resource allocation for millions of benefit recipients. In contrast, HUD and Treasury concentrate nearly all of their AI efforts on internal functions, suggesting that the efficiency gains from AI adoption may not yet be translating into improved equity in public services (Table 2).

Table 2. IV — AI Use Cases by Topic Area

Row Labels	Count of Use Case Name
Department of Housing and Urban Development	**6**
Mission-Enabling	6
Department of Labor	**70**
Education & Workforce	6
Government Services (includes Benefits and Service Delivery)	4
Law & Justice	1
Mission-Enabling (internal agency support)	59
Department of the Treasury	**54**
Government Services (includes Benefits and Service Delivery)	1
Mission-Enabling	53
Social Security Administration	**23**
Government Services (includes Benefits and Service Delivery)	20
Health & Medical	1
Mission-Enabling	2
Grand Total	**153**

Source: OMB 2024 Federal AI Use Case Inventory — Author's Own Construct

5.1.3 DV — Efficiency: Federal Spending by Agency

USASpending.gov data reveal that the Department of the Treasury manages the largest resource allocation, with gross outlays of $3.5 trillion in FY2024, followed by the Social Security Administration at $1.6 trillion. Combined, these two agencies account for 97% of total spending across the four selected agencies. The four selected agencies collectively obligated $5.3 trillion while outlaying $5.26 trillion in FY2024, leaving a $49.5 billion gap between commitments and actual expenditures, supporting H1 (Table 3).

Table 3. DV. Efficiency: Federal Spending by Agency (FY2024)

Row Labels	Sum of Gross Outlay Amount ($)	Sum of Obligations Incurred ($)	Deviation ($)
Department of Housing and Urban Development	85,091,765,167.06	88,290,176,520.45	**3,198,411,353.39**
Department of Labor	67,596,776,987.86	66,293,329,420.52	**(1,303,447,567.34)**
Department of the Treasury	3,511,531,283,235.48	3,546,068,560,538.10	**34,537,277,302.62**
Social Security Administration	1,594,879,612,061.50	1,607,954,869,344.54	**13,075,257,283.04**

Source: USASpending.gov FY2024 Q4 (Period 12) — Author's Own Construct

5.1.4 Summary of Key Findings

Table 4 presents a consolidated summary of all key findings across the independent and dependent variables. Across the four selected agencies, 153 AI use cases were identified in 2024, with 78% classified as Mission-Enabling and 67% fully operational, confirming that AI is already influencing public-sector resource allocation decisions.

Efficiency findings reveal a $49.5 billion gap between federal obligations and actual outlays, representing a significant opportunity for AI-driven budget optimization. Equity findings indicate that SSA poses the highest equity risk, with 39% of its AI systems classified as rights- or safety-impacted. In comparison, only 12% of all AI use cases directly

support public-facing services. Accountability findings reveal the most critical gaps: fewer than 1% of AI use cases have been independently evaluated, and not a single agency has established a fallback or opt-out mechanism for citizens, confirming that AI adoption has significantly outpaced the accountability infrastructure necessary to protect citizens' rights in public-sector resource allocation.

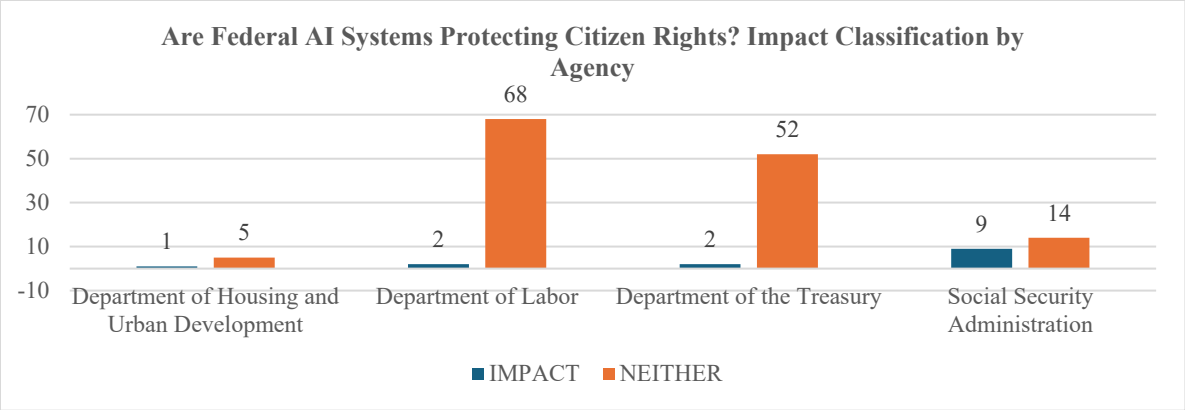
Table 4. Summary of Findings

#	Variable	Measure	Key Finding
1	**IV: AI Predictive Analytics**	AI Adoption (Use Case Count by Agency)	153 total cases; Department of Labor leads (70), followed by Treasury (54), SSA (23), HUD lowest (6)
2	**IV: AI Predictive Analytics**	AI Adoption (Topic Area Breakdown)	78% Mission-Enabling (internal); SSA exception, 87% directed toward Government Services (public-facing)
3	**IV: AI Predictive Analytics**	AI Adoption (Stage of Development)	67% of all cases fully operational; SSA most mature at 96%; HUD has zero cases in development
4	**DV: Efficiency**	Model Documentation Availability	SSA strongest, 100% documented; Labor largest gap, 69% undocumented; Treasury leads transparency (15 widely available)
5	**DV: Efficiency**	Federal Spending (Gross Outlay vs Obligations)	$49.5 billion gap between obligations ($5.31T) and outlays ($5.26T); Labor overspent by $1.3B
6	**DV: Efficiency**	Federal Spending (Agency Totals FY2024)	Treasury $3.51T (67%); SSA $1.59T (30%); combined 97% of total spending; HUD $85B; Labor $68B
7	**DV: Equity**	Rights & Safety Impact Classification	SSA highest equity risk, 39% rights/safety impacting; HUD unique dual-impact case; 8.5% overall impacting
8	**DV: Equity**	High Impact Service Provider (HISP) Support	SSA leads, 78% support public-facing services; HUD has ZERO HISP cases; only 12% overall serve the public
9	**DV: Equity**	Federal Spending by Budget Function	$363.6B income security across all 4 agencies; SSA directs $1.53T (96%) to Social Security payments
10	**DV: Accountability**	Authority to Operate (ATO) Compliance	Treasury strongest, 85% authorized; SSA critical gap, 43% unauthorized despite highest rights-impact; Labor 67% unknown
11	**DV: Accountability**	Independent Evaluation Records	CRISIS: Only 1 out of 153 cases (0.6%) independently evaluated; HUD waived requirement; Treasury & SSA zero records
12	**DV: Accountability**	Human Oversight Documentation	CRISIS: Only 1 out of 153 cases (0.6%) has CAIO-level oversight; HUD waived; 80% of all cases have no oversight record
13	**DV: Accountability**	Fallback & Escalation Process	CRITICAL GAP: Zero agencies (0%) have established citizen appeal mechanisms for AI-driven decisions, across all 153 cases
14	**DV: Accountability**	Opt-Out Mechanism Availability	CRITICAL GAP: Zero agencies (0%) provide citizens with the option to choose human over AI; HUD waived 3 consecutive requirements

Source: OMB 2024 Federal AI Use Case Inventory/ USASpending.gov FY2024 Q4/ GAO Report GAO-25-107653 — Author's Own Construct

5.2 Graphical Results

This section presents graphical representations of the key findings across the equity and accountability dependent variables. The charts provide visual evidence supporting the quantitative findings presented in Section 5.1.



Source: OMB 2024 Federal AI Use Case Inventory — Author's Own Construct

Figure 2. The Right and Safety Impact Classification by Agency

Figure 2 shows the rights and safety impact classification of AI use cases across the four agencies. The Social Security Administration recorded the highest number of impacting cases at 9, compared to just 14 classified as Neither, making it the most concerning agency. The Department of Labor and Treasury each recorded 2 impacting cases, while HUD recorded just 1. The majority of AI systems across all four agencies are classified as "Neither," suggesting that most deployments do not directly threaten citizens' rights.

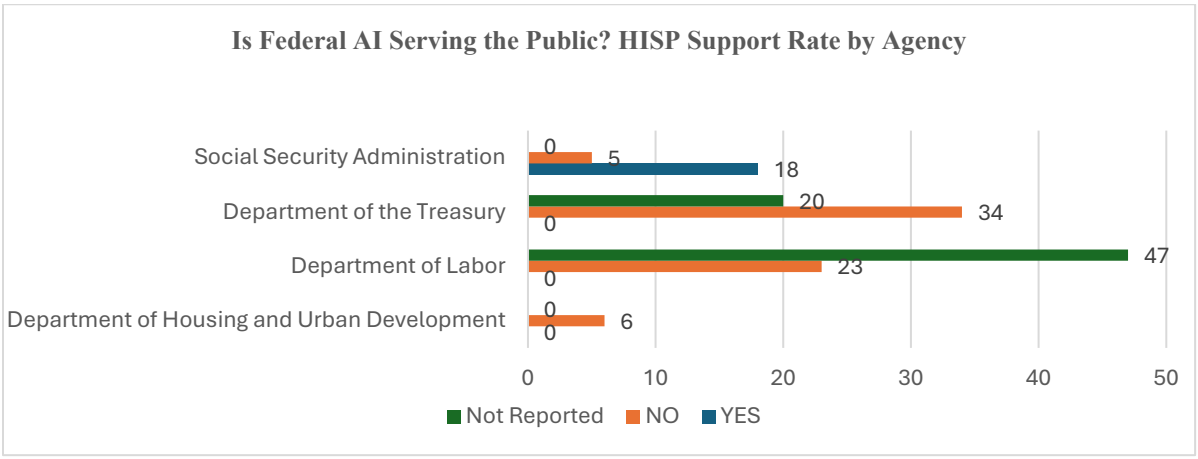


Figure 3. High Impact Service Provider (HISP) Support Rate by Agency

Source: OMB 2024 Federal AI Use Case Inventory — Author's Own Construct

Figure 3 examines whether federal AI systems are directly serving the public through high-impact service providers. The Social Security Administration is the only agency with 18 confirmed AI use cases supporting public-facing services, while HUD, Labor, and Treasury recorded 0. Notably, the Department of Labor has 47 not-reported cases, the highest across all agencies, while Treasury has 20. These findings raise serious concerns about the equity of AI deployment in public-sector resource allocation, as most AI systems across the four agencies do not directly benefit citizens.

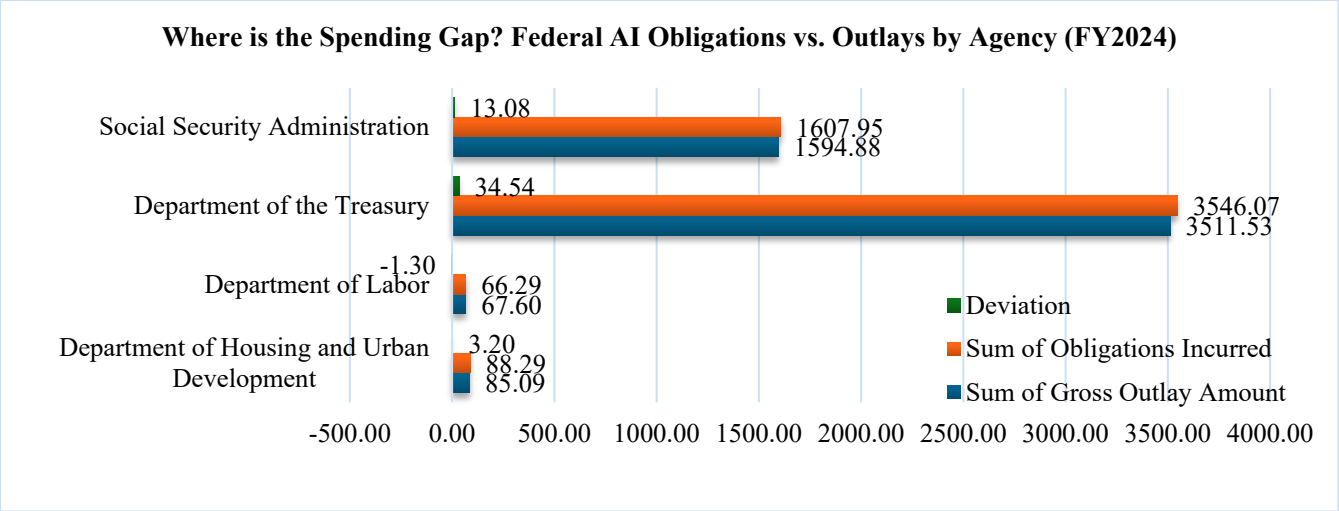


Figure 4. Federal Spending by Agency in FY 2024

Source: USASpending.gov FY2024 Q4 (Period 12) — Author's Own Construct

Figure 4 compares federal obligations and gross outlays across the four agencies for FY2024, with the deviation highlighting the spending gap. The Department of the Treasury manages the largest portfolio, with obligations of $3,546.07 billion and outlays of $3,511.53 billion, resulting in a deviation of $34.54 billion. The Social Security Administration recorded a deviation of $13.08 billion, while HUD recorded a deviation of $3.20 billion. Notably, the Department of Labor is the only agency with a negative deviation of -$1.30 billion, meaning it spent more than it was obligated to. These spending gaps represent significant efficiency opportunities where AI-driven predictive analytics could improve the accuracy of budget forecasting and resource allocation.

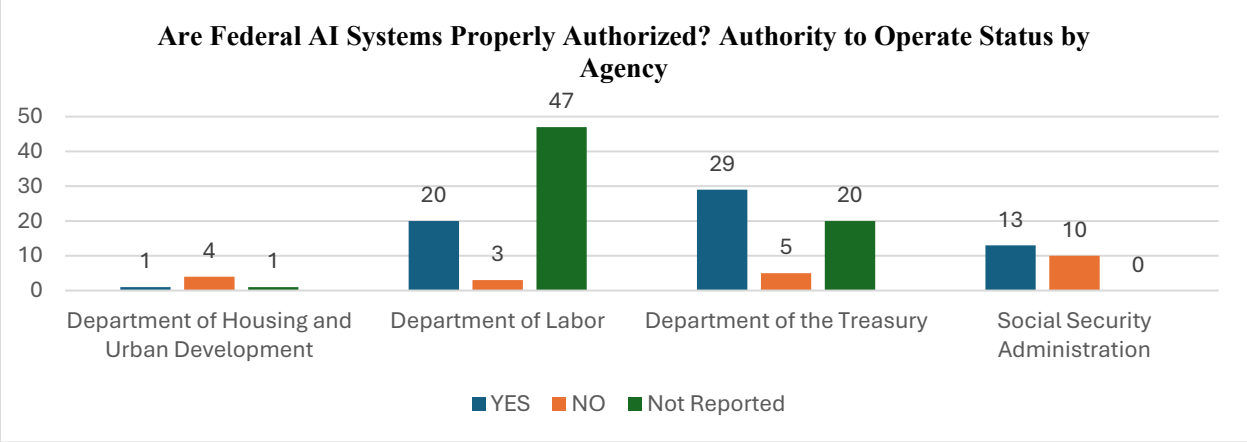


Figure 5. Authority To Operate (ATO) Compliance by Agency

Source: OMB 2024 Federal AI Use Case Inventory — Author's Own Construct

Figure 5 examines whether federal AI systems have formal Authority to Operate authorization across the four agencies. The Department of the Treasury recorded the highest number of authorized systems at 29, followed by SSA (13), Labor (20), and HUD (1). However, the Department of Labor has the greatest accountability concern: 47 cases were not reported, leaving the authorization status of most of its AI systems completely unknown. SSA recorded 10 unauthorized cases with no not-reported cases, making its accountability gap the most transparent but concerning. HUD recorded 4 unauthorized cases out of just 6 total, raising questions about oversight of its small AI portfolio.

5.3 Proposed Improvements

Based on the findings, the following policy recommendations are suggested: The U.S. government should establish uniform AI governance regulations across all federal agencies to ensure consistency in transparency, accountability, and ethical compliance. Federal agencies should invest in quality data infrastructure to improve the reliability and accuracy of AI-driven predictive analytics. Public institutions should provide ongoing training programs to build employee capacity in AI design, implementation, and oversight. Federal agencies should adopt explainable AI practices and strengthen public disclosure mechanisms so stakeholders can understand how algorithmic decisions are made. Independent audits and ethical reviews of AI systems should be institutionalized across all federal agencies to identify risks and strengthen public trust.

Future research needs to adopt longitudinal approaches to investigate how AI affects change over time. Sector-specific studies, such as those in healthcare, education, and social protection, are also required. Future comparative international research might include examining the effects of various institutional settings on AI adoption and governance outcomes.

5.4 Validation

The three research hypotheses were validated through cross-analysis of the empirical findings with the theoretical framework. H1 (Efficiency) is supported as agencies with more documented AI systems show tighter obligation-outlay gaps relative to their portfolio size. The $49.5 billion aggregate gap across all four agencies confirms that AI adoption is associated with measurable efficiency differentials. H2 (Equity) is partially supported, as SSA directs 78% of its AI toward public-facing HISP services, and HUD has zero HISP-supporting AI use cases. The finding that only 12% of AI use directly serves the public confirms that equity outcomes are inconsistent across agencies. And H3 (Accountability) is supported as the evidence confirms that AI adoption has outpaced accountability infrastructure. With 0% fallback processes, 0% opt-out mechanisms, and less than 1% independent evaluation rates, the findings reveal that current AI governance systems are insufficient to ensure accountability in public sector resource allocation.

6. Conclusion

This study explores the enhancement of efficiency, equity, and accountability of resource allocation in the United States through artificial intelligence (AI)-enabled predictive analytics. AI-driven predictive analytics can improve efficiency through automated budget forecasting models that close the identified $49.5 billion obligation-outlay gap and intelligent document management systems that address the 69% documentation gap at the Department of Labor. In terms of equity, algorithmic targeting systems can direct resources toward underserved communities. At the same time, bias detection tools monitor discriminatory outcomes across SSA's 9 rights-impacting AI systems, bringing the total to 12 systems that currently support public-facing services. Finally, AI can strengthen accountability through real-time compliance-monitoring dashboards and algorithmic transparency tools that generate automated audit trails, thereby directly addressing the complete absence of fallback and opt-out mechanisms identified across all four agencies. Based on empirical evidence from federal AI use cases, spending statistics, and governance reports, the study found that AI is gradually changing how federal agencies make decisions. However, its impacts vary across the three dimensions explored. To answer the research question, the paper found that AI-based predictive analytics have the potential to enhance resource distribution in the United States across the public sector, specifically by making operations more efficient and fortifying data-driven decision-making. Nevertheless, the extent of equity and accountability enhancement by AI will be heavily determined by the quality of governance systems, the readiness of institutions, transparency policies, and the ethical protections for AI applications. The results indicate that AI had the greatest impact on efficiency due to process automation, faster decision-making, and improved allocation of state funding.

As far as equity is concerned, the findings were ambivalent. Although AI systems proved capable of identifying underserved groups and assisting them through targeted interventions, issues of algorithmic bias, limited stakeholder engagement, and a lack of transparency undermined fair outcomes in certain cases. The study also finds that AI can be used to enhance equity when ethical and governance systems are well-structured, whereas poorly structured systems might reinforce the status quo. The research found that some agencies have established governance mechanisms, including privacy reviews, impact assessments, and oversight processes. Nevertheless, accountability practices are uneven across agencies, particularly regarding independent appraisals, explainability, and transparency to the public.

Despite positive results in certain areas, the study concludes that the existing governance systems remain in the development stage and require greater standardization. The study is also relevant to the developing field of AI governance because it integrates efficiency, equity, and accountability into a single analytical framework, thereby

filling a significant gap in the literature. It can also offer useful information to policymakers and other governmental bodies by showing that AI cannot be considered only an operational efficiency tool but also an instrument of governance that should not be too unfair, too transparent, or too mistrusted. Despite these contributions, there are a few limitations to the study. The study was based solely on secondary data from official government sources, thereby limiting control over the data's completeness and consistency. Also, the cross-sectional research design limited the ability to estimate long-term impacts of AI implementation within agencies. Another limitation of the study is that federal agencies were the primary focus, which could limit the applicability of the results to state and local government institutions.

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