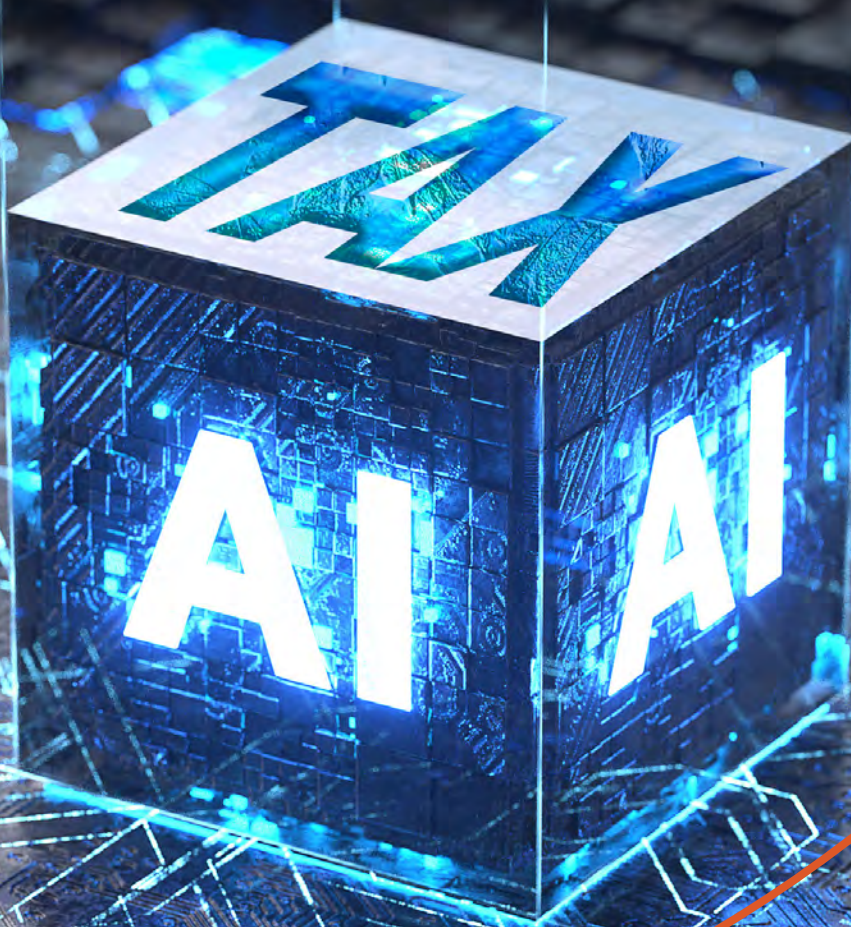# AI AND THE MODERN TAX AGENCY

## Adopting and Deploying AI to Improve Tax Administration

**Caroline Bruckner and Collin Coil**

American University Kogod Tax Policy Center

IBM Center for
The Business of Government

# AI and the Modern Tax Agency:
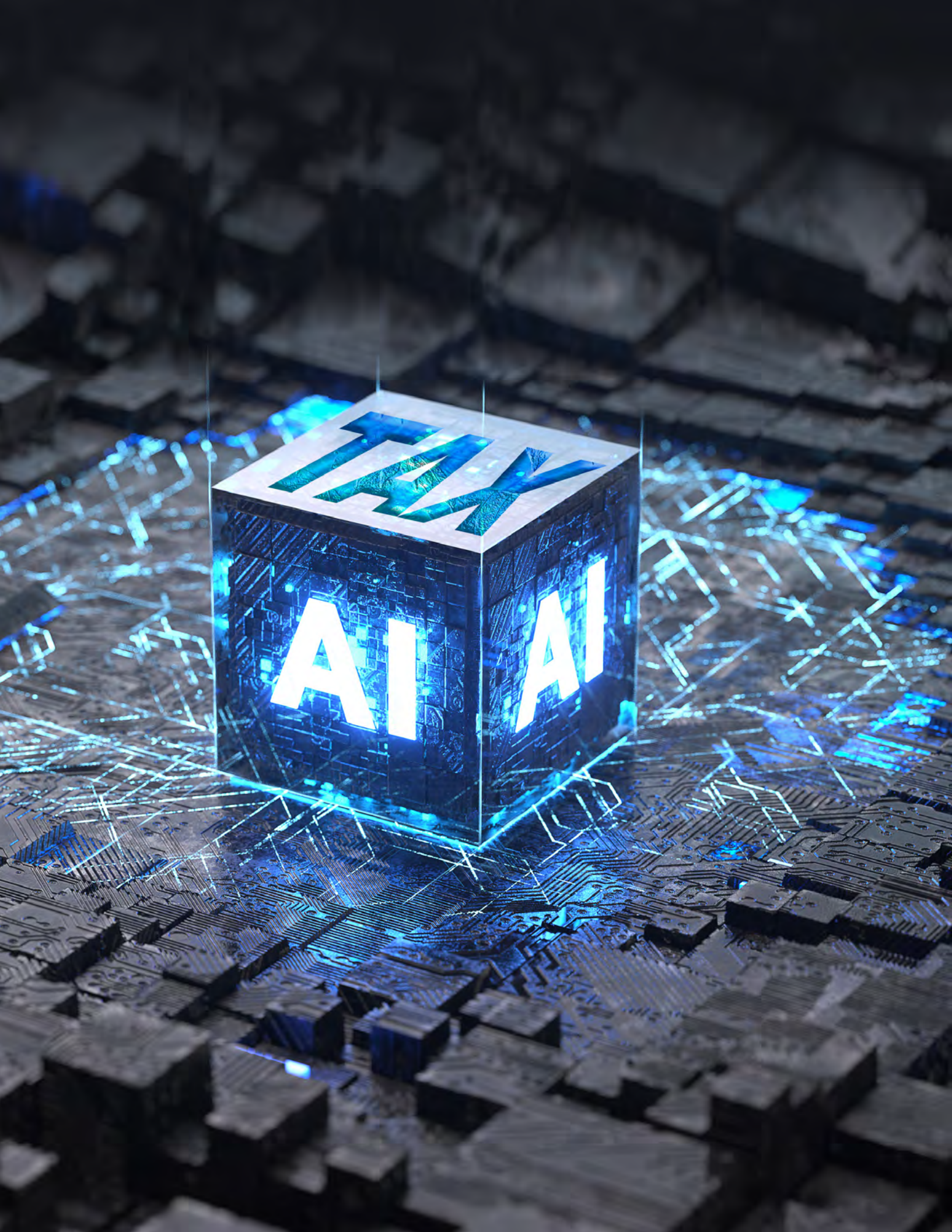## Adopting and Deploying AI to Improve Tax Administration

**Caroline Bruckner and Collin Coil**

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JANUARY 2024

IBM Center for
**The Business of Government**

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# Foreword

On behalf of the IBM Center for The Business of Government, in collaboration with the American University Kogod School of Business Tax Policy Center, we are pleased to present this new report, *AI and the Modern Tax Agency: Adopting and Deploying AI to Improve Tax Administration*, by Caroline Bruckner and Collin Coil of the Kogod Tax Policy Center.

Artificial intelligence (AI) has surged across government. National and international legislation has been proposed, and U.S. Federal agencies are now implementing requirements set forth in the new Executive Order on AI. Such policy and progress affect government work across civilian and defense sectors—including work done by tax agencies with the public and business communities.

Driven by common access to AI and the potential benefits of generative AI, the U.S. Internal Revenue Service (IRS) and tax agencies around the world are now focusing on how the technology could improve tax administration while minimizing some of the risks. To better understand opportunities and considerations, the IBM Center, in collaboration with the Kogod Tax Policy Center, recently hosted a global discussion on AI and the Modern Tax Agency. The findings inform the release of this new report, focusing on three key topics:

- How can AI and related technologies better enable taxpayers, including small businesses, to navigate tax filings and address emerging areas of concern?

- Where is AI today in terms of streamlining operations, and what is its potential to improve tax administration?

- What are key considerations for governance and developing transparent and ethical AI?

Based on insights from roundtable participants and research by the authors the report provides analysis and makes recommendations for the IRS and tax agencies around the world to leverage AI to improve customer service and education, compliance and enforcement, and risk management—and to do so while mitigating risk and building trust through the use of AI.

This report builds on the Center's extensive research over several years to help government adopt AI in a way that leads to better outcomes in terms of public service, agency operations, and risk management. Related reports include *Pathways to Trusted Progress With Artificial Intelligence*, *Artificial Intelligence in the Public Sector: A Maturity Model*, and *More Than Meets AI* (published with the Partnership for Public Service).
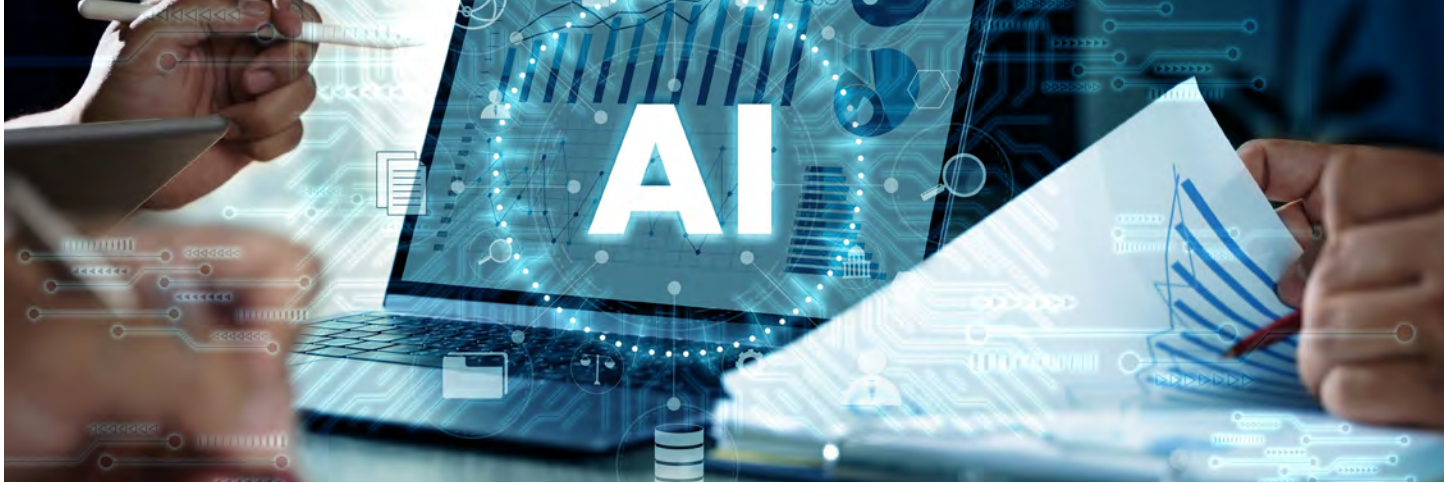
We hope that this report provides leaders and stakeholders of tax agencies with insights on how best to apply AI to improve results for taxpayers.



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# Introduction

The use of artificial intelligence (AI) has become a major technology trend, prompting significant news coverage, business developments, and regulatory changes. Although AI tools have been adopted rapidly by millions of users, governments have been slower to develop AI capabilities.

More specifically, tax agencies have shown recent interest in using AI as part of their modernization plans, hoping that the technology will enhance the taxpayer experience and facilitate operations. However, deploying AI to improve tax administration comes alongside risks, including bias, unethical usage, lack of transparency, and potential breaches of taxpayer privacy.

To address challenges and opportunities for using AI to support efficient and effective tax administration, the IBM Center and the American University Kogod Tax Policy Center (KTPC) recently convened a roundtable discussion that included tax agency leaders and experts from the U.S. and around the world. Roundtable participants focused on opportunities and challenges of using AI in tax administration to improve taxpayer experience, streamline processes, and address tax compliance and enforcement. While discussing AI's potential to facilitate tax agency functions and interactions with taxpayers, the roundtable also explored related ethical and governance questions.

Three central points emerged during the discussion:
- AI has the potential to improve the taxpayer experience through education, service, and outreach

- AI can facilitate tax agency compliance and enforcement activities, especially in addressing emerging asset classes and ever-changing tax rules

- As an evolving technology, AI needs to be rolled out alongside risk mitigation strategies and governance structures

Each of these key points forms a section of this report, which summarizes the roundtable discussion and builds upon the insights of participants. The report draws on comments shared during the roundtable to examine challenges and surface opportunities for AI, focusing primarily on the IRS but with implications for tax agencies around the world. While technical maturity and tax collection varies country to country, many of these challenges and opportunities have resonance with global tax leaders.

## About the Kogod Tax Policy Center

The Kogod Tax Policy Center conducts nonpartisan research on tax administration and compliance issues specific to small businesses and entrepreneurs. Its mission is to develop and analyze tax research and related policy recommendations, and to promote public dialogue through academic publications; legal research; congressional testimony, submissions, and engagement; and media education on challenges facing small businesses and entrepreneurs. It is a national thought leader on small business issues involving:

- Tax literacy and education

- Tax compliance of the growing independent workforce and gig workers

- Tax incentives and women business owners

- Tax data transparency research and policy implications

# Opportunities for Tax Administration in the U.S.

The U.S. Internal Revenue Service (IRS) is poised to overhaul its IT infrastructure and comprehensively upgrade the taxpayer filing experience, due to a major funding increase from Congress included in the Inflation Reduction Act (IRA) (P.L.117-169) in August 2022. With this new funding, the IRS looks to invest in new technology and more readily incorporate AI into its internal operating systems. The IRS has already announced plans for how these investments will impact the taxpayer filing experience, agency enforcement capability, and internal operations.[1] According to IRS Commissioner Daniel Werfel, the IRA funding has already resulted in a "much better experience" for taxpayers during the 2023 tax filing. As of September 15, 2023, the IRS had received more than 152.8 million individual federal tax returns, and issued more than 101 million refunds totaling more than $296 billion.[2]

In addition, the IRS, like all tax agencies, plays the central role in funding government operations through tax collection. For example, the IRS collected more than $4.9 trillion in taxes in fiscal year (FY) 2022, processed approximately 260 million tax returns, and issued more than $640 billion in refunds and outlays. However, in FY 2022 the IRS relied on outdated IT to "process more than five billion information returns (e.g., the Form 1099 series and Form W-2) and to verify information taxpayers report on their income tax returns, all while working to ensure taxpayer privacy and protect the confidentiality of the sensitive taxpayer information that resides on those systems."[3]

With a budget reduction of 22 percent in real terms from 2010 to 2021, the IRS has relied on "outdated technology and a shrinking workforce in the face of an increasingly complex tax environment."[4] For example, in recent years (and in addition to existing tax collection and enforcement responsibilities), Congress has tasked the IRS with administering a host of critical new programs and tax incentives (e.g., the 2010 Affordable Care Act (health care tax

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1.  The IRS, Inflation Reduction Act Strategic Operating Plan 2023-2031. https://www.irs.gov/about-irs/irs-inflation-reduction-act-strategic-operating-plan.
2.  The IRS, Written Testimony of Daniel Werfel, IRS Commissioner before the House Oversight and Accountability Committee Subcommittees on Government Operations and the Federal Workforce and Health Care and Financial Services on the IRS Operations, U.S. House of Representatives, (Oct. 24, 2023). https://www.irs.gov/newsroom/written-testimony-of-daniel-werfel-commissioner-internal-revenue-service-before-the-hoac-subcommittees-on-government-operations-and-the-federal-workforce-and-health-care-and-financial-services-and-irs-operations.
3.  Government Accountability Office, Written Testimony of Jessica Lucas-Judy, Director of Strategic Issues, before the Subcommittees on Government Operations and the Federal Workforce, and Heath Care and Financial Services, Committee on Oversight and Accountability, U.S. House of Representatives (Oct. 24, 2023). https://www.gao.gov/assets/d24107129.pdf.
4.  The IRS IRA Strategic Operating Plan (April 5, 2023). https://www.irs.gov/pub/irs-pdf/p3744.pdf.

credits), the 2017 Tax Cuts and Jobs Act (tax reform), the 2020 CARES Act (pandemic-related tax credits), and the 2022 IRA (energy tax credits)).[5] Given the expanded scope of operations, effective deployment of AI is vital for the IRS just to keep pace with the sheer volume of legislatively mandated duties.

Recognizing these challenges, in 2022 Congress increased mandatory funding for the IRS in the IRA—in addition to its annual appropriation. As envisioned by Congress, more than half of the total IRA funding ($45.6 billion) will go for enforcement, with $25.3 billion for operations support, $4.8 billion for business systems modernization, and $3.2 billion dedicated to taxpayer services.[6] AI will play a pivotal role in each of these functions moving forward. The IRS has already worked to incorporate AI into to some activities, including audit selection and redirecting calls from one call center to another.[7] However, the IRS must efficiently adopt and deploy AI across tax administration functions consistent with the requirements of an evolving regulatory landscape designed to address safety and security concerns, workforce impact, potential bias and civil rights implications, privacy issues, and international leadership demands.[8]

Such a goal has proven achievable—other countries have successfully demonstrated how AI can be deployed in public-facing tax administration roles. For example, the Australian Tax Office (ATO) has deployed Alex, an AI virtual assistant equipped with natural language understanding technology, to help direct taxpayers to answers for common questions. Launched in 2016, Alex has engaged in more than two million conversations in 18 months, resolved 88 percent of requests during the first contact, and contributed toward an 8-10 percent reduction in call center volumes.[9] Similarly, both the Inland Revenue Authority of Singapore and the Spanish Tax Administration Agency deployed AI-enabled chatbots to answer common tax questions. In contrast, the IRS has not yet been able to introduce a widely accessible, easily recognizable AI tool to aid taxpayers in answering tax questions or filling out forms.[10]

But the potential exists. Private sector examples suggest taxpayers can effectively engage and respond to AI-triggered prompts and responses. Often, consumers interact with AI models without realizing it. For example, Amazon uses AI to predict which items should be recommended to shoppers based on items added to their cart or search history. Shopping online for a child's bike will initiate "frequently bought together" ads and suggestions; social media users are regularly prompted to connect with other users suggested by apps; and streaming services keep audiences binging content by recommending shows.[11] Multiple smart phone apps use AI to analyze traffic patterns and provide routes that minimize time driving.[12] Widespread adoption of these AI tools demonstrate the ubiquity of AI as a function of digital life, despite many being users remaining unaware of it.

5.    Irwin, Neil, "The Tax Code Is Overtaxed: The I.R.S. has become the de facto administrator of a startling number of social welfare programs." *New York Times* (March 6, 2020). https://www.nytimes.com/2020/03/06/upshot/tax-code-irs-problems.html?unlocked_article_code=1.AU0.TFk5.PKBshZN0AUj7&smid=url-share.
6.    Congressional Research Service, Changes to the IRS Funding in the Debt Limit Deal (July 19, 2023). https://crsreports.congress.gov/product/pdf/IN/IN12172.
7.    Slowley, Erin, "Biden Artificial Intelligence Order Has 'Absolute' IRS Support," Bloomberg Tax, (Nov. 1, 2023). https://www.bloomberglaw.com/product/tax/bloombergtaxnews/daily-taxreport/X6PJP08S000000?bna_news_filter=daily-tax-report#jcite.
8.    See, e.g., Executive Order 14110 (EO 1411) on Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence.
9.    "Australian Tax Office deploys new virtual assistant," *Nuance*, Nov. 30, 2021. https://www.nuance.com/asset/en_au/collateral/enterprise/case-study/cs-australian-tax-office-en-au.pdf.
10.   See, e.g., the IRS Blogpost, Using Voice and Chat Bots to Improve the Collection Taxpayer Experience, https://www.irs.gov/about-irs/using-voice-and-chat-bots-to-improve-the-collection-taxpayer-experience.
11.   Soled, Jay A., and Kathleen DeLaney Thomas, "Predictive Analytics and the Tax Code," *Florida State University Law Review*, (May 8, 2023). https://ssrn.com/abstract=4441446.
12.   Lau, Johann, "Google Maps 101: How AI helps predict traffic and determine routes," Sept. 3, 2020. https://blog.google/products/maps/google-maps-101-how-ai-helps-predict-traffic-and-determine-routes/.

Deploying AI across a tax agency's functions presents unique challenges, distinct from those faced by the private sector. For the IRS, these challenges stem from both the extensive existing IRS digital footprint and the overwhelming (and increasing) complexity of U.S. tax laws. The IRS cannot innovate and incorporate more AI without retiring older digital tools. Unlike private sector apps that provide an easily accessible "one-stop-shop" user experience, IRS.gov can be challenging to navigate even for experienced tax professionals. Moreover, AI cannot solve basic statutory complexity, and an oversimplification of the U.S. tax code can result in an incorrect item on a return. To date, "attempts to use natural language processing to make the tax code legible to machines have not been successful, due in part to the complexity of the tax code."[13] But "the advent of superhuman AI legal skills" will emerge as AI continues to develop.[14]

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13.  Lawsky, Sarah, Form as Formalization, *Ohio State Technology Law Journal* (2020). https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3587576.

14.  Nay, John J., David Karamardian, Sarah B. Lawsky, Wenting Tao, Meghana Bhat, Raghav Jain, Aaron Travis Lee, Jonathan H. Choi, Jungo Kasai, Large Language Models as Tax Attorneys: A Case Study in Legal Capabilities Emergence (May 31, 2023). Minnesota Legal Studies Research Paper No. 23-15, Northwestern Public Law Research Paper No. 23-48. https://ssrn.com/abstract=4476325 or http://dx.doi.org/10.2139/ssrn.4476325.
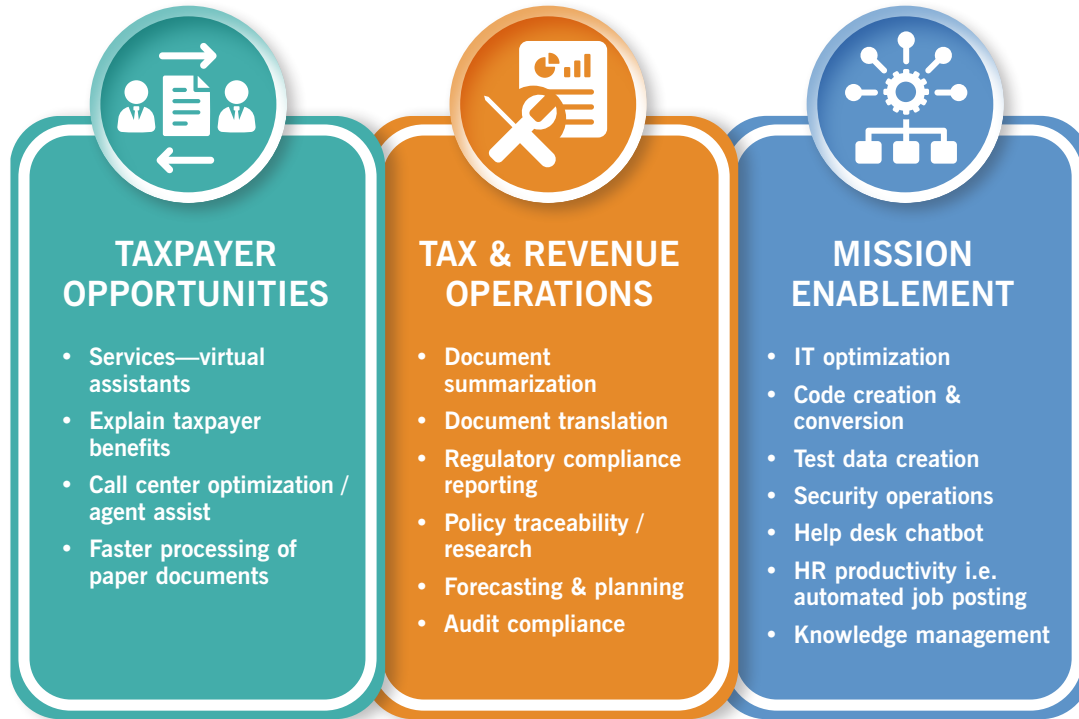
# The State of AI for Government Services

Put simply, AI[15] combines computer science and robust datasets to enable problem solving. AI models deploy computers and algorithms to identify complex patterns in data, and then they use those patterns in a wide variety of applications. Most AI models must be "trained" on a dataset to learn features and patterns in the dataset, before the model's performance can be assessed on a "testing" dataset. Once the performance of the model has been verified on the testing dataset, it can be deployed.

The most recent wave of AI development started during the COVID-19 pandemic. This focused on generative AI models, a type of AI that learns the features underlying a dataset, then uses those features to create new data points. Generative AI models, like OpenAI's DALL-E 2 and ChatGPT, can generate images and text; ChatGPT belongs to a class of generative AI models known as large language models. Private sector investment in large language models has led to the development of several different publicly available products, including OpenAI's GPT models, Google's PaLM, Meta's LLaMa, and IBM's watsonx.

Generative AI models can generate net-new content and better understand existing content, taking a leap forward in natural language processing. They can also learn and represent grammar, software code, molecules, images, and many other data types. The graphic below captures examples of key applications of generative AI for tax administration.

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15.  AI technologies and systems are considered to comprise software and/or hardware that can learn to solve complex problems, make predictions or undertake tasks that require human-like sensing (such as vision, speech, and touch), perception, cognition, planning, learning, communication, or physical action. https://www.nist.gov/system/files/documents/2019/08/10/ai_standards_fedengagement_plan_9aug2019.pdf.

## TAXPAYER OPPORTUNITIES

- Services—virtual assistants
- Explain taxpayer benefits
- Call center optimization / agent assist
- Faster processing of paper documents

## TAX & REVENUE OPERATIONS

- Document summarization
- Document translation
- Regulatory compliance reporting
- Policy traceability / research
- Forecasting & planning
- Audit compliance

## MISSION ENABLEMENT

- IT optimization
- Code creation & conversion
- Test data creation
- Security operations
- Help desk chatbot
- HR productivity i.e. automated job posting
- Knowledge management

AI can support improved taxpayer experience and tax agencies in with customer support, compliance and enforcement, and governance and risk management, as discussed in the next section.

# AI in Customer Service, Outreach, and Education to Support Tax Agencies

Every year, millions of taxpayers struggle to comply with their tax filing obligations. In the U.S., for millions of taxpayers, "the most important function the IRS performs is issuing timely tax refunds."[16] In 2022, about two-thirds of U.S. individual taxpayers were due a tax refund. For low-income taxpayers, these refunds may serve as a lifeline to pay for housing, transportation, food, or medicine. However, research shows time and again that U.S. taxpayers struggle to comply with their filing obligations, particularly if they are individuals with business income or side jobs.[17]

Such taxpayers are a growing part of the U.S. workforce. Recent survey data suggests that as many as 70 million workers earn income as independent contractors, self-employed workers, or occasional side-workers.[18] This trend does not apply only to the U.S., but rather stems from changes in technology and global workforce trends. For example, the World Bank recently found that online gig work platforms, "account for 12 percent of the global labor market— much higher than previously estimated—and holds particular promise for women and youth in developing countries."[19] This presents a host of tax administration challenges, because such income is not subject to income or payroll tax withholding.

This impacts tax compliance rates. When workers' only income is subject to both tax withholding and third-party information reporting, the tax filing process is typically straightforward. For example, U.S. taxpayers with W-2 income overwhelmingly report their income properly on their returns. However, when there is no tax withholding or information reporting to the IRS, tax compliance rates drop significantly.[20] This failure to comply contributes significantly to the "tax gap," or the difference between taxes imposed and those ultimately collected. In October 2023, the IRS published new tax gap data for 2021. The IRS estimated that the tax gap had increased by $192 billion to $688 billion, and individuals with business income were the largest contributors.[21]

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16. National Taxpayer Advocate, 2022 Annual Report to Congress. https://www.taxpayeradvocate.irs.gov/reports/2022-annual-report-to-congress/prologue-introductory-remarks-by-the-national-taxpayer-advocate.
17. Bruckner, Caroline, and Jonathan B. Forman, *Women, Retirement, and the Growing Gig Economy Workforce*, 38 Ga. St. U. L. Rev. 259 (2022). https://readingroom.law.gsu.edu/gsulr/vol38/iss2/8.
18. MBO Partners, 2023 State of Independence. https://www.mbopartners.com/state-of-independence/.
19. World Bank, "Demand for Online Gig Work Rapidly Rising in Developing Countries." (2023). https://www.worldbank.org/en/news/press-release/2023/09/07/demand-for-online-gig-work-rapidly-rising-in-developing-countries.
20. GAO, Statement of James R. McTigue, Director of Strategic Issues, Tax Gap: Multiple Strategies Are Needed to Reduce Noncompliance, before the Committee on Ways & Means, U.S. House of Representatives. https://www.gao.gov/assets/gao-19-558t.pdf.
21. The IRS, Tax Gap Projections for 2020 and 2021 (October 2023). https://www.irs.gov/pub/irs-pdf/p5869.pdf.

Certainly, the absence of withholding and information reporting is a major factor for taxpayer compliance. However, the reality is that the absence of effective tax education tools and low tax literacy rates impact many taxpayers' ability to comply. In the U.S., more than 32 million adults do not read at sufficient levels, according to the U.S. Department of Education and the National Institute of Literacy.[22] But the ability to read does not guarantee a taxpayer's ability to navigate the complexity of tax rules, nor does a college education. A recent KTPC survey of U.S.-based small business owners that measured tax literacy of respondents found that:

- Approximately one-third of respondents did not know whether they needed to pay quarterly estimated taxes, and a quarter did not know how to pay their taxes.

- While 54 percent of respondents set aside money to pay taxes, 30 percent did not know whether they needed to pay taxes or set money aside for them.

- Although 76 percent of respondents had at least a college degree compared to 23.5 percent of the U.S. population, only 13.5 percent learned how to do taxes in college and only 7.5 percent reported learning how to do taxes in high school. At the same time, more than half of the states require completion of a financial literacy course to graduate high school.[23]

Tax literacy is often overlooked by tax agencies as a key factor in tax compliance. In response, the Organization for Economic Cooperation and Development (OECD) has launched a series of projects to study tax education and the role it plays in building tax culture, compliance, and citizenship in countries. In connection with this work, in 2021 OECD published a global sourcebook on taxpayer education that detailed the results of a survey of 59 tax agencies reporting on 140 tax education initiatives. That research found that "[t]ax literacy can help people save money . . . legitimately lower their tax bills or how to avoid filing late or other pitfalls that might cause them to incur fines or penalties. It also increases tax compliance in the long term by increasing tax morale (i.e., the intrinsic willingness to pay taxes) because tax literacy makes them less threatening."[24]

To supplement tax education, AI can help to preemptively resolve some errors that lead to incorrect returns. Often, errors in tax filings from low- and middle-income taxpayers are accidental. Errors may arise from confusion or improper education on how to file taxes or navigate tax benefits eligibility criteria. These errors can lead to a variety of consequences, from overpayments to audits and corresponding penalties and interest. As AI chatbots and virtual assistants increasingly handle routine taxpayer queries, human agents can focus on more complex and strategic tasks. This 24/7 availability enhances the overall taxpayer experience. In addition, AI has the potential to be deployed across tax agency functions, including websites and mobile apps, to scan tax forms and assist taxpayers with filling them out. These developments can positively impact the taxpayer experience. They can also help to free tax administration workers to engage in work that requires human judgement and skills.

22. Straus, Valerie, Hiding in plain sight: The adult literacy crisis. *Washington Post (Nov. 1, 2016)*. https://www.washingtonpost.com/news/answer-sheet/wp/2016/11/01/hiding-in-plain-sight-the-adult-literacy-crisis/?noredirect=on.
23. Bruckner, Caroline, and Barabra Robles, Small Business Tax Literacy Project: Understanding Tax Literacy Gaps for Small Business and the Growing Gig Workforce (April 2023). https://8614653.fs1.hubspotusercontent-na1.net/hubfs/8614653/Small-Business-Literacy-Infographic_rd1.pdf.
24. OECD, Building Tax Culture, Compliance and Citizenship, 2021. https://www.oecd.org/tax/building-tax-culture-compliance-and-citizenship-second-edition-18585eb1-en.htm.

While the IRS, like other tax agencies, has deployed some AI, more can be done using AI to develop targeted information campaigns that can increase taxpayer awareness of tax benefits as well as tax-free filing assistance (e.g., free tax e-file programs or volunteer income tax assistance (VITA) offerings). AI enables targeted information campaigns that help to educate taxpayers, and to personalize their interactions in ways that can help compliance. Personalization can improve the taxpayer experience and help tax agency employees resolve issues or answer questions more efficiently, resulting in cost savings to taxpayers and agencies.

Personalizing taxpayer services requires taxpayers and employees to have a 360-degree view of taxpayer filings, data, and history. That could be extended to agency interactions like chatbot, live assistor, and online self-service experiences. Such a 360-degree approach would enable faster resolution to common issues, and help taxpayers and tax agencies work to reduce both underpayments and overpayments. Also, by analyzing historical data, AI algorithms can help to identify taxpayers' specific needs and preferences and tailor the information and assistance provided. This not only improves taxpayer satisfaction, but also encourages voluntary compliance as taxpayers perceive the tax agency as more responsive and understanding.

# AI in Tax Compliance and Enforcement

Most taxpayer experiences with tax agencies—other than annual tax filing—fall under the umbrella of compliance and enforcement activities. Tax agencies currently have a variety of tools to facilitate these operations. When deciding which AI tools to use to improve tax compliance activities, tax agencies should consider which AI implementations have the highest return on investment, weighing factors such as increasing accuracy of tax filings, enhancing the taxpayer experience, and improving compliance with the ever-evolving complex tax rules. One area where AI is likely to have an immediate impact is efforts to combat tax scams.

**Disrupting Emerging Tax Scams.** Every year, Americans lose millions of dollars to scams targeting taxpayers. In fact, the IRS complies its annual "Dirty Dozen" list of tax scams plaguing taxpayers, and provides resources for identifying and reporting them.[25] However, the IRS acknowledges that annually reporting information on these scams is not sufficient for protecting taxpayers. The IRS has indicated that IRA funding will help to develop and deploy new digital tools to combat these scams. Essentially, AI will provide the "night vision googles" that enable the IRS to detect tax scams and tax cheats shielding income.

Recent research advancements on AI anomaly detection can facilitate development of tools that identify filings involving fake W-2 forms, Employee Retention Credit schemes, fraudulent claims for unemployment compensation, or detection of ghost preparers. These kinds of scams often have typical hallmarks that appear in an individual's annual tax filing, and they can be identified when the current year's return is compared with data from prior years or from similar taxpayers in the current tax year. Using automated AI detection tools can greatly enhance the speed of detecting these scams.

AI tools can also help to disrupt scams impacting taxpayers that do not directly appear in annual tax filings. For example, telephone or mail scams use generative AI (e.g., ChatGPT) to design fake IRS correspondence and target elderly populations with "notices" of fines or penalties.[26] These scams convince victims to send money or personally identifiable information to perpetrators. Recently, a group of senators sent a letter to the IRS Commissioner asking about steps being taken to mitigate tax scams using AI.[27] Generally, tax agencies will need to deploy AI systems to counter and mitigate the effects of the growing use of generative AI in tax scams. In another example, IRS AI systems may be able to identify at-risk populations, enabling the IRS to reach out to potential victims before they become targets.

25. The IRS, Dirty Dozen. https://www.irs.gov/newsroom/dirty-dozen.
26. Senators Hassan, Margaret, Charles Grassley, Ron Wyden, and James Lankford, "the IRS Letter on AI Tax Scams," May 1, 2023. https://www.grassley.senate.gov/imo/media/doc/hassan_grassley_to_irs_-_ai_tax_scams.pdf.
27. Stanton, Cady, "Senators Question the IRS Readiness for AI-Generated Tax Scams," Tax Notes, May 3, 2023. https://www.taxnotes.com/featured-news/senators-question-irs-readiness-ai-generated-tax-scams/2023/05/02/7glnn.

**Audit Selection and Process.** Audits represent one of the most common reasons taxpayers interact with tax agencies, and are often stressful experiences for taxpayers. In the U.S., recent research has identified racial disparities in audit rates of low-income taxpayers despite race-blind audit selection in IRS processes.[28] Moreover, recent research has found "[t]here is also an alarming propensity for AI to mirror or even amplify existing biases in the training of datasets. That bias can inadvertently perpetuate inequalities in tax administration, culminating in misguided advice or uneven auditing patterns for certain demographics."[29] In response to these developments, IRS leadership has committed to addressing any racial disparity in processes for selecting cases for audit as a "topmost priority," and reiterated that the IRS does not collect data on race.[30]

AI ethics experts have explained that even in the context of racially-and-gender blind tax data, "[b]iases can stem from various sources, including the dataset itself, divergences within the dataset or biases introduced in the training process, which can compound over time."[31] That noted, the IRS recognizes the utility of incorporating AI to "help IRS compliance teams better detect tax cheating, identify emerging compliance threats and improve case selection tools to avoid burdening taxpayers with needless 'no-change' audits."[32]

Recent AI advances in task-agnostic anomaly detection may also help with managing audit selection processes. These models can identify anomalies in data within datasets with evolving characteristics. For example, they can learn when new tax credits are introduced, and can determine the difference between correct and incorrect filings with those new credits. This is especially useful to the IRS as Congress evolves programs and adds new credits. Ultimately, task-agnostic anomaly detection can reduce the need to train new detection models from scratch every filing season.

During the audit process, AI tools may provide invaluable assistance. Intentional tax evasion schemes grow more complex every year. This is particularly true as tax evaders work to obfuscate their income and wealth in offshore accounts, emerging and under-regulated asset classes (e.g., cryptocurrencies), and through tax loopholes. In some cases, journalists have exposed global tax schemes even before tax administrators could act.[33] Going forward, AI will enable both journalists and tax authorities to identify these schemes and assist auditors during the review process, allowing them to track shielding of income from regulators. The IRS has already initiated the rollout of AI models to help identify risk of noncompliance in large partnerships, identifying 150 returns for additional review in 2023.[34]

Overall, AI tools have the potential to enhance the speed and accuracy of audits. This can increase efficiency and enforcement effectiveness. Moreover, deploying AI can allow for more audits of highly complex evasion schemes at a lower burden to the public. This will—with compliance and reducing the tax gap—help to restore the public's trust in the IRS' ability to conduct audits expeditiously and fairly.

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28. Elzayn, Hadi, et al., "Measuring and Mitigating Racial Disparities in Tax Audits," Jan. 2023. https://siepr.stanford.edu/publications/working-paper/measuring-and-mitigating-racial-disparities-tax-audits.

29. Alarie, Benjamin, Rory McCreight and Cristina Tucciarone, "Will AI Replace Tax Practitioners?" *Tax Notes Federal*, Oct.30, 2023, p. 855.

30. The IRS, Letter of IRS Commissioner Werfel to Members of U.S. Senate on Audit Selection. https://www.irs.gov/pub/newsroom/werfel-letter-on-audit-selection.pdf.

31. Alarie, Benjamin, and Rory McCreight, "The Ethics of Generative AI in Tax Practice," *Tax Notes Federal*, July 31, 2023, p. 785.

32. The IRS Press Release, "the IRS announces sweeping effort to restore fairness to tax system with Inflation Reduction Act funding; new compliance efforts focused on increasing scrutiny on high-income, partnerships, corporations and promoters abusing tax rules on the books," Sept. 8. 2023. https://www.irs.gov/newsroom/irs-announces-sweeping-effort-to-restore-fairness-to-tax-system-with-inflation-reduction-act-funding-new-compliance-efforts.

33. Guevara, Marina Walker, How Artificial Intelligence Can Help Us Crack More Panama Papers Stories, (2019). https://www.icij.org/inside-icij/2019/03/how-artificial-intelligence-can-help-us-crack-more-panama-papers-stories.

34. Government Accountability Office, "the IRS Audit Processes Can Be Strengthened to Address a Growing Number of Large, Complex Partnerships," July 2023. https://www.gao.gov/assets/gao-23-106020.pdf.

# AI in Governance, Risk, and Authentication for Tax Agencies

Even with many benefits from incorporating AI across tax agency functions, the risks are real. In the U.S., leaders recognize the issues and opportunities widespread adoption of AI across agencies present, and have endeavored to lead on AI governance issues and risk mitigation.

Following the enactment of the Artificial Intelligence in Government Act of 2020 (P.L. 116-260) and the Advancing American AI Act (117-263), on Oct. 30, 2023, President Biden issued Executive Order 14110 (EO 1411) on Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence as a "governmentwide effort to guide responsible AI development and deployment through federal agency leadership, regulation of industry, and engagement with international partners."[35]

Among other things, EO 14110 directs federal agencies to advance AI governance and innovation and to manage its risks with respect to the public. With more than 100 specific actions to implement, EO 14110, prioritizes the following eight overarching policy areas:

1. **"Safety and security**. EO 14110 promotes the development and implementation of repeatable processes and mechanisms to understand and mitigate risks related to AI adoption, including with respect to biosecurity, cybersecurity, national security, and critical infrastructure.

2. **Innovation and competition**. EO 14110 compels actions to attract AI talent to the United States, understand novel intellectual property (IP) questions, protect inventors and creators, and promote AI innovation, including at startups and small businesses.

3. **Worker support**. EO 14110 states that AI adoption may be disruptive to the workforce, and directs agencies to research and develop potential mitigations against such disruptions.

4. **Consideration of AI bias and civil rights**. EO 14110 states that AI models may perpetuate biases and their implementation may lead to civil rights violations. EO 14110 includes a section on equity and civil rights considerations for use of AI in the criminal justice system and the administration of federal government programs and benefits.

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35. Congressional Research Service, Highlights of the 2023 Executive Order on Artificial Intelligence for Congress (Nov. 17, 2023). https://crsreports.congress.gov/product/pdf/R/R47843.

5.  **Consumer protection**. EO 14110 instructs agencies to enforce existing, technology-agnostic authorities to minimize harms to consumers, and to identify needed authorities related to AI.

6.  **Privacy**. EO 14110 calls for the evaluation and mitigation of privacy risks—potentially exacerbated by AI—associated with the collection, use, and retention of user data.

7.  **Federal use of AI**. EO 14110 requires the Office of Management and Budget (OMB) to establish an interagency council to coordinate AI use by federal agencies and develop guidance on AI governance and risk management activities for agencies. It acknowledges the ubiquity of generative AI (GenAI) tools and directs agencies to move toward adoption with safeguards in place. The EO also calls for additional agency hiring and training activities to increase the AI workforce capacity across the federal government.

8.  **International leadership**. EO 14110 declares that the United States should be a global leader in AI development and adoption by engaging with international allies and partners, leading efforts to develop common AI regulatory and accountability principles and advancing responsible global technical standards for AI."[36]

On the heels of issuing EO 14110, the OMB issued a proposed memorandum with additional guidance to implement the objectives of EO 14110 for covered agencies, including the U.S. Department of Treasury (Treasury) and the IRS.[37] With a focus on accountability and AI governance, the draft OMB guidance states that agencies must:

1.  ***Designate a Chief AI Officer to Take Responsibility for Implementing EO 14110 Directives***, and coordinate their agency's use of AI, which includes removing barriers to the responsible use of AI, promoting AI innovation, and engaging in AI risk management.

2.  ***Convene an Agency AI Governance Board***, which must include "appropriate representation from senior agency officials responsible for key enablers of AI adoption and risk management, including at least IT, cybersecurity, data, human capital, procurement, budget, agency management, customer experience, performance evaluation, statistics, risk management, equity, privacy, civil rights and civil liberties, and officials responsible for implementing AI within an agency's program office(s)."

3.  ***Develop and Release an Agency Strategy for Removing Barriers to the Use of AI***

4.  ***Publicly Release an Expanded AI Use Case Inventory***[38]

5.  ***Report to OMB any Agency Specific Lists of AI Purposes that Are Presumed to be Rights-Impacting or Safety-Impacting***

6.  ***Conduct Periodic AI Risk Reviews***

While the regulatory landscape of federal agency use of AI continues to develop in response to EO 14110 directives, Congress, and the White House are pushing agencies to develop a consistent and transparent approach on AI adoption into agency operations and interactions with the public. Over the coming months, Treasury will likely issue statements and reports consistent with EO 14110 and the corresponding OMB guidance. In complying with these kinds of directives, tax agencies may want to consider the following strategies on how to mitigate AI risks.

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36.  Id.
37.  OMB, Proposed Memorandum for the Heads of Executive Departments and Agencies. https://ai.gov/wp-content/uploads/2023/11/AI-in-Government-Memo-Public-Comment.pdf. The IRS is a bureau of the U.S. Department of Treasury. https://www.irs.gov/about-irs/the-agency-its-mission-and-statutory-authority.
38.  U.S. Department of Treasury, Agency Inventory of AI Use Cases, (May 2023). https://home.treasury.gov/system/files/136/Treasury-AI-Use-Case-Inventory-May-2023.pdf.

# How Can Tax Agencies Work to Mitigate AI Risks?

Risks associated with AI systems have become more prominent as more people start using large language models. These systems can create hallucinations, or factually incorrect, made-up responses—for example, Google's Bard chatbot hallucinated during its release demonstration.[39] Other types of AI carry risks in addition to hallucinations. These can include privacy violations, perpetuation of bias against marginalized groups, and lack of reliability. Risks associated with AI tools produced by tax agencies are heightened due to the legal implications from filing incorrect returns.[40]

Additional steps beyond external oversight are necessary to mitigate risks stemming from AI in tax administration. Numerous approaches may help to take such steps.

**Robust Training Data.** An AI system is only as good as the data it trains on. High quality data is imperative to manage risk; the IRS and other tax agencies should take steps to ensure data quality. Beyond annual tax filings, tax agencies could consider sourcing data from enforcement activities. Audits can provide a label of "correct" or "incorrect" for filings. These labeled data can help in training systems to identify erroneous filings. Furthermore, tax agencies can consider sourcing legal arguments and decisions from judicial cases to curate a dataset for a tax advice chatbot.

Additional work needs to be done to ensure that tax data meets appropriate quality metrics. One of the most important metrics involves data accuracy. If models are trained using erroneous tax return information, the model could learn patterns in the erroneous data for identifying correct returns, leading to bias and errors.

Tax agencies must also consider factors beyond accuracy of the dataset, such as data completeness. With many missing values, the model will not learn effectively. Additionally, agencies should examine representation in their datasets. This representation could be in terms of low- and high-income filers, correct versus incorrect returns, or geographic characteristics.

39. Daniel, Will, "Google CEO Sundar Pichai says 'hallucination problems' still plague A.I. tech and he doesn't know why," Yahoo! Finance, Apr. 17, 2023. https://finance.yahoo.com/news/google-ceo-sundar-pichai-says-173747803.html.
40. Soled, Jay A., and Kathleen DeLaney Thomas, "Predictive Analytics and the Tax Code," *Florida State University Law Review*, (May 8, 2023). https://ssrn.com/abstract=4441446.

Using data that overrepresent one group generally leads models to underperform on underrepresented groups, which could perpetuate bias. Given racial bias concerns that research has already identified with respect to IRS algorithms used for audit selection discussed earlier, tax agencies should be particularly mindful of how they develop data.

**Fine Tuning a Foundation Model.** Since quality data drives AI performance, tax agencies may choose to consider retraining a foundation model. As discussed previously, foundation models involve AI trained on massive datasets. In the case of large language models, these are general corpuses of text and not focused on specific topics. Foundation models are generally bigger and more powerful than those built using more focused datasets.

Using a foundation model may help boost performance of AI systems. Once fine-tuned on tax-specific data, the model can leverage learning from the initial training around specific features. This staged learning approach may reduce errors in AI systems.

**Model Architectures.** Agencies should also assess how the specific structure of the models deployed can mitigate risk. AI architecture often has a great impact on performance and ability to reduce risks. For example, one common tool to reduce bias involves introducing an "adversary" to an AI network that takes outputs from a content generator, and assesses them for certain characteristics. This adversary is often another AI system to critique the generator. Adversarial AI has been successfully deployed to mitigate bias in language models,[41] suggesting value in managing other risks in AI systems. Other algorithmic or architectural innovations may have similar benefits.

**Human Role in the System.** According to AI tax experts, AI in tax administration "excels when tasks have defined boundaries, consistent rules, and ascertainable outcomes. However, when confronted with ambiguous or novel tax situations, AI is likely to find itself on shaky ground. It is in these complex situations, such as development (and assessing the efficacy of) aggressive tax avoidance schemes, that human insight shines."[42]

Although AI systems often run on computers as part of automated data analysis pipelines, human involvement is integral to mitigate risks. One obvious strategy to involve humans in AI systems arises through thorough red-team testing. Red-teaming is the practice of using a team to attack the system, attempting to causing the system to break. In the context of AI systems, the adversarial group might seek to convince a model to ignore any restrictions the developers put in place.[43] Tax agencies need to require all systems under development to undergo significant testing and red-teaming. This would allow developers to identify critical flaws in a program that would lead it to divulging personally identifiable information, producing misinformation, or perpetuating bias.

Another way to increase human involvement involves deploying AI systems as advisors to people, instead of replacing them. AI lacks critical reasoning skills necessary to understand the implications of its output, but human operators possess those skills. Human-centered AI development is imperative to controlling AI risks.

41.  Hu Zhang, Brian, Blake Lemoine, and Margaret Mitchell, "Mitigating Unwanted Biases with Adversarial Learning," Jan. 22, 2018. https://arxiv.org/pdf/1801.07593.pdf.
42.  Alarie, Benjamin, Rory McCreight and Cristina Tucciarone, "Will AI Replace Tax Practitioners?" Tax Notes Federal, Oct.30, 2023, p. 855.
43.  Ji, Jessica, "What Does AI Red-Teaming Actually Mean?" Center for Security and Emerging Technology, Oct. 23, 2023. https://cset.georgetown.edu/article/what-does-ai-red-teaming-actually-mean/.

# How Can AI Be Used to Build Trust in the Modern Tax Agency?

In addition to collecting revenues, tax agencies need to prioritize building positive relationships with taxpayers through improving the taxpayer experience. The IRS has reiterated its commitment to taxpayer experience in its April 2023 Strategic Operating Plan. Robust AI risk management represents one strategy that can increase trust among users. If taxpayers are assured that their information is secure and the systems tax administrators use are accurate, taxpayers will more likely trust tax administrators.

Furthermore, taxpayers are more likely to trust accurate and easy-to-use systems. If an AI system is frequently incorrect and its recommendations result in taxpayers paying unwarranted penalties, users will distrust the system and the tax agency. Beyond AI risk management and ensuring accuracy, tax agencies can take a number of steps to boost trust in AI systems.

**Transparency and Interpretability.** Transparency provides assurances about robust AI systems to taxpayers. This transparency requires public information on where AI systems are used, how taxpayer data is used, why use of that data is necessary, and what steps can mitigate risks. Providing information educates consumers of the technology, enabling them to understand exactly how their data is used.

Additionally, developers need to consider AI interpretability. Interpretability refers to the degree to which users can understand an AI model's decisions. Some common yet less sophisticated models, like support vector machines and decision trees, have high interpretability. However, emerging AI technologies, including large language models and other deep learning systems, are difficult to explain. Steps must be taken to ensure that users can understand how an AI system arrives at its conclusions and recommendations, so that they can interact with the system to maximize benefits from that system. Building interpretable AI models constitutes an integral part of building trust.

**Inclusive Development.** Tax agencies must create tools that taxpayers want to use. The first step in building these tools is conducting a thorough needs analysis to understand what tools and features the taxpayers are asking for. If users see the IRS building tools that meet their needs, they are more likely to trust and use those tools.

Moreover, tax agencies need to ensure that these tools are accessible and easy to use. Creating accessible tools goes beyond ensuring websites are visually appealing and easy to navigate. AI tools and the platforms that host them, whether mobile apps or web sites, should be assessed for accessibility. For example, these tools need to allow the use of screen readers

and have color palettes that accommodate users with colorblindness. Because visual appearances are a signal for trustworthiness in web sites,[44] tax agencies need to build aesthetically appealing systems as part of their efforts to build trust with taxpayers. At the same time, tax agencies need to be ultimately mindful of their role to equitable and fairly administer our tax laws when adopting AI across its functions. "Disparities in AI access, primarily driven by economic and accessibility barriers, disproportionately affect the underserved and low-income demographics. . . . The digital divide exacerbates this situation, in which individuals without access to technology or the necessary digital skills remain at a disadvantage."[45] Therefore, AI tools and support to guide users should be designed to be easily accessible for a wide range of technological literacy.

Inclusive development of AI can be facilitated through teams. Representation across a wide range of ages, racial and ethnic identities, gender identities, disability status, and socioeconomic status matters for creating AI systems that meet the needs of diverse users. Building these diverse teams ensures that a variety of perspectives are included in the creation of AI tools. This would increase trust by demonstrating that diverse stakeholders were included in design, development, and deployment of these systems.

**AI Education.** As tax agencies roll out AI tools to assist taxpayers, they need to educate the users of these systems to increase uptake and trust in the tools. At a basic level, this should include walkthroughs or step-by-step guides to assist taxpayers who use AI. Such simple steps can prevent taxpayers from making errors that would decrease trust in AI.

However, tax agencies should take additional steps to educate taxpayers on AI systems. Users should learn how the models work, where they should and should not be applied, and limitations of the models. Making taxpayers aware of potential shortcomings in AI models means they are more likely to be aware of risks, and the users can take steps to counteract those risks. AI education is a necessary component of building trust in AI systems.

**Continuous Monitoring and Evaluation.** Inevitably, every AI system will have some errors, and this is especially true for tools that tax agencies introduce in ever-changing tax landscapes. Tax agencies should take several steps to continuously monitor AI tools. The first step involves tracking changes in the tax code, to ensure that AI models are trained on the most up-to-date information. The second involves agencies assessing patterns of misfiling taxes that stem from AI tools. The third involves developing a system to ingest, analyze, and respond to taxpayer concerns about AI. The commitment to preventing consistent errors will help tax agencies demonstrate their goals to have taxpayers make accurate filings.

Furthermore, tax agencies should publish regular reports about the status of their AI tools, reflecting both the benefits to taxpayers and error rates. Transparency about the issues identified due to continuous monitoring will help taxpayers understand the potential risks of using the systems; marginal error rates will foster trust with users.

44. Alberts, Wouter A., and Thea M. van der Geest, "Color Matters: Color as Trustworthiness Cue in Websites," *Technical Communication*, May 2011. https://www.jstor.org/stable/10.2307/26464334.
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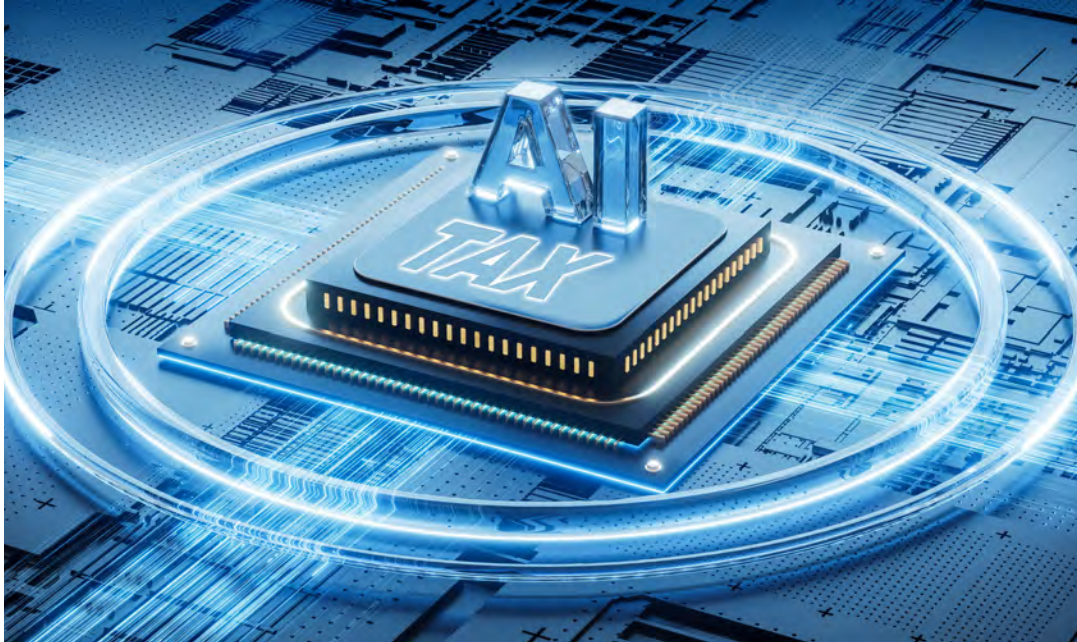


# Conclusion

Tax agencies can deploy AI to help revolutionize tax administration. AI applications can help educate taxpayers and help tax agencies detect fraud in emerging asset classes. However, as agencies deploy AI, they must also develop oversight and governance structures to ensure ethical use, mitigate risks, foster transparency, and build trust with taxpayers. Future discussions with a diverse set of stakeholders are necessary to fully explore the potential applications and challenges facing tax agencies considering using AI in their operations.

# Acknowledgements

The individuals listed below generously offered their input on AI deployment in modern tax agencies. We greatly appreciate their contributions during the roundtable and to this report. The contents of this paper do not necessarily reflect the views with whom we spoke. Additionally, the views expressed by the participants and presented in this paper do not necessarily reflect positions or policies of the federal government or its agencies.

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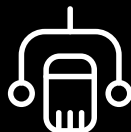
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