Chapter 5: Implementing artificial intelligence-powered automation to optimize compliance across the taxpayer lifecycle

5.1 Introduction

It is no surprise that the government needs to squeeze every dollar from the taxpayers to fund its expenditure. By proactively collecting government dues that fall within the ambit of its authority, the government is merely fulfilling its responsibility to all the citizens. One of the reasons citizens pay taxes is to contribute to social responsibilities, and ideally expect the government to discharge its obligations through the provision of various public goods and services. However, there are occasions when taxpayers do not fulfill their obligations even when they have the financial capability. Moreover, as businesses and the economy grow, they become increasingly complicated, making it more difficult for tax authorities to trace down elusive entities. If left unattended or managed inadequately, tax noncompliance may lead to erosion of the very citizen-society-government relation that taxes are supposed to build. Hence, tax accountability is necessary to ensure compliance with tax laws and, if necessary, institute punitive relief (Alm & Soled, 2016; Cockfield & Green, 2019; Kivihotan & Agbaje, 2020).

Tax administration may use a combination of legal and non-legal tools to obtain deterrence and punitive relief against non-compliant taxpayers. While tax policy measures focused on rights and how burdens are shifted may not necessarily be sufficient to enhance accountability, they could be used to complement other regulatory reforms more directly aimed at shifting accountability drivers and facilitating compliance. Assurance that the taxpayer is acting by its declared intentions has always been at the heart of the governance process and government accountability in a fiscal or tax

administration context. Taxpayer noncompliance erodes the trust that is essential for the successful conduct of many government programs. While one may think accountabilities are primarily the domain of the state, the discussion above highlights taxpayers also have an accountability dimension that needs to be embraced and integrated into the overall fiscal responsibility framework. Hence, the importance of understanding and managing taxpayer accountability cannot be understated (McKernon et al., 2024; Rukundo, 2020).

5.1.1. Context and Significance of Taxpayer Accountability

Taxation is an essential component for the existence of a state, and it provides the means through which a state can fund its public infrastructure and services demanded by the citizens. Politically, taxation is a primary way through which citizens express their desire for services while the state's funding of services creates its own set of obligations as citizens' expectations for quality public service increase. Economically, taxation provides the state with the resources needed to operate; thus a field of study has been created detailing the effects of tax policy on macroeconomic aggregates. In essence, tax systems typically exhibit a cycle that proportionality goes on at all levels of society. However, taxpayers tend to consider only the private cost of a tax, disregard the social costs involved, and exhibit tax evasion behavior along three distinct lines. First, some taxpayers are prepared to go beyond avoidance and evade, blatantly ignoring the rules. Second, and at the other end of the scale, are those who do not evade and who may formally wish to comply, but who find the obstacles prohibitive. Third, some resolve their problems by at least occasionally not following the rules. As public budgets are under particular pressure at present and governmental resources for enforcement are limited, there is political and economic support for widening the compliance net and, in particular, for reducing the size of the evasion problem.

Despite the importance of taxes in the lives of individuals as well as their impact on public budgets, questions of tax accountability have not until recently been the subject of sustained analysis within the fields of either political theory or political philosophy. This paper aims to remedy this significant absence by providing a framework that can be deployed in thinking through the importance of devising 'good' tax systems that can enhance taxpayers' accountability. The paper does not aim to document everything that has been written on the subject nor does it seek to propose a set of first principles when it comes to tax accountability, but rather it points in a positive direction to issues that require attention from tax policymakers.

Fig 5 . 1 : compliance across the taxpayer lifecycle

5.2. Understanding the Taxpayer Lifecycle

With the introduction of new technologies, digital ecosystems and processes, new taxpayer service expectations, and complex compliance requirements, the management of taxpayer compliance across the lifecycle has become more difficult, resulting in an increase in taxpayer noncompliance, lack of transparency, and risk of tax fraud, especially for low- and middle-income populations. The IIAG aims to take an integrated and holistic approach to optimize taxpayer compliance across the taxpayer lifecycle to deliver a seamless taxpayer experience, effective service delivery, and trust and transparency between taxpayers and revenue agencies.

The taxpayer lifecycle is defined as all interactions between an individual or business and a revenue agency regarding tax compliance or payment. Phases of the taxpayer lifecycle may include taxpayer registration; taxpayer education; the filing of taxes and claims; compliance checks, assessments, audits, and appeals; amendment and reconciliation of tax filings; tax payment and receipt issuance; tax refund; and updating taxpayer data, such as a business closure. In the IIAG, we consider the lifecycle from both the taxpayer's and the administrators' perspectives for each of the different compliance and service management activities throughout the lifecycle.

Taxpayer noncompliance as a result of a lack of understanding of their tax obligations and revenue agency services, or simple carelessness, often causes the greatest concern and potential economic harm for revenue agencies. Hence, optimizing taxpayer education and outreach is an important component of the service delivery mandate of revenue agencies. IT-based enablers for taxpayer education could include rule-based systems, chatbots, and virtual assistants that answer taxpayer questions about simplifications for low- and middle-income taxpayers to enhance compliance and limit audit procedures.

5.2.1. Phases of the Taxpayer Lifecycle

Compliance refers to the taxpayer's ability and willingness to plan and act according to the intent of tax laws in an environment of two-way communication and trust. It is a function not only of the taxpayer's interaction with the government but also of the laws and regulations that govern all manner of business interaction. There are several phases of the taxpayer lifecycle — some evolving and some fixed — each presenting its own compliance and business challenges. The life cycle of established businesses typically follows the path of Operations, Growth, and Exit. Other fixed taxpayer periods exist for trust account holders, payroll administrators, builders, producers, and international trade enterprises. Each of these areas poses particular compliance risks, presenting opportunities for AI automation and machine learning at various lifecycle stages.

There are two key compliance challenges based on the taxpayer lifecycle: The first involves the taxpayer's willingness to comply. It is during the Operations, Start-Up, and Introduction phases that the compliance burden can act as a disincentive for a business to enter the legal economy, either as a self-employed entity or as an incorporated tax filer. Informal, cash-based businesses are likely to spend significantly less on compliance-related services than their formal counterparts. Informal activities are unfettered by regulation or legal scrutiny, and their operators are unaccountable for the taxes, as well as the legal and financial obligations, normally associated with open commerce. Subsequently, officials working to reduce evasion must be cognizant of the possible negative impact that overly burdensome compliance responsibilities can have on nascent businesses. The second compliance challenge rests with the fact that once tax returns are filed, the possibility of accurate transaction verification is almost nonexistent. While verification systems exist – that is, netting incoming and outgoing cash and checking transfer prices through consistent accounting procedures – the quality of verification implementation relies on the will and ability to comply. As such, post-transaction auditing becomes the most common verification process and bears the highest costs.

5.2.2. Key Compliance Challenges

Compliance plays a pivotal role throughout the taxpayer lifecycle, with taxpayers facing various challenges at different phases. This not only impacts the self-initiated activities of taxpayers but also reduces voluntary compliance capabilities. The tax administration must therefore focus on offering timely, matching, and compassionate support tailored to the needs of different taxpayer groups. The speedy digitalization of taxpayers, alongside AI-powered capabilities, enables genuine digitized automation, while AI adoption in tax authorities naturally confronts existing compliance mindsets that have a crucial historical interrelation with trust. Both citizens and businesses expect faster, more convenient, and purely digital processes and data, proper for the responsibilities they must uphold. At the same time, the administrating bodies of these taxpayer roles firmly oppose this development based on their understanding of either compliance risks or trust for those taxpayer clusters as a whole. A joined-up collaboration between the tax authority and the taxpayers, for the benefit of society at large, requires a new mindset. At the beginning of the taxpayer lifecycle, tax-related obligations and processes must be as simple and easy to follow as possible. This is challenging, especially for ordinary taxpayers. In many countries, these taxpayers are the highest group in terms of numbers and, as far as their tax contribution is concerned, the lowest in terms of amount. The complexity of tax systems, along with rapidly changing external conditions, makes meeting compliance requirements increasingly difficult. With changing work roles, taxpayers, and businesses alike need to deal with new tax obligations: new forms of income give rise to the question of how to declare those, how to deal with withholding, and how to comply with possible declaration deadlines. Tax authorities have made great improvements on the compliance side, offering free automated tax return technology. The up-to-date availability of third-party tax information is there in sufficient volume, and decision trees reduce the complexity of the systems. Yet, this is still not sufficient. Taxpayers postpone submitting their taxes, and when they ultimately do, they tend to opt for the solution that incurs the lowest tax to deal with the pressure of meeting the deadline.

5.3. Overview of AI-Powered Automation

AI-powered automation solutions improve how people work, and augment their expertise and their ability to service clients. Automation technologies have been used for many years to improve efficiency, increase productivity, and drive down costs. However, organizations are quickly moving to utilize increasingly sophisticated, intelligent automation capabilities that leverage AI technologies to perform tasks requiring more complex decision-making, more nuance, and more interaction with people. Intelligent automation combines traditional automation technologies with AI

technologies such as document understanding, speech analytics, machine learning, and natural language processing. As a result, organizations can move beyond hyper-automation initiatives, which focus primarily on scale and efficiency, to AI-powered automation initiatives that drive higher value by redesigning complex, cross-functional processes to deliver better business outcomes and create better customer and employee experiences.

Enable AI strategy – Establish an organization's approach to AI-powered automation by educating executive stakeholders on the value AI offers to automation initiatives and the potential for AI to influence business operations more broadly. A strong AI vision and strategy with executive buy-in will guide the organization's utilization of AI-powered automation and ensure its priorities are aligned with the corporate vision and strategy. Create the right foundation for AI – Help organizations determine their readiness for the foundational capabilities required to successfully implement and support an enterprise-wide AI agenda. Organizations may need to invest in new technologies, models, infrastructure, and ways of working, but doing so helps them be better positioned to create and deploy AI at scale. Leverage existing automation-led AI examples – Assist organizations in identifying early or existing AI project initiatives that leverage automation and have been driven primarily by business operations. Benefit from existing AI successes to help create momentum for AI use cases.

5.3.1. Definition and Scope of AI in Automation

In the field of automation, definitions are not explicit. However, when experts talk about AI in automation, they usually refer to the use of AI techniques and technologies to enhance or augment automation capabilities. A simple definition of AI is an acquired machine capability to do things considered too complex for classical automation. Other definitions state that AI is about the ability of machines to exhibit human behavior. We prefer to adopt a pragmatic definition and weigh that any capability allowing the execution of a task or a piece of a process, previously considered too complex for traditional automation forms, is an example of AI in automation. Just as traditional automation systems have different forms and layers of interaction within task and process execution, the same goes for AI. Some simple use instances of AI in automation combine traditional automation concepts with the use of AI techniques. Examples of these are traditional RPA systems with supervised machine learning classifiers added to handle process variants. Other examples are RPA systems automatically configured by using AI techniques able to capture the behaviors of an expert user executing a task, or workflows handling process versioning and variants through the use of process mining enabling the analysis phase. AI techniques are also applied to tasks normally considered out of reach of traditional automation methods, such as those tasks implicating

unstructured data or knowledge, like intelligent document processing using deep learning or natural language generation and understanding. Deploying AI in automation is considered a game changer as AI handles cognitive tasks currently executed manually.

5.3.2. Types of AI Technologies Used

A wide range of methods, approaches, and algorithms is commonly and reductively referred to as AI technologies. These encompass tools in disciplines such as machine learning, natural language processing, machine vision, knowledge representation, expert systems, simulation, robotics, etc. The most utilized AI methods can be categorized into three technological categories: cognitive analytic technologies, computer cognizant technologies, and computer generative technologies. We briefly introduce these categories here. Cognitive analytic technologies can reduce the need for human analysis of large or complex information portfolios by providing insights about what the "data is saying" for a given scenario. Examples of cognitive analytic technologies include traditional logistic regressions, as well as other statistical or operations research-based technologies that have been around for many decades like models cluster mapping, risk score modeling, forecasting, and many other areas, as well as more recent advances using statistical and structural modeling based machine learning algorithms across diverse application areas, such as natural language processing, time-series analysis, neuroscience, and other areas. Computer-cognizant technologies can augment or replace human execution of domain tasks by more cogently performing tasks such that they allow machines to "understand" non-structured domain artifacts. Examples include cognitive robotic process automation using Optical Character Recognition, Computer Vision, natural language processing, speech analytics, and similar technologies.

Computer generative technologies automate tasks of creative domain experts by leveraging either human insight and data probabilistically or creating artifacts focused on achieving evaluatory business objectives. Examples in the tax domain include generative capabilities in transcribing domain-wide human expertise into Machine Learning Impact Models based on traditional logistic regressions and machine learning-based evaluations, and patent title and abstract generation, among others.

5.4. Benefits of AI in Tax Compliance

Various tax processes require a lot of time and effort from both the tax agency and the taxpayers. These include filing tax returns, preparing and submitting tax documents, and auditing. In recent years, several technologies have been included in the efforts to help reduce the tax regulatory burden in terms of costs and workload. These include electronic filing of tax returns, emailing agents for help, tax notifications via social media, real-

time chatbots, and the already much-discussed Artificial Intelligence and Machine Learning. AI is useful in various activities (especially those that require repetitive action) in sectors ranging from telemarketing, banking, finance and investment, human resources, healthcare, and manufacturing to computer programming and fraud detection.

1. Enhanced Accuracy and Efficiency

AI is being widely experimented with in tax administration. There is a good chance that it will be of a lot of help by assisting both the government and taxpayers in improving accuracy and efficiency in tax compliance by automating both routine and high-volume work. It will primarily help in reducing human errors made while dealing with mundane tasks. Its ability to analyze huge volumes of data, detect errors and inconsistencies in the data, and then address them quickly is beneficial to tax preparers and administrative agencies. Taxpayers will benefit from the use of AI in tax compliance in other ways too. The accuracy, timeliness, and comprehensive nature of information related to taxpayers will be better due to machine-assisted low-cost and low-error information compiling. Moreover, the advice services in terms of return preparation, audit, judicial, planning, and compliance will improve due to the use of AI predictive models.

2. Real-Time Monitoring and Reporting

The ability of AI systems to monitor millions of sources in real-time will help both the agency and taxpayers in the early identification of tax evasion schemes or tax avoidance measures. Not only will this help build research on possible tax risks, but it can also reduce the agency's reliance on sieving through a ton of compliance data while conducting audits. More informed decision-making might be possible in terms of targeting and timing audits. Moreover, AI has been shown to discover patterns in taxpayer behavior, which can be useful in determining special accounting and reporting risks and deficiencies.

3. Cost Reduction and Resource Allocation

Also, risk analysis based on the patterns discovered by AI programs can be helpful in efficient resource allocation. This will help reduce the costs of compliance checking and service provision. The agency will be able to deploy limited resources toward only those taxpayers who have a higher probability of providing incorrect or incomplete data. For tax preparers, the dredging of various areas of gas-filled unequal temperatures across the country without needing any teaspoons. A review of the pros and cons of using AI in tax compliance will help us identify the multi-faceted benefits of machine-assisted compliance while adequately addressing issues of reliability, accountability, and security.

5.4.1. Enhanced Accuracy and Efficiency

Robo-advisors predict the future. In the domain of sales tax compliance, those that implement AI-Powered Autonomous Collections can not only predict the future but calculate it at a significantly reduced cost. What accounts for the return on investment for AIPAC? First, it does what large-scale tax compliance has never been able to achieve: this hybrid of AI with robotics or autonomous processes has reduced errors in automated calculations by over 90% so that tax departments can finally afford to systematically eliminate error reviews due to the sheer volume of false positives from the reliance on tax rules, lookup tables, reviews of tax-exemptions and judgmental inputs by non-specialists. Second, agencies also save on program make-work products. For example, tax agencies prepare hand tables of individual taxpayer-specific expected versus actual payments throughout the year. These are of limited utility even though they generate reams upon reams for exempt small businesses – and are seldom examined due to the volume. Most end taxpayers have simply filed away in folders for 5 years or so after they file their returns or responses to any inquiries after filing.

The lowering of error rates cannot only overcome the return-on-investment hurdles. More importantly, the vast volume of compliance work that is simply left to auto-pilot due to a lack of budget and problem-solving resources, can be converted into a useful management tool. With sensible ex-ante proration tables, the predictive resources can tell collection agencies what effect iAPAC is having on delinquent returns at various due dates and, most importantly, provide a "Do Not File" table which greatly reduces the amount of paper that client agencies have to process. To add value, the output should easily flow into collections agencies' operating systems to facilitate adoption by underfunded agencies.

5.4.2. Real-Time Monitoring and Reporting

AI is rapidly changing the face of financial reporting, and CPAs must understand these technologies, their risks, and how to leverage them for compliance. As tax moves earlier in the business process – and is intertwined with business decisions – data must flow to the tax function sooner. A tax return cannot be compiled days after the financial statements close. A key benefit of AI technologies is their ability to operate in real time; therefore, tax compliance cannot be an afterthought. Workflow must be designed for the tax function both to enable and to leverage these developments. Revenue agencies around the globe are shifting their focus from traditional forms of audit verification to "real-time" or "live" audits. Scheduled audits are not going away, but many taxing authorities are shifting to a model reminiscent of the post-implementation stages of design check systems. They are deploying "transaction monitoring" technologies to analyze large numbers of transactions for risk-prone items that may warrant an audit

response. However, the difference between income and operational tax auditors and internal control auditors is that the former cannot examine millions of individual transactions within the time and budget to conduct the audit. They must focus on limited areas of risk suggested by specific red flags or transactions. For income taxes, the flags may be identified directly from a transaction monitoring process or indirectly from identifying transactions that can create significant income tax effects. Additionally, heuristics permitting a greater understanding of the underlying key drivers enable the models to focus on profitability. For operational taxes, the flags are typically based on direct observations of individual transactions not complying with statutory and regulatory requirements; for example, lack of appropriate documentation.

5.4.3. Cost Reduction and Resource Allocation

The digitization of tax compliance has drastically improved the accuracy and efficiency of various processes across the taxpayer lifecycle. By alleviating tax administrations of the burden of manual processes, taxpayers are incentivized to invest in technology that allows for real-time risk assessments and in-depth monitoring of compliance. This investment drives down costs associated with both programmed activities and traditional methods of enforcing the compliance burden.

Fig 5 . 2 : Cost Reduction and Resource Allocation

Implementing programmatic compliance strategies, such as benefits delivery or other economic incentives to change taxpayer behavior, can lead to the gradual reallocation of

budget resources. The savings could then be put towards innovative efforts on a broader scale. With automation, all levels of government can innovate and rethink approaches to processes and policies. We are already beginning to see a strategy rethink. Many tax administrations offer advisory services to taxpayers, universities, and business development industry leaders on the use of advanced analytics and emerging technologies to achieve better taxpayer service, more effective compliance programs, and greater tax revenue – often at no or low cost.

In addition to strategic partnerships, tax administrations often enter into joint-cost savings and investment programs with other government agencies, such as social insurance or treasury. There are several examples globally. Croatia has established an inter-agency task force to oversee its E-invoicing project. Such projects can enhance global trade, internally create cross-business processes for communitarian agencies, optimize internal IT implementations, and avoid reinvention of government technology or business processes.

5.5. AI Implementation Framework

1. Assessment of Current Compliance Processes

Most tax administrations are still struggling with traditional, mainly manual, processes that consume significant human and financial resources. Further, when it comes to compliance, they often/underestimate taxpayers' actual risk of not meeting their obligations. Increasing the use of taxpayer data, including through third parties, can help automate significant parts of the compilation, risk assessment, decision, and enforcement stages of the taxpayer lifecycle. These changes will require appropriate investments in technology systems and tools. The benefits, however, can be significant: making better decisions and doing better work, while spending less time performing lower-value work.

2. Integration of AI Tools

AI tools can enable economies of scale within tax administration while simultaneously increasing productivity and augmenting employee expertise and supervisory capacity. New AI tools should be rigorously tested before implementation, and rolled out carefully, focusing first on relatively constrained and isolated use cases to diminish operating risk. Data from the pilots, including complaints submitted, can be used to modify the tools before deployment on a larger scale. Tools should be designed to complement and not replace human decision-making wherever possible. Decisions on high-risk taxpayers, or involving sensitive issues such as criminality or taxpayer financial distress, should still reside with human staff, but they could take those decisions more effectively with appropriate AI expertise.

3. Change Management Strategies

Public sector organizations are notoriously risk-averse and slow to change. A key challenge in implementing AI tools to optimize compliance will therefore be overcoming resistance to change and rolling out the tools. This requires proper investment in skills both to design and build the models as well as to use the models built, working with the data, and deciding the input parameters for the models. Given the tight labor market for these skills, taxpayers may not be able to recruit internally, necessitating partnerships with the private sector to both build and run the tools and having the insights of internal staff guide their use.

5.5.1. Assessment of Current Compliance Processes

Tax authorities conduct a variety of compliance programs, covering arrears collection, tax audits and inquiries, agreements, preventive actions, part-time programs, and credit controls. These programs are designed to comply with generally accepted tax enforcement principles, such as proportionality, prevention, progression, protection, and fairness. They have diversified considerably, not only because taxpayer segments react differently to the various means that could be used to "motivate" them to pay their taxes on time but also because the first, second, and third pillars assign different roles to tax administrations. Furthermore, the specific compliance actions authorities implement in practice tend to be modified frequently.

Tax administration officials are well aware of this and understand that "what" we do is not as important as "how" we do it. In other words, how we select projects and manage operations is more likely to bring compliance outcomes in line with expectations than the specific compliance programs we are implementing for the different taxpayer segments expected to deliver the greatest revenue impact. Collectively, we do this through a set of interconnected decisions, policies, processes, and activities generally referred to as "compliance process management."

Tax compliance processes are a set of interrelated activities, aimed at facilitating and monitoring compliance with relevant tax obligations, that tax governments perform on their own or with taxpayers and their representatives to promote compliance. The way tax agencies design, manage, and implement these processes, aiming at a balance between the degree of facilitation and the number of controls, will determine the level of compliance achieved. Therefore, the primary decision areas related to the design and development of compliance processes are those related to compliance programs.

5.5.2. Integration of AI Tools

Through integrating AI capabilities, the accessibility, scope, and quality of automation can be magnified, elevating the overall level of compliance process improvement. AI technologies can address the question of how to enrich RPA capabilities and extend automation beyond basic rule-based processes. They can categorize unstructured data, improve machine learning models using active learning principles, and quickly compose text—while RPA picks up the data, faster than any human could. This begs the question: Why not add AI capabilities to every RPA project practically? So, let's check a few examples. Speech transcription, audio-to-text conversion, intelligent document processing, CRM data entry, UI testing, and scraping all have ready-to-go AI models integrated into the typical automation platforms. The effort for applying these must-have automation use cases is much lower than for integrating an external vendor-trained AI model.

Where does that leave non-lift-and-shift RPA projects—integrating vendor-trained AI models into RPA for productivity gains? Deploying a specific proprietary pre-trained AI module doesn't magically obviate the need to plan and maintain automation robustly. External vendor-trained AI may reduce the time to deployment for some NLP solutions, but hardly for others, and the chronic unbalance among retention, attention, and routing uses of knowledge can present interactive voice response routing challenges. Configuring a tool to utilize a proprietary AI model user-friendly and optimized not only to the top intents but also to the ongoing user experience—presents the full-stack product design challenge of corrective human feedback—acquire, evaluate, evolve—never really leave perception to others. Furthermore, the daily user experience of the chatbot requires conversation design, and the customer journey must be designed with user experience front and center, otherwise, the chatbot will fall short, even more so than mundane or boring chatbots typically do.

5.5.3. Change Management Strategies

Change management is a challenging process, particularly for large organizations that have well-established and entrenched ways of working. Implementing new technology could often be met with suspicion, resistance, and outright rejection. This could especially be the case when workers are faced with the prospect of being replaced by new technology. Unfortunately, these sorts of changes came with short lead times, rising pressure to move quickly, and the need to realign business models to drastic changes in demand. In many instances, the organizations thereupon implemented an assembly-line-like solution. They deployed technologies designed largely without any substantive input from the frontline workers who had developed trust-based relationships with service delivery customers over many years in favor of top-down decisions designed to maximize short-term economic gain.

In numerous cases, these disputes led to some harsh refrains of technology threatening the very human relationship involved in providing and receiving services from one another—the very basis of the social contract that defines what it means to be a citizen in modern society. With constant advancements in AI tools, we can rethink that dynamic; exploring and investing in the available tools is key to developing solutions that simplify jobs, rather than replace them. Shared experience and wisdom are only naturally included in the design of new systems if workers and customers are engaged early and meaningfully in the decision-making processes, during the design, implementation, and evaluation of the introduced solutions. Change management is the task of incorporating workers into future designs early, thus framing and facilitating changes, rather than dictating.

5.6. Future Trends in AI and Tax Compliance

Advances in AI technology are progressing rapidly, creating capabilities that tax agencies, firms, and taxpayers have only begun to explore. AI will change how compliance is approached, with a focus on prevention, education, fairness, transparency, and assistance. Technology developments will provide better tools to detect potential compliance issues earlier across the taxpayer lifecycle and to offer advisory services on compliance in real-time. These tools will help guide or support decision-making, allowing a more streamlined and accurate FTA to make objective risk-based decisions while freeing up resources for addressing complex tax avoidance issues and helping citizens comply.

Rapid advances in Generative AI capabilities allow for improved predictive models based on increased amounts of internal and external data sources feeding richer, deeper tax risk profiles at the individual taxpayer level, further enabled by open banking technology. These advanced predictive models are serving as a backbone to tools used to individually assess taxpayer compliance risk, driving tailored interventions that are more targeted and specific to the type of risk being addressed. Tools to communicate proactively with taxpayers further assist in guiding compliance, offering timely reminders and deadlines for filing and payment of taxes. Other tools provide chat assistance to answer questions on query types addressed previously in documents or help in assessing the allocation of income and expenses across different countries, drawing on large datasets cached and fed by taxpayer-submitted data and regulatory guidance to minimize errors.

While generative AI tools are rapidly advancing, concerns over the accuracy, integrity, and originality of the output remain. Additional regulatory focus on the responsible use of AI-generated tools and ensuring transparency and consumer protection will likely be forthcoming. This regulatory scrutiny will impose restrictions on how generative models

are used, especially affecting trust businesses such as accounting and auditing firms. More widely, agencies and countries working on frameworks or playbooks outlining compliance guidelines for the responsible, fair, and transparent use of advanced AI models, in general, will be facilitated by the rapidly growing ecosystem for these tools and their applications.

5.6.1. Emerging Technologies

Technological innovations will have a profound impact on tax and tax compliance in the years ahead. While many who are immersed in new technologies are excited by the promising potential applications of generative artificial intelligence, this technology is only one of a range of emerging technologies that could create efficiencies and enhancements within the tax sector. Other technologies, including robotic process automation, data analytics, artificial intelligence, cloud computing, and blockchain, to name only a few, are also rapidly reaching maturity. Together, these technologies could augment the capabilities of the tax sector and allow it to become increasingly efficient in applying tax policy and processing compliance obligations. These technologies could also represent an augmentation strategy for addressing the current resource challenges. Furthermore, by influencing the behaviors and decisions of both taxpayers and governments, these technologies could change current business models regarding how compliance and enforcement are conducted in the future. Yet applying tax regulations and determining compliance behaviors is inherently complex, and neither I nor any other technologies will be an easy solution to the underlying issues of tax policy design, supporting taxpayer decision-making, or the role compliance plays in determining taxpayer satisfaction.

The increasing complexity of tax systems suggests that different forms of collaboration between machines and humans could be necessary in the future. Exploring the nature of human involvement could be particularly critical, with uncertainty about what the political priorities will be for the tax sector in the coming years. Would there be a desire for tax administrations to focus on tax compliance behaviors, tax avoidance and evasion, or service provision? Likewise, what role would there be for businesses to play in this regard? Would businesses adopt technological solutions in which compliance becomes less complex because of greater attention to conforming to the spirit of the law? Or would businesses concentrate only on minimizing tax burdens? Would emerging technologies facilitate greater– or lesser– degrees of engagement between business and government on these questions?

5.6.2. Regulatory Changes and Adaptation

Tax compliance represents one of the most rapidly-evolving areas of technology-guided change. National governments are evolving their regulatory programs for a variety of reasons, including globalization, the proliferation of the digital economy dispersed over numerous jurisdictions, and a focus on broader post pandemic economic recovery and rebuilding goals. AI's capabilities for data-driven dynamic enhancement of decision-making across these areas make these tools an increasingly important area for consideration.

Regulatory Enhancement via Ninety-Plus Global Governments Adopting Digitalization While creating new forms of sapient data-driven control models, the countries of the world face perennial barriers of politics, culture, and market risk that shape individual compliance regimens. There has been a Global Digital Tax agenda, focusing on minimum tax standards that disrupt the regulatory lack of control that existed for traditional taxes like VAT, GST, source-based tax on international remit income, and the like. In parallel, there has been an AML framework for public and private sector coordination on the observance of cross-border flows and that, again, lack of national fiscal controls. These agencies work to bring order to a chaotic tax regime associated with distributions created by displaced home portfolio investments, foreign remittance payouts, or simple passporting decisions by consuming within the compact of national citizenship. As a result, there has been a massive acceleration around the globe in the digital automation of these efforts, a fact that should be considered by any creative who believes they have carved out a small buy-in comparative advantage.

The mission of design and deployment should be viewed as a process of planning, deploying, and executing with an eye toward velocity, learning, and self-correction. Beyond basic AML controls, there will be an increasing focus on the use of discrete inches of AI and other installed process-level compliance architectures to help keep very sensitive data better managed by organizations doing business with or within nation-state fiscal reach.

5.7. Stakeholder Engagement

Tax compliance and enforcement play a critical role in ensuring that tax systems are efficient and abide by the social contract underscoring the provision of public goods. They depend on the relationship among tax authorities, taxpayers, and intermediaries, which need to be structured with care to ensure compliance. Common to all models of tax compliance is the assumption that the taxpayer perceives the costs of both compliance and enforcement. Future and present taxpayer's compliance behaviors are determined by overall costs whose relative components are known for every individual

taxpayer. These costs include the efficiency of the tax authorities, the quality of the taxpayer's pre- and post-transaction processes, and the cost-effectiveness of the deterrent mechanisms as well as social norms and taxpayer education. In particular, the implementation of preventative actions as part of self-enforceable contracts with tax advisors reduces the risk of future costs. AI-powered automation has the potential to transform these cost functions of both the tax authority and the taxpayer in favor of the tax authorities. In the absence of stakeholder engagement, the balance of power and motivation will shift in favor of the taxpayer. Building on the present costs of the taxpayer and government, we discuss how the power function of the taxpayer can be adjusted with the involvement of the taxpayer, and intermediaries in particular, to achieve the aims of the tax authority without incurring excessive social costs. We investigate how AI can assist tax authorities in collaboration with the taxpayer to formulate efficient self-enforced contracts to re-establish a balance of incentive economic power functions.

Collaboration with Tax Authorities Bringing efficiency and effectiveness to the core transactional processes of the bureaucracy-driven service economy is a major use case of AI-powered automation. Tax authorities, across all countries, especially low-and middle-income ones, have huge IT-enabled, technology-induced efficiency gaps that prevent them from fulfilling their core function of supervising economic exchanges through setting up the most efficient combination of form-fitting, audit-benchmarked, and IT-enforced compliance as well as deterrent mechanisms. The bureaucracy of tax authorities also tends to demotivate, with significant losses in terms of increasing the costs of compliance, the design and introduction of discreetly constructed nudges that encourage taxpayers to adhere to the requirements of the social contract. Enabling tax authorities to regain the status of experts, who serve rather than push around taxpayers, can be accomplished through such strategic self-enforcement contracts and AI-powered automation can add significant value.

5.7.1. Collaboration with Tax Authorities

Tax authorities expect limited or no collaboration along the IT development pathway and this often results in complex validation processes. More active collaboration can gain law-academically recommended, validated, and standardized prototype solutions that could be incorporated into commercial solutions. It can also streamline validation processes. Cooperation between regulatory agencies and the individuals or companies they regulate frequently occurs only as a succumbing process. A reporting tax authority engages in delivering reporting solutions for tax users depending on taxes to be collected. With little to no direct involvement of tax authorities, the market for software houses providing tax solutions for digital economic transactions has been erected without the

essential globalization of domestic taxes. Neither political institutions nor the tax market participants have even tried to realize a vision of blockchain as a trust machine outside CBDC projects in which state money should be tokenized or digitalized. Crypto assets regulating procedures have to ascertain their trustworthiness. Tax and blockchain are about trust, which tax authorities have to actively create. Collaboration with tax authorities is essential not only for undertaking a blockchain-based solution but also for continuously maintaining it in the everchanging, or floating, tax legislative and regulatory environment. Building such a collaborative relationship requires the solution developer to engage tax authorities early and regularly. Ideally, the development of blockchain support for any tax purpose should be made with tax authority involvement, so that when the solution is done, they are as happy with it as the taxpayers. Tax authorities are always careful with their processes and rules, so it is time-consuming to undertake a project in which the authorities are fully engaged in the design process, provided the authorities have some form of tax technology comfort.

5.7.2. Involvement of Taxpayers

Taxpayer involvement can be an important approach on how to improve the regulations and processes but also the developments or implementations needed to increase awareness around the offered means of assistance, as well as improve their utilization. This also includes communication on the consequences of non-compliance. Taxpayer involvement has also proven to be an important means of ensuring that compliance is not a burden for the taxpayer. Insights into how taxpayers think about compliance and possibilities to lower the burden of compliance are important information to understand.

Problems exist surrounding the utilization of e-filing or other electronic tax return submissions. Automatic e-filing systems are available for taxes like the individual income tax yet are not largely utilized for certain groups of low-income taxpayers. Having to choose to e-file when a return may be complicated for most low-income people or having a tax return prepared at a commercial or community-based program can take up as much but possibly more lower-skill training. This could mean that either automatic e-filing systems are poorly designed or that the complexity for these taxpayers is not reflected in these systems. A good way to measure the impact of such information, and taxpayer involvement in these areas is to see how these processes evolve when such information is obtained and is taken into consideration during developments.

5.8. Measuring Success

1. Key Performance Indicators (KPIs)

To assess the effectiveness and impact of a taxpayer lifecycle management program implementation, tax agencies can establish and track Key Performance Indicators (KPIs). KPIs help provide structure to the reporting needs of tax agencies and their stakeholders. Also known as performance metrics, these measures are data-driven objectives that demonstrate the relative impact of the program's outputs over time.

Implementing AI-powered automation can enable tax agencies to efficiently track many KPIs. Examples of lifecycle indicator KPIs include:

• New taxpayer registrations comprised of both traditional taxpayers and nontraditional taxpayers to support agency goals around tax administration coverage

• Tax return filings, files on time, and returns filed as a percentage of total returns

• Tax returns and payments processed electronically and overall compliance with e-filing regulations

• Overall accuracy of taxpayer-expected payment dates

• Overall accuracy rate for taxpayer-specific AI predictions used to conduct taxpayer outreach

• Taxpayers who have a growing outstanding balance, a potentially falling outstanding balance, returning to compliance, or new disallowances placed on repayment plans

• Tax refund claims reviewed by digitized work queues incorporating automated verification processing

2. Feedback Mechanisms

Forward-thinking tax agencies are implementing voluntary taxpayer feedback programs to capture real-time customer service expectations. Implementing taxpayer feedback loops provides tax agencies with the ability to quickly identify taxpayer expectations, experiences, and pain points. For instance, a taxpayer's experience with access to customer service may differ based on different channels. Gathering feedback on these experiences can help tax agencies identify areas for improvement.

Surveys and business intelligence software capabilities are used to capture and analyze this real-time feedback. Some tax agencies have reported milestone improvement in taxpayer service, reasonable accommodations and overall taxpayer satisfaction with using the services of tax agencies in implementing taxpayer feedback programs. Tax agencies should continue to assess the effectiveness of the feedback program and iterate, including at various stages in the feedback lifecycle of outreach, post-closure, and post-processing.

5.8.1. Key Performance Indicators (KPIs)

When implementing any change, a set of rules clarifying how decisions will be taken, assessed, and by which criteria, is paramount to achieving success. This is particularly critical in regulated environments. In the case of tax compliance risks, the early taxpayers' engagement, the effective resolution, and the prevention of future recurrence are vital functions where KPIs play a key role in identifying the right balance between the roles of the taxpayer, the tax authority, and third parties. Tax authority costs and taxpayer burden are primary cost dimensions that place criteria on the effectiveness of a new AI-powered approach for closed-loop tax processes where tax authority input continues to be essential. The KPI discussion assumes both the best taxpayer and tax authority involvement practices while focusing on the application of AI and automation to ensure efficiency and quality decision-making from all parties with minimized taxpayer burden and enforcement costs from the tax authorities.

Any early engagement change will have a significant effect on the allocated case numbers to conclude tax compliance process loops for most parties. The risk categories and rules applied to allocate cases to the new processes and by whom will vary over time according to each taxpayer risk profile, balancing incentive/penalty mechanisms. Until newly implemented AI processes take effect, the current processes, case categories, and loss provisions significantly affect the KPI levels. Main taxpayer performance levels will be the number of applicants and awards targeted by risk class and the speed of any award process involved. The number of NPVs involved and the time until finalization will be prime KPI focus parameters while any payment and approval delays, as well as attorney involvement, are key measures of both authority performance and taxpayer risk performance.

5.8.2. Feedback Mechanisms

To fine-tune the objective KPI descriptions and ensure that they accurately measure their intended purpose, feedback mechanisms should be thoroughly documented within a feedback loop. AI systems can have many sources of input to help guide the systems toward accurate, key solutions. Most foundational is the work product generated ultimately by the AI. As the AI generates its output, it and the users interacting with the output can share that information back with the developers. As the AI generates free text, humans can and are encouraged to like/dislike the response and provide additional comments. Manual quality review for accuracy and effectiveness can also inspect the output. The frequency and depth of this quality review will assist in gathering the data required to ensure meaningful updates to the model, ideally frequently.

As models change, the previously desired outcome may change. Organizations need to take time to understand when and why the model has changed or has become stagnant in generating quality responses; then provide this information back to the development team. Did the model change because of new data? Did the model adjust to promote diversity and not focus on the prediction of the single response that seemed most likely? Are the original model goals still valid? When it is imprudent for the AI to generate a response or an input that it cannot or should not completely generate on its own, it should recognize this limitation and hand the request responsibly to a human expert. Running regular internal audits will encourage transparency and facilitate these types of collaborative practices and procedures across an organization.

5.9. Conclusion

In recent years, there has been exploding interest in the increased application of artificial intelligence (AI) powered automation solutions across a wide area of functions and services in the enterprise. One area where such solutions are remarkably under-utilized and continue to apply labor-intensive resource onboarding and ongoing compliance
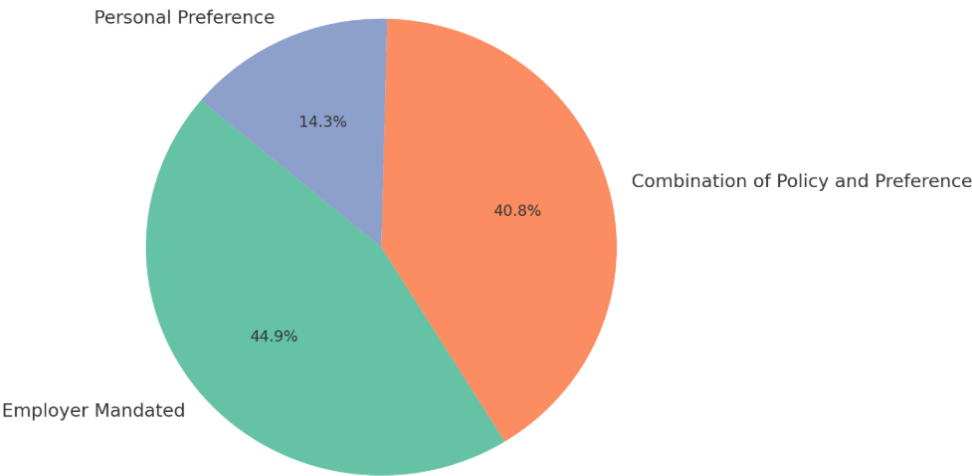

Fig 5 . 3 : Gen AI in Accounting

processes, progressing haphazardly through the taxpayer lifecycle is the tax for businesses and individuals. The main challenge of this essay is to identify how AI-Powered Tax Automation can transform and enhance each of the phases of the taxpayer lifecycle to aid tax authorities in delivering enhanced taxpayer service while optimizing resource usage and reducing service delivery costs. By extending the general-purpose framework of Digital Transformation accompanied by an on-premise or Cloud delivered

Stack of Possible Solutions for each of the constituent components of taxation as an enterprise service – Strategic Approach, Design, Technology, Change Management, Data and Advanced Analytics, Security & Privacy, Citizen/user Research and Service Level Management, we provide an outline roadmap which could support tax authorities in this endeavor. In doing so, we not only identify a large number of use cases and pain points that are improved or addressed through such solutions in different phases of the taxpayer lifecycle, but we also illustrate practical examples from leading enterprise tax automation solution providers in the form of their existing or planned on-premise or Cloud-based solutions. These examples also reinforce the enterprise automation stack that is articulated in the paper as the necessary technology foundation to support fully autonomous or AI-assisted tax compliance during the different phases of the taxpayer lifecycle. In particular, we analyze the unique implications of the PAINLESS approach for the design of these enterprise tax automation solutions. Finally, we conclude with the organization's overall key takeaways and organizational and policy recommendations for tax authorities contemplating the use of PAINLESS tax solutions.

5.9.1. Final Reflections and Key Takeaways

The untapped potential of AI powering automation could play a significant role in improving operational excellence and optimizing taxpayer compliance throughout the taxpayer lifecycle. The interest in automation is not new, though it has more recently gained traction as an essential implementation element for organizations of all kinds. There is a glimmer of hope to engage business with the Tax functions through better processes, tax-savvy systems, and easier platforms. Tax functions stand to benefit from a careful and deliberate conversation with their businesses to review opportunities, risks, and thresholds.

Finally, the concept doesn't only apply to a "big budget" transformational program. Tactical steps at a smaller scale can yield significant improvements that could help re-establish credibility and respect in the short term while providing the necessary learning opportunities for innovative and creative talent. Investment in automation could assist with building a robust pipeline of appropriate core compliance changes as well as supporting the organization's overall natural evolution as well as its stakeholders' need for assurance. The earlier insights provided by automation could deliver clear and transparent measures of the critical aspects of tax risk, leading to advisory accountability and the assurance elements dropped into the key processes.

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