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Chapter 8: Artificial intelligence-enhanced tax compliance and optimization in insurance firms

8.1. Introduction

AI is revolutionizing several sectors, influencing highly specialized areas such as tax regulations and consulting. By fully enhancing tax compliance, tax optimization can be achieved, as all data is seamlessly available in real time. This can be done without excess costs via in-house solutions. Tax compliance is relevant for all sectors of an economy. Because of the relatively high complexity of tax issues insurance companies are facing, compliance is not always easily achieved. Due to real-time compliance advantages AI-assisted software technology might help insurance companies predominantly in terms of foreign withholding tax and insurance premium tax. However, the need for state-of-the-art tax solutions might also lead to specialized tax consulting, withholding, and payment service solutions (Kogler et al., 2013; Bailey & Borwein, 2019).

The compliance risk of insurance companies is predominantly relevant for foreign withholdings tax. Insurance companies enable private individuals and corporations to financially mitigate risks such as fire damage, burglary, environmental damage, personal accident, illness or death, company bankruptcy, and natural disasters. In return, they continuously receive premiums, i.e. an amount of money that corresponds to the sum of possible insured losses adjusted for the risk of the insured event occurring. Potential tax issues arise when excess funds are generated, which lead to the allocation to general reserves. For insurance companies with international exposure, the general reserves can lead to substantial foreign withholding tax burdens. Because insurance contracts are concluded over several years, the business activities of the insurance holder can be subject to taxation in different countries during the term of the contract. If the business activities are subject to taxation in different countries, foreign withholding tax might arise if the excess funds are transferred to the corporate holder's home jurisdiction at the

end of the term of the contract (Schreiber & Zolt, 2020; Omar et al., 2021; Simons & Choudhury, 2022).

8.1.1. Overview of AI's Impact on Tax Compliance

The tax compliance domain has seen a long history of innovation and an abstract level of data automation supportive interventions. Tax compliance and fraud detection systems are among the most successful attempts at automating the tax engagement process, but they have also led to higher levels of intrusion for consumers. Data analysis, filters, rules, support infrastructure, and shared risk systems use individual behavioral data to try and infer intentions surrounding tax compliance. Yet is this tax intelligence predictive of behaviors that could be used to automate and digitize? The taxation of insurance clients and firms is complex. The relationship between year-end accounting results and tax liabilities is often complicated, with year-end accounting and tax rules differing. The product lines of the insurers with their inherent underlying risks tend to be long and the duration differences for life and non-life firms are substantial, which often provides incentives for artificial loss/gain recognition.

Fig 8 . 1 : Artificial Intelligence and Tax Compliance

8.2. The Role of AI in Tax Compliance

Achievements in artificial intelligence are transforming the way taxes are administered and complied with, and in the process, are enhancing the quality of tax advice, increasing the efficiency of tax compliance, and optimizing the underlying tax processes. Tax technology may consist of tax research tools, tax compliance tools, tax accounting tools, tax practice management tools, tax information reporting tools, and tax optimization tools. The innovation and improvement in tax technology may fall within the realm of Regulatory Technology, whose core capability may involve the enabling of data gathering and workflow automation through the use of smart, machine learning feature-enabled systems.

Tax compliance involves preparing and filing forms and computations for declaring tax bases; in doing so, tax compliance must abide by the regulations specified in legislation, court rulings, case studies, revenue agency ruling documents, and revenue agency directives. Accounting and tax calculations are intertwined; accounting rules dictate the computation of net income and the tax process takes in net income, special attributes such as Tax Book Value, and revenue agency directives to calculate federal, state, and local taxes. The estimation and eventual payment of quarterly taxes and preparation of tax forms are predicated on the underlying accuracy of the tax function. Tax technology is used on a wide landscape such as for preparing federal and local tax returns for businesses, partnerships, and individuals, or calculating, collecting, and remitting payroll and sales taxes for third parties or internal purposes. Further, a tax compliance function or department in an organization or government is responsible and accountable for adhering to the tax laws of the country, state, province, or locality in which the organization or government is located. Penalties mandated by the tax authorities may be fines, fees, additional taxes, and, in egregious situations, imprisonment of individuals who are responsible for tax compliance.

8.2.1. Key AI Innovations Transforming Tax Compliance

Tax professionals have been slow to adopt AI-enhanced developments, with some estimates finding tax departments using only 8% of the available AI tools. While AI promises vast efficiencies, some fear they will be replaced. Currently, AI is mostly enabling advisory and compliance, but in the future, we should probably expect to see faster transformations toward more complete digitization, with AI embedded in products. The most advanced AI tools being offered by major vendors focus on the following dimensions: Examination detection, analytics as an AI-enabled extension of traditional tax dashboards, Use of AI for advanced modeling, Expert systems modeling compliance, Adjacent area comparative tools, and Data-entry AI.

Machine learning algorithms modeling taxpayer behavior can help detect new trends faster and also see unusual audit risk patterns even for taxpayers who do not have a problematic audit history. AI could make a simultaneous analysis of thousands of audits a day possible by scoring them, thus speeding the process of audit selection by making it more objective or data-driven, helping both the taxpayer and the policy objectives be met intelligently. Such tools could analyze audit data to help better predict what situations lead to higher adjusted audit tallies and to provide comparative insights and how those taxpayer audits are respectively similar to those happening simultaneously and dissimilar to those involving parallel taxpayers.

8.3. Current Challenges in Tax Compliance for Insurance Firms

As with many other types of business, insurance companies have to comply with numerous global, country, state, and local tax regulations. These tax types include income, sales, employer payroll, and multiple types of taxation related to asset holding and transfers. However, the insurance industry is unique, and there are several factors unique to the industry that enhance the compliance burden on insurance firms, particularly those that operate internationally. These factors open new avenues for disclosure modification, as well as legal and illegal tax base erosion and profit shifting. Also, new sanctions, tariffs, and limits on cross-border remittances require insurance companies to implement additional compliance workflows.

This report focuses on possible solutions at the income tax compliance level. For income tax purposes, some of the many unique characteristics of insurance companies include (i) the tax base structure, which is unlike that of most other businesses; it is akin to accounting treatment of the extraordinary losses or “insurance reserves” created in the course of business; (ii) the structure of foreign country tax systems, which impose high rates on income recognition but allow rebates for foreign-level taxation; (iii) the integration of several countries’ tax systems; (iv) multi-country, unified-loss tax returns, a combination of avoidance and promotional offers that tax-loss insurance companies towards headquarter country symmetry induces; and (v) the U.S. tax system’s peculiarities on foreign branch taxation.

8.3.1. Analyzing the Unique Tax Compliance Hurdles Facing Insurance Companies

On the surface, insurance companies appear akin to other corporate entities or nonfinancial firms. However, insurance companies are unique in a variety of important ways, each of which may materially affect an insurance company’s tax position. Investigators have long noted these distinctive features. These unique characteristics of insurance firms and the highly regulated nature of the insurance business lead to tax

reporting complexities not found in other industries and to certain unique compliance hurdles that insurance firms must face. Furthermore, these unique features also have implications for certain federal tax policy concerns related to insurance firms, including whether the tax code favorably treats insurance firms relative to other businesses, whether tax rules governing insurance firms contain special inequities relative to the laws governing other businesses, and whether the tax code creates economic distortions related to investment and business decisions that are unique to insurance firms. This final concern appears to be particularly relevant for insurance firms and in other potential examples of risky business activities.

The first three aforementioned concerns relate to whether the tax code applies the same rules to insurance companies as it does to nonfinancial firms. The unusual structure of insurance firms not only poses practical challenges for the Internal Revenue Service in their attempts to develop unique analytical approaches for verifying the accuracy of tax-related events, but they also present unusual unique hurdles for insurance companies in their attempts to comply with federal tax laws. Indeed, these compliance hurdles can be quite taxing for insurance companies. These potential hurdles are further complicated by a second special goal of insurance firms, which is to prepare for uncertainty rather than to maximize shareholder wealth. More than any other nonfinancial corporate industry, insurance companies struggle under the burden of submitting their federal tax documents for approval before the tax year has even begun.

8.4. AI Technologies in Tax Optimization

The application of artificial intelligence to the field of tax compliance and optimization has grown significantly in the last few years, mainly as a result of the more general evolution of the different subfields of AI such as machine learning, natural language processing, and robotics. Starting from the basis of those technologies, this section presents examples of their use in tax optimization and compliance solutions.

1. Machine Learning Applications

Machine learning, especially in the field of supervised learning, has been used for several tax compliance and optimization applications. These applications mainly used routine prediction, classification, and estimation tasks for the following problems: tax revenue and demand forecasting, taxpayer categorization and segmentation, tax noncompliance detection, tax audit risk assessment, tax fraud detection, creation of deepfake digital content detection algorithms, overseas direct investment initiative evaluation, capital gains tax compliance prediction, evasion risk assessment for individuals and businesses attributing indirect taxes, predictive indexes for estate and inheritance tax, and preferential VAT legislative impact assessment model.

2. Natural Language Processing

Natural Language Processing is another popular subfield of AI that has been applied in several tax compliance and optimization solutions, with a special focus on the issue of large volumes of written tax documents and tax-related papers. Those NLP applications solve problems such as automatic extraction of information from tax documents – contracts and invoices, for example – classification of documents extracted from OCR systems, creation of chatbots for answering tax-related questions and providing tax optimization and compliance advice, automatic creation of reports on tax optimization and compliance, automatic generation of financial and tax disclosures, automated neutrality checking of approval processes for tax incentives, explanation and prediction of tax litigation outcomes, tax risk allocation, and economic recovery detection using tweets.

8.4.1. Machine Learning Applications

During the past two decades, more and more insurance companies have resorted to the power of machine learning (ML). In addition to fraud detection, ML has been also applied to conservative data mining tasks such as classification, regression, and clustering. Backed by significant advances in computing and access to vast amounts of data, ML applications in insurance are thriving. ML provides a new way to automate and improve actuarial tasks, causing shifting duties of actuaries by creating a new generation of actuaries who manage the AI model rather than develop it. The automation of actuarial tasks means that actuaries maintain the model, while data scientists and software engineers conduct the pre-processing work and create products for end-users.

While life actuaries are aware of impending heavy competition from ML in the future, there is less debate about P&C actuaries. AI applications are already happening or will soon be possible in twelve key insurance areas. AI has already changed the competitive landscape utterly and has paved the way for pure data aggregator disruptors. ML applications in insurance, excluding life insurance, have been classified mainly into P&C and health insurance divisions. The customer side of the business has been using many advanced ML techniques for premium pricing, product design, leakage search, lead selection, next-best action selection, account profile enrichment, customer churn, marketplace competitive analysis, and salvage estimation. Back-end insurance ML tasks are loss or claims forecasting, loss reserving and claim modeling, expense projection, distribution performance and optimization, and portfolio optimization.

8.4.2. Natural Language Processing

Research of the NLP subject, despite finding its roots back in the early attempt to mathematically model human reasoning under an algorithmic perspective launched in the work of Turing, has undergone a massive revitalization due to the expansion of the Data Science field and the use of AI methods, especially with the increase of the computational power available, amount of data for training purposes, and maturation of Deep Learning techniques, as part of the ML field, which has developed new algorithms such as Transformers and added additional layers for training, able to calculate the previously unapproachable amount of degrees of freedom presented in very big models.

NLP text transformation techniques available from the Transformer family seemed to present a family of generic techniques for NLP downstream tasks ranging from Named-Entity Recognition to Zero-Shot Machine Translation. Despite these models being characterized as multitask learning approaches, or a way for applying Transfer Learning in NLP by adapting techniques when previously trained in a general NLP corpus, in our perspective, they present a new family of general-purpose tools to be applied to concrete practical tasks. The popularization of these tools has had a strong impact in fields such as Chat-Bots, Question Answering, and Text Summarization, either in its general form or other different or complementary approaches solved by famous open-source implementations, whatsoever possible due to the investments that have been made by big tech firms and the Open Source community-wide adoption of the PyTorch framework.

8.5. Data Management and Integration

Now we delve into the specifics of the data management and integration processes. Insurance firms must establish a solid foundation of data management and integration to fuel the interplay between tax technology and data analytics. They must collate the relevant internal and external datasets, validate their accuracy, and establish clear tax data use and retention policies. In particular, data quality is essential for the reliability of tax provisioning, digital representation of tax risk, automated response to tax compliance requirements, and digital planning. Robust data management and integration also enable effective scenario modeling for the impact of different business decisions on tax-based capital requirements and risk appetite. Data supporting tax compliance and optimization can be sourced from multiple disparate business functions of an insurance firm, including underwriting, pricing, finance and accounting, customer engagement, business operations, and treasury. From the customer engagement and business operations functions, customer data can be sourced for compliance, attribution of business to various jurisdictions for compliance, and tax treatment of insurance products based on specificities of the customer, including asset class, domicile, gender, health

issues, and age, for product optimization to address tax arbitrage opportunities for the customer. For transfer pricing and business profitability optimization globally and specific segments, by a line of business, or by insured peril or region, pricing, and underwriting support data should be sourced in addition to claims handling data. Operations and treasury data also assist with the evaluation of tax treatment of insurance products offered to customers at different points in the value chain and legislative and technological changes for tax risk management. In addition, data sourced from the roles of the allocations associated with tax treatment assist with the evaluation of tax treatment of business partnerships.

8.5.1. Data Sources

Good data management and integration are paramount to successful AI-enhanced applications in tax compliance and optimization. These applications require vast amounts of quality, available, timely, and relevant data about customers, financial

Fig 8 . 2 : Data Management and Integration

transactions, and business operations within the firm, among others. The desirability of linking financial transactions with taxation depends on the ability to properly extract various pieces of evidence about financial transactions: as unique, low-probability events, they allow for the identification of financial transactions and, thus, for the

identification of taxable events. The audit trail of such unique and low-probability events, used together with tax rules, will allow for quantifying tax liabilities, enabling and forming the basis for tax minimization. A variety of information and transaction sources exist within a firm: internal sales and purchase information are often cross-verified using various external sources, including customers' websites, payment systems, marketing and advertising platforms, external service providers, and industry-specific platforms, associations, and government agencies. Audit should be supported by connecting the firm's historical internal and external information with other external data; for example, using customers' market presence and stature. Expensive and resource-consuming audits are increasingly necessary to inform a tax authority whether the company has complied with the law's formalities, whether they have the details required to demonstrate fiscal substance, and whether the firms are making a profit that is chargeable to tax. Furthermore, as governments thirst for taxation revenue, they have also allocated significant budgets to detecting tax avoidance and ensuring compliance through audits.

8.5.2. Data Quality and Governance

The ever-increasing quantity and variety of information being captured and stored present major challenges for the design and development of tax compliance and optimization solutions for insurance firms. High-quality data is essential for AI systems to help make reliable forecasts and predictions. However, there are multiple, competing variations of the phrase "garbage in, garbage out" and variations suffer from different states of incompleteness, inconsistency, unreliability, accessibility, timeliness, and unreliability. In particular, pretraining foundation models require access to large datasets, so those datasets require surveillance and governance both to ameliorate these various issues and to ensure their applicability to the domain and the tasks the model is intended for. How the model will be used also affects the design and governance of the dataset. The datasets' overall trustworthiness properties will also determine whether an application can be deployed for piloting or production use.

Data can be thought of as functioning in service of applications and available for networked consumption, relying parties, data provisioning relations, and value and trust infrastructure policy agreements. Specifically, internal model developers are service- and target-specific consumers, and application-specific data publications are internal or external disclosures of data supply. The budgetary and algorithmic complexities of data provisioning implementations are significant. Sharing useful, reusable, and privacy-preserving datasets while remaining compliant with relevant laws and regulations regarding data provisioning for external model development is an active area of research.

8.6. Regulatory Framework and Compliance

Ensuring compliance with the relevant tax laws and regulations is an immediate challenge for every insurance firm. The regularity framework at both national and subnational levels is expansive, complex, and comprises thousands of pages. Changes are made every year as new laws are created or incorporated through treaties and agreements. Many changes are scheduled for the next few years. Governments the world over need revenues, and insurance has proven to be a very lucrative source. Specifically, taxation concerning international insurance transactions is under increasing scrutiny. Laws, rulings, and treaties highlight the fact that "adequate" measures and benchmarks need to be established to ensure that the profits of international insurers are properly taxed within the jurisdiction in which the risk is borne. At the same time, the over-dependence of the insurance industry on the insurance investment income has triggered new proposals for reforming the insurance taxation regime worldwide. More and more countries are adopting a simpler approach to the taxation of insurance compared to the traditional statutory and supervisory regimes implemented over the last decades.

In particular, governments are proposing to finally treat insurers like other corporations, subjecting them to specific corporate taxes with no special concessions. This paradigm shift has resulted in several important effects. It has led to the emergence of a consensus worldwide on the desirability of a fundamental restructuring of the taxation of insurance. It has raised again the recurring question of the effectiveness of statutory control in its capacity as a substitute for taxation. It has moved vertical equity at the tax policy level, and the common issue of international tax avoidance to the forefront of the political agenda. Finally, it has added to the burgeoning debate on the taxation of financial services, already a usual refrain in the international discussions on capital, and a very prominent feature in the ongoing review of the international financial architecture.

8.6.1. Navigating Regulatory Challenges and Ensuring Compliance

Tax compliance presents significant opportunities and challenges for the insurance industry. Given the ever-deepening engagement of the digital economy with tax compliance, the industry should act to achieve and maintain compliance. The industry maintains data and processes that could be used to support compliance with relatively small additional costs, or could conversely expose themselves to larger costs for lack of compliance. AI-enabled approaches to support compliance with tax obligations can present unique operational advantages. The industry is dominated by large firms with dense networks of operations in many locations. A characteristic of these organizations is that they are relatively automated and digitalized. Their tax compliance obligations are also relatively broad, have many moving parts, and can vary among locations. The

scale of operations means that potential tax and penalties for non-compliance can be individually significant.

How then to support tax compliance in the insurance industry in a manner that achieves the outward objectives of compliance while also minimizing the costs of compliance? Utilization of AI and deep learning methods applied to claims processing procedures can identify potentially suspicious claims. AI-customized approaches to modeling and understanding the drivers of demand for commercial insurance can assist in the identification of tax planning and sales processes that are most likely to be subject to scrutiny. Last, risk and portfolio modeling informed through AI can sharpen the accuracy of data collection utilized within the specialized assessment of large insurance groups or conglomerates. Our goal is to build and explore a roadmap that integrates these components and milestones into a coherent model that can help to ensure compliance from the work of the insurance industry. In short, we are interested in leveraging the data that the firm possesses and making the firm more effective and efficient while managing the relationship and interface with the provision of public goods.

8.7. Benefits of AI in Tax Processes

In the present-day business environment of high uncertainty and continuous change, tax departments must leverage innovative technologies that revolutionize how they perform their work. Artificial intelligence (AI), which encompasses a broad range of technologies that can mimic cognitive functions, such as visual perception, speech recognition, learning, reasoning, problem-solving, and decision-making, as well as linguistic and cognitive understanding, provides great opportunities for tax functions seeking to become more effective. To specifically address insights regarding AI use in tax processes and benefit categorization based on AI use in tax work, we focus on the identification of major AI solution areas in tax work and associated anticipated organizational benefits. We focus on distinct AI solution areas, such as modeling, pattern recognition, natural language processing, robotic process automation, planning, workforce enablement, knowledge bases, and decision support that reflect some of the most promising present-day AI technologies, and link AI deployment-specific solutions in tax areas such as compliance, reporting, provisioning, technology impact assessment, as well as research and operations.

Today in business, the two main driving objectives for organizations are efficiency improvement and cost reduction. These are identified as the two major benefits areas for an organization to exploit AI, which can easily be implemented across a variety of organization functions. We agree that AI can help improve efficiency and deliver cost savings in a myriad of industrial applications by enabling, augmenting, and automating business processes. Specifically within tax functions, companies in several industries

noted that, without a doubt, automation powered by AI will allow tax departments to deploy their opportunities on higher-value work and, at the same time will help capitalize on cost savings through the use of external resources for more repetitive work, while reducing the overall time spent and eliminating errors from the preparation of assessments, minimizing the risks on the tax functions.

8.7.1. Cost Reduction

Everything we do costs money. Every business tries to reduce its cost. There have been various methods and approaches to reduce cost. Redundant systems have been outsourced. Non-productive internal employees have been fired. Plants have been moved from one country to another to take advantage of lower costs. Technology has been used to create efficiencies and improve productivity.

The taxation of insurance carriers is highly specialized and very complex. The many years of regulatory pressure that these carriers have been subjected to have also created a lot of data. In addition, the transactions of a major insurance carrier are highly regulated and conducted via large volumes of transactions. Hence, there are also many transactional records reflecting every aspect of running an insurance company. What is different now is that technology is being harnessed to do what is often mundane routine transaction processing. This technology is being used by enterprises to take over months of week-after-week processing. These sophisticated software programs look at description patterns embedded in the policy records, transaction records, and even the tax filings of the carrier and use these patterns to write predictions about what these transactions represent and what their tax treatment ought to be.

What took months can now be done in days. What took weeks can now be done in hours. As a result, these models can reduce current external costs estimated at a hundred million dollars for the industry as well as current internal costs running into tens of millions of dollars also incurred by most major carriers. Every company has costs. In the case of insurers, the tax function is expensive. The cost associated with tax work could potentially be eliminated. Long-term care hyper-complexity multiplied by the tax pencil pushers multiplied by the millions of transactions. Automating this task of preparing the myriad of taxes could make tax compliance for carriers cheap.

8.7.2. Efficiency Improvement

Tax compliance and tax optimization are two areas particularly concerned with the efficient exhaustion of resources. For tax compliance services, tax compliance costs are reduced by: (i) the automation of rules-based, tedious, repetitive tasks performed by

humans; (ii) the automation of checks ensuring a higher level of accuracy and completeness in tax filings and limiting exposure to tax audits and fines; and (iii) a greater speed in preparing, processing and filing tax statements and other applications for all clients, reducing the number of overall working days by all professionals. Tax optimization is only concerned with a reduction of tax payments while assuring a high level of accuracy and compliance with existing laws and rules.

Insurers deal with many tax codes, rules, and computations considering each of their policy and reinsurances. Considering taxpayers' special nature, generally, AI models, taxonomies, and applications are developed by both insurers and external companies, with a specialization in tax compliance systems, accountancy tax service companies, or AI consulting houses. Through processes, current taxonomies used in tax processes compare information on the policy being acquired from the client against tax rules and tax contracts allowing taxwise involuntary problems, nuisances, and inconsistencies on the client. AI taxonomies can then warn the analysts and clients and allow immediate correction. Generically, programs are employed for the entire onboarding process for both the client and the insurance firm. Tax applications, then, could be much faster and easier than tax models employed up to now.

8.8. Future Trends in AI and Taxation

Modern technology is necessary to improve upon the antiquated tax structure of today. New and innovative programs are available to provide companies and CPAs with the tools necessary to improve tax measurement and compliance. For counting and optimizing purposes, we expect the introduction and increasing sophistication of predictive analytic tools that weed through a wealth of data to help find compliance and avoidance strategies that might be overlooked by mere humans. However, this is a two-edged sword and AI may also be used to identify strategies that are overly valuable to particular companies for risk analysis and planning purposes to have recommended adjustments. Predictive analytics can help identify patterns in compliant behavior while remaining passive for the general operations of the rest of the corporate world. Tax departments would be able to identify relevant data including such things as robustness of earnings, sudden swings in acceptable variances, ratios of cash versus accrual expenditures, and much more that predict associated tax outflows, possible avoidance through "creative" deductions, and state of the art avoidance transaction locations and amounts. Conversely, predictive analytics would also be used by revenue departments to conduct "fairness audits" and thereby identify CPAs and in-house tax staff of companies who have handled audits in an overly aggressive manner that is appealing to the passions of corporations. This might be done, for example through the development

of transparency indices that would trigger further inquiries and potentially recommendations of increased review by tax authorities.

8.8.1. Predictive Analytics

As various tax positions share characteristics or dependencies that allow for their classification in predictive models, predictive analytics leverage the processing power of enhanced artificial intelligence, like deep learning or boosted decision trees, in elucidating predictions with the numeric confidence intervals of traditional inferential modeling. Predictive tax models are used by tax practitioners and public fiscal treasuries alike in predicting tax collections, the effects of changes in laws on proposed revenues, or taxpayers' compliance propensity, among others. Services provided by firms include tax collection forecasting models, geocoding of unpaid taxes, estimation of payment probability, refund fraud, and identity theft, among others. Predictive algorithms fit historical data and contain information on what enables a taxpayer to shape the patterns of past outcomes, for example, what factors made a transaction's tax impact to classify under a certain code among all corporation tax codes that taxpayers can choose.

Incorporation of data patterns before tax accrual decision-making, like the usage of multidimensional data cubes that support analysis of the tax decision-making parameters and their interaction effects, allows for the development of tax and financial predictive algorithms that support strategic and explanatory modeling of the tax expense as it integrates the overall business objectives. Predicted tax impacts could help the international tax corporate function in selling its impact and importance to the operational sides, adding incentives that enhance it instead of taxing currency conversion tax, but also justify the choice of transfer pricing approach. With the development of data arrival settings that warm up data used in modeling and feature engineering, predictive models can assist tax departments in conducting tax strategy what-if analyses also around fast business cycles that occur at current market conditions, enhancing already existing predictive tax expense models.

8.8.2. Blockchain Technology

As we anticipate the future of AI development in the taxation domain, we scratch the surface of an important trend of Blockchain technology. But let our readers be cautioned that Blockchain technology is not necessary for all transactions and funding activities used by AI controls: there are many if not all, AI audit checks that do not deploy Blockchain technology and still serve their purpose of accurately and timely describing and explaining AI audit and tax compliance control testing results.

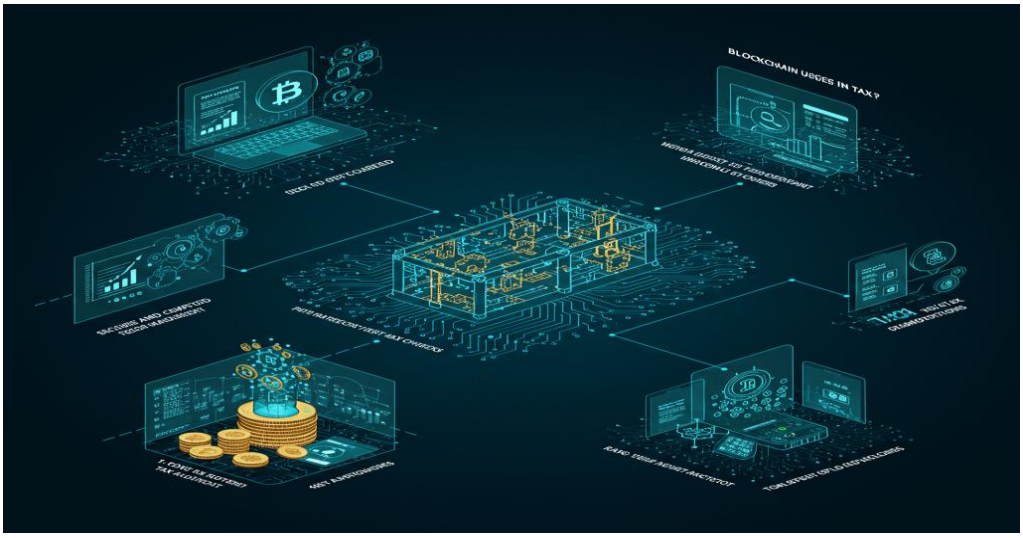

Fig 8 . 3 : Blockchain Use Cases in Tax AI

The core feature of Blockchain technology is its immutable digital signatures of transactions: when a correct result is delivered, a Blockchain signature is created. As long as a private key providing access to that transaction is safeguarded, it will never be falsified and will forever stop any provider from denying that such a transaction occurred and that it is the correct authorization of the actual transaction. An immutable transaction also allows for automatic AI testing of the transaction by providing a key or digital signature of that transaction ready for verification. Since audit control checking is simply verification, testing can be done automatically, and the verification function may be sent to outside audit providers, who can verify the results and send back their approval.

The importance of Blockchain technology is that it fulfills the security and validation requirements of any audit, validation, and tax compliance operation in AI outputs. In one sense, Blockchain allows for the possibility of verifying a prior transaction. The need for further verification opens up AI implementation for scrutiny by auditors or controlling structures within a corporation. This also allows for semi-decentralized Blockchain technology to be deployed through a corporation where the AI and Blockchain security controls are implemented well: a less incentivizing, costly, and timely AI supervisory structure may be implemented if the company vendors do not own the keys to the transactions verified.

8.9. Conclusion

AI's development in the tax compliance and optimization area is still in its infancy. Regarding tax compliance, available tools assist the preparation of tax returns in a semi-

automated way, needing a tax professional's oversight or leading to sub-optimal results. Concerning tax optimization, existing solutions support tax modeling by providing estimates of effective tax rates associated with business decisions, which may lead to sub-optimal results due to input inaccuracy by tax professionals, who appear to have the main input role. The semi-automated and modeling nature of these solutions explains their low transformation potential in the tax compliance and optimization areas. However, as solutions obtain Tax Data and Input parameters increasing power, integration with technology enabling the increase of underlying models' accuracy, the provision of tax advice via more sophisticated programs, and the coupling with tax modeling automation, the transformational potential of AI in tax compliance and optimization will be significant.

As data and model maturity reaches abundance, new solutions in the tax compliance and optimization area will emerge. These solutions will assist or automatically prepare tax returns, prepare more accurate estimates of tax liabilities and outputs of tax models, automatically run tax models to support businesses' decision-making, review tax positions generating alerts of constraint violation, enable underground economy monitoring, and revolutionize tax planning in the tax risk management area. Ultimately, AI's development will drastically change tax services, eliminating most current work and enabling tax professionals to focus on the most added-value ones, whether it is an internal or outsourced tax department. Furthermore, we anticipate a transformation in firms' corporate structure, with many companies reducing in-house tax department personnel, and shifting the workforce to consultancy firms specializing in tax compliance and optimization services.

8.9.1. Final Thoughts and Implications for the Future

This paper started with an explanation of AI, offering initial clues about specific properties to later create an AI cycle. It then highlighted AI's exponential growth and provided a discussion of its impact on various industries, focused on financial institutions, by discussing among other aspects, blockchain technology. The next step was the discussion of fintech companies, moving forward with a critical look at banks and a review of fintech companies used in tax processes. The relationship between fintech companies and banks was also addressed. The next chapter focused on taxes, tax obligations, and their respective impact on companies’ cash flow, by clearly explaining their nature, types, and objectives, followed by a discussion about corporate income tax and corporate tax management. The next two chapters were aimed at providing a more refined discussion of technology in business and taxes in the past and present. Finally, insurance companies were addressed in terms of activities and products, as well as

balance sheet peculiarities explaining in detail the insurance tax and respective treatment, tax compliance, and tax optimization.

The paper concludes with a discussion of the importance of tax compliance and tax planning provided by the products offered by fintech companies when possibly enhanced by AI, to tax management of insurance firms, using a real-life example. Considering all the aspects discussed, various insights are drawn. It is indeed difficult not to be amazed by AI technology, from how rapidly it evolved to the impacts it can cause. If such impacts are indeed so extensive to be called a new industrial revolution we cannot answer. But we hope that the present work at least pointed potentials and limits of AI, from a business and tax-oriented perspective, contributing to a better-informed society and business environment.

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