Conceptual Model for Taxation and Regulatory Governance among South African Crypto Asset Holders

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Abstract. The rapid adoption of digital assets has revolutionised the global financial landscape, bringing new opportunities and challenges. In South Africa, digital asset adoption has surged, driven by economic factors and a tech-savvy population. However, this growth has outpaced regulatory development, particularly around tax compliance. This paper proposes a conceptual model aimed at addressing the non-compliance issues among crypto asset holders. The model incorporates advanced mechanisms for visualising crypto address interactions and generating crypto tax Non-Fungible Tokens as a verification tool. By mapping and monitoring crypto transactions, the model provides regulatory bodies with enhanced tools to track, verify and enforce tax obligations transparently and efficiently.

Keywords: Digital assets, Tax compliance, South African regulatory framework, Crypto tax reporting, Tax evasion

1 Introduction

The advent of crypto assets (also known as digital assets) has transformed the global financial landscape through Blockchain technology (BCT) by enhancing security, low transaction costs, and the potential for financial inclusion [1]. Crypto assets refer to "a digital representation of value or right that can be transferred or stored electronically using distributed ledger technology (DLT)" [3]. DLT is often used interchangeably with BCT, referring to a decentralised system where transaction records are maintained and shared using peer-to-peer technology. The decentralised and anonymous nature poses challenges for regulators, particularly in taxation and compliance. Regulators worldwide have developed varying approaches ranging from outright bans to comprehensive frameworks. South Africa leads in Sub-Saharan Africa with supportive trading frameworks aimed at mitigating risks associated with money laundering (ML), terrorist financing (TF), fraud, and tax evasion, driven by economic volatility, a desire for alternative investments, and a tech-savvy population [4].

Studies by [5] and [6] reveal that the South Africa Revenue Service (SARS) addresses only 6 out of 11 crypto transaction types, with gaps in airdrop, initial coin offerings, and theft losses. This study builds on these findings by examining non-compliance among crypto asset holders (CAHs), a significant issue that risks tax revenue losses and enables illicit activities. South Africa's recent grey-listing by the Financial Action Task Force has intensified the need to address identified risks [7].

The primary objective of this study is to assess the key factors contributing to non-compliance among CAHs in South Africa, which complement the findings of [5] and

[6]. This study also addresses the following secondary objectives: i) Examine the current regulatory frameworks provided by the South African regulators; ii) Propose a conceptual model to enhance compliance with tax laws by CAHs.

To achieve these objectives, this study adopts the following research methodology: literature review, modelling, and theoretical use case. Section 2 presents background details of the digital asset landscape. The proposed conceptual model is outlined in Section 3. Section 4 presents a theoretical use case based on a fictional scenario to expand the idea behind the proposed concept. The limitations of the study are presented in Section 5, while Section 6 provides the concluding remarks of the study.

2 Literature Review

This section briefly provides the background details on *crypto asset taxation*, *regulatory frameworks*, *compliance challenges*, *related work*, and *technology solutions*.

2.1 Crypto Asset Taxation Landscape

Crypto asset taxation varies across different jurisdictions based on their regulatory priorities [8]. The United Kingdom treat crypto assets similar to property or shares, applying capital gains tax on certain transactions [9], while Germany promotes long-term investment with tax exemptions [10]. These varying approaches underscore the absence of a unified global framework; hence they have distinct tax implications [6]. Emerging crypto transactions like decentralised finance (DeFi) add complexity, requiring clear tax guidelines for yields and interest earnings [11]. DLT's pseudonymous nature further complicates tax enforcement, especially with cross-border transactions, and the use of privacy coins [12].

2.2 Regulatory Frameworks

Various jurisdictions have adopted unique regulatory frameworks to address the unique challenges crypto assets pose. Japan recognises crypto assets as legal property and imposes strict requirements on crypto asset service providers (CASPs) [13], while China bans CASPs and other crypto-related activities [14]. Effective frameworks depend on clear tax guidance, anti-money laundering (AML) measures, and international cooperation, including stringent Know-Your-Customer and AML protocols for CASPs to strengthen regulatory oversight [15]. The South African regulatory environment is evolving, with South African Reserve Bank, Intergovernmental Fintech Working Group, and Financial Sector Conduct Authority playing pivotal roles [2].

2.3 Compliance Challenges

Non-compliance among CAHs stems from complex tax laws, crypto's novelty, and limited tax awareness. Simplifying tax guidelines and raising awareness could improve compliance rates, reducing tax evasion and risks associated with scams, ML and TF. Strengthening compliance enhances transparency and maintains financial stability [15]. Awareness initiatives by regulators might demystify the crypto tax implications and encourage voluntary compliance among CAHs.

2.4 Related Work

This study focuses on the existing systems that offer tax guides for South African users: Koinly [16], Coinpanda [17], CryptoTaxCalculator [18], Kryptos [19], Recap

[20], and CoinLedger [21]. Table 1 compares these systems with the proposed model. All these platforms require subscription fees, varying based on the level of services provided. These subscription fees range from a minimum of 39 US Dollars (Kryptos) up to a maximum of 2,000 South African Rands (Recap)[1].

Table 1. Table captions should be placed above the tables.

Features	CoinLedger	Recap	Kryptos	CryptoTax-Calculator	CoinPanda	Koinly	Proposed-Model
Does not require a subscription fee							✓
Support South African tax laws & regulations	✓	✓	✓	✓	✓	✓	✓
Automated data imports (CSV files / API Keys)	✓	✓	✓	✓	✓	✓	✓
Generate tax reports based on SARS guidelines	✓	✓	✓	✓	✓	✓	✓
Record addresses linked to crypto sent/received							✓
Crypto tax-loss harvesting mechanisms	✓	✓	✓	✓	✓	✓	✓
Real-time tax calculations & reporting	✓	✓	✓	✓	✓	✓	✓
Handles various types of crypto transactions	✓	✓	✓	✓	✓	✓	✓
Adopt NFTs to verify tax reports or data							✓
Combat illegal activities by providing insight into the crypto address interactions							✓

The proposed model stands out by leveraging Non-Fungible Tokens (NFTs) to verify tax data, enabling CAHs to overcome challenges with annual subscription fees that deter tax compliance, particularly when they struggle to pay fees for SARS-required tax reports due to incurred losses or little fortune from trading digital asset.

2.5 Technology solutions

The following technologies might be used to address the identified problem:

Blockchain analytics (BA): uses advanced tools to examine Blockchain transactions, identifying patterns related to tax evasion or illicit activities (i.e., scams, ML & TF), helps to detect non-compliant CAHs and supports accurate tax calculations [22].

Automation reporting systems (ARS): simplifies tax reporting by automatically generating reports from data inputs, reducing human error and easing the administrative burden. ARS can integrate with existing tax infrastructure to enhance compliance.

Smart contracts & regulatory technology: smart contracts are self-executing contracts that automate compliance through encoded tax rules, ensuring that taxes are calculated and paid automatically [23].

ARS emerged as the preferred solution, as it automates report generation, minimises human errors, and allows CAHs to upload transaction data, while the system automatically handles the rest, promoting ease of use and encouraging compliance.

[1] $39 is approximately 713.57 South African Rands, while the highest amount in US Dollars is $79 which is approximately 1,445.44 South African Rands according to the XE exchange rate for 21 July 2024, 12:22 UTC. Note that *Recap* charges this subscription fee for 500 transactions, while others charge their subscription fees for 100 transactions.

3 A proposed conceptual model for reducing non-compliance with tax laws by CAHs

This section simplifies digital asset taxation to reduce non-compliance with South African tax laws by CAHs and curb illegal activities. This model incorporates four core components: *actors*, *data sources*, *importing & processing transactions*, and *generating tax reports*, see **Error! Reference source not found.**.a. To avoid repetition of similar concepts, this study has adopted the following approach (presented by steps 1-5 in **Error! Reference source not found.**.a) to examine the functionalities of these components, including how they interact with each other:

Step 1. Identify actors: determine the role players of the proposed model.

Step 2. Identify data sources: identify systems or objects that store transaction data used by actors for importing and processing information.

Step 3. Importing and processing transactions: procedure to ensure transactions are processed in alignment with SARS tax laws, including accurate base cost (cost basis) calculations for digital asset acquisition.

Step 4. Generating tax reports: creating tax-compliant reports based on processed data, and classifying transactions according to SARS tax guidelines.

Step 5. Defining proposed model: integrate steps 1-4 to form a cohesive model.

All these steps are discussed in detail in the following subsections.

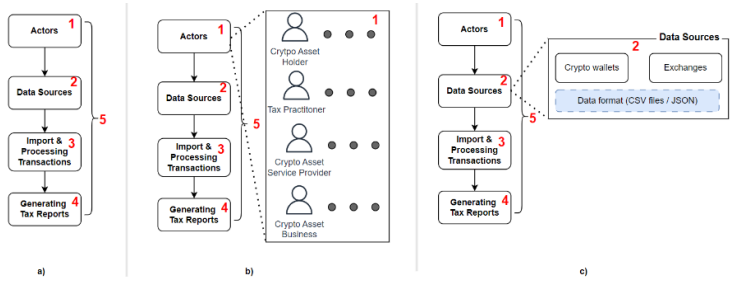

Fig. 1. a) Overview of the proposed model, b) Actors, c) Data sources

3.1 Identify actors

The proposed model accommodates the following actors: *CAHs*, *tax practitioners*, *CASPs*, and *crypto asset businesses (CABs)*, see **Fig. 1**.b. *CAHs* are taxpayers who directly engage in crypto transactions and file their tax obligations. *Tax practitioners* assist CAHs in filing their tax obligations on their behalf. *CASPs* are businesses facilitating the buying, selling, and custody of crypto assets, while *CABs* are businesses that accept crypto payments or hold them as part of their operations. Note that all the CASPs and CABs registered in South Africa are mandated to submit their crypto tax obligations to SARS, which is similar to how they declare their shares tax obligations.

3.2 Identify data sources

Crypto transactions can be imported from two main sources: *Crypto wallets* and *Exchanges*, as shown in **Fig. 1**.c. *Crypto wallet* is a program that stores public and/or private keys for transactions, while *an Exchange* is a business that enables the trading of digital assets. Historical transaction data from these sources is usually available in CSV or JSON format, accessible via file downloads or API keys.

3.3 Importing and processing of crypto transactions

These processes occur simultaneously to consistently track data from a single source, preventing it from mixing with data from other sources. The processed transactions are grouped into four categories as shown in see Fig. 2:

Income/revenue transaction. SARS deemed these transactions as income: mining rewards, staking rewards, airdrops, DeFi interest, and getting paid crypto [17].

Transactions that trigger buy & sell. are subject to the SARS-approved cost-basis method to generate disposal events. SARS uses them to determine whether a CAH is a trader or investor. Trader actively buys and sells assets, holding them for less than 3 years. Investor occasionally buys and sells assets, holding them for 3 years or more.

Applying cost basis method. SARS permits specific methods for grouping transactions to determine the base cost of acquired digital assets upon sale. The applicable cost basis methods for digital assets are Specific Identification, and First In, First Out.

Generating disposal transactions: are results obtained from the cost-basis method which groups them into trades or investments. Trades are short-term investments subject to income tax. Investments are long-term and subject to capital gains tax.

Recording of wallet address interactions. involves tracking addresses used to send or receive digital assets. These addresses are compared to known flagged or banned addresses to check for connections to illegal activities such as scams, ML & TF.

Storing of CSV files. imported CSV files are stored for future reference, ensuring data integrity or any other investigations that might emanate.

Error! Reference source not found. illustrates how these various processed transactions are generated.

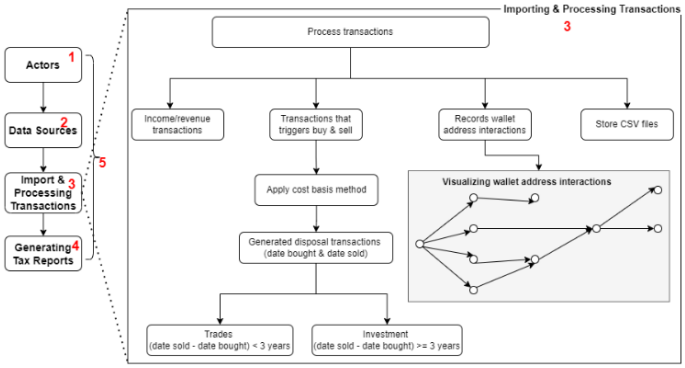

Fig. 2. Importing and processing crypto transactions

3.4 Generating tax reports

This process uses SARS tax tables to apply income and capital tax rates, generating two main reports: income and capital tax reports (see **Error! Reference source not found.**). The income tax report covers short-term investments and transactions classified as revenue, while the capital tax report covers long-term investments and transactions like spending or gifting digital assets. These reports are merged into a single consolidated tax report for SARS, offering a complete view of tax implication metadata. This metadata includes income (gains, losses, taxable income, tax payable)

and capital (gains, losses, taxable capital, tax payable). All these metadata are then embedded in an NFT, which serves as proof of tax compliance when submitted to SARS.

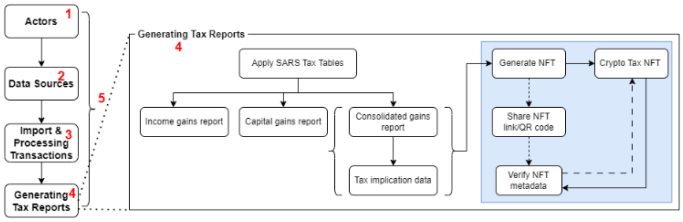

Fig. 3. Generating tax reports

3.5 Defining the proposed model

This section integrates the components discussed in **Error! Reference source not found.**.a to form the conceptual model as our last step. **Error! Reference source not found.** presents the consolidated representation of these components: *actors*, *data sources*, *importing & processing transactions*, and *generating tax reports*. The numbering from 1-4 denotes each component, while number 5 outlines the approach taken to explore the integration of these elements within the model.

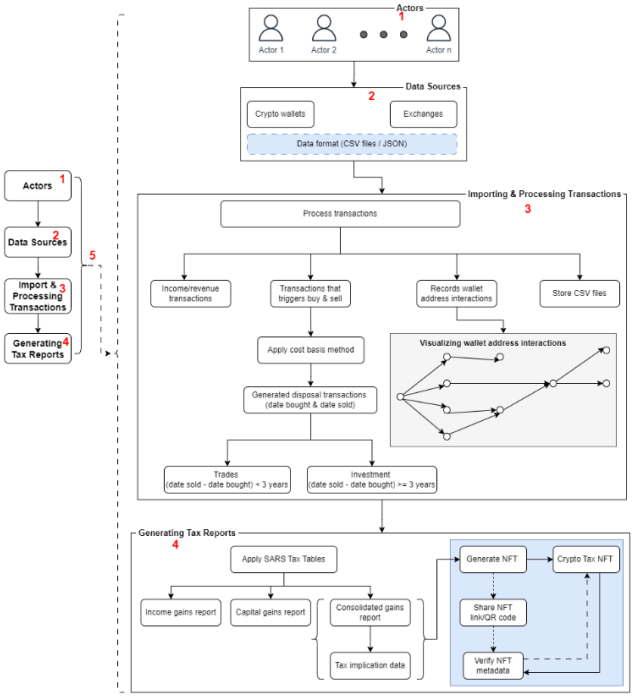

Fig. 4. Proposed model

4 Theoretical use case scenario

This section explores a scenario that the proposed solution could address. The following items outline the sequence of events within the scenario as shown in **Error! Reference source not found.**.

Step 1. Account creation with Crypto Exchange 1 (CE_1): Peter creates an account with CE_1.

Step 2. Interaction with CE_1: Peter uses his CE_1 account to perform various tasks such as trading, transferring digital assets and other activities.

Step 3. Depositing/Withdrawing funds: Peter deposits or withdraws funds (fiat currency) into or from his CE_1 account

Step 4. Purchasing digital assets: Peter uses deposited funds to acquire digital assets.

Step 5. Selling digital assets: After holding the assets for a certain period, Peter sells them for fiat currency. If an asset is held for less than 3 years, SARS considers and taxes these assets as income; otherwise, it's taxed as capital.

Step 6. Account creation with Crypto Exchange 2 (CE_2): Peter creates an account with another exchange, CE_2.

Step 7. Interaction with CE_2: Peter performs similar tasks in his CE_2 as in CE_1.

Step 8. Transferring digital assets to the CE_2 account: Peter generates a receiving address on CE_2 and transfers assets from his CE_1 account to CE_2. The digital asset network authenticates and authorised the approval of this transfer

Step 9. Sending digital assets to a compromised Crypto Wallet: Peter transfers digital assets from his CE_2 account to a Crypto Wallet (CW_1), potentially linked to scams, ML & TF activities, or sanctioned addresses. CW_1 receives the digital assets from Peter's CE_2 account.

Step 10. Unknown users sending digital assets to CW_1: unidentified users from wallets CW_2 and CW_3, transfer digital assets to CW_1.

Step 11. Returning digital assets to CE_1: Peter transfers some of the digital assets back to his CE_1 account. Peter receives digital assets from the CE_2 account.

Step 12. Processing account data for tax compliance: Peter compiles and processes his CE_1 data for tax compliance using either the existing tax system, consulting a tax practitioner, or performing the calculations himself.

Step 13. Submitting tax report to SARS: Peter submits the consolidated tax report to SARS to fulfil his fiscal tax year obligations.

Step 14. Proof of submission to SARS: the consolidated tax report serves as proof of Peter's compliance with crypto tax regulations.

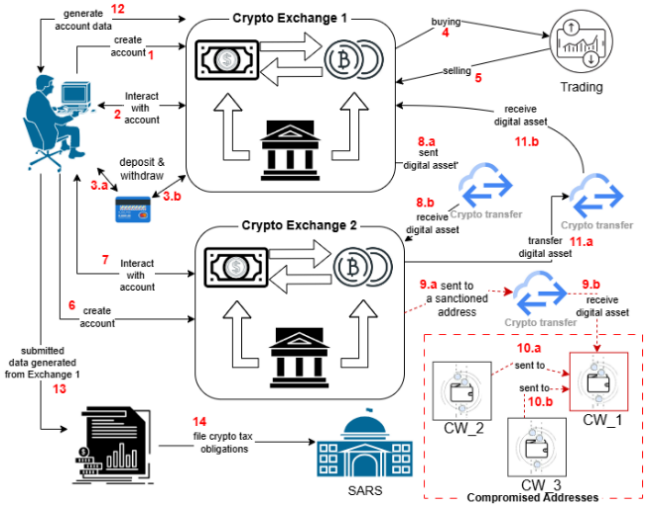

Fig. 5. Scenario

This scenario identified a loophole that CAHs might use to evade taxes or conceal interactions with compromised crypto addresses. Certain activities, like transfer between addresses, holding, or purchasing assets, are tax-free under SARS guidelines. The account data generated in step 12 only includes transfers in steps 8 and 11, ignoring transactions outside account boundaries, making it difficult for SARS to detect potential links to scams, ML, or TF activities. For instance, Peter could hide assets in CE_2 undetected, highlighting the need for improved crypto tax compliance. This study proposes a model to aid South African regulators by visually interpreting CAH's transactions and activities, incorporating NFTs as a verification tool for SARS or any regulator assessing tax compliance. The model process is outlined below:

Step 1. Steps 1-14: these steps are similar to those discussed in **Error! Reference source not found.**, detailing Peter's crypto interactions across various exchanges.

Step 19. Visualisation of crypto address interactions: the model introduces a visualisation mechanism to map interactions between crypto addresses (see step 19 of **Error! Reference source not found.**). This involves tracking and processing transactions to monitor specific crypto addresses, providing insights into digital asset flows, which might reveal suspicious activities or non-compliance.

Step 20. Generation of Crypto Tax NFTs: outlines the creation of crypto tax NFTs, which serve as an immutable verification tool for tax-related data submitted by CAHs. Each NFT is uniquely linked to specific transactions and tax obligations, ensuring data integrity post-submission, enhancing the tax reporting process, and facilitating easier audits by regulatory bodies.

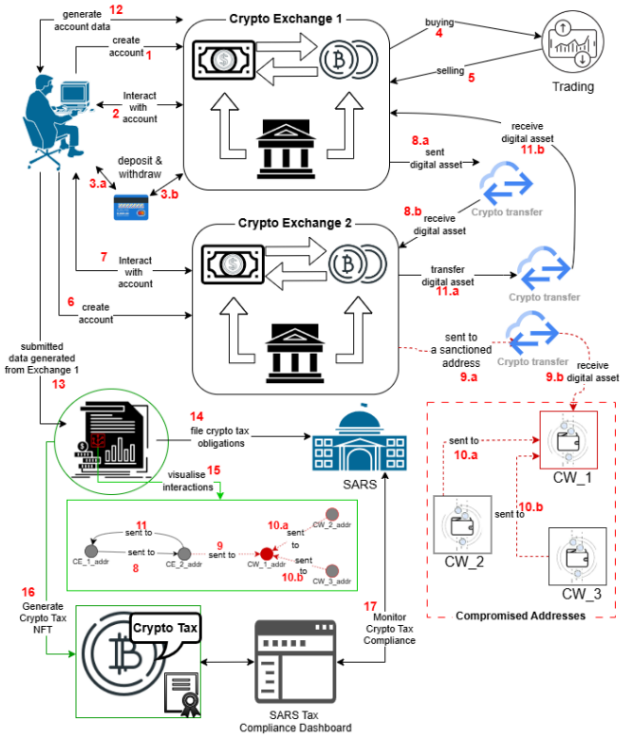

Fig. 6. Solution

Step 21. Monitoring Tax Compliance: the model provides a dashboard for regulators to monitor tax compliance which visualises NFTs, tracking CAH's tax adherence and any discrepancies. The proposed model offers a comprehensive solution for enforcing tax compliance in the rapidly evolving crypto landscape, integrating real-time monitoring with historical data visualisation.

5 Limitations

The following limitations could impact the effectiveness and accuracy of the model:

- *Data accuracy:* the reliability of tax reports depends on the accurate input data from CAHs, especially for imported CSV files which are prone to manipulation and may lead to inaccurate tax calculations. SARS should conduct audits and investigate sampled data to validate its authenticity
- *Visualisation of crypto address interactions:* practices like the use of multiple address generation and centralised exchanges might complicate the tracking of address interactions to a specific CAH. Despite this concern, the visualisation still provides SARS with valuable insight for further investigations.
- *Regulatory adaptability*: the model should adapt to new regulations to remain effective, though frequent updates could challenge its accuracy and relevance.
- *User adoption*: the success of the model relies on CAH adoption, which may be hindered by low awareness of tax compliance requirements and consequences of non-compliance.

- *Privacy and security concerns*: safeguarding sensitive tax and transaction data is essential, even though cybersecurity risks cannot be eliminated, they can be mitigated by maintaining robust security protocols.

6 Conclusion

This study proposes a conceptual model that addresses tax compliance issues among CAHs in South Africa. The model enhances regulatory oversight by visualising the crypto address interactions, as well as using crypto tax NFTs for data verification. While the model presents a significant advancement in the field, this study acknowledges limitations such as dependency on data accuracy and the complexity of tracking transactions across multiple addresses, which underscore the need for further research to refine and expand the model's capabilities. Overall, the model aims to improve transparency, efficiency, and compliance in the South African financial ecosystem.

Future research focuses on the design and implementation of the proposed model.

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