

A Framework for Implementing Sarbanes-Oxley controls in Cryptocurrency Trading Using Enterprise Resource Planning Systems

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Abstract:

Cryptocurrency is gaining popularity in the trade exchange market and has become an acceptable payment mode among many trading companies. It is without a doubt that crypto assets have the potential for advanced financial exchange. However, there are missing clarity of form, disclosure, and governance to inform investor decisions. The digital revolution has also introduced a load of computer malpractices that may challenge the legitimacy of data generated in the trading markets, especially where cryptocurrency is involved. Fraud is one major setback facing this digital currency, and there is a need to come up with a framework to curb the fraudulent activities that may face this market. In this qualitative analysis, we seek to uncover the vices that are present in cryptocurrency trading, study the classification of crypto assets in the U.S. and various countries and look at how to implement Sarbanes-Oxley controls in curbing the identified financial frauds. Due to the rise in cybercrime, digital currency faces a more risky trading platform where fraudsters may steal digital currencies held by individuals. Individuals may also be deceived into making transactions using the currency and lose their financial assets for items that don't exist. Several users have reported losing their hard-earned cryptocurrencies to cyber theft. Since the world embraces the use of these currencies, the risk of possible fraud being carried out through them increases, it is a trend that needs to have controls in place to ensure that presentations of company trading in cryptocurrencies are accurate and legit. The Sarbanes-Oxley act of 2002 lays down controls for curbing fraud in many I.T. departments and its associated systems. This paper defines a framework for implementing Sarbanes-Oxley Act of 2002 (SOX) controls in cryptocurrency trading using Enterprise Resource Planning (ERP) systems. Implementation of the COBIT framework in managing financial fraud in enterprise resource planning systems like Systems Applications and Products (SAP) is a good measure in ensuring SOX controls help investors make informed choices when making investments.

Key Word: Cryptocurrency, enterprise resource planning (ERP), COBIT, COSO, Crypto-assets.

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I. Introduction

Computer usage in financial-related activities has increased over the past few years. Due to the need to ensure the integrity of the data produced by such activities, it is important to have regulations on how the data needs to be handled and shared. The Sarbanes-Oxley Act of 2002 is a federal law in the United States that outlines measures for mitigating fraud or any manipulation in the financial sector (Sarbanes, 2002). The federal state created the Sarbanes-Oxley act to counter fraud in public trading companies in the U.S. In line with the act, there is a need to incorporate various controls into financial systems to ensure the legitimacy of the business transactions conducted with their use. However, other countries can borrow the set regulations and use them to formulate fraud mitigation measures in their states.

Enterprise Resource Planning (ERP) applications like Systems Applications and Products (SAP) span many areas of day-to-day business operations. These activities include procurement, project management, supply chain operations, risk management, and accounting (Shaul & Tauber, 2013). ERPs may be operated by a single user or setup up for access by multiple users. The most common usage structure is accessible by multiple users since many organizations have different employees designated for different tasks geared towards the smooth running of the enterprise. Therefore, each access to the system must be monitored and accounted for.

Cryptocurrency is an alternative payment form consisting of various encryption algorithms. It is a digital currency formed of many algorithms and acts as a virtual accounting system and a currency simultaneously. Digital currencies are traded using digital wallets called cryptocurrency wallets

(Mukhopadhyay, Skjellum, Hambolu, Oakley, & Brooks, 2016). As the name suggests, the items or the currency being traded is intangible, but value can be attached.

There has been a rise in digital currency usage as many people are embracing the use of the currency in trading. Several entities also accept the use of the currency in making and receiving payments for their services (Kethineni & Cao, 2020). This scenario has seen cryptocurrency gain popularity in the world and the introduction of the currency in exchange trade markets.

II. Material And Methods

Sarbanes-Oxley Act

Stock markets had faced challenges before, resulting in global scandals and financial crises among publicly traded companies. The Sarbanes-Oxley act is the remedy for restoring faith in the financial markets and ensuring that companies neither fraudulently trade nor financially misrepresent themselves in the stock markets (Verleun, Georgakopoulos, Sotiropoulos, & Vasileiou, 2011). The act dictates that there has to be an oversight board that ensures that these companies prepare no fraudulent financial statements. It is also geared towards ensuring that off-balance sheet items are not used fraudulently. Companies may use off-balance sheet items to commit fraud by moving assets and putting the company in a lucrative financial position for investors.

III. Discussion

Framework for Internal Controls

Assets in the crypto space are naturally of uncertain nature. The state indicates they possess essential determinants such as those of securities. Notably, not all those participating in crypto markets know when to treat such assets as security. There is an evident divergence in crypto-asset classifications; their regulation and insufficient information about them make it difficult for cryptocurrencies to succeed in the trading markets (Whittaker & Reid, 2018). There are over 2000 cryptocurrencies, many of which are not currencies.

Digital asset transactions have been catalysts for fraud activities and each country has taken its stance on regulating and classifying crypto assets. The classifications being made by the various countries are in attempts to distinguish digital assets, which are virtual currencies, from other forms of electronic payment like PayPal, credit cards and wire transfers (Bartolucci & Kirilenko, 2020). Consumers become more vulnerable to fraud due to lack of protection and lack of a centralized system for managing crypto assets.

Crypto assets that are application-specific provide a platform on which users can build on. The assets can be modeled into entities and not currencies. When the crypto asset is similar to a stock, it attracts dividends and price appreciation as valuation components. Each asset has an underlying purpose or project. In this regard, they need to be valued on a type basis keeping in mind that a single valuation measure may not be enough. Utility tokens, functional crypto assets, satisfy a particular purpose provided by a service or good. The following table shows the various classifications of crypto assets and their various governance schemes.

Table no 1: Classifications of crypto assets and their various governance schemes (Smith, 2019).

		Governance	
		Centralized	Sufficiently Decentralized
Type	Non-convertible	Units are unique to virtual communities but not convertible to fiat currency. E.g., V-Bucks	Units are not unique to one community, useful in other communities, but not convertible to fiat currency.
	Medium of exchange	Units are used as substitutes for legal tender, but functionality relies on the efforts and powers of certain groups. E.g., Ripple	Units are used as substitutes for legal tender, function without the power of a central actor, and its powers are not reliant on a specific group. E.g., Bitcoin
	Application	Units function as a base for other crypto assets' development, and their functionality and power rely on a specific group. E.g., Waves	Units function as a base for other crypto assets' development, it functions without the power of a central actor, and the network's success is not dependent on the efforts of a specific group. E.g., Ethereum

	Functional	Units serve a specific purpose and may be exchanged for a service or good. Its functionality relies on the efforts and powers of a specific group. E.g., OmiseGo	Units serve a specific purpose and may be exchanged for a service or good. Its functionality does not rely on a central actor, and the network's success does not rely on the efforts and powers of a specific group.
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Transactions of cryptocurrencies such as that of bitcoin take place on a decentralized database recording each transaction as a series of blocks. The blockchain is regarded as a digital bookkeeping system and is a basis of transactions for several cryptocurrencies (Chou, Agrawal, & Birt, 2022). Blockchain technology is a trustless environment that lacks third-party supervision or verification (Bonsón & Bednárová, 2019). Given the nature and the lack of protection in the form of trading, investors are advised not to invest what they are not willing to lose in cryptocurrency.

Management's responsibility is establishing, implementing, and evaluating internal controls for the company's systems. These controls should also be implemented for systems that house financial data (Abbott, B. Daugherty, & Peters, 2016). The current business activities are carried out in more complex applications (ERPs) that house departmental data, including payroll, procurement, and other financial transactions. Sarbanes-Oxley is attributed to two different measures that help regulate financial transactions. The first set is a set of rules to be followed. The rules dictate that there is a need to define the role of management in maintaining adequate control structure for financial reporting and have an assessment to ascertain if the internal controls are adequate in financial reporting.

The second part of the governance is attributed to auditing the reports produced by the measures set using internal controls. Confirmation of the conformity of the reports to the actual financial state of the entity is a mandatory undertaking of the company's board of management (D'Onza, R. Lamboglia, & Verona, 2015). As stipulated in the Sarbanes-Oxley act, the implementation of internal controls in I.T. departments is left to individual interpretation. However, two frameworks shed light on the base implementation of the controls in I.T. systems.

These frameworks include the Control Objects for Information and related Technology (COBIT) Framework and the Committee of Sponsoring Organizations (COSO) of the Treadway Commission framework. It is important to note that the frameworks do not exhaustively provide the internal controls to put in place but rather the best practices to implement the controls. These frameworks focus on the processes and controls put in place to manage finance-related data in enterprise applications rather than the technical measures put in place to ensure the data's integrity (Zhang, le Fever, & le Zhang S, 2013). By focusing on the processes and procedures, the frameworks become effective in various organizations with varying technical implementations depending on their organizational needs.

COBIT framework consists of four logical sections governing the implementation of the framework in I.T. application systems. Depending on the ERP application the organization is interested in using, the following are the four significant steps of implementing Sarbanes-Oxley controls in cryptocurrency trading.

a) Plan and organize

Various cryptocurrencies are available for a firm to decide on what to acquire or trade. Crypto assets maintain varied classifications, which evolve, thus affecting their valuation, regulation, and governance. It is vital to note that cryptocurrencies can be managed by their developers via centralized governance in the early stages of development or adoption. There is a need to deliberate on what crypto asset to venture into, how to acquire it, its evolution dynamics, and how to govern them. At the plan and organize phase, the firm conducts a risk assessment in adopting a particular crypto asset. It then formulates a strategic plan for risk mitigation. At this phase, there is a need to outline how internal audits will function.

b) Acquire and implement

Acquire, and implementation phase sets the remediation efforts in place. Enterprises have various management levels. At this stage, the responsibilities of each set of management groups have defined functions to play. The structuring is geared towards providing transparency in the trade of crypto assets. The phase is also concerned with the installation of automated systems to help in the management of assets. Having automation in place saves on resources required in auditing and maintenance. By automating the management of cryptoassets, an assessor only needs to determine whether the automation effectively ensures transparency and accuracy of the data generated in the transactions in these systems. Change management needs to be implemented to provide an audit trail

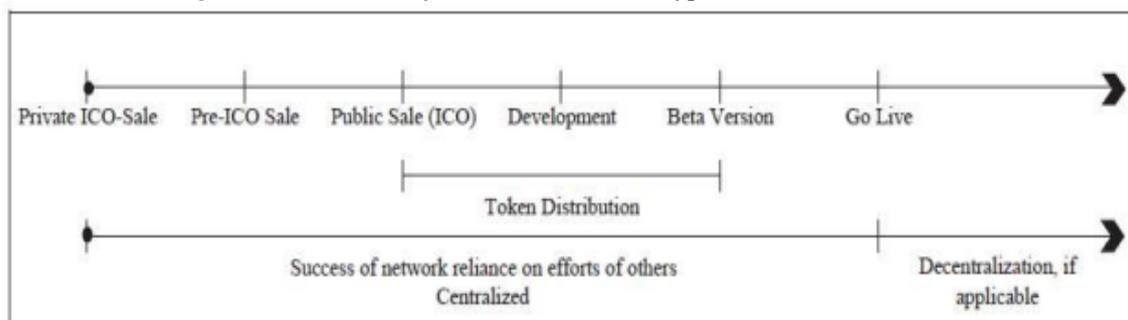
during assessment of processes whose management cannot be automated. The audit trail should track all changes made in the transactions.

c) Deliver and support

The phase is concerned with providing the services, in this case, crypto assets, to the right consumers. It usually involves a declaration of the initial coin offer arrived at via multiple algorithms and the influence of stock and various trading market dynamics. The Committee of Sponsored Organizations (COSO) gives guidelines for implementing internal control using the Internal Control-Integrated Framework (ICIF) (D'Aquila, 2013). The guidelines provided therein provide integral control in financial reporting. These guidelines are necessary to manage financial transactions and transparency in small and publicly traded sectors.

At this phase, there needs to be sufficient information for investors to make informed decisions on what crypto asset to trade. The data is harvested from ERPs that have proven secure data generation processes and auditable data. Profits are made in preference to other crypto assets or stock products. Therefore, providing information on the other assets in the trade exchange market is important. Conventionally, a crypto asset is developed, and initial coin offerings are placed privately. This serves as the first step of testing the crypto-asset, as shown in the figure below. The next phase is the pre-ICO sale, where an asset is provided for sale even to the public. There is a need to provide information on the asset and its advantages over other market trades. Algorithms are utilized at this phase to implement the various transaction conformities required to be in place by Sarbanes-Oxley Act. Beta versions are produced and availed in the exchange market for trading on successful implementation. The asset then competes with other crypto-assets in the market and starts to build a network. This blockchain system slowly builds a network for the asset, which may eventually assume a decentralized governance model in the stock market.

Figure no 1: The life-cycle and character of crypto-assets (Smith, 2019).



d) Monitor and evaluate

Good enterprise applications require a maker-checker system for validation. The simplest explanation of this scenario is; one who raises or prepares a transaction and one who approves it (Farkas & Hirsch, 2016). Information systems incorporated in finance applications should be able to alert supervisory staff when employees make errors or when standard procedures for preparing financial reports are being violated. The basic functionality of the set controls is to ensure conformity to set trading standards and the availability of accurate data on business transactions.

It is impossible to claim that an information system is risk-proof. There is always a workaround or an exploitable flaw that necessitates appropriate protection measures to be put in place. Therefore, it is important to assess threats that may face financial systems trading in cryptocurrencies, ascertain the probability of the risks, and formulate mitigation procedures if they occur (Koker & Koutmos, 2020). ERP systems are utilized in managing company resources and finances in financial systems. Cryptocurrencies are no exception in using these crypto assets as they have become widely accepted payment modes.

The major concern for their use in SAP is ensuring that the data provided by transactions in the ERP is accurate and fraud-free. For instance, if an invoice is raised in the SAP application with a price or quantity outside the defined tolerance, SAP is configured to block such an invoice. This configuration needs to be checked by internal and external auditors to ensure that it conforms as documented. There is also a need to confirm that data stored in the table tallies with what is represented in reports generated by the SAP application. Confirming this conformity is a measure for testing the effectiveness of the control used in the code

implementations. In general, the COBIT framework is implemented in SAP to ensure the application's design, effectiveness, completeness, and accuracy are kept in check.

The main areas to look at protecting the investors include management of risks, supervision of trading platforms, consumer information security, consumer complaints outlet, rules curbing money laundering, business continuity, and reporting (Kemal, 2014). Security and data assurance is vital. For instance, FOREX has established itself as a publicly traded company and may be a framework for exchanging crypto-assets.

The biggest concern in the crypto space is information asymmetry between crypto-asset market promoters, regulators, and buyers of the assets. Financial misrepresentations have been the course of continued poor financial investment decisions amongst investors (Ante, 2020). The inadequate information also makes the cryptocurrency market more vulnerable, whereas customers stand to lose immensely in the event the crypto-asset value degrades suddenly. Without proper governance among the publicly traded company, customers need to come to terms with the fact that they may lose their investment at any time; hence advised to invest in what they are comfortable parting with in the event of such risks occurring.

IV. Conclusion

Sarbanes-Oxley Act is a regulation that fights fraudulent activities and ensures that investors make informed decisions based on sufficient and accurate information provided to them. Digital currency trading platforms cannot provide accurate and adequate information. They rely on computer systems and applications to guarantee the validity of the information they disseminate.

Enterprise resource planning systems are being assimilated into companies at a fast rate. They are designed to link various departmental data into a centralized database for easy processing and sound data governance.

Crypto assets exist in an uncertain crypto space influenced by various market factors. A change in existing market assets may positively or negatively affect the crypto asset's value. For investors to make informed decisions on investment, they need to provide information about the other assets that influence the kind of crypto asset they want to acquire.

ERP systems like SAP are an excellent way to implement maker-checker processes to ensure data integrity. The processes are a proper way of implementing internal controls as stipulated by COBIT frameworks on best financial practices.

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