

Accounting Information Security and IT Governance Under COBIT 5 Framework: A Case Study

Qayssar Ali Al-Fatlawi

Faculty of Administration and Economics, University of Kufa, Najaf, Iraq.
E-mail: qayssara.alfatlawi@uokufa.edu.iq

Dawood Salman Al Farttoosi

Faculty of Administration and Economics, University of Kufa, Najaf, Iraq.
E-mail: dawood.jasim@uokufa.edu.iq

Akeel Hamza Almagtome*

Faculty of Administration and Economics, University of Kufa, Najaf, Iraq.
E-mail: akeelh.alhasnawi@uokufa.edu.iq

Received November 10, 2020; Accepted December 20, 2020

ISSN: 1735-188X

DOI: 10.14704/WEB/V18SI02/WEB18073

Abstract

This paper aims to explore the role of applying information technology governance using the COBIT 5 framework in improving the security of accounting information systems. The paper also aims to assess the level of governance of information technology in the Trade Bank of Iraq TBI through COBIT 5 processes, including 4 dimensions of planning and organization, acquisition and implementation, support and delivery, and monitoring. The study uses a qualitative approach through a case study conducted at the Iraqi Bank of Commerce. The results show that applying the COBIT 5 governance mechanisms of information technology reduces data processing risks and improves automated accounting information systems' security. The results also show that the Trade Bank of Iraq can implement the COBIT 5 Framework. Also, the accounting system used in the Bank has all the features of information technology governance that, on the one hand, ensure confidentiality of customer information and, on the other hand, prevent the system from penetrating. The results of the current study provide a better understanding of stakeholders on the nature of IT governance in the light of the COBIT 5 framework and its role in enhancing accounting information security.

Keywords

Information Security, IT Governance, Accounting Information System, COBIT 5.

Introduction

The banking sector typically needs the most improvement of tech and is more inclined to opt to outsource in the face of such circumstances. Development of corporate applications accounts for 50% of the IT budget managed and outsourced in most cases (de la Fuente Asprón, 2010). However, some banks do not measure software and maintenance, despite being one of the most extensive IT processes. The reasons why productivity is not analyzed are that the production software model is personalized and challenging to measure. It is also because of the intangible nature of the software. The banks take the time it takes to produce software and not the amount produced, which in most cases comprises an increase in project costs (Pérez, Montequín, Fernández, & Balsera, 2017). Due to the recent economic crisis, most financial institutions decided to reduce the number of projects or urge software developers to decrease their rates. Their response was to build offshore software factories to reduce costs. The idea of industrializing software production justifies software plants' creation, but this is not always the case. They hire a high level of training, yet with lower rates, which reduces costs but does not improve development processes. Financial institutions have to apply for software development companies, particularly in their software factories, to measure their delivery. Even though it seems odd, most delivered software is not measured (Tam, da Costa Moura, Oliveira, & Varajão, 2020). There are several ways to measure software, as Fenton and Neil (2000) explained that companies could know real productivity of this information. They can devise strategies to improve and pay for products and not the time needed to produce them. To deliver software projects that financial markets consider being synonymous with performance, speed of execution and consistency, the financial software industry wants to become an industrial commodity (Amagtome & Alnajjar, 2020). The use of information technology in the accounting and financial sectors has resulted in a continuous increase in the number of financial institutions operating in Iraq (Khaghaany, Kbelah, & Almagtome, 2019). This interest has increased in particular in the banking sector institutions over the last ten years, which has led to an increased interest of academic and professional researchers in the study of control and risk management methods, as well as in the auditing of electronic accounting systems used in these organizations (Ali, Almagtome, & Hameedi, 2019). In this regard, the risk and control of electronic accounting information systems' security is the essence of the auditing process in organizations that rely on high-tech information systems in IT auditing and financial auditing.

On the other hand, many recent studies such as (Andry & Setiawan, 2019; Huygh, De Haes, Joshi, & Van Grembergen, 2018; Lin & Wittmer, 2017; Singh, Pandiya, Upadhyay, & Singh, 2020; Wittmer & Lin, 2019) have highlighted the role of information technology

governance mechanisms in enhancing the security of accounting information in the organization. Effective implementation of governance of information technology helps ensure that information technology helps to achieve the objectives of organizations and works to improve the effectiveness of investment in them. Maximizing returns from the use of information technology leads to improved productivity and efficiency and depends mostly on how information technology risks are managed and measured and assessed. COBIT 5 is a general model for the internal control of information technology and information security protection. Besides, it represents an approach to manage IT better and employs its capabilities to bring added value to the organization. This study aims to assess the potential role of improving IT governance mechanisms in line with the COBIT internal control framework in improving the security of electronic accounting systems.

Literature Review

Security of Accounting Information System

Financial institutions need software development firms to calculate their "software production" in general. They will build strategies to protect this knowledge by converting those tech companies into industrialized software suppliers capable of delivering software projects relevant to the performance, short supplies and quality demanded by the financial markets today (Landau, Rochell, Klein, & Zwergel, 2020). The Banks played a leading role in the financial sector's growth, especially with the advent of the Internet, and smartphones in 2000. Still, the conventional banking sector is not so much in step with today's rapidly evolving technological world. Banking needs improvements in tech companies that build their software and services to improve protection and minimize costs to address current problems in the industry and overcome such challenges. The optimal use of information technology in the accounting and financial fields has led to an increase in interest in monitoring electronic information systems (Ali, Hameedi, & Almagtome, 2019). The risks to which these systems are exposed may lead to a loss of confidence in accounting information and the emergence of fundamental errors in the measurement process. Besides, it also causes damage to the reputation of financial institutions and their relationship with their clients. Control of information technology and the provision of security and protection are of great importance to achieve the banks' objectives that apply them. Therefore, accounting information systems' security is one of the issues of great interest to accounting practitioners (Al-Wattar, Almagtome, & AL-Shafeay, 2019). They need to assess the risks associated with electronic accounting information systems. The assessment of the risks associated with accounting information security affects how accounting and auditing tasks, ways, and the accounting system's security in general. Besides, the risk assessment of

accounting information systems auditing is a critical component of auditing in the light of information technology (A. Almagtome, Shaker, Al-Fatlawi, & Bekheet, 2019). Despite the role of electronic accounting systems and their computerized application programs in facilitating companies' financial reporting, their emergence has increased information security risks. These risks penetrate information systems or manipulate accounting information, particularly in the financial sector. The emergence of the information age has contributed significantly to the global economy's development (Ye & Hu, 2020).

Technological development is the main feature of the world economy, and most economic activities use a complex electronic information system. Thus, accounting information's electronic processing has become a key feature of modern organizations (A. H. Almagtome, Al-Yasiri, Ali, Kadhim, & Bekheet, 2020).

The traditional AIS does not have a place in the business world because International companies have officially entered information technology. The electronic AIS can quickly handle large volumes of financial data, which has significantly contributed to economic activities. It has also become an essential factor in the success or failure of economic decisions. The main problem facing the application of electronic accounting systems is the risk of penetrating accounting systems and the security of information processed electronically. Figure 1 illustrates the layers of the electronic accounting system and the data flow within the system and with consumers of the application.

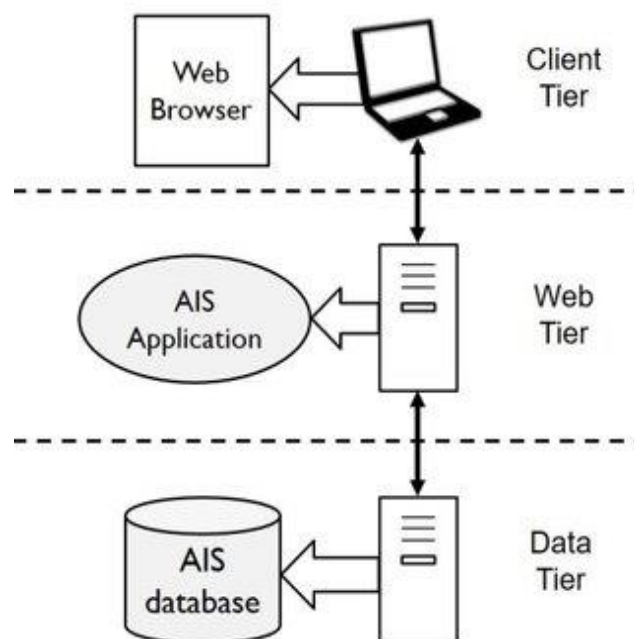


Figure 1 Data Flow in the Accounting Information System
Source: Al-Hawari (2017)

The Internet accounting information system refers to a next-generation Cloud-based accounting information system. All interactive agencies, departments and divisions, associates, social care teams, and other social institutions and entities are linked intrinsically linked via the Web (Zhang, 2019). It holds Operations such as collecting, transmission, storage, processing, retrieval, production and recording of accounting data globally. The accounting information system has resource sharing, real-time information, electronic storage media, cost savings, etc. With the continuous development of information technology, the risks of using these technologies have increased in practice, particularly in banking accounting systems (A. H. Almagtome et al., 2020). Information systems are always at risk for penetration or manipulation of information. However, the accounting system is best suited to meeting business challenges in an accelerated and complex information environment compared to traditional information systems.

IT Governance and COBIT 5 Framework

The protection of electronic systems and their information output has led to the need to seek procedures and information to effectively manage information technology systems (Damayanti & Manuputty, 2019). It requires the development of instructions and controls that include maximizing information technology's benefits. These measures intend primarily to protect the system's outputs from being tampered. Therefore, the goal is to enforce the governance frameworks of information technology. The United States of America was the first to do so, with the Information Technology Institute in 1988 and its acronym (ITI). The worldwide need to monitor and regulate the information and technologies associated with it within organizations. There has been no consistent definition of IT governance (De Haes & Van Grembergen, 2009). ITGI (2003) defines IT governance as the Board of Directors' responsibility and the Executive Leadership and is part of corporate governance. Information Technology governance consists of leadership, corporate structure and procedures that promote operational technologies and ensure the organization's policy and objectives. While, Mueller, Schmidt, and Kuerbis (2013) describe IT governance as a term that refers to the operational and administrative requirements for its availability to guarantee a particular root, defined by information technology, to handle it a sound and continuous manner. Graham et al. (2010) define IT governance as a set of relationships and processes designed to ensure that the information technology organization maintains its strategies and objectives, delivers benefits and maintains risks at an acceptable level.

Information Technology governance is just a set of objectives, policies, strategies, and procedures assigned to managers and decision-makers in institutions (da Silva et al., 2018). The goal is to help decide the general course of information technology management and

control to optimize the value of information and applied technologies. The goal of IT governance is to direct IT assistants to ensure that the success achieves the following objectives:

- Support the integration and cooperation of the organization's objectives, information technology priorities, and achieving the necessary benefits. Work on the production and operation of information technology infrastructure.
- To enhance the management and development of high-quality technology applications.
- Identify best practice in the area of technological advancement.

Accordingly, senior management must be more confident in meeting its needs. On the other hand, organizations face many challenges, especially those that rely heavily on information technology. Without efficient management capable of dealing with these constraints, they are more likely to fail. These organizations face common and individual challenges based on environmental, political and economic issues. Such problems can be an obstacle to the achievement of successful IT governance. Lee, Lee, Park, and Jeong (2008) addresses the critical threats to the implementation of regulation in information technology:

1. In these groups, the system lacks unclear rules and guidelines for implementing IT management.
2. The financial services devoted to IT projects and programs were insufficient.
3. Lack of coordination and consistency between various layers of administration.
4. Lack of senior management trust in information technology: the main issue that hinders information technology projects' success is that senior management is unwilling to rely on information technology in the decision-making process.

It produces the best performance at the lowest possible expense, and the company must handle the capital as quickly as effectively as possible. It is essential to ensure that sufficient technology, software, hardware and human resources are available to provide IT services.

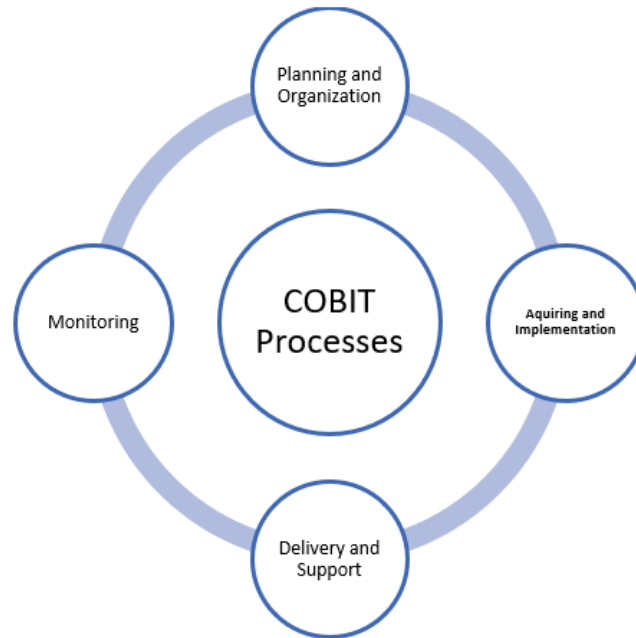


Figure 2 COBIT Processes Model

The COBIT internal control framework is one of the most critical IT governance developments. This framework aims to set best practices in the governance and auditing of electronic information systems and related technologies. The Information Systems Auditing and Control Association (ISACA) has developed this framework. This framework's creation dates back to the mid-nineties due to auditors' difficulties when working in electronic systems—the first version of this framework published in 1996. The COBIT framework initially developed as a framework for carrying out auditing tasks in the IT environment, based on a set of control objectives for IT processes. Figure 2 shows the IT processes following the COBIT Processes Model.

The main objective was to control and audit the information technology environment. The second version published in 1998 and this version witnessed many developments entirely based on information technology auditing. Fundamental indicators and performance factors and maturity models applied to IT operations in 2000. Developments in the field of information technology governance have not limited to this. Instead, they proceeded to produce the release of COBIT4 in 2005, which included several principles that explained governance and governance mechanisms (Apriliana, Sarno, & Effendi, 2018). For example:

- (1) The organization's objectives link the objectives of the IT organization and its partnership to promote the development of IT
- (2) The organization links its roles and duties in the field of IT operations.

The new version of COBIT was COBIT5, released in 2012 and the version underlines the idea of IT governance within the company. According to ISACA, this version is a comprehensive framework that helps organizations achieve their governance and IT management objectives.

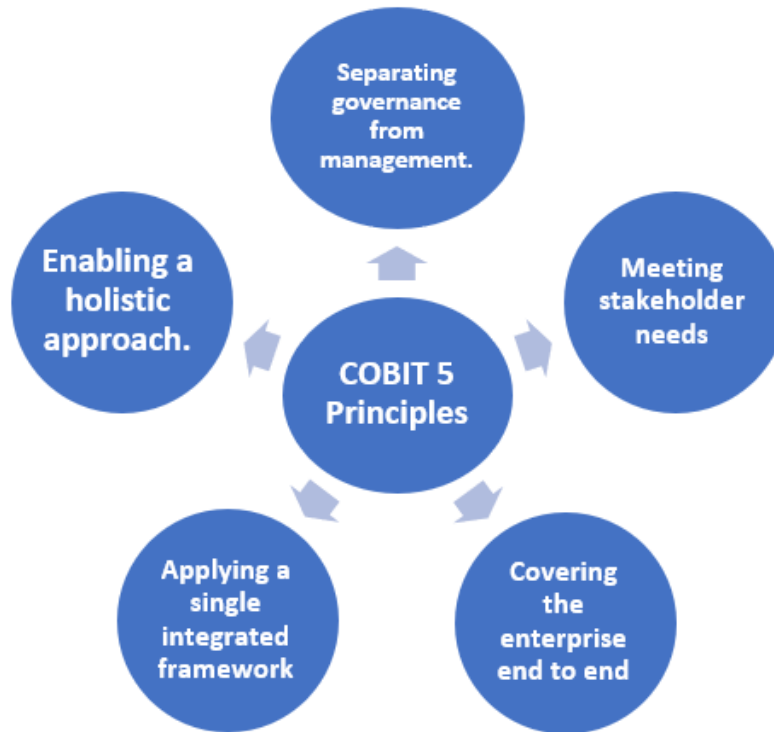


Figure 3 Principles of COBIT 5

This system offers the requisite assistance to the enterprise in the management of information technology in a holistic manner, taking into account all aspects of the job duties related to information technology and business (De Haes & Van Grembergen, 2015). In this regard, the fifth edition of the COBIT Framework identified the basic principles of internal control (ISACA, 2013), represented by the five basic principles set out in Figure 3.

Meeting the Stakeholder Needs

This principle clarifies that COBIT should provide all processes and other elements that support the organization's value-added process. It maintains a balance between the achievement of benefits, the reduction of risk levels, the use of resources, and information technology to meet beneficiaries' needs (stakeholders). This principle is extremely important for organizations because of each organization's different objectives that require the translation of high-level institutional objectives into specific objectives related to

information technology and manageable. These objectives then linked to specific processes and practices.

- **Covering the Enterprise End to End**

The COBIT framework creates an integration between information technology governance and corporate governance, encompassing all roles and processes within the organization. Therefore, the COBIT system does not concentrate solely on the IT function. Instead, it considers information and related technology as assets like any other asset within the company. It considers all aspects of IT governance and management in a comprehensive and end-to-end manner. It is comprehensive for all, internally and externally, related to information governance and information management of the organization.

- **Implementation of A Single Integrated Framework**

There is a range of acceptable IT standards and implementations, each offering guidelines on a subset of IT activities. The COBIT architecture draws on the alignment and integration of standards and other systems to construct a coherent approach. Thus, the COBIT framework is, therefore, a comprehensive framework for IT governance and its management.

- **Enable the Holistic Approach**

The nature of effective and efficient governance of IT management within the company involves a holistic methodology that considers a variety of factors that communicate with each other. The COBIT process provides a series of catalysts to promote the introduction of robust corporate governance and IT management structure. These variables commonly accepted as something that can help accomplish the project's goals.

- **Separating Governance from Management**

The COBIT framework makes a clear distinction between governance and management. These involve various types of operations, specific hierarchical systems serving different purposes. The COBIT view, on the core difference between government and administration, is as follows:

- **Governance:** it seeks to assess stakeholders' needs, conditions, and options to determine the balanced and agreed objectives of the organization. These objectives and directions are instruments for setting priorities, making decisions, monitoring performance and compliance, and achieving the agreed objectives.

- **Management.** Management plans operate and monitor activities in coordination with the directives established by the governance body to achieve the institution's objectives. Management is the responsibility of executive management under the CEO's leadership (CEO) in most companies. These five principles work together to enable the organization to develop an effective management and governance framework that improves and benefits investment in information and technology to benefit stakeholders.

Materials and Methods

This paper uses a descriptive approach to the analysis of the role of IT under COBIT 5 on the security of accounting information. Besides, this paper uses the case study method used by the Iraqi Trade Bank to assess the level of governance of information technology. To this end, a checklist designed to cover the COBIT 5 IT governance processes, i.e.

- Planning and Organization
- Acquisition and Implementation
- Delivery and Support
- Monitoring

Each of these processes has been translated into a set of procedures with 51 control procedures to ensure the security of accounting information as set out in Annex 1. Table 1 shows the distribution of control procedures for each IT governance process, according to COBIT 5.

Table 1 Evaluation Checklist of IT Governance

#	IT processes	Items No.
1	Planning and Organization	13
2	Acquisition and Implementation	13
3	Delivery and Support	13
4	Monitoring	13
Total		52

Data collected are extracted from the Bank, the study sample, through direct interviews with information system officials at the head office of the Bank. The responsible person within the Bank responded to each of the survey's axes to assess the extent to which the information security procedures followed in the Bank comply with the COBIT requirements set out in the CHECKLIST in 4 IT processes.

Results and Discussion

Table 2 presents a summary of the TBI IT governance assessment results using the COBIT processes as the basis for the assessment. The evaluation deals with the Bank's procedure to improve the security of accounting information in four sections. The table 2 shows that 12 of the 13 items in planning and organization index are implemented in the Bank, representing about 92%. This ratio means the Bank's commitment to implementing the requirements of governance of information technology by providing technological infrastructure plans to allow for the monitoring of procedures and future directions. Besides, there are long-term, accurate and transparent strategic plans for accounting information systems.

On the other hand, there are standards and procedures for internal banking and property rights policies and raising awareness of the security of information systems. Also, there are specialized risk assessment and assessment units exposed to and documented and measured by the accounting information systems used. The administration is also taking the necessary measures to address these risks. Besides, internal control controls certain levels of risk in the Bank, which indicates that the administration is applying the supervisory systems' adequacy and the new banking services. It primarily reflects the Bank's compliance with the requirements of IT governance.

Table 2 Evaluation Summary of the Bank IT governance

#	IT processes	Total Procedures	Implemented	%
1	Planning and Organization	13	12	92%
2	Acquisition and Implementation	13	9	69%
3	Delivery and Support	13	11	85%
4	Monitoring	13	11	85%
	Total	52	43	83%

The results show that 9 of the 13 items in the acquisition and implementation index are implemented by the Bank, with 69%, which means that the Bank has administrative units to manage changes related to change and control initiatives, evaluate influences, and control emergency issues. Besides, mechanisms exist to promote electronic equipment and new software through policies for the launch and distribution of software, documentation procedures and maintenance responsibilities by the competent authorities. However, it requires the development of appropriate control systems to determine the system's software to be acquired. Besides, the Bank needs to provide software installation and certification to deal with changes in its work.

The results also show that the Bank implements 11 out of 13 items of delivery and support index, representing about 85%. This rate means that the Bank meets IT governance requirements by providing data accuracy, integrity, handling, level of importance and storage management. Besides, the Bank has accurate documentation and record systems for the preparation, collection, and retention of data and handling errors and the validity of its use. Also, an efficient and efficient system is available to identify and respond quickly to customer requests to assist clients and provide services effectively, indicating that the Bank is concerned with the customer's problems and answers to their questions. However, there is still a need for more interaction with customer requirements. The Bank shall have excellent and reliable risk management by the Board of Directors. The Department also takes the appropriate measures to address these risks through a detailed contingency plan to address the risks it may face in providing new banking services. This rate indicates that bank employees' behaviour gives customers an impression of trust and a high level of confidence. Accordingly, the Bank has advanced technical equipment suitable for banking.

Finally, 11 of the 13 items in the Planning and Organization index are implemented by the Bank at 85%, which means that the Bank complies with the governance requirements of information technology by providing appropriate information on a governance level. Besides, there are auditing standards to monitor and evaluate the Bank's performance on an ongoing basis. Besides, those working in auditing and risk control enjoy the professionalism, independence and a good percentage of powers that enable them to access all records and documents related to the work of the Bank. It helps to improve internal control procedures effectively. Moreover, there are mechanisms for the supervision of internal operations and determining the level of reporting on this control. The Bank is also obliged to carry out regular operations, enabling it to carry out a process of measuring the available level of accounting information systems in the Bank. Efficiency and effectiveness are also available to the Board of Directors.

Figure 4 shows the process of IT governance under the COBIT framework, which is a tool for controlling information technology. Planning and organization have the most significant impact on the assessment of the internal control system of the Bank. The bank administrators' response to items related to this dimension is 92%, which is a high percentage compared to other dimensions. This result demonstrates the critical importance managers attach to planning and organizational governance procedures. A clean and appropriate control environment can explain this result concerning the nature of the business and its size. The control environment is a factor that affects the system because of the safety factors and ethical values that motivate workers to work with integrity and prevent illegal and immoral behaviour that promotes internal control systems. Besides,

specialized IT Information Systems Management Units are available to monitor operating costs. The Bank also has a system to acquire the necessary human resources, skills, and expertise, which indicates the Bank's interest in the system's human managers by setting appropriate recruitment criteria that take into account experience, honesty and integrity, and the ongoing assessment of staff compliance with the information security standards followed in the Bank.

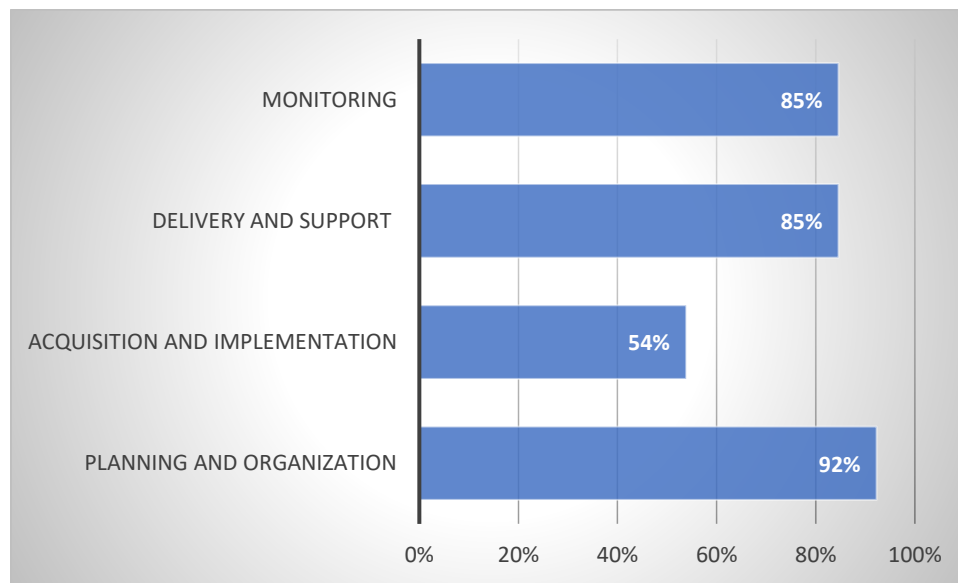


Figure 4 COBIT IT processes

In the second dimension (delivery and support), the bank administrators' response to the items related to this dimension is 85%, which indicates the importance of information technology support and delivery procedures followed in the Bank. This result is due to an efficient and efficient system for determining the needs of and providing services to customers. It indicates that the Bank is concerned with the customer's problems and answers to their questions. Besides, the Bank has a system for preparing, collecting, storing and handling data errors. In the third dimension (Monitoring and Evaluation), the Bank's administrators' response to the items related to this dimension is 85%, which indicates the Bank's commitment to the requirements of governance of information technology by providing appropriate information on the level of governance. Besides, auditing standards are in place to continuously monitor and evaluate the Bank's performance. An internal monitoring structure is in place that is commensurate with the complexity of the threats that the Bank might be subject, which has primarily helped to reduce the risks associated with the items in the financial statements. Furthermore, implementing an automated database management software program would undoubtedly contribute to protecting and promoting

the transfer of information within the network, contributing to a decrease in the risk of exploitation or misuse of information.

In the last dimension (Acquisition and Implementation), the response of the Bank's Administrators to the items relevant to this dimension is 54%, which is the average percentage relative to the other dimensions. It attributes to the comparatively low efficiency of the governance processes related to assessing operating requirements and the quality of service rendered by the Bank. We consider governance processes relevant to establishing IT goals and creating operating plans. There is also an essential framework for relating the efficiency of information technology to the Bank's goals, which may lead to the efficacy of internal management procedures of electronic accounting systems by continual evaluation of the technologies employed within the Bank. Indeed, the effective implementation of IT governance in banks that adopt high-tech electronic accounting information systems based on the COBIT internal control framework has the following advantages:

- It leads to an improvement in the efficiency of the information technology used in the Bank by improving the information security resulting from the accounting system at every stage of its operation.
- It increases accounting information security and increases the confidence of information users and other clients in the Bank's information since effective control mechanisms in the work of the applied accounting system, whether from a technical point of view or the provision of qualified personnel to deal with the system.

Summary and Conclusions

Security of accounting information systems in the banking sector is fundamental because of the critical role in achieving high-quality banking services. Besides, terminals work to provide accurate information to decision-makers, improving and developing the performance of these services and increasing their effectiveness and adequacy in the banking sector. The current paper aims to explore the role of implementing governance mechanisms for information technology in enhancing the security of electronic accounting systems. It also seeks to assess the requirements of using the COBIT framework processes for the implementation of governance of information technology in the Trade Bank of Iraq. The results show that the Bank has an appropriate and appropriate control environment. Still, it needs to be strengthened and developed in some of its procedures, particularly concerning determining the size of the human resources for managing and operating the various activities of the Bank and delegating powers and responsibilities to the banking business. Besides, there are banking units responsible for managing the risks associated with

information security, as these units take some of the necessary measures to address those banking risks. However, the internal control team's role focuses on discussing appropriate supervision in developing banking services and the risk assessment process. The Bank also has suitable supervisory activities to monitor the financial and accounting performance of the Bank. However, they must give more attention to paragraphs on the appropriate separation between the tasks assigned to the workers and the attention to activating the complaint box's use for each individual. Accordingly, the segregation of duties can activate as a useful monitoring tool for improving customer trust, monitoring independent employee performance, and continuously improving and developing performance.

On the other hand, the Bank has adequate and well-adapted information and communication systems. Given its extreme importance, it needs more support and strength to reach the highest possible level. The Bank has auditing standards for monitoring and evaluating performance at a good rate, but does not rise to the level required, particularly about the use of performance reports to assess employees and professionally in the Bank. The Bank also operates regularly, enabling it to measure the available level of accounting information systems in the Bank. Still, it needs to monitor and strengthen this aspect in all its dimensions to achieve higher quality levels for the Bank to increase its credibility and ability to compete. Finally, the implementation of the governance mechanisms of information technology under the COBIT Internal Control Framework improves the efficiency of the internal control system in electronic accounting systems. Therefore, the adoption of the COBIT internal control framework reduces information security risks in light of electronic accounting information systems. The paper draws on the COBIT 5 report, which presents a study in which the regulation and control of IT systems used to address two main issues of global IT governance: risk and information security. For practical reasons, this work mainly sheds light on why the accounting information system and IT systems management tend to be the most appropriate way of understanding risk and safety management. Bank officials should also use these findings to guide the resolution of these issues.

References

- Al-Hawari, F. (2017). Analysis and design of an accounting information system. *International Research Journal of Electronics and Computer Engineering*, 2, 16-21.
- Al-Wattar, Y.M.A., Almagtome, A.H., & AL-Shafeay, K.M. (2019). The role of integrating hotel sustainability reporting practices into an Accounting Information System to enhance Hotel Financial Performance: Evidence from Iraq. *African Journal of Hospitality, Tourism and Leisure*, 8(5), 1-16.

- Ali, M., Almagtome, A., & Hameedi, K. (2019). Impact of accounting earnings quality on the going-concern in the Iraqi tourism firms. *African Journal of Hospitality, Tourism and Leisure*, 8(5), 1-12.
- Ali, M., Hameedi, K., & Almagtome, A. (2019). Does Sustainability Reporting Via Accounting Information System Influence the Investment Decisions in Iraq? *International Journal of Innovation, Creativity and Change*, 9(9), 294-312.
- Almagtome, A., Shaker, A., Al-Fatlawi, Q., & Bekheet, H. (2019). The Integration between Financial Sustainability and Accountability in Higher Education Institutions: An Exploratory Case Study. *International Journal of Innovation, Creativity and Change*, 8(2), 202-221.
- Almagtome, A.H., Al-Yasiri, A.J., Ali, R.S., Kadhim, H.L., & Bekheet, H.N. (2020). Circular Economy Initiatives through Energy Accounting and Sustainable Energy Performance under Integrated Reporting Framework. *International Journal of Mathematical, Engineering and Management Sciences*, 5(6), 1032-1045.
- Amagtome, A.H., & Alnajjar, F.A. (2020). Integration of Financial Reporting System and Financial Sustainability of Nonprofit Organizations: Evidence from Iraq. *International Journal of Business & Management Science*, 10(1), 27-47.
- Andry, J.F., & Setiawan, A.K. (2019). IT Governance Evaluation using COBIT 5 Framework on the National Library. *Jurnal Sistem Informasi*, 15(1), 10-17.
- Apriliana, A.F., Sarno, R., & Effendi, Y.A. (2018). Risk analysis of IT applications using FMEA and AHP SAW method with COBIT 5. In *IEEE International Conference on Information and Communications Technology (ICOIACT)*, 373-378.
- da Silva, A.P.B., Moraes, C.S.A., Dos Santos, P.O.L., Gravina, R.M., Goncalves, C.D., De Araújo, A.P.F., & De Sousa, R.T. (2018). Structuring the COBIT 5 goals cascade in the context of ICT governance in DPU/Brazil. In *IEEE 13th Iberian Conference on Information Systems and Technologies (CISTI)*, 1-6.
- Damayanti, R., & Manuputty, A.D. (2019). A Analysis Of Information Technology Governance In Department of Communication And Informatics of Salatiga Using COBIT 5 Framework DSS Domain. *Journal of Information Systems and Informatics*, 1(2), 97-122.
- De Haes, S., & Van Grembergen, W. (2009). An exploratory study into IT governance implementations and its impact on business/IT alignment. *Information Systems Management*, 26(2), 123-137.
- De Haes, S., & Van Grembergen, W. (2015). Enterprise Governance of IT. In *Enterprise Governance of Information Technology*, 11-43.
- De La Fuente Asprón, R. (2010). Measure the productivity of software development in banking. *Financial Tech Magazine*, N°217 .
- Graham, J.D., Fineberg, H., Helbing, D., Homer-Dixon, T., Kröger, W., Maila, M., & Wilson, M. (2010). The emergence of risks: Contributing factors: *International Risk Governance Council (IRGC)*.
- Huygh, T., De Haes, S., Joshi, A., & Van Grembergen, W. (2018). Answering key global IT management concerns through IT governance and management processes: A COBIT 5 View. In *Proceedings of the 51st Hawaii International Conference on System Sciences*. 5335-5344.

- ISACA, C. (2013). *5: Process Assessment Model (PAM)-Using COBIT 5*. Illinois: Isaca.
- Khaghaany, M., Kbelah, S., & Almagtome, A. (2019). Value relevance of sustainability reporting under an accounting information system: Evidence from the tourism industry. *African Journal of Hospitality, Tourism and Leisure*, 8, 1-12.
- Landau, A., Rochell, J., Klein, C., & Zwergel, B. (2020). Integrated reporting of environmental, social, and governance and financial data: Does the market value integrated reports?. *Business Strategy and the Environment*, 29(4), 1750-1763.
- Lee, C.H., Lee, J.H., Park, J.S., & Jeong, K.Y. (2008). A study of the causal relationship between IT governance inhibitors and its success in Korea enterprises. *In IEEE Proceedings of the 41st Annual Hawaii International Conference on System Sciences (HICSS)*, 433-433.
- Lin, C., & Wittmer, J.L. (2017). Proactive information security behavior and individual creativity: Effects of group culture and decentralized IT governance. *In IEEE International Conference on Intelligence and Security Informatics (ISI)*, 1-6.
- Mueller, M., Schmidt, A., & Kuerbis, B. (2013). Internet security and networked governance in international relations. *International Studies Review*, 15(1), 86-104.
- Pérez, C.Á., Montequín, V.R., Fernández, F.O., & Balsera, J.V. (2017). Integration of balanced scorecard (BSC), strategy map, and fuzzy analytic hierarchy process (FAHP) for a sustainability business framework: a case study of a Spanish software factory in the financial sector. *Sustainability*, 9(4), 527.
- Singh, R., Pandiya, B., Upadhyay, C.K., & Singh, M.K. (2020). IT-Governance Framework Considering Service Quality and Information Security in Banks in India. *International Journal of Human Capital and Information Technology Professionals (IJHCITP)*, 11(1), 64-91.
- Tam, C., Da Costa Moura, E.J., Oliveira, T., & Varajão, J. (2020). The factors influencing the success of on-going agile software development projects. *International Journal of Project Management*, 38(3), 165-176.
- Wittmer, J.L.S., & Lin, C. (2019). Proactive Information Security Behavior: Group Culture and IT Governance Effects. *In Academy of Management Proceedings, 2019(1)*, 12819.
- Ye, Z., & Hu, J. (2020). Internal Control of Enterprise Computer Accounting Information System in the Age of Big Data. *In The International Conference on Cyber Security Intelligence and Analytics*, 15-321.
- Zhang, Y. (2019). Security Risk of Network Accounting Information System and Its Precaution. *In 3rd International Conference on Mechatronics Engineering and Information Technology (ICMEIT)*, 418-422.