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RESEARCH ARTICLE

EVALUATING ACCOUNTING TECHNOLOGY GOVERNANCE IN SYRIAN ORGANIZATIONS USING COBIT MATURITY MODEL AND EXAMINING ITS ASSOCIATION WITH ACCOUNTING INFORMATION RELIABILITY

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ABSTRACT

Businesses rely on Accounting Technology (AT) to provide relevant and reliable information to internal and external users with for decision making. As a response to new governance requirements, Information Technology (IT) governance has been under development for several years. Just as business management is governed by generally accepted good practices, IT, including AT, should be governed by practices that help ensure an enterprise's IT resources are used responsibly, its risks are managed appropriately and its information and related technology support business objectives. AT governance is the process by which decisions are made around AT investments. How these decisions are made, who makes the decisions, which is held accountable, and how the results of the decisions are measured and monitored are all parts of AT governance. This paper evaluates the AT governance using COBIT Maturity Model (CMM) in Syrian organizations listed in the Syrian Commission on Financial Markets and Securities (SCFMS) and examines the associations between maturity levels of AT governance and the reliability of accounting information.

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INTRODUCTION

Businesses rely on Accounting Technology (AT) to provide relevant and reliable information to internal and external users with for decision making. As a response to new governance requirements, Information Technology (IT) governance has been under development for several years. Just as business management is governed by generally accepted good practices, IT, including AT, should be governed by practices that help ensure an enterprise's IT resources are used responsibly, its risks are managed appropriately and its information and related technology support business objectives (Schwarz and Hirschheim, 2003). AT governance is the process by which decisions are made around IT investments. How these decisions are made, who makes the decisions, which is held accountable, and how the results of the decisions are measured and monitored are all parts of AT governance (Luftman, 2000). While there is no 'standard' definition, in general, IT governance involves specifying the decision rights, the accountability and authority framework for important IT decisions, with the objective of encouraging 'desirable behavior's in the use of IT (Weill and Ross, 2004). The Information Technology Governance Institute (ITGI) defines IT governance as "the leadership, organizational structures, and processes that ensure that the enterprise's IT sustains and extends the enterprise's strategies and objectives". Additionally, they state that "While governance developments have primarily been driven by the need for the transparency of enterprise risks and the protection of shareholder value, the pervasive use of technology has created a critical dependency on IT that calls for a specific focus on IT governance" (ITGI, 2003:1).

According to the IT Governance Institute, IT governance is the responsibility of the board of directors and the executive management, and is an integral part of enterprise governance. It raises information to a more impressive level as a key organizational asset and treats governance of information in equality with governance of other assets like human, financial, tangible and intangible assets (Schwarz and Hirschheim, 2003). According to Marrone *et al.* (2010), COBIT contributes to business IT alignment that lead to better IT governance. This is because it ensures an adequate congruence of the strategic goals of business and IT and applying IT in an appropriate and timely way. Van Gembergen and De Haes (2009) found that there is a strong correlation between the implementation of COBIT and the achievement of IT goals. They also found a positive correlation between the achievements of IT goals with business goals. Recent research suggests that certain characteristics of IT governance contribute to more effective alignment and execution of IT programs, including security governance. Kerr and Murthy's paper (2007) presents the results of an international survey of IT professionals exploring the relationships between COBIT's 34 IT control and security processes and the reliability of financial reporting. One

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hundred and eighty nine relatively experienced IT professionals responded to the Web-based survey. The respondents, who were on average familiar with COBIT, rated the importance of each of the 34 IT processes from the viewpoint of maintaining effective internal control over the reliability of financial reporting. Respondents also indicated what they felt were the "key" or most important IT processes from the viewpoint of effective internal control over the reliability of financial reporting.

Organizations can approach governance on an ad hoc basis and create their own frameworks, or they can adopt standards that have been developed and perfected through the combined experience of hundreds of organizations and people. By adopting a standard IT governance framework, organizations may realize a number of benefits (Spafford, 2003). In this paper we adopt IT governance tools to assess AT governance due to the applicability of these tools to accounting technology which is considered as an integral part of information technology.

To date, the Syrian Commission on Financial Markets and Securities neither Damascus Securities Exchange have not provided specific guidance as to how management's evaluation and testing of controls are to be performed and has not mandated the use of any particular process of evaluating the effectiveness of controls. The methods used by management to evaluate controls vary across companies, depending on the nature of the company and the controls being evaluated. Accordingly, it is important to evaluate the AT governance in business organizations listed in SCFMS, to measure the maturity levels of AT governance, and to examine the association between AT governance and the reliability of accounting information.

To provide some degree of comparability of internal control reports across companies, SEC (Securities and Exchange Commission), based on Sarbanes-Oxley (SOX) legislation, requires management of public companies to implement an adequate system of internal controls over their financial reporting process. This includes controls over transaction processing systems that feed data to the financial reporting systems. Management's responsibilities for this are codified in Sections 302 and 404 of SOX. Section 302 requires that corporate management (including the CEO) certify their organization's internal controls on a quarterly and annual basis. In addition, Section 404 requires the management of public companies to assess the effectiveness of their organization's internal controls. This entails providing an annual report addressing the following points: (1) a statement of management's responsibility for establishing and maintaining adequate internal control; (2) an assessment of the effectiveness of the company's internal controls over financial reporting; (3) a statement that the organization's external auditors have issued an attestation report on management's assessment of the company's internal controls; (4) an explicit written conclusion as to the effectiveness of internal control over financial reporting; and (5) a statement identifying the framework used in their assessment of internal controls (Hall, 2008). Although several possible frameworks exist, the SEC has not mandated the use of any one particular framework.

During the past two decades, a variety of standard IT governance frameworks and different assessment methods for evaluating IT impact and performance has emerged. Some tools have developed into a set of guidelines, others into methods or best practices, and others into *de facto* or *de jure* standards (Larsen *et al.*, 2006). The objectives of this paper are to evaluate AT governance in Syrian organizations listed in the SCFMS based on the COBIT maturity model, and to examine the associations between AT governance and accounting information reliability. This paper is classified into seven sections. Section 1 presents a variety of IT governance tools. Section 2 provides a background of COBIT framework. Section 3 discusses the development of research hypotheses. Section 4 illustrates the research design. Section 5 presents the findings. Section 6 discusses the results. Section 7 provides the conclusion of the study.

IT governance tools

Through a survey of literature, Larsen *et al.* (2006) discuss a variety of tools that address IT governance. Some of them will be mentioned in this section to highlight the importance of them and to call for further research to assess them and to draw the attention of companies to the applicability of them in evaluating IT processes and internal control structures.

ITIL: Information Technology Infrastructure Library (ITIL) is the world-wide de facto standard in Service Management (Behr *et al.*, 2004). ITIL provides a comprehensive, consistent volume of best practices drawn from the collective experience of thousands of IT practitioners around the world (Niessink & van Vliet, 2001). ITIL focuses on critical business processes and disciplines needed for delivering high-quality services. Out of the ITIL framework, the British Standard BS15000 has emerged. BS15000 is the world's first standard for managing IT services (Larsen *et al.*, 2006).

COBIT: Control Objectives for Information and Related Technology (COBIT) has been developed as a generally applicable and accepted standard for good Information Technology (IT) security and control practices (Lainhart, 2000). This tool will be discussed in details in the next section.

COSO: SEC rules refer to the *Internal Control— Integrated Framework* published by the Committee of Sponsoring Organizations of the Tread way Commission (COSO) in 1992. This framework identifies five components of internal control—the control environment, risk assessment by management, control activities, information and communication, and monitoring of controls—which are intended to provide reasonable assurance of achieving the following three objectives: reliable financial reporting, effective and efficient operations, and compliance with applicable laws and regulations (Kerr and Murthy, 2007).

ASL: Application Services Library (ASL) is a collection of best practice guidance for managing application development and maintenance. It is the public domain standard for application management, separate from the ITIL, but linked to it in terms of adherence to standards for managing processes and providing a coherent, rigorous, public domain set of guidance (Bastiaens, 2004). ASL is a part of the IT Service Management (ITSM) Library. ASL recognizes three types of control, i.e. functional, application and technical control. Where ITIL is a generally accepted standard for organizing technical management, the ASL offers a framework for the organization of application management (Meijer 2003).

CMM/CMMI: The Capability Maturity Model (CMM) is a methodology used to develop and refine an organization's software development process. The model describes a five-level evolutionary path of increasingly organized and systematically more mature processes. CMM was developed and is promoted by the Software Engineering Institute (SEI). CMM is through the years developed further integrating the different activities, i.e. CMM Integration (CMMI). Whereas CMM is based on the classical waterfall model, CMMI is addressing iterative development and is being more result oriented (Larsen *et al*., 2006).

ISO 17799: The ISO 17799 or the counterpart of British Standard BS 7799 is a standard for information security including a comprehensive set of controls and best practices in information security. Compliance with ISO 17799 and BS7799 ensures that an organization has established a certain compliance level for each of the ten categories covered (Ma & Pearson, 2005), i.e. security policy, security organization, asset classification and control, personnel security, physical and environmental security, communications and operations management, access control, systems development and maintenance, business continuity management, and compliance (ISO, 2000; BS, 2002).

SOX: several sections of the Sarbanes–Oxley Act of 2002 (SOX) directly affect the governance of the information technology (IT). However, Section 404 on "internal control assessment" requires rapid and current disclosures to the public of material changes, and authentic and immutable record retention. The SEC requires publicly traded companies to comply with the Treadway Commission's Committee of Sponsoring Organizations that defines enterprise risk and places security as a critical variable in enterprise risk assessment (Brown and Nasuti, 2005). By mandating the requirements for reliability and usefulness of financial reporting, SOX is designed to renew investor's trust and understanding of public corporation financial reporting.

eSAC: The electronic system assurance and control (eSAC) model was developed by the Institute of Internal Auditors to facilitate the discussion of objectives, risks, and mitigation responses within the context of ebusiness. This model's purpose is to focus on how the risks resulting from rapid technology and e-business model changes can be managed, both in discussion and implementation. The COSO framework of objectives, risks and controls (mitigating responses) is an integral part of this model, since it has been successfully employed in numerous organizations (eSAC Model 2002). The eSAC report narrates further that an organization typically pursues its mission through establishing strategies and objectives consistent with its values. A sound control environment helps an organization stay on its intended path as it moves from its mission to results.

These documents, and other documents, have been issued and aimed to assist with the definition, assessment, reporting on and improvement of internal control in organizations. Although such documents have been developed to address different needs and audiences, many of them have built on the contribution of previous documents and consider much the same internal control concepts (Buckley 1999). For example, amongst others, COBIT has drawn on both COSO and a predecessor of eSAC. The COBIT is a "trusted" open standard (Pathak 2003) that is being used increasingly by a diverse range of organizations throughout the world. COBIT is arguably the most appropriate control framework to help an organization ensure alignment between use of IT and its business goals, as it places emphasis on the business need that is satisfied by each control objective (Colbert and Bowen, 1996). Next section will discuss the COBIT framework.

COBIT Framework

While a range of frameworks, standards and documents related to the control of IT, the primary focus of the COBIT is on aligning use of IT with the achievement of organizational goals. COBIT is a comprehensive framework of 34 control objectives that has been developed from "41 international source documents" (Lainhart 2001, p. 20) and validated internationally to help balance IT risk against investment in IT controls. COBIT has been implemented in many countries since its introduction in 1996 (Ridley *et al*., 2004). One explanation for COBIT's popularity is that its extensive *Executive Summary*, *Framework*, *Control Objectives*, *Management Guidelines* and *Implementation Tool Set* are free of charge. Payment is required only for the Audit Guidelines (Ridley *et al*., 2004).

COBIT is an IT-focused governance and control framework created by the IT Governance Institute (ITGI) and Information Systems Audit and Control Association® (ISACA). To guide their work, the initial development of COBIT was as a framework for the execution of IT audit assignments. It was constructed around a comprehensive set of so-called "Control Objectives for IT Processes" (IASCF, 1994). Over successive versions, COBIT transitioned toward broader IT governance and management framework with management tools including metrics, critical success factors, maturity models, and tools for the assignment of roles and responsibilities for IT processes. COBIT 4 saw the development of tools to align business and IT goals and their relationship with supporting IT processes (De Haes and Debreceny, 2013). Developed as an open standard, COBIT is being increasingly adopted globally as the governance and control model for implementing and demonstrating effective IT governance. COBIT 4 also strengthened the connection with other relevant governance frameworks and IT frameworks and standards (ITGI, 2005). More recently, COBIT was complemented with the Val IT and Risk IT frameworks (ISACA, 2009c, 2010). These addressed the IT-related business processes and responsibilities in value creation (Val IT) and risk management (Risk IT). In each case, Val IT and Risk IT drew key concepts and processes from COBIT and added domain-specific guidance (De Haes and Debreceny, 2013).

The first, second, and third editions of COBIT were published in 1994, 1998, and 2000, respectively. COBIT 4, which is widely adopted by business organizations, was published in 2005. In April 2012, COBIT 5 was released with the concept of enterprise governance of IT (EGIT) as a foundation (ISACA, 2012b). According to ISACA, COBIT 5 provides a comprehensive framework that assist enterprises to achieve their objectives for the governance and management of enterprise IT. COBIT 5 enables IT to be governed and managed in a holistic manner for the whole enterprise, taking in the full end-to-end business and IT functional areas of responsibility, considering the IT-related interests of internal and external stakeholders (ISACA, 2012b). COBIT, to some degree in the fourth edition and more systematically in the fifth edition, covers the lifecycle of governance, strategic, and tactical management within the IT domain (De Haes and Debreceny, 2013). The COBIT Framework defines and explains a methodology for controlling and assessing the effectiveness, efficiency, integrity, reliability, availability, compliance, and confidentiality of IS resources. It also establishes a set of 34 high-level IT processes, that represents a total of 214 control objectives (Ridley *et al*., 2004).

The control objectives have been organized into a hierarchy of processes and domains that are designed to help bring about the alignment of business and IT objectives, by identifying the requirements for IT resources and information associated with 214 detailed control objectives. IT processes are grouped into four domains: planning and organization, acquisition and implementation, delivery and support, and monitoring and Evaluating. As the framework considers all aspects of information and its supporting IT, management can use COBIT to help provide an appropriate control system for IT (Ridley *et al*., 2004). The four domains are presented below.

1. Planning and Organization (PO): covers the strategies and tactics on how IT can best contribute to achieving the organization's business objectives, forming a good organization with good technological infrastructure as well.
2. Acquisition and Implementation (AI): identification of IT solutions and then implemented and integrated into business processes to realize the IT strategy.
3. Delivery and Support (DS): Domain related to the delivery of desired services, which consist of operations on system security and business continuity aspects to training provision.
4. Monitoring and Evaluating (ME): All IT processes need to be assessed regularly and periodically how the quality and conformance with the control requirements.

Each of these IT processes that will be hold in measuring IT performance to get maturity level of IT processes within a company. There are six levels of maturity levels namely (COBIT, 2007):

0 Non-existent—Complete lack of any recognizable processes. The enterprise has not even recognized that there is an issue to be addressed.

1 Initial/ Ad Hoc—There are evidence that the enterprise has recognized that the issues exist and need to be addressed. There are, however, no standardized processes; instead, there are ad hoc approaches that tend to be applied on an individual or case-by-case basis. The overall approach to management is disorganized.

2 Repeatable but Intuitive—Processes have developed to the stage where similar procedures are followed by different people undertaking the same task. There is no formal training or communication of standard procedures, and responsibility is left to the individual. There is a high degree of reliance on the knowledge of individuals and, therefore, errors are likely.

3 Defined Process—Procedures have been standardized and documented, and communicated through training. It is mandated that these processes should be followed; however, it is unlikely that deviations will be detected. The procedures themselves are not sophisticated but are the formalization of existing practices.

4 Managed and Measurable—Management monitors and measures compliance with procedures and takes action where processes appear not to be working effectively. Processes are under constant improvement and provide good practice. Automation and tools are used in a limited or fragmented way.

5 Optimized—Processes have been refined to a level of good practice, based on the results of continuous improvement and maturity modeling with other enterprises. IT is used in an integrated way to automate the workflow, providing tools to improve quality and effectiveness, making the enterprise quick to adapt (see Figure 1).

Maturity modelling for management and control over IT processes is based on a method of evaluating the organization, so it can be rated from a maturity level of non-existent (0) to optimized (5). This approach is derived from the maturity model that the Software Engineering Institute defined for the maturity of software development capability. Although concepts of the SEI approach were followed, the COBIT implementation differs considerably from the original SEI, which was oriented toward software product engineering principles, organizations striving for excellence in these areas and formal appraisal of maturity levels so that software developers could be ‘certified’. In COBIT, a generic definition is provided for the COBIT maturity scale, which is similar to CMM but interpreted for the nature of COBIT’s IT management processes. A specific model is provided from this generic scale for each of COBIT’s 34 processes (ITGI, 2007: 17).

Whatever the model, the scales should not be too granular, as that would render the system difficult to use and suggest a precision that is not justifiable because, in general, the purpose is to identify where issues are and how to set priorities for improvements. The purpose is not to assess the level of adherence to the control objectives (ITGI, 2007: 17). The COBIT Maturity Model is an IT governance tool used to measure how well developed the management processes are with respect to internal controls. The maturity model allows an organization to grade itself from nonexistent (0) to optimized (5). Such capability can be exploited by auditors to help management fulfill its IT governance responsibilities, i.e., exercise effective responsibility over the use of IT just like any other part of the business. A fundamental feature of the maturity model is that it allows an organization to measure as-is maturity levels, and define to-be maturity levels as well as gaps to fill. As a result, an organization can discover practical improvements to the system of internal controls of IT. However, maturity levels are not a goal, but rather they are a means to evaluate the adequacy of the internal controls with respect to company business objectives (Pederiva 2003).

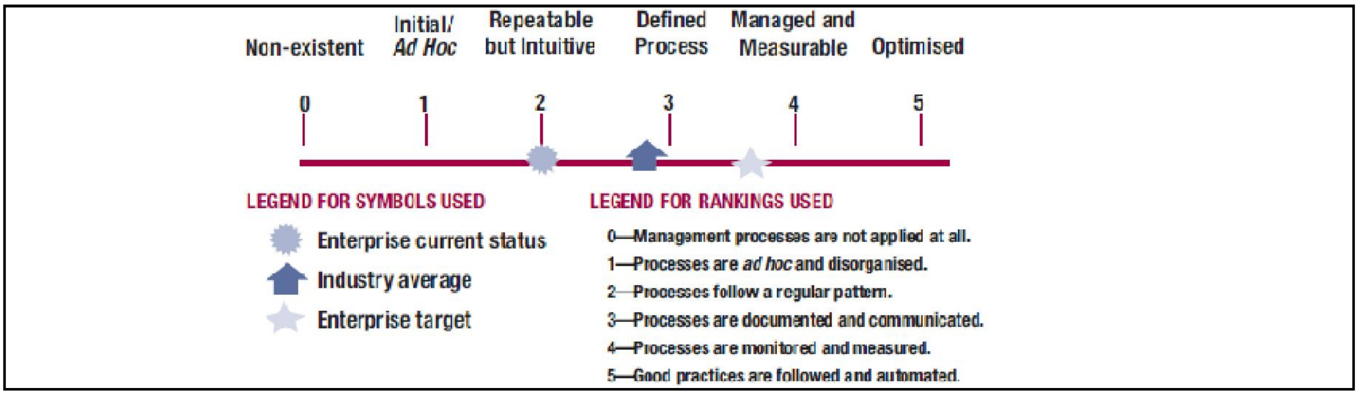
Non-existent
Initial/ Ad Hoc
Repeatable but Intuitive
Defined Process
Managed and Measurable
Optimised
0
1
2
3
4
5
LEGEND FOR SYMBOLS USED
Enterprise current status
Industry average
Enterprise target
LEGEND FOR RANKINGS USED
0—Management processes are not applied at all.
1—Processes are ad hoc and disorganised.
2—Processes follow a regular pattern.
3—Processes are documented and communicated.
4—Processes are monitored and measured.
5—Good practices are followed and automated.

Figure 1. COBIT maturity model. Source: ITGI, 2007

Research Hypotheses

According to the Financial Accounting Standards Board (FASB) the objective of accounting information system is to provide relevant and reliable information to decision makers. Internal controls aim to ensure the reliability of financial information, the effectiveness and efficiency of operations and the compliance of laws and regulations (Zhang 2007). The validity of an internal control system affects the significance of in-ternal controls. Hoitash and Hoitash (2009) state that the value of internal control influences operational performance through information reliability operational effectiveness. Computerized internal controls have effects on the value of internal controls and performance of operations. The usage of new information technology means computerized controls should be built into the AIS (Mndzebele, w.d).

Grant *et al*. (2008) identify in their study five categories of accounting errors account for approximately 50 percent of the accounting errors reported by companies with IT deficiencies: (1) revenue recognition issues; (2) receivable, investments and cash issues; (3) liability and accrual issues; (4) inventory, vendor, and cost of sales issues; and (5) property, plant, and equipment issues.

Statement of Auditing Standard (SAS) No. 94 affirms that the nature and character of an entity's use of technology in its information system affects the entity's overall internal control (IC) structure. However, a minimal amount of information existed prior to the Sarbanes-Oxley Act of 2002 (SOX) to develop an understanding of the impact of IT control deficiencies on financial reporting. Recent management and audit reports filed with the Securities and Exchange Commission by accelerated SOX companies now provide a rich body of data to measure this impact. SOX focuses on internal controls, including IT controls, to foster the preparation of reliable financial statements. Section 404 of SOX requires companies to identify, report, and resolve IC material weaknesses. Thus, IT deficiencies never reported before are now in the spotlight and are targeted for evaluation and improvement. Formal systems are classified into four types by Simon (2000): beliefs systems (formal systems used by top managers to define, communicate, and reinforce the basic values, purpose, and direction for the organization), boundary systems (formal systems used by top managers to establish explicit limits and rules that must be respected), diagnostic control systems (formal feedback systems used to monitor organizational outcomes and correct deviations from preset standards of performance), and interactive control systems (formal systems used by top managers to regularly and personally involve themselves in the decision activities of subordinates). The view of control within COBIT is broadly in line with Simons' perspective (De Haes and Debreceny 2013). For example, the definition of control in COBIT 3 is "the policies, procedures, practices, and organizational structures designed to provide reasonable assurance that business objectives will be achieved and that undesired events will be prevented or detected and corrected" (ITGI, 2000, 12). The concept of a control objective is unique to COBIT. It sees the institution of control as leading to a necessary outcome or end state. The word "control" is not in use in COBIT 5 and is replaced by "good practices" (De Haes and Debreceny 2013). These new good practices are defined as "a proven activity or process that has been successfully used by multiple enterprises and has been shown to produce reliable results" (ISACA 2012b).

In line with the preceding discussion, the more the mature the AT governance, achieving control objectives related to AT processes, the more reliable accounting information will be produced. According to SFAC No. 5, accounting information is reliable if it represents what it purports to represent. Reliability can be viewed through three components: complete, neutral, free of material errors. A complete depiction includes all information necessary for a user to understand the phenomenon being depicted, including all necessary descriptions and explanations. Accounting information should be neutrally depicted without bias in the selection or presentation of financial information. Free from error means there are no errors or omissions in the description of the phenomenon, and the process used to produce the reported information has been selected and applied with no errors in the process (SFAC No. 5, 2010).

Based on this assumption, the following hypotheses can be developed.

H1: The more the planning and organizing domain is mature the more accounting information is reliable.
H2: The more the acquiring and implementing domain is mature the more accounting information is reliable.
H3: The more the delivering and supporting domain is mature the more accounting information is reliable.
H4: The more the monitoring and evaluating domain is mature the more the accounting information is reliable.

Research Design

AT processes, presented in Appendix 1, which are as same as IT processes suggested by ITGI in its COBIT version 4, were assessed by the maturity level using the COBIT Maturity Model (CMM) Tools. Assessment of maturity level performed for each IT process from level 0 (non-existent) to level 5 (optimized). Assessment was done by internal auditors in 35 Syrian business organization listed in the SCFMS to the AT processes. The questions at each maturity level were generated from the statement in each COBIT maturity level (see Appendix 1). Respondents were asked to rank each AT process on the maturity model from their point view, where 0 indicates "Non-existent", 1 indicates "Initial/ Ad Hoc", 2 indicates "Repeatable but Intuitive", 3 indicates "defined Process", 4 indicates "Managed and Measurable", and 5 indicates "Optimized". Reliability indicators were also assessed by them on a scale from 0 to 5, which composed of three questions about completeness, neutrality, and free from errors. Respondents were asked to rate the components of reliability (free from material errors, neutral, completeness) from to 0 to 5, where 5 indicates most reliable, and 0 indicates least reliable. The questionnaire was sent by email to the all Syrian organizations listed in the SCFMS (46 companies), however, 35 responses were returned.

RESULTS

Table 1 and Figure 2 show the means of AT processes which indicate the maturity levels of AT processes. "Plan and Organize" level is between the first stage 1 (Initial/ Ad Hoc) and stage 2 (Repeatable but Intuitive). "Acquire and Implement" level is between stage 3 (defined Process) and stage 4 (Managed and Measurable). "Deliver and Support" level is also between stage 3 (defined Process) and stage 4 (Managed and Measurable). "Monitor and Evaluate" is between stage 2 (Repeatable but Intuitive) and stage 3 (defined Process).

Table 1. Descriptive analysis of maturity levels of AT processes

AT Processes	Mean	Standard Deviation
Plan and Organize (PO)	1.5171	1.33405
Acquire and Implement (AI)	3.4946	.15806
Deliver and Support (DS)	3.9071	.27325
Monitor and Evaluate (ME)	2.0857	.76683

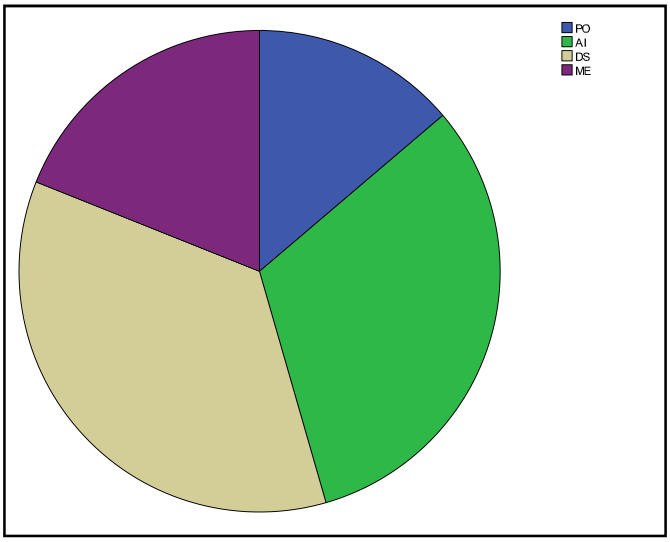

Figure 2. Maturity levels of AT processes in Syrian Business Organizations

Maturity levels of Syrian organizations can also be classified by each domain separately as shown in Figure 3. For planning and organizing, there were 9 companies between 0 and 1 levels, and 26 companies between 1 and 2 levels. For acquiring and implementing, there were 34 companies between 3 and 4 levels, and 1 company at level 4. For delivery and support, there were 17 companies between 3 and 4 levels, 5 companies at level 4, and 13 companies between 4 and 5 levels. Finally, for monitoring and evaluating domain, there were 3 companies between 0 and 1 levels, 22 companies between 1 and 2 levels, and 10 companies at level 3.

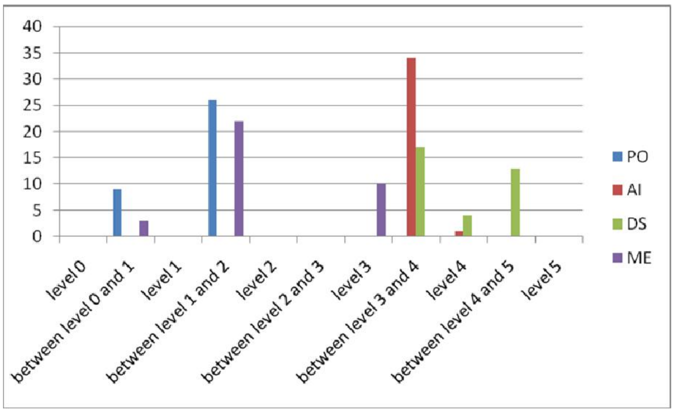

Figure 3. Syrian organizations' maturity levels according to IT governance domains

Using Pearson's correlation coefficient to analyze associations between AT processes and reliability of accounting information, results are as follows:

- Correlation is significant between "Plan and Organize" and reliability of accounting information at the 0.05 level.
- Correlation is not significant between "Acquire and Implement" and reliability of accounting information.
- Correlation is significant between "Deliver and Support" and reliability of accounting information at the 0.05 level.

- Correlation is significant between “Monitor and Evaluate” and reliability of accounting information at the 0.01 level.

DISCUSSION

Results presented above are reasonable in several aspects. First Syrian organizations appear weak in the planning and organizing domain, probably because the concept of technology planning is still not recognized by Syrian organizations. However, maturity level related to acquisition and implementation seems fairly good. The same thing can be said about the maturity level related to delivery and support. In contrast, the maturity level of monitoring and evaluating domain was considered quite low. These results indicate that AT governance in these organizations is in a good manner. This is probably due to the ownership of these companies (corporations), and to the industry nature (50% of these companies provide banking and insurance services) which needs an effective internal control structure to function properly and reliable information to attract investors. Second, the associations between IT domains and accounting information reliability appeared significant, except for acquiring and implementing. This means that acquiring and implementing AT solutions does not guarantee the reliability of accounting information.

Third, Syrian organizations were found, as mentioned above, less mature in planning and organizing domain, but more mature in other domains. This result can be justified based on the statement disclosed by ITGI (2007) which states that ”the maturity levels are designed as profiles of IT processes that an enterprise would recognize as descriptions of possible current and future states. They are not designed for use as a threshold model, where one cannot move to the next higher level without having fulfilled all conditions of the lower level. With COBIT’s maturity models, unlike the original SEI CMM approach, there is no intention to measure levels precisely or try to certify that a level has exactly been met. A COBIT maturity assessment is likely to result in a profile where conditions relevant to several maturity levels will be met.

It seems quite difficult to discuss the results of this study with previous studies because “to date it appears that only limited examination of the published literature on COBIT has been reported. Because much of the literature that is available on COBIT appears to have a practitioner focus, and has been made available through a range of often nonacademic for a, the literature is not as accessible as that available in areas that have been investigated intensively by academic researchers” (Ridley *et al*., 2004). It appears that relatively little academic literature has been published that investigates the utilization of COBIT and its association with accounting information. This may be because the extensive electronic sources available on COBIT are primarily designed for IT and audit practitioners. These sources are produced by ISACA and the IT Governance Institute and are not referred to by many academic authors. Accordingly, there is little literature that considers the range and characteristics of organizations that have utilized COBIT and the outcomes of implementation. For example, COBIT is explored for financial reporting control mechanism. Kerr and Murthy (2007) in their study have investigated the relationship between COBIT and internal control over the reliability of financial reporting. The result showed that five COBIT processed were deemed particular critical for maintaining effective internal control over the reliability of five processes which is ensure system security, manage charges, assess risk, assess internal control adequacy and manage data.

Grant *et al*. (2008) study indicates that IC deficiencies and accounting errors occur more often in companies when IT deficiencies exist. Accounting issues dealing with revenue recognition; receivables, investments, and cash; inventory, vendor, and cost of sales; and financial statement, footnote, US GAAP, and segment disclosures issues are more widespread in companies that report IT deficiencies. When compared to companies that do not report IT deficiencies, IT deficient companies pay higher audit fees, while employing smaller audit firms. In addition, companies that report IT deficiencies are smaller, based on revenues, than companies that do not report IT deficiencies. Jeffrey *et al*. (2008) state that COBIT processes assist auditors by providing a well control environment that is categorized under four domains – plan and organize, acquire and implement, deliver and support, monitor and evaluate. Tuttle and Vander vale (2007) also find that COBIT process manage the audit framework for IT control and change the way of auditors think about information criteria and IT control. COBIT processes are useful in providing the internal control in IT applications and compliance with Sarbanes Oxley Act that ensure the effectiveness of its IT structure.

Conclusion

IT governance plays a vital role in accounting information reliability. Based on data collected from Syrian organizations listed in the SCFMS, this study reveals that three domains of AT governance namely: “Planning and Organizing”, “Delivering and Supporting”, and “Monitoring and Evaluating” correlate positively with accounting information reliability. However, the fourth domain namely: “Acquisition and Implementation” does not seem that it has an association with accounting information. Additionally, the COBIT maturity model was used to assess the maturity levels of AT governance in Syrian organizations listed in the SCFMS. Results indicate different maturity levels relating to AT domains. Plan and Organize level is between the first stage 1 (Initial/ Ad Hoc) and stage 2 (Repeatable but Intuitive). Acquire and Implement level is between stage 3 (defined Process) and stage 4 (Managed and Measurable). Deliver and Support level is also between stage 3 (defined Process) and stage 4 (Managed and Measurable). Monitor and Evaluate is between stage 2 (Repeatable but Intuitive) and stage 3 (defined Process). Evidence from this study suggests that companies with AT governance, especially when they apply AT processes in Panning and Control, Delivery and Support and Monitor and Evaluate domains, can enhance and improve the reliability of accounting information. This re-affirms the widespread impact that IT governance can have on the overall IC structure of the business, which in turn influences the financial reporting quality.

This study demonstrates the association between three domains of AT governance and the reliability of accounting information, and highlights the importance of COBIT maturity model in evaluating the AT governance level. Additionally, it reveals some of the important issues associated with AT in the financial reporting process. Managers must continue to evaluate the impact of AT on their overall system of internal controls, and should continue developing the AT governance processes to ensure reliable accounting information. Auditors must stay aware of AT developments and weigh the risk AT places on financial reporting. As technology evolves and new systems develop, the role of AT in financial reporting systems is increasing rabidly. This study can help managers and auditors identify AT deficiencies that affect financial reporting and take corrective actions to eliminate these weaknesses. Business organizations can benefit from COBIT framework by applying it to establish AT governance, and adopt COBIT maturity model to assess IT governance performance continuously, and improve financial reporting quality.

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Appendix 1. Assessment matrix of COBIT domains and AT processes according to COBIT maturity model

COBIT Domains and AT Processes	Maturity Levels					
	0	1	2	3	4	5
Plan and Organize (PO)						
PO1 define a strategic AT plan						
PO2 define the information architecture						
PO3 determine technological direction						
PO4 define the AT processes, organization, and relationships						
PO5 manage the AT investment						
PO6 communicate management aims and direction						
PO7 manage human resources						
PO8 manage quality						
PO9 assess and manage AT risks						
PO10 manage projects						
Acquire and Implement (AI)						
AI1 identify automated solutions						
AI2 acquire and maintain application software						
AI3 acquire and maintain technology infrastructure						
AI4 enable operations and use						
AI5 procure AT resources						
AI6 manage changes						
AI7 install and accredit solutions and changes						
Deliver and Support (DS)						
DS1 define and manage service levels						
DS2 manage third-party services						
DS3 manage performance and capacity						
DS4 ensure continuous service						
DS5 ensure systems security						
DS6 identify and allocate costs						
DS7 educate and train users						
DS8 manage service desk and incidents						
DS9 manage the configuration						
DS10 manage problems						
DS11 manage data						
DS12 manage the physical environment						
DS13 manage operations						
Monitor and Evaluate (ME)						
ME1 monitor and evaluate IT performance						
ME2 monitor and evaluate internal control						
ME3 ensure regulatory compliance						
ME4 provide AT governance						