



Report Information from ProQuest

June 14 2012 10:58

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Search Strategy

Set#	Searched for	Databases	Results
S12	(ab(("it governance" OR "information technology governance")) AND ab(framework) AND ab(Cobit)) NOT stype.exact("Wire Feeds" OR "Dissertations & Theses" OR "Newspapers")	ABI/INFORM Complete,Applied Social Sciences Index and Abstracts (ASSIA),ASFA: Aquatic Sciences and Fisheries Abstracts,ERIC,International Index to Music Periodicals Full Text,International Index to Performing Arts Full Text,Library and Information Science Abstracts (LISA),Linguistics and Language Behavior Abstracts (LLBA),National Criminal Justice Reference Service (NCJRS) Abstracts Database,Physical Education Index,PILOTS,ProQuest Dissertations & Theses (PQDT),ProQuest Dissertations & Theses A&I,ProQuest Hospital Collection,Social Services Abstracts,Sociological Abstracts,Technology Research Database,Water Resources Abstracts	28
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S10	(ab(("it governance" OR "information technology governance")) AND ab(framework) AND ab(Cobit)) AND peer(yes)	ABI/INFORM Complete,Applied Social Sciences Index and Abstracts (ASSIA),ASFA: Aquatic Sciences and Fisheries Abstracts,ERIC,International Index to Music Periodicals Full Text,International Index to Performing Arts Full Text,Library and Information Science Abstracts (LISA),Linguistics and Language Behavior Abstracts (LLBA),National Criminal Justice Reference Service (NCJRS) Abstracts Database,Physical Education Index,PILOTS,ProQuest Dissertations & Theses (PQDT),ProQuest Dissertations & Theses A&I,ProQuest Hospital Collection,Social Services Abstracts,Sociological Abstracts,Technology Research Database,Water Resources Abstracts	9
S9	(ab(("it governance" OR "information technology governance")) AND ab(framework) AND ab(Cobit)) NOT stype.exact("Dissertations & Theses" OR "Wire Feeds")	ABI/INFORM Complete,Applied Social Sciences Index and Abstracts (ASSIA),ASFA: Aquatic Sciences and Fisheries Abstracts,ERIC,International Index to Music Periodicals Full Text,International Index to Performing Arts Full Text,Library and Information Science Abstracts (LISA),Linguistics and Language Behavior Abstracts (LLBA),National Criminal Justice Reference Service (NCJRS) Abstracts Database,Physical Education Index,PILOTS,ProQuest Dissertations & Theses (PQDT),ProQuest Dissertations & Theses A&I,ProQuest Hospital Collection,Social Services Abstracts,Sociological Abstracts,Technology Research Database,Water Resources Abstracts	33
S8	(ab(("it governance" OR "information technology governance")) AND ab(framework) AND ab(Cobit)) NOT stype.exact("Dissertations & Theses")	ABI/INFORM Complete,Applied Social Sciences Index and Abstracts (ASSIA),ASFA: Aquatic Sciences and Fisheries Abstracts,ERIC,International Index to Music Periodicals Full Text,International Index to Performing Arts Full Text,Library and Information Science Abstracts (LISA),Linguistics and Language Behavior Abstracts (LLBA),National Criminal Justice Reference Service (NCJRS) Abstracts Database,Physical Education Index,PILOTS,ProQuest Dissertations & Theses (PQDT),ProQuest Dissertations & Theses A&I,ProQuest Hospital Collection,Social Services Abstracts,Sociological Abstracts,Technology Research Database,Water Resources Abstracts	46

Set#	Searched for	Databases	Results
S7	(ab(("it governance" OR "information technology governance")) AND ab(framework) AND ab(Cobit)) AND stype.exact("Dissertations & Theses")	ABI/INFORM Complete,Applied Social Sciences Index and Abstracts (ASSIA),ASFA: Aquatic Sciences and Fisheries Abstracts,ERIC,International Index to Music Periodicals Full Text,International Index to Performing Arts Full Text,Library and Information Science Abstracts (LISA),Linguistics and Language Behavior Abstracts (LLBA),National Criminal Justice Reference Service (NCJRS) Abstracts Database,Physical Education Index,PILOTS,ProQuest Dissertations & Theses (PQDT),ProQuest Dissertations & Theses A&I,ProQuest Hospital Collection,Social Services Abstracts,Sociological Abstracts,Technology Research Database,Water Resources Abstracts	1
S6	ab(("it governance" OR "information technology governance")) AND ab(framework) AND ab(Cobit)	ABI/INFORM Complete,Applied Social Sciences Index and Abstracts (ASSIA),ASFA: Aquatic Sciences and Fisheries Abstracts,ERIC,International Index to Music Periodicals Full Text,International Index to Performing Arts Full Text,Library and Information Science Abstracts (LISA),Linguistics and Language Behavior Abstracts (LLBA),National Criminal Justice Reference Service (NCJRS) Abstracts Database,Physical Education Index,PILOTS,ProQuest Dissertations & Theses (PQDT),ProQuest Dissertations & Theses A&I,ProQuest Hospital Collection,Social Services Abstracts,Sociological Abstracts,Technology Research Database,Water Resources Abstracts	47
S5	ab(("it governance" OR "information technology governance")) AND ab(framework)	ABI/INFORM Complete,Applied Social Sciences Index and Abstracts (ASSIA),ASFA: Aquatic Sciences and Fisheries Abstracts,ERIC,International Index to Music Periodicals Full Text,International Index to Performing Arts Full Text,Library and Information Science Abstracts (LISA),Linguistics and Language Behavior Abstracts (LLBA),National Criminal Justice Reference Service (NCJRS) Abstracts Database,Physical Education Index,PILOTS,ProQuest Dissertations & Theses (PQDT),ProQuest Dissertations & Theses A&I,ProQuest Hospital Collection,Social Services Abstracts,Sociological Abstracts,Technology Research Database,Water Resources Abstracts	180
S4	ab(("it governance" OR "information technology")) AND ab(framework)	ABI/INFORM Complete,Applied Social Sciences Index and Abstracts (ASSIA),ASFA: Aquatic Sciences and Fisheries Abstracts,ERIC,International Index to Music Periodicals Full Text,International Index to Performing Arts Full Text,Library and Information Science Abstracts (LISA),Linguistics and Language Behavior Abstracts (LLBA),National Criminal Justice Reference Service (NCJRS) Abstracts Database,Physical Education Index,PILOTS,ProQuest Dissertations & Theses (PQDT),ProQuest Dissertations & Theses A&I,ProQuest Hospital Collection,Social Services Abstracts,Sociological Abstracts,Technology Research Database,Water Resources Abstracts	5404
S3	ab(("it governance" OR "information technology")) AND ab(framework)	ABI/INFORM Complete,Applied Social Sciences Index and Abstracts (ASSIA),ASFA: Aquatic Sciences and Fisheries Abstracts,ERIC,International Index to Music Periodicals Full Text,International Index to Performing Arts Full Text,Library and Information Science Abstracts (LISA),Linguistics and Language Behavior Abstracts (LLBA),National Criminal Justice Reference Service (NCJRS) Abstracts Database,Physical Education Index,PILOTS,ProQuest Dissertations & Theses (PQDT),ProQuest Dissertations & Theses A&I,ProQuest Hospital Collection,Social Services Abstracts,Sociological Abstracts,Technology Research Database,Water Resources Abstracts	5404

Set#	Searched for	Databases	Results
S2	governance AND (IT OR ge information technology)	ABI/INFORM Complete,Applied Social Sciences Index and Abstracts (ASSIA),ASFA: Aquatic Sciences and Fisheries Abstracts,ERIC,International Index to Music Periodicals Full Text,International Index to Performing Arts Full Text,Library and Information Science Abstracts (LISA),Linguistics and Language Behavior Abstracts (LLBA),National Criminal Justice Reference Service (NCJRS) Abstracts Database,Physical Education Index,PILOTS,ProQuest Dissertations & Theses (PQDT),ProQuest Dissertations & Theses A&I,ProQuest Hospital Collection,Social Services Abstracts,Sociological Abstracts,Technology Research Database,Water Resources Abstracts	442964
S1	it governance framework	ABI/INFORM Complete,Applied Social Sciences Index and Abstracts (ASSIA),ASFA: Aquatic Sciences and Fisheries Abstracts,ERIC,International Index to Music Periodicals Full Text,International Index to Performing Arts Full Text,Library and Information Science Abstracts (LISA),Linguistics and Language Behavior Abstracts (LLBA),National Criminal Justice Reference Service (NCJRS) Abstracts Database,Physical Education Index,PILOTS,ProQuest Dissertations & Theses (PQDT),ProQuest Dissertations & Theses A&I,ProQuest Hospital Collection,Social Services Abstracts,Sociological Abstracts,Technology Research Database,Water Resources Abstracts	129689

ENABLING EFFECTIVE IT GOVERNANCE: LEVERAGING ISO/IEC 38500:2008 AND COBIT TO ACHIEVE BUSINESS-IT ALIGNMENT

Autor: Chaudhuri, Abhik.

Informações da publicação: EDPACS 44. 2 (Aug 2011): 1-18.

[Link para o documento do ProQuest](#)

Resumo: ISO/IEC 38500:2008, the standard for Corporate Governance of Information Technology, provides a framework of principles for senior management and the board of directors to use while evaluating, directing, and monitoring and use of IT in their organizations. The 6 principles of good corporate governance of IT are: 1. responsibility, 2. strategy, 3. acquisition, 4. performance, 5. conformance, and 6. human behavior. Control Objectives for Information and related Technology (COBIT) provides additional insight about what can help with the implementation and improvement of the 6 principles that ISO/IEC 38500:2008 provides for effective IT Governance and alignment between business and IT. The IT audit should consider ways and means to support and improve the overall efficiency and effectiveness of business processes. Significant audit points are plan and organize, acquire and implement, deliver and support, and monitor and evaluate. A performance monitoring and reporting system can be put in place to guide the organization in determining the critical barriers to success.

Assunto: Corporate governance; Information technology; Computer audits; Standards;

Título: ENABLING EFFECTIVE IT GOVERNANCE: LEVERAGING ISO/IEC 38500:2008 AND COBIT TO ACHIEVE BUSINESS-IT ALIGNMENT

Autor: Chaudhuri, Abhik

Título da publicação: EDPACS

Volume: 44

Edição: 2

Páginas: 1-18

Ano de publicação: 2011

Data de publicação: Aug 2011

Ano: 2011

Editora: Taylor&Francis Ltd.

Local de publicação: Abingdon

País de publicação: United Kingdom

Assunto do periódico: Computers--Electronic Data Processing

ISSN: 07366981

CODEN: EDPCDF

Tipo de fonte: Trade Journals

Idioma de publicação: English

Tipo de documento: Feature

Artigo principal do documento: References;Charts;Diagrams;Tables

ID do documento ProQuest: 884891680

URL do documento: <http://search.proquest.com/docview/884891680?accountid=14643>

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Última atualização em: 2011-08-24

Base de dados: ABI/INFORM Complete

Documento 2 de 28

An Integrated Security Governance Framework for Effective PCI DSS Implementation

Autor: Nicho, Mathew; Fakhry, Hussein; Haiber, Charles.

Informações da publicação:: International Journal of Information Security and Privacy 5. 3 (Jul 1, 2011): 50-67.

[Link para o documento do ProQuest](#)

Resumo: This paper analyses relevant IT governance and security frameworks/standards used in IT assurance and security to propose an integrated framework for ensuring effective PCI DSS implementation. Merchants dealing with credit cards have to comply with the Payment Card Industry Data Security Standards (PCI DSS) or face penalties for non-compliance. With more transactions based on credit cards, merchants are finding it costly and increasingly difficult to implement and interpret the PCI standard. One of the top reasons cited for merchants to fail PCI audit, and a leading factor in data theft, is the failure to adequately protect stored cardholder data. Although implementation of the PCI DSS is not a guarantee for perfect protection, effective implementation of the PCI standards can be ensured through the divergence of the PCI standard into wider information security governance to provide a comprehensive overview of information security based not only on security but also security audit and control. The contribution of this paper is the development of an integrated comprehensive security governance framework for 'information security' (rather than data protection) incorporating Control Objectives for Information and related Technology (COBIT), Information Technology Infrastructure Library (ITIL) and ISO 27002.

Termo de objeto :

Termo do assunto: Integrated, Security, Governance, Paradigms, Frameworks, Domains, External, Legal, Regulatory, Standards, Best practices, Internal, Business, Issues, Infrastructure, Cores, Processes,; Governments, Commerce, Guidance, organisation, Relationships, Ruling Class, End Users, Life cycle, Models, Transitions, Operation, Improvement, Allocations, Confidentiality, Agreements, Screening, Terms, Employment, Consciousness, Education, Training, Protection, Privacy, Responsibility, Quality Assurance, Expertise, Placement, Requirements, Investigation, Compliance,; Definitions, Criteria, Onsite, Assessments, Self Assessment, Attack, Negotiation, Discretion, Risks, Systems, Types, Links, Perspective, Goals, Measures, Adoption, Technology, Orientation, Baseline, Principles, Testing Procedures, Implementation, Assurance, Utilization, Networks, Spectators, Organizations, Regulations, Merchants, Credit, Cards, Processors, Gateways,

Developers,; Software, Countries, Personnel, Effectiveness, Efficiency, Integrity, Availability, Reliability, Extended, Accuracy, Authenticity, Resources, Applications, Components, Linked, Environments, Role, Activities, Measurement, Benchmarking, Grievances, Delay, Frequencies

Termo taxonômico: Solea vulgaris

Termo geográfico: Taiwan, Charting

Termo estatístico: ordination, Average, Standard Deviation

Título: An Integrated Security Governance Framework for Effective PCI DSS Implementation

Autor: Nicho, Mathew¹; Fakhry, Hussein; Haiber, Charles¹ University of Dubai, UAE

Autor da correspondência: Nicho, Mathew

Título da publicação: International Journal of Information Security and Privacy

Volume: 5

Edição: 3

Páginas: 50-67

Número de páginas: 18

Ano de publicação: 2011

Ano: 2011

Editora: IGI Global

País de publicação: United States

Assunto do periódico: Computers--Computer Security

ISSN: 1930-1650

Tipo de fonte: Scholarly Journals

Revisado por especialistas: Sim

Idioma do sumário: English

Idioma de publicação: English

Tipo de documento: Journal Article

DOI: 10.4018/jisp.2011070104

Atualizar: 2012-01-01

Número de registro: 16071019

ID do documento ProQuest: 910074802

URL do documento: <http://search.proquest.com/docview/910074802?accountid=14643>

Última atualização em: 2012-01-26

Documento 3 de 28

IS practitioners' views on core factors of effective IT governance for Taiwan SMEs

Autor: Lin, Fengyi; Chou, Shuching; Wei-Kang, Wang.

Informações da publicação:: International Journal of Technology Management 54. 2,3 (2011): 252-269.

[Link para o documento do ProQuest](#)

Resumo: With Sarbanes-Oxley Act (SOX) and other legislation enacted worldwide, effective information technology (IT) governance has become an imperative for many companies. To maintain effective supervision for keeping their organisation on track with its business strategy, top management need to understand their evolving roles in governance over IT by adopting relevant frameworks to assist the design and evaluate the performance of the company's IT systems. One commonly used framework is COBIT (control objectives for information and related technology) which provides guidelines and best practices to design and evaluate the performance of IT systems. The purpose of this paper is to evaluate the general status of IT governance in Taiwan's small and medium enterprises (SMEs) and examine whether the key components necessary for achieving effective IT governance are in place. [PUBLICATION ABSTRACT]

Keywords: IT governance; information technology; COBIT; small and medium-sized enterprises; SMEs; information security; technology management; internal control framework; performance evaluation; Taiwan.

Assunto: Studies;

Classificação: 9130: Experimental/theoretical

Título: IS practitioners' views on core factors of effective IT governance for Taiwan SMEs

Autor: Lin, Fengyi; Chou, Shuching; Wei-Kang, Wang

Título da publicação: International Journal of Technology Management

Volume: 54

Edição: 2,3

Páginas: 252-269

Ano de publicação: 2011

Data de publicação: 2011

Ano: 2011

Editora: Inderscience Enterprises Ltd.

Local de publicação: Geneva

País de publicação: Switzerland

Assunto do periódico: Business And Economics--Management, Technology: Comprehensive Works

ISSN: 02675730

CODEN: IJTMEG

Tipo de fonte: Scholarly Journals

Idioma de publicação: English

Tipo de documento: Feature

ID do documento ProQuest: 860127044

URL do documento: <http://search.proquest.com/docview/860127044?accountid=14643>

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Última atualização em: 2011-10-04

Base de dados: ABI/INFORM Complete

Documento 4 de 28

Research and Markets Adds Report: IT Governance Today - A Practitioners Handbook

Autor: Anonymous.

Informações da publicação:: Professional Services Close - Up (Feb 11, 2011).

[Link para o documento do ProQuest](#)

Resumo: IT governance is a board-led management framework, not a software 'solution' or a single, proprietary framework, for making IT an integrated, value-adding part of the business. This product is also available as part of our IT Governance Library. This book assesses the strengths and weaknesses in the context of competitiveness, corporate governance demands and regulatory requirements, of current frameworks (including COSO, CoBIT, ITIL, ISO 15000, ISO17799, AS 8015, GAISP). An integrated IT governance model: Aimed squarely at IT governance practitioners (including board members, owners, directors, partners, senior executives, IT managers, governance practioners, professional advisers, project managers, process owners, and intelligent people in public and private sector organisations everywhere) - IT Governance Today is a comprehensive state-of-the-art snapshot of IT governance in the corporate world today. Buy this book and ensure that the IT systems in your business are genuinely capable of adding value!

Texto completo: Research and Markets has announced the addition of the "IT Governance Today - A Practitioners Handbook" report to its offerings.

In a release, Research and Markets noted that report highlights include:

The one book the 21st century governance professional cant afford to be without!

IT governance is a board-led management framework, not a software 'solution' or a single, proprietary framework, for making IT an integrated, value-adding part of the business. This product is also available as part of our IT Governance Library. This book assesses the strengths and weaknesses in the context of competitiveness, corporate governance demands and regulatory requirements, of current frameworks (including COSO, CoBIT, ITIL, ISO 15000, ISO17799, AS 8015, GAISP). An integrated IT governance model: It proposes an integrated IT governance model that pulls together the key components of these frameworks into a single integrated model that overcomes the limitations of each, and creates a comprehensive tool that is truly

capable of generating long-term business value. Role of the CIO and management structure:

The book contains a substantial chapter on the role of the CIO, and an optimum management structure (including CKO, CTO, CISO, etc.) for the IT department that brings together all the key roles and responsibilities.

It also looks at essential tools such as the:

- IT Balanced Scorecard
- the Baldrige criteria
- capability maturity models (including CMMI and OPM3)
- the Zachman Framework for enterprise architecture
- project governance (including portfolio management, OPM3 and agile project management methodologies)
- operational risk and risk management frameworks such as Basel2 and the Treadway Commission's ERM
- financial concepts in the IT environment such as ROI and TCO
- IT performance optimisation
- IT audit
- and so much more.

The benefits of an integrated IT governance model:

- Reduce risks

Risk management is about more than just obtaining some official seal of approval. An effective IT governance framework will help safeguard your business information, enable your business to recover faster from a disaster and minimise the disruption caused by mishaps or technical breakdown.

- Integrate IT with your overall business goals

The point of IT governance is to enable your business to achieve its objectives and to make technological innovations work to your advantage.

- Ensure that projects succeed

Project governance is one of the most financially significant areas of IT governance. By managing projects involving IT as business projects rather than just IT projects, you can avoid spiralling costs and disappointing outcomes.

- Improve return on investment

IT governance means proper costing and control of IT investments. By evaluating the total cost of ownership and keeping track of IT performance, you will be able to improve the return on investment of your IT systems over the longer term.

The IT governance practitioner's manual:

Aimed squarely at IT governance practitioners (including board members, owners, directors, partners, senior executives, IT managers, governance practitioners, professional advisers, project managers, process owners, and intelligent people in public and private sector organisations everywhere) - IT Governance Today is a comprehensive state-of-the-art snapshot of IT governance in the corporate world today. Buy this book and ensure that the IT systems in your business are genuinely capable of adding value!

Key Topics Covered:

PREFACE

CHAPTER 1: IT GOVERNANCE TODAY

CHAPTER 2: IMPLEMENTING IT GOVERNANCE

CHAPTER 3: IT MANAGEMENT STRUCTURE

CHAPTER 4: ERM AND INTERNAL CONTROL

CHAPTER 5: ENTERPRISE IT ARCHITECTURE

CHAPTER 6: PROJECT GOVERNANCE

CHAPTER 7: IT GOVERNANCE METRICS

CHAPTER 8: IT PERFORMANCE MANAGEMENT

CHAPTER 9: FRAMEWORKS

CHAPTER 10: IT AUDIT

Report information:

researchandmarkets.com/research/3f5671/it_governance_toda

((Comments on this story may be sent to newsdesk@closeupmedia.com))

Título: Research and Markets Adds Report: IT Governance Today - A Practitioners Handbook

Autor: Anonymous

Título da publicação: Professional Services Close - Up

Ano de publicação: 2011

Data de publicação: Feb 11, 2011

Ano: 2011

Editora: Close-Up Media, Inc.

Local de publicação: Jacksonville

País de publicação: United States

Assunto do periódico: Business And Economics

Tipo de fonte: Trade Journals

Idioma de publicação: English

Tipo de documento: News

ID do documento ProQuest: 851194939

URL do documento: <http://search.proquest.com/docview/851194939?accountid=14643>

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Última atualização em: 2011-06-04

Base de dados: ABI/INFORM Complete

Documento 5 de 28

Medical Records System Adoption in European Hospitals

Autor: Marques, Ana; Oliveira, Tiago; Dias, Sara Simões; Martins, Maria Fraga O.

Informações da publicação:: Electronic Journal of Information Systems Evaluation, supl. ECIME 2010 Special Issue 14. 1 (Jan 2011): 89-99.

[Link para o documento do ProQuest](#)

Resumo: This paper describes the introduction of an IT Governance Framework into a Hospital environment. It further addresses the relationship between corporate governance (hospital strategy and organization) and the

role of IT Governance in managing new services deployment. Both ITIL and COBIT are introduced as a best practice for supporting Hospital Information Systems (HIS) management. IT Governance is an extensive framework; therefore the authors focused their study on ITIL Assessment combined with COBIT. The assessments were centered on IT Service Management, which, according to our findings, is being carried inefficiently in Hospital Sao Sebastiao (HSS). Finally, they applied the framework on both Service Desk and Incident Management processes. They analyzed the level of IT governance maturity and produce some recommendations to improve IT Service Management practices. The ITIL assessment identified existing gaps between the current organization practices and how the organization should perform according to ITIL, and what key actions need to be taken to close those gaps.

Texto completo: Headnote

Abstract: Health Care system has had an ongoing focus on improving access to and quality of care, and more recently on cost reduction. The primary mean to achieve these goals has been to change health care policy, as exemplified by the adoption of health information technology in particular the adoption of patient centred information, characterized by the ability to manage comprehensive patient information such as: medical records; appointments scheduling; theatre management and ward reporting. Different terms are used to refer to these systems including the most common: electronic patient record; electronic medical record; computer based patient record and medical records system (MRS). Despite the importance of these systems in health care, little is known about the adoption. This study addresses the existent research gap by analyzing the adoption of MRS in European hospitals. Study data source is the e-Business Watch 2006 decision maker survey, covering 448 hospitals in the European Union. Additional information related to country wealth indicators, was extracted from the EU official statistics and opinion polls website. Variable choice is based on a derivation from the recently introduced framework known as Human, Organization and Technology fit (HOT-fit) and Technology, Organization and Environment (TOE) framework. Adding the environmental context into the HOT-fit framework, the Human, Organization, Technology and Environment (HOTE) framework is derived. HOTE framework identifies four contexts that influence information and communication technologies (ICT) adoption: Technology characteristics including equipment but also processes; Organizational context as size, localization and even managerial structure; Human context relating to "User Involvement"; and Environmental context that incorporate the cultural environment of the country and regulatory influence. In order to reduce the number of variables available, a factor analysis (FA) is performed, using the principal component technique with varimax rotation. Three eigenvalues, greater than one are extracted, explaining 69.68% of the variance contained in the data. The three contexts found are: country wealth, competition and technology readiness. To determine the correlation between HOTE framework characteristics and MRS adoption a Logit model is used. For that were used variables obtained from the FA and other variables such as hospital size, education level and research level, gathered directly from the e-business watch survey. MRS adoption is significantly associated with Education Level, Technology Readiness and Country Wealth. Since MRS adoption may be an organization survival strategy for hospitals to improve quality and efficiency while reducing costs, hospitals that are at risk of missing the wave of implementation should be offered incentives that enable them to implement and maintain patient centred information systems.

Keywords: ICT adoption; e-Business, HOTE framework, Hospitals, Factor Analysis, Logit model.

1. Introduction

Healthcare is a sector that is experiencing a significant number of internal, but also external pressures. Progress in medicine and also in information and communication technologies (ICT), are resulting in new methods and new opportunities to support or even enable new types of health care services. The continuously increase of life expectancy, leading to ageing societies, combined with citizen empowerment, stretch the limits

of what countries can afford to offer as national health care systems (Daveri 2001, OECD 2004, United Nations 2007). As a result, governments are confronted by the urgent need to find means to limit the rise of healthcare costs without compromising quality, equity and access. The primary mean to achieve these goals has been to change health policy, as the adoption of health information systems (HIS). European Commission Council for health information, stated that "e-Health is today's tool for substantial productivity gains, while providing tomorrow's instrument for restructured, citizen-centered health care systems and, at the same time, respecting the diversity of Europe's multi-cultural, multi-lingual health care traditions. There are many examples of successful e-Health developments including health information networks, electronic health records, telemedicine services, wearable and portable monitoring systems, and health portals." (European Union 2005). Health information technologies range from simple systems, such as transaction processing systems, to complex ones, such as clinical decision support systems (Yusof et al. 2008). One of the most advocated technologies is patient centered information. Patient centered information systems are electronic version of patient's information. Different terms are used to refer to these systems including electronic patient record (EPR), electronic medical record (EMR), computer based patient record (CPR) and medical records system (MRS) (Blobe 2000, Chang et al. 2007, Kazley and Ozcan 2007). These systems are characterized by the ability to manage comprehensive patient care information such as medical records, appointments scheduling, theatre management and ward reporting. Electronic medical records are "a system that integrates electronically originated and maintained patient-level clinical information derived from multiple sources, into one point of access," and "replaces the paper medical record as the primary source of patient information" (American Hospital Association 2007). United States of America (USA) federal government called 2004 the year for electronic medical records adoption (Thompson and Brailer 2004).

This study addresses the existent research gap by analyzing the adoption of MRS in European hospitals, determining the factors that are associated to MRS adoption. Furthermore this study's implications can guide policy and practice through the identification of specific barriers to hospital MRS use.

2. Theoretical Background

Introduction of health information systems can radically affect health care organizations and health care delivery. However, information technology change has been more rapid outside than within the healthcare industry (Chang et al. 2007). Other industries faced the similar transformations and developed theories and methods that are being applied to healthcare (Pfeffer and Salancik 1978, Dasputa et al. 1999, Ammenwerth et al. 2006).

Several evaluation studies on health information technology adoption highlighted that a large number of adoption problems were attributed to the lack of fit between technology, human and organizational context (Davis 1993, Dishaw and Strong 1999, Goodhue et al. 2000, Tsiknakis and Kouroubali 2009). Yusof et al. (2008) presented an overview of evaluation models in health information's systems, using human, organizational and technology measures. He developed a new framework based on human, organization and technology-fit (HOT-fit) after having conducted a critical appraisal of the findings of existing HIS evaluation studies (right side of Figure 1). Nevertheless, there are also a number of studies in all industries that point out the importance of the environmental context, upon the adoption of information technology (Chang et al. 2007, Oliveira et al. 2008). Kazley and Ozcan (2007) explored the environment factors as determinant to EMR adoption.

A review of the literature suggests that the technology, organization, and environment (TOE) framework (Tornatsky and Fleischer 1990) may provide a useful starting point for studying adoption of innovation (Lin and Lin 2008, Zhu and Kraemer 2005). The TOE framework identifies three features of a firm's context that may influence adoption of technological innovation: (1) the technological context describes both the existing technologies in use and new technologies relevant to the firm; (2) the Organizational context refers to characteristics of the organization such as scope and size; (3) the Environmental context is the arena in which a

firm conducts its business, referring to its industry, competitors, and dealings with the government. The TOE framework explains adoption of innovation, as can be seen in the left side of Figure 1. The TOE framework has been examined in a number of empirical studies on various information system (IS) domains. It was used to explain electronic data interchange (EDI) adoption (Kuan and Chau 2001). Thong (1999) explained IS adoption and use. Pan and Jang (2008) explained enterprise resource planning (ERP) adoption. This framework was also used to explain e-business adoption (Zhu et al. 2003, Zhu and Kraemer 2005, Oliveira and Martins 2010) and use (Lin and Lin 2008, Zhu and Kraemer 2005, Zhu et al. 2006). Empirical findings from these studies confirmed that the TOE methodology is a valuable framework in which to understand the adoption of IT innovation.

In order to study the adoption of MRS in European Countries, a derivation from the recently introduced framework known as HOT-fit is applied (Yusof et al. 2007). We propose to add the environmental factor into the HOT-fit framework, Human, Organization, Technology and Environment (HOTE) framework was derived. HOTE framework is a junction of HOT-fit framework (Yusof et al. 2008) and TOE framework (Tornatsky and Fleischer, 1990). The proposed framework identifies four aspects that influence ICT adoption: Technology context including equipment but also processes; Organizational context as size, localization and even managerial structure; Human context relating to "User Involvement"; and Environmental context that incorporate country cultural environment and regulatory influence.

3. Conceptual model and hypotheses

Factors of ICT adoption have largely been discussed in the literature (Ammenwerth et al. 2006, Yusof et al. 2008, Kazley and Ozcan 2007, Tsiknakis and Kouroubali 2009). In order to study MRS adoption, we introduce a new framework HOTE. HOTE framework identifies four aspects that influence MRS adoption: Technology context; Organizational context; Human and Environmental contexts. According to HOTE framework a conceptual framework for MRS is depicted on Figure 2.

3.1 Human

Introduction of MRS systems can radically affect health care delivery. Professionals need to adapt themselves to the use of this new technology adoption. This can found many obstacles, depending on individual level attributes as IT Knowledge and training, motivation and openness to new ways of working (Ammenwerth et al. 2006). Overall capacity to evaluate technologies opportunities depend primarily on human capital and organization knowledge (Cohen and Levinthal 1989). MRS implementation requires employees with higher education level (Martins and Oliveira 2008).

H1: Hospitals with higher education levels are more likely to adopt MRS;

Teaching hospitals provide a great deal of charity care and medical research, as well as provide the training and educations of many of the nation's health care workforce. According to Retchin and Wenzel (1999), academic health centers can easily adapt to the use of MRS because they "have the expertise to resolve the remaining software issues, the components necessary for the integrated delivery, a culture for innovation in clinical practice, and a generation of future providers that can be acclimated to the requisites for computerized records."

H2: Teaching hospitals are more likely to adopt MRS;

3.2 Organization

In the organizational context, general health care hospitals face a higher degree of competitiveness (Kazley and Ozcan 2007). General hospitals often report higher occupancy rates and more financial and social pressures. A specialized hospital is only option for a specific target, thus not requiring the hospital to compete with others in the environment. Also the amount of inter-departmental information should be much lower comparing to a general hospital where the different services act as isolated islands. For these reasons, is expected that a general hospital would be more likely to take actions, such as MRS adoption to attract patients.

H3: General health care hospitals are more likely to adopt MRS;

Hospital ownership may also guide organizational strategy, based on hospital mission and values. Since MRS adoption is expressed in e-health 2005, as a European priority (European Union 2005), hospitals dependent of public funds may anticipated MRS adoption.

H4: Public hospitals are more likely to adopt MRS;

Organizational size is one of the most studied ICT adoption factors, since size is associated with more financial capability but also adequate human resources (Zinn et al. 1997, Kazley and Ozcan 2007). Larger hospitals achieve easily economies of scale and mainly information and resources needed across the organization. Several studies show positive relationship between ICT adoption and organization size (Zhu et al. 2003, Pan and Jang 2008). It is expected that larger hospitals tend to adopt MRS.

H5: Larger hospitals are more likely to adopt MRS;

3.3 Technology

Technology readiness (TR) can be defined as hospital technology profile or even hospital technology appetite. Apart from MRS adoption, Hospitals may already use other distinct systems, many times departmental "islands of automation", that support specific daily activities. MRS integrates electronically originated and maintained patient-level clinical information derived from multiple sources. Literature suggests that integrated technologies tend to enhance performance (Hong and Zhu 2006). Burke et al. (2002) reported that hospitals with a higher level of overall IT adoption exhibit a very different profile, especially concerning strategic IT applications. On the other hand, Healthcare industry is a data sensitive industry, and despite all the existing standards and frameworks such as Health Level 7 (HL7), information security is frequented reported as an obstacle to ICT adoption (Gomes and Lapão 2008, ISO/IEC 27001 2005). "Security protection" should be an important influence upon MRS adoption. Therefore, in general is expected that hospitals with greater TR are more likely to adopt MRS.

H6: Hospitals with higher technology readiness are more likely to adopt MRS;

3.4 Environment

Empirical evidence suggests that competitive pressure is a powerful driver of ICT adoption and diffusion (Gibbs and Kramer 2004, Kazley and Ozcan 2007), therefore is expected that the adoption of MRS is influenced by the proportion of surrounding MRS adopters. Under a competitive market, hospitals may be pressured to secure their market share of patients. Under a variety of offers, patients may elect where to go for health care and will likely choose a hospital that offers new or better services such as MRS.

H7: An environment competition increases the likelihood of hospital MRS adoption;

Several studies (American Hospital Association 2007, Kazley and Ozcan 2007) point the cost of implementation as the greatest barrier to ICT adoption. This factor is particular relevant for e-health adoption since, health care industry in Europe is still very dependent of public funds (Forum e-health 2008). Hospitals in areas where the amount of financial resources are more abundant are more likely to have the support for high cost services and technology such as MRS. Balotsky (2005) reported that "markets with greater per capita income supported higher hospital cost".

H8: Hospitals from richer countries are more likely to adopt MRS;

4. Data and methodology

Study data source is the e-Business W@tch 2006, developed by the European Commission, Enterprise & Industry Directorate General to study the impact of ICT and e-business on enterprises, industries and on the economy in general. In spring 2006 e-business watch (<http://www.ebusiness-watch.org>) conducted the latest decision maker survey that coved 834 hospitals from the 13 000 existent in European Union (EU), using computer-aided telephone interview (CATI) technology. The survey considered only hospitals that used computers and the sample drawn was a random sample of the hospitals in each country.

According to Eurostat recommendations, upon "did not answer" or "does not know" as answer to a specific question, should not imply its imputation, based on operator?s answer and consequently final sample include

448 hospitals from 16 European countries: France; Germany; Italy; Poland; Spain; UK; Belgium; Czech Republic; Finland; Greece; Hungary; Latvia; Lithuania; Netherlands; Portugal and Sweden, where 79% of the data collected from Owner, managing director, Head or IT senior member, suggesting high quality of the data source.

In order to consider the environment context present in the adopted framework, additional information from EU official statistics and opinion polls website was used (http://europa.eu/documentation/statistics-polls/index_en.htm). Statistics as percentage of Households with internet access, gross domestic product (GDP) per inhabitant and total spending in research and development (R&D) as percentage of GDP, allowed building what we designate as country wealth indicator. Because Turkey and Norway are not European Union members the above statistics were not available. Consequently these countries were excluded from the analysis.

In order to reduce the number of variables available, a factor analysis (FA) is performed, using the principal component technique with varimax rotation (for further details see Sharma (1996)).

To test the adopted conceptual framework, since the dependent variable is binary (to adopt or not), a logit model is developed. Literature evidences the use of logit model to study the following adoptions: computer-mediated communication technologies (Premkumar 2003), internet (Martins and Oliveira 2008), web site (Oliveira and Martins 2008), e-commerce (Martins and Oliveira 2009) and e-business (Pan and Jang, 2008, Zhu et al. 2003). Logit model pretends to estimate the following conditional probability

$$P(y = 1 | x) = \frac{e^{x\beta}}{1 + e^{x\beta}} \quad (1)$$

Where $y=1$ if hospital decided to adopt MRS and zero otherwise; x is the vector of explanatory variables, β the vector of estimated parameters and $(.)$ is the standard logistic cumulate distribution.

5. Results

To reduce the number of variables available (variables used in the analysis are described in Appendix), a FA is performed, using principal component technique with varimax rotation. The variables used in the analysis are described in Table 1.

Three eigen-value, greater than one are extracted, explaining 69.68% of the variance contained in the data. The three factors found are: country wealth, competitor and technology readiness (Table 2). Kaiser-Meyer-Olkin (KMO) that measures sample adequacy is 0.79, which can be considered good (Sharma 1996). Individual KMO is also adequate, since all factors have a loading greater than 0.50. The analysis employs a well-explained factor structure.

When items are positively, but imperfectly correlated, a scale enjoys a substantial improvement in reliability over a single item. Reliability is the consistency of a set of items that make up a scale. All three factors have a composite reliability over the cut-off of 0.70, as suggested by Straub (Straub 1989).

Table 3 resumes explanatory variables used to determine the probability of hospital's MRS adoption, through a logit model.

Logit model results are summarized on Table 4. Due to the existence of missing values only 448 observations were used. Estimation results show that, at 5% significance level only Education Level, TR and Country Wealth are positively associated with MRS adoption. Goodness of fit is measured in two ways: first through the log likelihood test that reveals global significance and finally the discriminate power of the model is assessed, by the area under the curve that is equal to 76%, revealing a good discrimination. There is evidence to accept the significance of the model.

Figure 3 resumes the influence of each of the significant variables into MRS adoption probability. Making each of the significant variables range from minimum to maximum observed value and keeping the other variables at the average value, it is possible to estimate the influence of each significant variable on MRS adoption probability. The slope of each of the curves obtained, show the influence on MRS adoption probability. From Figure 3 we can conclude that Technology Readiness has the strongest impact on hospital MRS adoption.

6. Discussion

Finding 1: Organizational context do not influence MRS adoption;

The research framework confirms some findings from previous studies in identifying critical factors affecting a hospital ICT adoption. From the four contexts identified (Human; Organizational; Technology and Environment), this study disagrees on the Organizational context, concluding that MRS adoption is significant associated with Human, Technological and Environmental contexts.

Finding 2: Hospitals with higher TR are more likely to adopt MRS;

This finding is based on the estimated logit model. TR proven to be the most significant variable. TR can be defined as hospital's technological appetite, since this indicator includes other existing systems, networks, security and also ICT training. This finding is consistent with the literature (Burke et al. 2002, Chang et al. 2007, Martins and Oliveira 2008). The possible reason is that MRS integrates electronically originated and maintained patient-level clinical information derived from multiple sources. Also the existence of different applications across the organization, make the acceptance of a new system much easier. Furthermore a hospital with TR equal to 1.5 (maximum value for study samples) has 90% probability of MRS adoption.

Finding 3: Hospitals from richer countries are more likely to adopt MRS;

Country Wealth is positively associated with MRS adoption (Table 3). More, a hospital from the wealthiest country has 80% change of MRS adoption. MRS have heavy acquisition and implementation costs, but also the maintenance costs are something that hospital's need to considered into their expensive lines. This finding is concordance with literature (Kazley and Ozcan 2007).

Finding 4: Hospitals with higher education levels are more likely to adopt MRS;

According to the estimated model (Table 3), education level is positively associated with MRS adoption. This conclusion is in line with literature (Chang et al. 2007, Kazley and Ozcan 2007, Martins and Oliveira 2008). Hospitals are formed by a specific group of professionals with specific training, that not necessary include ICT training and despite the mental image that hospital stands for doctor and nurses, this is not the reality (Lapão 2005). The majority of hospital's employees are medical auxiliary that do not have necessary a university degree.

Finding 5: Teaching hospitals may be more likely to adopt MRS

R&D variable is in the frontier of significance (Table 3), with 13% significance level so we cannot exclude this factor so determinant, especially if we consider that education level is a significant variable. In theoretical terms, hospitals with a higher level of research employees should also present a higher education level and higher technology profile (Retchin and Wenzel 1999).

Finding 6: Hospital size does not influence MRS adoption;

Surprise may arise from hospital size, since is frequently appointed as an important adoption factor (Chang et al. 2007, Kazley and Ozcan 2007). Nevertheless, literature revision in other industries points this variable "controversial" predictor for IT adoption. However, larger organizations have multiple levels of bureaucracy and this can impede decision-making processes regarding new ideas and projects (Hitt et al. 1990, Whetten 1987). Moreover, e-business adoption often requires close collaboration and coordination that can be easily achieved in smaller organizations. There is also empirical evidence against this positive relationship (Martins and Oliveira 2008, Oliveira 2008, Zhu et al. 2006). The advantage of the availability of funds being greater for large firms (Iacovou et al. 1995, Rogers 2003) does not prevail, nor does the disadvantage of larger firms having multiple levels of bureaucracy, which can impede decision-making processes regarding new ideas and projects (Hitt et al. 1990, Whetten 1987). Martins and Oliveira (2008) concluded that firm size is only relevant for simple technologies adoption, becoming irrelevant upon complex technologies.

7. Conclusions

Within the context of an e-health policy in Europe that advocates the use of ICT in health care industry, this study fills a gap in the literature by analysing adoption factors. Theoretical framework incorporates the factors

identified on previous studies, identifying four adoption factors: Human; Organizational; Technological and Environmental. Using a sample from hospitals across EU, estimation results show that MRS adoption is positively associated with Education Level, TR and Country Wealth, excluding the organizational factor. Hospitals are a particular organization where human aspect overlaps the organizational, becoming the factor in MRS adoption.

If hospitals are more likely than other to adopt MRS based on Human, Technological and Environment characteristics, it is possible that these significant variables represent barriers to MRS utilization to some hospitals. According to this study hospitals from poor countries, with poor technology readiness and lower education levels are less likely to adopt MRS. Since MRS is one of the most advocated technologies, for hospital performer booster, improving quality and efficiency, policy makers should take steps to encourage the adoption, by creating specific financial support, or even greater financial reimbursement to hospitals the use MRS. Additional, provide proper programs that aid hospital implementing and also teaching employees to use MRS systems.

This study makes an important theoretical contribution, since it allows excluding Organizational context as an important context to MRS adoption. Nevertheless this conclusion needs to be assed upon other e-health systems. For future research, a theoretical framework based on three contexts: Human, Technology and Environment (HTE) should be applied in order to understand Hospital ICT adoption.

Acknowledgements

We would like to acknowledge e-Business W@tch survey 2006 for data providing.

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Author Affiliation

Ana Marques¹, Tiago Oliveira¹, Sara Simões Dias² and Maria Fraga O. Martins¹

¹ISEGI, Universidade Nova de Lisboa, Lisbon, Portugal

²FCM, Universidade Nova de Lisboa, Lisbon, Portugal

anacarinamarques@hotmail.com

toliveira@isegi.unl.pt
sara.dias@fcm.unl.pt
mrfom@isegi.unl.pt

Assunto: Studies; Information technology; Hospitals; Corporate governance; Best practice; Information systems;

Classificação: 5220: Information technology management, 8320: Health care industry, 2110: Board of directors, 9130: Experiment/theoretical treatment

Título: Medical Records System Adoption in European Hospitals

Autor: Marques, Ana; Oliveira, Tiago; Dias, Sara Simões; Martins, Maria Fraga O

Título da publicação: Electronic Journal of Information Systems Evaluation

Volume: 14

Edição: 1

Suplemento: ECIME 2010 Special Issue

Páginas: 89-99

Número de páginas: 11

Ano de publicação: 2011

Data de publicação: Jan 2011

Ano: 2011

Editora: Academic Conferences International Limited

Local de publicação: Reading

País de publicação: United Kingdom

Assunto do periódico: Business And Economics

Tipo de fonte: Trade Journals

Idioma de publicação: English

Tipo de documento: Feature

Artigo principal do documento: Diagrams;Tables;References

ID do documento ProQuest: 856989968

URL do documento: <http://search.proquest.com/docview/856989968?accountid=14643>

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Última atualização em: 2011-03-15

Base de dados: ABI/INFORM Complete

IS practitioners' views on core factors of effective IT governance for Taiwan SMEs

Autor: Lin, Fengyi; Chou, Shuching; Wang, Wei-Kang.

Informações da publicação:: International Journal of Technology Management 54. 2-3 (2011): 252-269.

[Link para o documento do ProQuest](#)

Resumo: With Sarbanes-Oxley Act (SOX) and other legislation enacted worldwide, effective information technology (IT) governance has become an imperative for many companies. To maintain effective supervision for keeping their organisation on track with its business strategy, top management need to understand their evolving roles in governance over IT by adopting relevant frameworks to assist the design and evaluate the performance of the company's IT systems. One commonly used framework is COBIT (control objectives for information and related technology) which provides guidelines and best practices to design and evaluate the performance of IT systems. The purpose of this paper is to evaluate the general status of IT governance in Taiwan's small and medium enterprises (SMEs) and examine whether the key components necessary for achieving effective IT governance are in place.

Termo de objeto :

Termo do assunto: Processes, Strategy, Goals, Acquisition, Implementation, Factors, Technology, Infrastructure, Development, Procedures, Accountability, Training, Variables, Loading, Accumulation, Domains,; Objectives, Planning, organisation, Covers, Tactics, Identification, Achievement, Business, Architecture, Delivery, Evaluation, Internal, Adequacy, Governance, Independent Variables, Performance, Capacity, Quality, Monitoring, Costs, Continuous, Systems, Security, Risks, Communications, Management, Compliance, External, Participation, Frequencies, Employment,; Responsibility, Controllers, Managers, Gender, Males, Females, Work Experience, Independent, Measurement

Termo estatístico: Factor Analysis, factor loading, Regression, dependent variable, Durbin-Watson Statistic

Título: IS practitioners' views on core factors of effective IT governance for Taiwan SMEs

Autor: Lin, Fengyi¹; Chou, Shuching; Wang, Wei-Kang¹Department of Business Management, National Taipei University of Technology, Taipei, Taiwan.

Autor da correspondência: Lin, Fengyi

Título da publicação: International Journal of Technology Management

Volume: 54

Edição: 2-3

Páginas: 252-269

Número de páginas: 18

Ano de publicação: 2011

Ano: 2011

Editora: Inderscience Publishers Ltd.

País de publicação: United Kingdom

Assunto do periódico: Business And Economics--Management, Technology: Comprehensive Works

ISSN: 0267-5730

Tipo de fonte: Scholarly Journals

Revisado por especialistas: Sim

Idioma do sumário: English

Idioma de publicação: English

Tipo de documento: Journal Article

DOI: 10.1504/IJTM.2011.039314

Atualizar: 2011-05-01

Número de registro: 14795698

ID do documento ProQuest: 886045023

URL do documento: <http://search.proquest.com/docview/886045023?accountid=14643>

Última atualização em: 2011-11-04

Base de dados: Technology Research Database

Documento 7 de 28

ASSESSING THE LEVEL OF INFORMATION TECHNOLOGY (IT) PROCESSES PERFORMANCE AND CAPABILITY MATURITY IN THE PHILIPPINE FOOD, BEVERAGE, AND TOBACCO (FBT) INDUSTRY USING THE COBIT FRAMEWORK

Autor: Tugas, Florenz C.

Informações da publicação:: Academy of Information and Management Sciences Journal 13. 1 (2010): 45-68.

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Resumo: A grounded literature on how information technology (IT) processes are being managed is imperative in an industry with an increasing reliance on IT for its strategic and operational undertakings. This study seeks to provide a comprehensive assessment of the level of IT processes performance and capability maturity in the Philippine food, beverage, and tobacco (FBT) industry by applying the theory of benchmarking and the CobiT framework on IT governance. After administering the 167-item survey instrument to 22 publicly-listed companies in the FBT industry, represented by respondents composed largely of IT managers and administrators and subjecting the results to statistical tests and IT experts' validation, it was found out that the FBT industry currently has a maturity score of 2.05. At this maturity level, IT processes have developed to the stage where similar procedures are followed by different people undertaking the same task but there is no formal training of communication of standard procedures. To be able to evolve to the next immediate level where IT processes are standardized, documented, and communicated through training, companies in the FBT industry should bank on their key strength in the Acquire and Implement (AI) domain and improve on their weakness in the Monitor

Texto completo: Headnote

ABSTRACT

A grounded literature on how information technology (IT) processes are being managed is imperative in an industry with an increasing reliance on IT for its strategic and operational undertakings. This study seeks to provide a comprehensive assessment of the level of IT processes performance and capability maturity in the Philippine food, beverage, and tobacco (FBT) industry by applying the theory of benchmarking and the CobiT framework on IT governance. After administering the 167-item survey instrument to 22 publicly-listed companies in the FBT industry, represented by respondents composed largely of IT managers and administrators and subjecting the results to statistical tests and IT experts' validation, it was found out that the FBT industry currently has a maturity score of 2.05. At this maturity level, IT processes have developed to the stage where similar procedures are followed by different people undertaking the same task but there is no formal training of communication of standard procedures. To be able to evolve to the next immediate level where IT processes are standardized, documented, and communicated through training, companies in the FBT industry should bank on their key strength in the Acquire and Implement (AI) domain and improve on their weakness in the Monitor and Evaluate (ME) domain.

Keywords: Benchmarking; Capability; Domain; Governance; Maturity.

INTRODUCTION

The advent of information technology has significantly influenced and changed how businesses are being managed and monitored today (Hunton, Bryant & Bagranoff, 2004). It has brought both positive and negative impacts to the business world. As such, a term double-edged sword is often used to describe it.

To ensure smooth management of the new business set-up, the concept of corporate governance was redesigned to include information technology as a major part of it. New governance and internal control frameworks came up just for this concern to be addressed. This resulted to an increased awareness that IT governance is a major ingredient in achieving every organization's goal of value creation.

In spite of the availability of new governance and internal control frameworks, many organizations still compromised their going concern because of poor enterprise-wide governance. The collapse of Enron in 2002 and the recent 2009 Satyam scandal in India are among the proofs of this predicament. Much more alarming is that in 2008, Satyam was the winner of the coveted Golden Peacock Award for Corporate Governance under Risk Management and Compliance Issues. Because of this, the awareness for both corporate and IT governance must be heightened and taken more seriously.

THE STATE OF THE FBT INDUSTRY

Over the last few years, the global food, beverage and tobacco (FBT) industry group has exhibited modest growth, with growth particularly low in the tobacco and beverage markets. The industry group generated total revenues of \$4,140.3 billion in 2005, this representing a compound annual growth rate (CAGR) of 2.9% for the five-year period spanning 2001-2005 (Datamonitor, 2006).

The leading revenue source for the global FBT industry group is the sale of food products, which generated total revenues of \$2,634.3 billion in 2005, equivalent to 63.6% of the overall industry value. In comparison, beverage sales accounted for \$1,035.4 billion in 2005, which represents 25% of the industry value. However, the increasing global population will drive demand up, while rising income levels in many economies allow increased spending on added-value processed, packaged, and luxury items in this category. The global consumption volumes of tobacco are steadily falling, as the health risks become more widely understood, although in some countries, such as India, volume growth remains positive (Datamonitor, 2006).

But looking forward, the global FBT industry group is expected to accelerate from its current value growth

position. With an anticipated CAGR of 3% over the 2005-2010 period, the industry is expected to reach a value of \$4,805.5 billion by the end of 2010. The drivers operating during the last five years are set to persist for the next five (Datamonitor, 2006).

In the Philippines, the FBT industry belongs to the industrial sector. There are 23 publicly listed companies under the FBT industry (Philippine Stock Exchange (PSE), 2009). It is a highly regulated industry particularly the tobacco companies. A study by RNCOS in New Delhi on September 13, 2008 on the Philippine FBT Market Forecast until 2011 showed the patterns in consumption behavior in the different food segments. The study indicated five key results about the sub-industry: (1) because of the strong increase in consumer expenditure during 2001 to 2006, a rise of 7.5% is also expected from 2007 to 2011; (2) the increase in the working hours of employees, increase in number of employees and diverse eating habits has led to a high consumption of ready-to-eat meals; (3) the demand for organic food will increase at a growth rate of 10% to 20% because of the growing middle class population; (4) an increase in disposable incomes and demand for imported alcoholic beverages; and (5) there is an inadequate water supply and healthy drinking concerns that have resulted in the growth in the bottled water industry (Dy, Ha, Gan & Alba, 2009).

DEPENDENCE OF FBT COMPANIES ON IT

According to Siethe and King (1994), in the market where the existence of perfect competition restricts generation of a reasonable profit, successful implementation of IT systems plays a crucial role in order for organizations to maintain a competitive standing.

Since all the major players in the FBT industry group source ingredients and sell their products all over the world, the current high oil prices are significantly increasing transportation costs by way of inflated petroleum prices. Companies have begun to combat such problems by driving efficiency within their regional distribution networks. By monitoring demand within a particular global region, companies have been able to minimize transportation, thus mitigating their exposure to these rising costs (Datamonitor, 2006).

The use of information technology to manage its supply chain and distribution channels can be viewed as an opportunity in this case (Romney & Steinbart, 2008). Likewise, the heightened regulation set by the Bureau of Internal Revenue in terms of point-of-sale (POS) registers for FBT companies also presents an opportunity for IT to be maximized. Because of this, to support the expected increase in consumer expenditure, the IT infrastructure and utilization is expected to cater to the growing volume of transaction processing to support daily business operations.

VALUE OF INVESTING IN IT

Investing in IT aids in surpassing competition by improving productivity, profitability, and quality of operations (Devaraj & Kohli, 2003). Likewise, according to a study conducted by Dewan and Kraemar (2000), when the World Bank provided assistance amounting to \$1 billion annually to companies which want to invest in developing their existing systems, it turned out that the gross domestic product (GDP) growth of countries wherein there is a rampant utilization of IT systems is considerably higher compared to the GDP growth of countries where companies are non-IT users.

But according to a study conducted by Willcocks and Lester (1997), investment in IT systems alone does not assure companies that they will reap the full benefits that these systems promise. Instead, it is accompanied by the danger that improper application of such could be detrimental to the organization. With this, there is more reason for the need to ensure IT governance more specifically to ensure its alignment with business strategy.

IT GOVERNANCE: A FOCUS ON COBIT

According to Simonsson and Johnson (2006), the existing literature on IT governance has inherited much from the discipline of corporate or enterprise governance but it has been able to develop itself into a discipline of its own (Dy, Ha, Gan & Alba, 2009). This is evidenced by several professional groups and organizations created for the purpose of establishing new internal control frameworks that primarily focus on IT governance.

Information Systems Audit and Control Association (ISACA) is one of the professional groups established for

this purpose. In 1998, the Information Systems Audit and Control Association (ISACA) established the Information Technology Governance Institute (ITGI) to advance international thinking and standards in directing and controlling an enterprise's information technology (ITGI, 2007). The institute exists to clarify and provide guidance on current and future issues pertaining to IT governance, control, and assurance (Hunton, Bryant & Bagranoff, 2004). The framework that this institute developed emphasizes that an organization first sets its objectives, and then follows a continual process in which performance is measured and compared against those objectives. One its products is the Control Objectives for Information and related Technology (CobiT) which provides guidance on IT governance by setting the structure that links IT processes, IT resources, and information to enterprise strategies and objectives. While CobiT was once a tool primarily for auditors to use, the increasing criticality of IT governance has caused it to evolve into a management resource (Hunton, Bryant & Bagranoff, 2004).

Though at present, there is still lack of consensus on how IT governance is viewed; CobiT is the most renowned framework for support of IT governance concerns. It is based on best practice, focusing on the processes of the IT organization and how its performance can be assessed and monitored. This framework is maintained by an independent, not-for-profit research institute, drawing on the expertise of its affiliated association's members, industry experts, and control and security professionals. Its content is based on ongoing research into IT good practice and is continuously maintained, providing an objective and practical resource for all types of users. It provides good practices across a domain and process framework and presents activities in a manageable and logical structure. However, it is important to emphasize that CobiT framework is a model of IT governance only and not of organization as a whole (ITGI, 2007).

CobiT defines IT activities in a generic process model with four domains and 34 generic control processes. These domains are Plan and Organize (PO), Acquire and Implement (AI), Deliver and Support (DS), and Monitor and Evaluate (ME). The domains map to IT's traditional responsibility areas of plan, build, run, and monitor (ITGI, 2007). PO domain covers strategy and tactics, and concerns the identification of the way IT can best contribute to the achievement of the business objectives. AI domain addresses the aptness and likelihood of providing solutions that will meet business needs. DS domain is concerned with the actual or physical delivery of required services, which includes service delivery, management of security, and continuity, service support for users, management of data and operational facilities. ME domain addresses performance management, monitoring of internal control, regulatory compliance and governance. Across these four domains, CobiT has identified 34 IT processes where links are made to the business and IT goals that supported (ITGI, 2007). The four domains and 34 IT processes largely represent a comprehensive dimension of an organization's IT processes performance and capability that needs to be managed.

Moreover, the United States (US) Securities on Exchange and Commission (SEC) mandated the use of a standard internal control framework established by a body or group that has gone through due-process procedures, including the wide distribution of the framework for public comment, and made particular mention to the Committee of Sponsoring Organizations of the Treadway Commission (COSO) Internal Control - Integrated Framework, which was issued in 1992. COSO is widely accepted as the authority on internal controls and is incorporated into policies, rules, and regulations that are used to control business activities (Romney & Steinbart, 2008) and CobiT is the generally accepted internal control framework for IT (ITGI, 2007). Using the CobiT framework, an organization can devise a system of IT controls to conform with Section 404:

Management's Report on Internal Control over Financial Reporting (Yu, Rogación, Pérez & Lichengyao, 2006). Furthermore, the Public Company Accounting Oversight Board (PCAOB) Auditing Standard No. 2 states that because of the frequency with which management of public companies is expected to use COSO as the framework for the assessment, the directions in the proposed standard are based on the COSO framework.

VALUE OF IT GOVERNANCE

The huge amount of capital expenditures in IT systems emphasizes the importance of proper governance in

organizations. Once this is achieved, the full potential of IT is maximized. The single most important determinant of whether an organization will gain the full value of IT is through an effective IT governance structure (Robinson, 2005)

Melnicoff (2002) highlighted various benefits of investing in effective IT governance. First, it adds value to the business. Effective IT governance takes into account the rate changes of the industry where the business belongs. The governance could also add value by providing the company with a competitive advantage. Another advantage involves the concept of accountability. Lines of responsibility among different management positions would be clear since authorizations of IT decisions are defined. Moreover, Melnicoff (2002) provides that an effective, business-specific IT governance model is an essential tool for executives struggling with the challenge of leveraging the full potential of IT as a generator of sustainable business value. It allows top managers to readily evaluate their company ' s existing governance structure and to determine if the IT environment needs to be altered (Dy, Ha, Gan &Alba, 2009).

COBIT AND THE MATURITY MODEL

Companies need an objective measure to assess where they are and identify where improvement is required. Answers to this are provided by CobiT by means of benchmarking of IT process performance and capability, expressed as maturity models, derived from the Software Engineering Institute's Capability Maturity Model (CMM), goals and metrics of the IT processes to define and measure their outcome and performance based on the principles of Kaplan and Norton's balanced business scorecard, and activity goals for getting these processes under control, based on CobiT' s control objectives (ITGI, 2007).

The three dimensions of process maturity are capability, coverage, and control as illustrated in figure 3 (ITGI, 2007).

The three-dimension model is a way of measuring how well developed management processes are. How well developed or capable they should be primarily depends on the IT goals and the underlying business needs they support. How much of that capability is actually deployed largely depends on the return enterprise wants from the investment. On the other hand, the degree and sophistication of controls that need to be applied in a process are more driven by the enterprise' s risk appetite and applicable compliance requirements (ITGI, 2007).

CobiT provides maturity models to enable benchmarking and identification of necessary capability improvements. Maturity modeling 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 (SEI) 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 product engineering principles, organizations striving for excellence in these areas and formal appraisal of maturity levels so that software developers could be "certified" (ITGI, 2007). The maturity models primarily focus on how well a process is managed.

The CobiT 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 at the lower level. The maturity models primarily focus on how well a process is managed. 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 (ITGI, 2007).

The right maturity is influenced by the enterprise's business objectives, the operating environment and industry practices. Specifically, the level of management maturity depends on the enterprise's dependence on IT, its technology sophistication and the value of information (ITGI, 2007).

BENCHMARKING

Robert Camp (1989) developed a ??-step model moving sequentially through for phases. Kearns, along side, defined benchmarking as the continuous process of measuring products, services, and practices against toughest competitors or those companies recognized as industry leaders (Moriarty, 2008). Watson (1993) views benchmarking as a continuous process that searches for and applies significantly better practices for the purpose of achieving superior competitive performance (Moriarty, 2008). Yu, Rogación, Pérez and Lichengyao (2006) defined benchmarking as a comprehensive technique that can be used to identify operational and strategic gaps, and to look for best practices that eliminate such gap. Benchmarking has an "internal dimension" whereby the organization critically examines itself searching for best practices and an "external dimension" whereby the organization explores its industry and other relevant areas outside of its own industry in order to identify those best practices that may be applicable in its own operating environment (Yu, Rogación, Pérez & Lichengyao, 2006).

Moreover, Watson (1993) provided another perspective of benchmarking. This unconventional perspective approaches benchmarking as a process of organizational adaptation, not adoption - not simply a question of copying others, but learning how to improve by sharing ideas (Moriarty, 2008).

PREVIOUS STUDIES

The 2008 IT Governance Global Status Report, a research conducted by ITGI through PricewaterhouseCoopers (PwC), revealed that though the importance of IT continues to increase and organizations know who can help them implement IT governance, appreciation for the available expertise and delivery capability is only average. But on a positive note, 92% of IT users are aware of problems with the use of IT and the need to do something about them and 88% of the same IT user community recognizes the IT governance is the solution.

Moreover, separate studies on IT practices conducted by Yu, Rogación, Pérez and Lichengyao (2006) and Acosta, Samson, Tan and Tecson (2009) yielded maturity scores of 2.97 and 2.70 for listed expanded and non-expanded commercial banks and selected life insurance companies in the Philippines, respectively.

Yu, Rogación, Pérez and Lichengyao (2006) developed a 167-item that was taken from the four domain and 34 IT processes of the CobiT framework with the level of perceived importance as an added dimension to at least compensate, indirectly, for the level of centrality of IT to business operations and the level of IT to business strategy. The level of importance served as the weight to get a more accurate assessment of the IT practices. The survey instrument was a product of classroom conceptual inputs under the researcher' s tutelage and was validated with select group of IT Security and Audit Practitioners using the Delphi Method. The results of the study were further validated by practitioners in the banking industry and were presented to the Accountancy department of the De La Salle University (DLSU).

Nonetheless, the following trends were identified in the study of Yu, Rogación, Pérez and Lichengyao (2006): (1) overall fair ME domain was due to consistency of performance; (2) fair score of the DS domain was largely attributable to outliers; (3) high absolute score of the AI domain was somewhat attributable to outliers; (4) consistent low performance in the PO processes and low overall performance for the PO domain; (5) overall industry strength in core operations processes; (6) overall strategic weakness in strategic processes; (7) decentralization of managing IT resources and processes leads to lower overall IT governance maturity; and (8) poor performance in earlier domains in the IT governance life cycle leads to poor performance in related processes in subsequent domains.

EXCLUSION OF OUTLIERS

The study of Yu, Rogacion, Perez and Lichengyao (2006) considered the effect of outliers in the results. Outliers are points of data that lie outside of the range of reasonably expected values. Based on the concept of the Capability Maturity Model Integration (CMMI), in the area of IT governance maturity in the Philippine financial services industry, no firms have yet to achieve the Managed and Optimized levels. The latest appraisal

dated December 15, 2005 the organizations which were identified as having achieved the Managed level and which were identified as candidates for the Optimized level in the future, do not include the banks within the population of the study of Yu, Rogacion, Perez and Lichengyao (2006). The list also did not include the companies in the Philippine FBT industry.

RESEARCH PROBLEM AND SIGNIFICANCE

A shortcoming recognized in the previous studies conducted by Yu, Rogacion, Perez and Lichengyao (2006) and Acosta, Samson, Tan and Tecson (2009) was the non-conclusiveness of their findings with respect to the industries chosen.

By making use of 22 (of which 21 responded) out of 23 (one was excluded) publicly-listed companies in the FBT industry, this study provides a comprehensive assessment of the current level of IT processes performance and capability maturity.

Furthermore, this study provides answers to the following questions:

1. What are the industry's key strengths?
2. What are the industry's weaknesses and what are the reasons behind these?
3. How does the industry fare with respect to other industries?
4. What maturity level does the industry need to be at and how can it get there?

Moreover, one of the short-term plans of the Philippine government is to create a new executive office that caters specifically to the information and communication technology issues that face the country. This research study has the potential to provide a globally accepted direction in terms of assessing IT management maturity levels of the local government units and the national agencies.

ASSUMPTIONS AND SCOPE

This study is working under the assumption that the survey instrument adopted passed instrument validation and the assessments provided by the respondents generally represent the current states of how IT processes are managed in their respective companies and they are aware of the level of centrality of IT to business operations and the level of centrality of IT to business strategy. Variables not covered in the operational framework are excluded from the scope of this study. Likewise, quantitative techniques applied are not intended to be mathematically rigorous but are used primarily to aid in the qualitative analysis. Companies not publicly listed under the FBT industry are also excluded from the scope of this study.

FRAMEWORK OF ANALYSIS

This study is grounded on benchmarking theory by Robert Camp (1989) and the IT processes performance and capability maturity of the CobiT framework with the level of importance as an additional dimension to indirectly address the level of centrality of IT to business operations and the level of IT to business strategy. Benchmarking takes place in two phases; (1) it begins as the search for best practices, and (2) culminates with mapping of current practices to these established best practices. According to Camp (1989), the process of benchmarking is divided into 10 steps (table 1) which progress through four phases.

The steps applicable to this research study are steps one to six, encompassing planning, analysis, and integration phases of Camp's general methodology. Phase four, the Action phase, constitute the use as intended of the results of the study by the companies in the FBT industry.

The maturity level of an organization presents a means to foresee the future performance of an organization contained by a certain discipline or set of disciplines. Practice has revealed that organizations do their best when they concentrate their process-improvement efforts on a controllable number of process areas that entail more and more sophisticated effort as the organization improves. A maturity level is a definite evolutionary table of process improvement. Each maturity level evens out a significant fraction of the organization's processes. The maturity levels are determined by the accomplishment of the specific and general goals that relate to each pre-defined set of process areas. There are six maturity levels, each a layer in the base for constant process improvement (ITGI, 2007).

The first step in improving a process is to know the limits of the process to be improved. The process could be any process and it will be a mixture of people, tools, technologies, and methods used to finish a job. Once the operational entity is definite, a clear understanding of the operational entity's principle and objectives directs improvement efforts. A lot of times, the principle and objectives are maintained in strategic planning documents. A clear understanding of the principle and objectives will maintain improvement efforts next to strategic needs and will keep away from burning up significant resources on improvement efforts that don't contribute to those needs. Together with understanding the operational entity's objectives, it is essential to understand how to know if objectives are achieved. The objectives of an operational entity are defined first so that some level of confirmation can be performed to verify that improvement efforts help to achieve those objectives. If the operational entity requiring improvement is known and its point is clearly understood, limits and risks are more simply identified and attended to. The present state of the operational entity could be measured against its objectives to identify current and possible barricades to attaining those objectives. Improvement plans would then be made and applied to deal with these hindrances. Operational process improvement using this maturity type model is just an organized approach to naming and addressing these limits and risks and improving the operational entity to more successfully attain its objective (Camp, 1989).

IT processes performance and management capability is interpreted using six levels of maturity (figure 5) are 0 for non-existent, 1 for initial /ad hoc, 2 repeatable but intuitive, 3 defined process, 4 managed and measurable and 5 optimized. This is best viewed as a guide on how enterprises can evolve from a non-existent to an optimize process.

Table 2 briefly explains each maturity level according to CobiT's generic model of maturity (ITGI, 2007).

The advantage of a maturity model approach is that is relatively easy for management to place itself on the scale and appreciate what is involved if improved performance is needed. The scale includes 0 because it is quite possible that no process exists at all. The 0 to 5 scale is based on a simple maturity scale showing how a process evolves from a non-existent capability to an optimized capability (ITGI, 2007).

RESEARCH METHODOLOGY

Applying the first six steps of Camp's benchmarking model, the first step of the model is complete at this point. The second step is the identification of participating companies. After discussing the survey instrument in class, students in Computer Information Systems (CIS) were grouped and tasked to identify one publicly-listed company each group belonging to the FBT industry as a requirement for the course. The researcher took care of other companies not chosen by the groups.

Twenty-three publicly-listed companies composing the Philippine FBT industry were considered. Out of the 23, one company was automatically removed because its business office is not located in the National Capital Region or Metro Manila. All 22 companies were invited to participate.

Step three is the determination of data collection method and collection of data. The design of the survey instrument was based on the four domains and 34 processes of the CobiT framework with a level of importance scale on the left-hand side of every item. The latter served as the weight per process in computing the maturity score. The researcher, with the help of CIS students, gathered primary data through the administration of a 167-item survey instrument developed by Yu, Rogación, Pérez and Lichengyao (2006). One company refused to participate and two companies did not continue to answer the survey instrument due to absence of formal IT processes in place. Automatically, the latter two companies were given a maturity score of 0.

Step four is the determination of current maturity levels. Accomplished survey tools were tallied per domain and summarized for each company. Likewise, maturity scores of each company were summarized per domain and per overall total to determine the industry's current maturity score. Likewise, profiles of the respondents and the participating companies were also considered in this step.

Step five involves in-depth analysis to develop recommendations. This was accomplished by analyzing process-level and domain-level results and drawing implications to identify opportunities for industry-wide IT processes

management maturity level improvement. Similar to the study of Yu, Rogación, Pérez and Lichengyao (2006), the researcher also excluded outliers. Companies that were assessed (overall) with managed level score (4.0) or higher were considered outliers in accordance with the appraisal conducted by CMMI in 2005.

Data collected and tabulated were tested for normality using Stata .sktest before the obtained values and adjusted values were subjected to t-test to determine the significance of differences between them, both per domain and per overall maturity score, using PHStat. Since the quantitative equivalents of the six levels in CobiT's maturity model are all whole numbers, the overall maturity scores of both obtained value and adjusted value were compared to the whole number equivalent of the assessed level and likewise tested for significance of differences using PHStat. This was done to ensure that the maturity score as assessed is indeed the maturity level of the industry as per CobiT's maturity model.

The conclusion and recommendations at this point were reviewed to ascertain that overall results would be value-adding and that the recommendations are practicable before final results were sent to the participating companies. IT auditors' and practitioners' validation was sought to carry out this sixth step.

RESULTS, DISCUSSION AND CONCLUSION

The respondents were composed of senior technical managers, wide area network (WAN) and data administrators, management information systems managers, and corporate IT managers. Based on the 2008 audited financial reports obtained from the PSE website, the total assets of publicly-listed companies in the FBT industry range from P237 million to P339 billion. Of the industry's total assets of P579 billion, 98.34% was from the respondent-companies. Of the 21 respondent-companies, 18 were audited by a Big 4 firm.

The FBT industry registered a 2.52 maturity score but removing the outliers as employed in the study of Yu, Rogacion, Perez and Lichengyao (2006), the FBT industry would have an adjusted maturity score of 2.05. The sets of data used in computing for both means passed the normality test. To determine the significance of differences between the overall and per domain obtained and adjusted maturity scores, they were subjected to two-tail t-test using 0.01 level of significance.

At 0.01 level of significance, the null hypotheses could not be rejected. Thus, the overall and per domain obtained and adjusted means do not significantly differ from each other. Though the removal of outliers does not result to any significant difference in the maturity score, such would make identification of the maturity level easier as the adjusted maturity score is nearer to a maturity level that is denoted by a whole number.

To ensure further that the overall obtained and adjusted means do not significantly differ with respect to the maturity level assessed at 2.0, they were subjected to an upper-tail t-test using 0.01 level of significance and 0.05 level of significance.

At 0.01 level of significance, the null hypotheses could not be rejected. But at 0.05 level of significance, only the adjusted mean hypothesis could not be rejected. It is at this point that removal of the outliers has a significant effect in the determination of the maturity level. The adjusted maturity level of 2.05 is closer to level 2, denoted by the whole number 2.0, than the obtained maturity level of 2.52. It is, therefore, safer to say that the FBT industry is currently at level 2 using the adjusted mean.

As such, the adjusted figures, with lower standard deviation, would be used in the subsequent analysis and discussion of the results.

In the PO domain, the industry scored the highest (2.42) in managing IT human resources (PO7) and the lowest (1.52) in defining the information architecture (PO2). The PO7 score, though not that high, can be attributed to the local laws enforced that govern recruitment, training, promotion, and termination practices. The PO2 score can be attributed to the communication problems between business and IT.

In the AI domain, the industry scored the highest (2.60) in procuring IT resources (AI5) and the lowest (2.01) in maintaining technology infrastructure (AI3). The AI5 score can be attributed to procurements that management is fully aware of but the AI3 score is an indication that once these resources are procured, less emphasis is given to their maintenance thereby reducing efficiency of use overtime.

In the DS domain, the industry scored the highest (2.55) in managing problems (DSIO) and the lowest (1.58) in ensuring continuous service (DS4). The DSIO score tends to compensate the low AI3 score; poor maintenance means more problems to manage. Because of this, continuous service (DS4) is compromised since most of the resources are used up in troubleshooting.

In the ME domain, the industry scored the highest (2.12) in ensuring regulatory compliance (ME3) and the lowest (1.51) in monitoring and evaluating IT performance (MEI). The ME3 score, though not that high, can be attributed to the awareness of potential financial liability once regulations are not complied with. But this still indicates a lack of full understanding of all issues related to these requirements. Moreover, the low score in MEI can be attributed to the costs related to monitoring controls and the absence of a culture geared toward continuous improvement.

On a domain level, the FBT industry scored the highest (2.26) in Acquire and Implement and the lowest (1.83) in Monitor and Evaluate. The high score in AI domain can be attributed to the anticipated compound annual growth rate of 3% over the 2005-2010 period in the FBT industry. This increasing demand tends to compel companies to provide solutions that will meet business needs through IT initiatives. Slowly, these companies should view this as an opportunity to grow and maximize the use of their existing IT infrastructures. This result is consistent with the study of Yu, Rogación, Pérez and Lichengyao (2006) and that of Acosta, Samson, Tan and Tecson (2009). Banks and selected life insurance companies scored also the highest (3.17 and 2.86, respectively) in this domain.

The low score in the ME domain is not consistent with the maturity scores obtained by Yu, Rogación, Pérez and Lichengyao (2006). Banks scored 2.97 in this domain and 2.73 in the PO domain, its lowest. But this low score is consistent with that of Acosta, Samson, Tan and Tecson (2009). Selected life insurance companies scored 2.53 in this domain. Though both banking and FBT industries are regulated (tobacco, in particular), banking regulations tend to be more established, structured, and implemented. The Bangko Sentral ng Filipinas (BSP) which oversees and monitors strict compliance to these regulations plays a huge part in this. In addition, the BSP has a dedicated group that supervises and examines solely the IT component of the banking industry. This set-up, though may exist in the FBT industry, tends to be not strictly followed and observed.

Moreover, analyzing the results by identifying the number of IT processes that scored below the adjusted maturity score in each domain, the PO domain has three out of 10 (30%), the AI domain has three out of seven (43%), the DS domain has six out of 13 (46%), and the ME domain has two out of four (50%). In the PO domain, these are defining the information architecture, managing quality, and assessing and managing IT risks. In the AI domain, these are acquiring and maintaining architecture software and technology infrastructure, and installing and accrediting solutions and changes. In the DS domain, these are managing third party services, ensuring continuous service, identifying and allocating costs, educating and training users, managing the configuration, and managing operations. In the ME domain, these are monitoring and evaluating IT performance and providing IT governance. Among the generic IT processes, MEI has the lowest score of 1.51 and AI5 has the highest score of 2.60.

The overall maturity score of FBT industry is 2.05. This is an indication that IT processes performance and capability maturity level in the Philippine FBT industry is repeatable but intuitive. This maturity score is below the maturity scores of banks and selected life insurance companies as assessed by the first two previous researches. Banks and life insurance companies are under compliance reporting with specific laws that make them controls and risk sensitive. Likewise, the nature and the core of business of these two industries highly involve processing of information and reports that are mission-critical, sensitive, and crucial. It follows, therefore, that to be able to cope with these, they should maximize the use of IT. The FBT industry, on the other hand, has its core business processes in the manufacturing and the delivery of a tangible good. Though, at present, there have been trends of automating production lines, the industry is still in the transitional stage in spite of companies in this industry to have been in existence, in an average, for more than 15 years.

As companies in the FBT industry aim to a higher maturity level, they usually just stick to a repeatable but intuitive process first. This maturity level is only temporary as these companies may choose to improve on their internal setup. A reason why companies undergo this level is the absence of a concrete set of formal procedures on how processes are performed. IT procedures are usually established by middle- or low-level management. However, if new processes are set, then it would only follow that the proper procedures are yet to be established for these new processes. Having the proper IT processes is a matter of discovery for most companies. Then they will realize that these become the best practices. It then takes numerous revisions to the manuals before the most effective and efficient means of executing the process is discovered. With this, it takes a while for a company to reach the level where a defined IT processes are already documented, in place, and practiced.

RECOMMENDATIONS

But companies in the FBT industry may fast track reaching the next immediate level. To move to the next level, companies need to; (1) continually refine a common language for goal setting, stating these in business terms so that IT process improvement measures now well understood by senior management and enterprise stakeholders; (2) make annual planning a crossorganizational team effort where the common goal is maximizing IT value delivery and managing IT-related risks. This includes regular steering group evaluation and assessment of IT capabilities and projects that have been completed and that have, whether or not, delivered real improvements to its performance; and (3) develop meaningful service level agreements for both internal services to users and external service providers.

Further, in the longer run, there is also a need to: (1) achieve full transparency of IT activities, senior management has complete confidence in the strategic role of IT and in how decisions are made; (2) fully optimize the direction of IT activities toward real business priorities, and the value being delivered to the enterprise can be measured and steps taken on a timely basis to correct significant deviations or problems; (3) have a standardized performance measurement process, such as balanced scorecard, is fully understood and embraced by the organization; (4) have the practice of continuous improvement of IT capability embedded in the culture and this includes regular external benchmarking and independent audits providing positive assurance to management and that the cost of IT is monitored effectively and the organization is able to achieve optimal IT spending through continuous internal improvements; and (5) have an effective outsourcing of selected services and effective negotiation with vendors such that when dealing with external business partners or service providers, the organization is able to demonstrate first-class performance and demand best practices from others.

Companies should also realize that the industry's core business is related to manufacturing goods. It is recommended, therefore, to continue improving and investing in systems related to manufacturing processes and streamlining production line since this is the industry's key strength. However, with regard to its back office operations, it is recommended to look at the possible option of outsourcing them as they are not the core business of the industry. In this case, companies will be more focused on allocating its budget and resources to producing goods more efficiently and in high quality through sophisticated automated manufacturing processes. In addition, regulatory agencies should revisit and review existing policies and regulations that govern the FBT industry and devise means on how to increase compliance and adherence to those in a doable and practicable fashion.

Finally, it is recommended that more research be conducted in this discipline - and more on to the empirical type of research - that will serve as a jump-off point to enrich further existing literature in applied IT governance. Variables of key interest for future researches range from selecting a comparable industry type to relating maturity levels to different quantitative and qualitative factors.

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Author Affiliation

Florenz C. Tugas, De La Salle University

Assunto: Studies; Information technology; Food processing industry; Tobacco industry; Benchmarks;

Localização: Philippines

Classificação: 9130: Experiment/theoretical treatment, 9179: Asia&the Pacific, 5220: Information technology management, 8610: Food processing industry

Título: ASSESSING THE LEVEL OF INFORMATION TECHNOLOGY (IT) PROCESSES PERFORMANCE AND CAPABILITY MATURITY IN THE PHILIPPINE FOOD, BEVERAGE, AND TOBACCO (FBT) INDUSTRY USING THE COBIT FRAMEWORK

Autor: Tugas, Florenz C

Título da publicação: Academy of Information and Management Sciences Journal

Volume: 13

Edição: 1

Páginas: 45-68

Número de páginas: 24

Ano de publicação: 2010

Data de publicação: 2010

Ano: 2010

Editora: The DreamCatchers Group, LLC

Local de publicação: Cullowhee

País de publicação: United States

Assunto do periódico: Computers--Computer Systems

ISSN: 15247252

Tipo de fonte: Scholarly Journals

Idioma de publicação: English

Tipo de documento: Feature

Artigo principal do documento: Graphs;Diagrams;Tables;References

ID do documento ProQuest: 763256493

URL do documento: <http://search.proquest.com/docview/763256493?accountid=14643>

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Última atualização em: 2010-11-11

Base de dados: ABI/INFORM Complete

Documento 8 de 28

Critical Factors Affecting the Evaluation of Information Control Systems with the COBIT Framework

Autor: Lin, Fengyi; Guan, Liming; Fang, Wenchang.

Informações da publicação:: Emerging Markets, Finance & Trade 46. 1 (Jan/Feb 2010): 42.

[Link para o documento do ProQuest](#)

Resumo: This paper empirically investigates the factors affecting auditors in evaluating information technology (IT) control structures by employing the COBIT framework, a popular IT internal control with integrated platform, and examines the relationship between monitoring function and other COBIT dimensions. The results of our empirical analysis indicate that key factors of IT governance endorsed by certified public accountants (CPAs) in

Taiwan match fairly well with those prescribed in the COBIT framework. CPAs can utilize COBIT as a guideline for developing their approach to internal control structure and further limiting their audit liabilities.

[PUBLICATION ABSTRACT]

Assunto: Information technology; Internal controls; Auditors; Correlation analysis; Discriminant analysis; Studies;

Localização: Taiwan

Classificação: 5220: Information technology management, 4130: Auditing, 9179: Asia&the Pacific, 9130: Experiment/theoretical treatment

Título: Critical Factors Affecting the Evaluation of Information Control Systems with the COBIT Framework

Autor: Lin, Fengyi; Guan, Liming; Fang, Wenchang

Título da publicação: Emerging Markets, Finance&Trade

Volume: 46

Edição: 1

Primeira página: 42

Ano de publicação: 2010

Data de publicação: Jan/Feb 2010

Ano: 2010

Editora: M. E. Sharpe Inc.

Local de publicação: Armonk

País de publicação: United States

Assunto do periódico: Business And Economics--International Commerce

ISSN: 1540496X

Tipo de fonte: Scholarly Journals

Idioma de publicação: English

Tipo de documento: Feature

ID do documento ProQuest: 219629162

URL do documento: <http://search.proquest.com/docview/219629162?accountid=14643>

Copyright: Copyright M. E. Sharpe Inc. Jan/Feb 2010

Última atualização em: 2011-10-25

Base de dados: ABI/INFORM Complete

ASSESSING THE LEVEL OF INFORMATION TECHNOLOGY (IT) PROCESSES PERFORMANCE AND CAPABILITY MATURITY IN THE PHILIPPINE FOOD, BEVERAGE, AND TOBACCO (FBT) INDUSTRY USING THE COBIT FRAMEWORK

Autor: Tugas, Florenz C.

Informações da publicação:: Allied Academies International Conference. Academy of Information and Management Sciences. Proceedings 13. 2 (2009): 68-73.

[Link para o documento do ProQuest](#)

Resumo: A grounded literature on how information technology (IT) processes are being managed is imperative in an industry with an increasing reliance on IT for its strategic and operational undertakings. This study seeks to provide a comprehensive assessment of the level of IT processes performance and capability maturity in the Philippine food, beverage, and tobacco (FBT) industry by applying the theory of benchmarking and the CobiT framework on IT governance. After administering the 167-item survey instrument to 22 publicly-listed companies in the FBT industry, represented by respondents composed largely of IT managers and administrators and subjecting the results to statistical tests and IT experts' validation, it was found out that the FBT industry currently has a maturity score of 2.05. At this maturity level, IT processes have developed to the stage where similar procedures are followed by different people undertaking the same task but there is no formal training of communication of standard procedures. To be able to evolve to the next immediate level where IT processes are standardized, documented, and communicated through training, companies in the FBT industry should bank on their key strength in the Acquire and Implement (AI) domain and improve on their weakness in the Monitor and Evaluate (ME) domain. [PUBLICATION ABSTRACT]

Texto completo: Headnote

ABSTRACT

A grounded literature on how information technology (IT) processes are being managed is imperative in an industry with an increasing reliance on IT for its strategic and operational undertakings. This study seeks to provide a comprehensive assessment of the level of IT processes performance and capability maturity in the Philippine food, beverage, and tobacco (FBT) industry by applying the theory of benchmarking and the CobiT framework on IT governance. After administering the 167-item survey instrument to 22 publicly-listed companies in the FBT industry, represented by respondents composed largely of IT managers and administrators and subjecting the results to statistical tests and IT experts' validation, it was found out that the FBT industry currently has a maturity score of 2.05. At this maturity level, IT processes have developed to the stage where similar procedures are followed by different people undertaking the same task but there is no formal training of communication of standard procedures. To be able to evolve to the next immediate level where IT processes are standardized, documented, and communicated through training, companies in the FBT industry should bank on their key strength in the Acquire and Implement (AI) domain and improve on their weakness in the Monitor and Evaluate (ME) domain.

INTRODUCTION

The advent of information technology has significantly influenced and changed how businesses are being managed and monitored today (Hunton, Bryant & Bagranoff, 2004). To ensure smooth management of the new business set-up, the concept of corporate governance was redesigned to include information technology as a major part of it. New governance and internal control frameworks came up just for this concern to be addressed. This resulted to an increased awareness that IT governance is a major ingrethent in achieving every

organization's goal of value creation. In spite of the availability of new governance and internal control frameworks, many organizations still compromised their going concern because of poor enterprise-wide governance. The collapse of Enron in 2002 and the recent 2009 Satyam scandal in India are among the proofs of this predicament. Because of this, the awareness for both corporate and IT governance must be heightened and taken more seriously.

THE STATE OF THE FBT INDUSTRY

Over the last few years, the global food, beverage and tobacco (FBT) industry group has exhibited modest growth, with growth particularly low in the tobacco and beverage markets. The industry group generated total revenues of \$4,140.3 billion in 2005, this representing a compound annual growth rate (CAGR) of 2.9% for the five-year period spanning 2001-2005 (Datamonitor, 2006).

But looking forward, the global FBT industry group is expected to accelerate from its current value growth position. With an anticipated CAGR of 3% over the 2005-2010 period, the industry is expected to reach a value of \$4,805.5 billion by the end of 2010. The drivers operating during the last five years are set to persist for the next five (Datamonitor, 2006).

In the Philippines, the FBT industry belongs to the industrial sector. There are 23 publicly listed companies under the FBT industry. It is a highly regulated industry particularly the tobacco companies. A study by RNCOS in New Delhi on September 13, 2008 on the Philippine FBT Market Forecast until 2011 showed the patterns in consumption behavior in the different food segments. The study indicated five key results about the sub-industry: (1) because of the strong increase in consumer expenditure during 2001 to 2006, a rise of 7.5% is also expected from 2007 to 2011; (2) the increase in the working hours of employees, increase in number of employees and diverse eating habits has led to a high consumption of ready-to-eat meals; (3) the demand for organic food will increase at a growth rate of 10% to 20% because of the growing middle class population; (4) an increase in disposable incomes and demand for imported alcoholic beverages; and (5) there is an inadequate water supply and healthy drinking concerns that have resulted in the growth in the bottled water industry (Dy, Ha, Gan & Alba, 2009).

IT GOVERNANCE: A FOCUS ON COBIT

According to Simonsson & Johnson (2006), the existing literature on IT governance has inherited much from the discipline of corporate or enterprise governance but it has been able to develop itself into a discipline of its own (Dy, Ha, Gan & Alba, 2009). Though at present, there is still lack of consensus on how IT governance is viewed; CobiT is the most renowned framework for support of IT governance concerns. It is based on best practice, focusing on the processes of the IT organization and how its performance can be assessed and monitored. This framework has been developed and is maintained by an independent, not-for-profit research institute, drawing on the expertise of its affiliated association's members, industry experts, and control and security professionals (IT Governance Institute (ITGI), 2007).

CobiT defines IT activities in a generic process model with four domains and 34 generic control processes. These domains are Plan and Organize (PO), Acquire and Implement (AI), Deliver and Support (DS), and Monitor and Evaluate (ME). The domains map to IT's traditional responsibility areas of plan, build, run, and monitor (ITGI, 2007). PO domain covers strategy and tactics, and concerns the identification of the way IT can best contribute to the achievement of the business objectives. AI domain addresses the aptness and likelihood of providing solutions that will meet business needs. DS domain is concerned with the actual or physical delivery of required services, which includes service delivery, management of security, and continuity, service support for users, management of data and operational facilities. ME domain addresses performance management, monitoring of internal control, regulatory compliance and governance. Across these four domains, CobiT has identified 34 IT processes where links are made to the business and IT goals that supported (ITGI, 2007). The four domains and 34 IT processes largely represent a comprehensive dimension of an organization's IT processes performance and capability that needs to be managed.

BENCHMARKING

Robert Camp (1989) developed a 10-step model moving sequentially through for phases. Kearns, along side, defined benchmarking as the continuous process of measuring products, services, and practices against toughest competitors or those companies recognized as industry leaders (Moriarty, 2008). Watson (1993) views benchmarking as a continuous process that searches for and applies significantly better practices for the purpose of achieving superior competitive performance (Moriarty, 2008). Yu, Rogación, Perez & Lichengyao (2006) defined benchmarking as a comprehensive technique that can be used to identify operational and strategic gaps, and to look for best practices that eliminate such gap. Benchmarking has an "internal dimension" whereby the organization critically examines itself searching for best practices and an "external dimension" whereby the organization explores its industry and other relevant areas outside of its own industry in order to identify those best practices that may be applicable in its own operating environment (Yu, Rogación, Perez & Lichengyao, 2006).

PREVIOUS STUDIES

Separate studies on IT practices conducted by Yu, Rogación, Perez & Lichengyao (2006) and Acosta, Samson, Tan & Tecson (2009) yielded maturity scores of 2.97 and 2.70 for listed expanded and non-expanded commercial banks and selected life insurance companies in the Philippines, respectively.

RESEARCH PROBLEM AND RESEARCH DESIGN

A shortcoming recognized in the previous studies conducted by Yu, Rogación, Perez & Lichengyao (2006) and Acosta, Samson, Tan & Tecson (2009) was the non-conclusiveness of their findings with respect to the industries chosen. By making use of 22 (of which 21 responded) out of 23 (one was excluded) publicly-listed companies in the FBT industry, this study provides a comprehensive assessment of the level of IT processes performance and capability maturity.

Applying the first six steps of Camp's benchmarking model, a validated 167-item survey instrument was administered to determine the maturity scores. They were tabulated and were subjected to statistical tests and IT experts' validation. Lastly, conclusions and recommendations were drawn.

RESULTS, DISCUSSION AND CONCLUSION

The respondents were composed of senior technical managers, wide area network (WAN) and data administrators, management information systems managers, and corporate IT managers. The total assets of publicly-listed companies in the FBT industry range from P237 million to P339 billion. Of the industry's total assets of P579 billion, 98.34% was from the respondent-companies. Of the 21 respondent-companies, 18 were audited by a Big 4 firm.

The FBT industry registered a 2.52 maturity score but taking into consideration the concept of outlier as used in the study of Yu, Rogación, Perez & Lichengyao (2006), the FBT industry would have an adjusted maturity score of 2.05. The adjusted figures, with lower standard deviation, would be used in the analysis and discussion of the results.

In the PO domain, the industry scored the highest (2.42) in managing IT human resources (P07) and the lowest (1.52) in defining the information architecture (P02). The P07 score, though not that high, can be attributed to the local laws enforced that govern recruitment, training, promotion, and termination practices. The P02 score can be attributed to the communication problems between business and IT. In the AI domain, the industry scored the highest (2.60) in procuring IT resources (AI5) and the lowest (2.01) in maintaining technology infrastructure (AI3). The AI5 score can be attributed to procurements that management is fully aware of but the AI3 score is an indication that once these resources are procured, less emphasis is given to their maintenance thereby reducing efficiency of use over time. In the DS domain, the industry scored the highest (2.55) in managing problems (DSIO) and the lowest (1.58) in ensuring continuous service (DS4). The DSIO score tends to compensate the low AI3 score; poor maintenance means more problems to manage. Because of this, continuous service (DS4) is compromised since most of the resources are used up in troubleshooting. In the ME

domain, the industry scored the highest (2.12) in ensuring regulatory compliance (ME3) and the lowest (1.51) in monitoring and evaluating IT performance (MEI). The ME3 score, though not that high, can be attributed to the awareness of potential financial liability once regulations are not complied with. But this still indicates a lack of full understanding of all issues related to these requirements. Moreover, the low score in MEI can be attributed to the costs related to monitoring controls and the absence of a culture geared toward continuous improvement.

The overall maturity score of 2.05 is an indication that IT processes performance and capability maturity level in the Philippine FBT industry is repeatable but intuitive. Though companies in this industry have been existing, in an average, for more than 15 years, they still are in the transitional stage to a completely standardized IT processes. As they aim to a higher maturity level, they usually just stick to a repeatable but intuitive IT processes. This maturity level is only temporary as these companies may choose to improve on their internal setup. One reason that companies undergo this stage is the absence of a concrete set of formal procedures on how processes are performed. Procedures are usually established by middle- or low-level management. However, if new processes are set, then it would only follow that the proper procedures are yet to be established for these new processes. Having the proper procedures is a matter of discovery for most companies. Then they will realize that these are the best practices. It takes numerous revisions to the manuals before the most effective and efficient means of executing the process is discovered. With this, it takes a while for a company to reach the level where a defined IT processes are already documented and in place and are practiced.

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Acosta, M., Samson, K., Tan, C., & Tecson, K. (2009). CobiT and Shareholder Value: A Study on Selected Life Insurance Companies in the Philippines. Unpublished undergraduate thesis, De La Salle University.

Author Affiliation

Florenz C. Tugas, De La Salle University

Assunto: Studies; Information technology; Performance evaluation; Benchmarks; Food processing industry; Tobacco industry;

Localização: Philippines

Classificação: 9130: Experiment/theoretical treatment, 5220: Information technology management, 9179: Asia&the Pacific, 8610: Food processing industry

Título: ASSESSING THE LEVEL OF INFORMATION TECHNOLOGY (IT) PROCESSES PERFORMANCE AND CAPABILITY MATURITY IN THE PHILIPPINE FOOD, BEVERAGE, AND TOBACCO (FBT) INDUSTRY USING THE COBIT FRAMEWORK

Autor: Tugas, Florenz C

Título da publicação: Allied Academies International Conference. Academy of Information and Management Sciences. Proceedings

Volume: 13

Edição: 2

Páginas: 68-73

Número de páginas: 6

Ano de publicação: 2009

Data de publicação: 2009

Ano: 2009

Editora: The DreamCatchers Group, LLC

Local de publicação: Cullowhee

País de publicação: United States

Assunto do periódico: Computers--Information Science And Information Theory

Tipo de fonte: Scholarly Journals

Idioma de publicação: English

Tipo de documento: Feature

Artigo principal do documento: Tables;Graphs;References

ID do documento ProQuest: 192409222

URL do documento: <http://search.proquest.com/docview/192409222?accountid=14643>

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Última atualização em: 2011-06-14

Base de dados: ABI/INFORM Complete

Documento 10 de 28

Exploring COBIT Processes for ITG in Saudi Organizations: An empirical Study

Autor: Abu-Musa, Ahmad A.

[Link para o documento do ProQuest](#)

Resumo: Control Objectives for Information and Related Technology (COBIT) has become one of the most important guidelines for information technology governance (ITG), which provides organizations with a useful tool to start evaluating their own ITG systems. COBIT introduces an ITG framework and supporting toolset that allows IT managers to bridge the gap between control requirements, technical issues and business risks. The objective of this study is to investigate the formality, auditing, responsibility and accountability of implementing COBIT processes for ITG in Saudi organizations. An empirical survey, using a self-administered questionnaire, was conducted to achieve these objectives. Five hundred questionnaires were distributed to a sample of Saudi organizations in a selected number of Saudi cities. One hundred and twenty seven valid questionnaires - representing a 25.4 percent response rate -were collected and analyzed using the Statistical Package for Social Sciences (SPSS) version 16. While the results of the study reveal that the majority of respondents reported that implementing ITG COBIT processes and domains is the responsibility of IT departments in Saudi organizations, most of the respondents reported that the COBIT processes and domains are neither audited nor formally conducted in their organizations. From a practical standpoint, managers and practitioners alike stand to gain from the findings of this study. The study provides useful information for senior management, IT managers, accountants, auditors, and academics to understand the implementation phase and the impact of COBIT on ITG in Saudi organizations. [PUBLICATION ABSTRACT]

Texto completo: Headnote

Abstract. Control Objectives for Information and Related Technology (COBIT) has become one of the most important guidelines for information technology governance (ITG), which provides organizations with a useful tool to start evaluating their own ITG systems. COBIT introduces an ITG framework and supporting toolset that allows IT managers to bridge the gap between control requirements, technical issues and business risks. The objective of this study is to investigate the formality, auditing, responsibility and accountability of implementing COBIT processes for ITG in Saudi organizations. An empirical survey, using a self-administered questionnaire, was conducted to achieve these objectives. Five hundred questionnaires were distributed to a sample of Saudi organizations in a selected number of Saudi cities. One hundred and twenty seven valid questionnaires - representing a 25.4 percent response rate -were collected and analyzed using the Statistical Package for Social Sciences (SPSS) version 16. While the results of the study reveal that the majority of respondents reported that implementing ITG COBIT processes and domains is the responsibility of IT departments in Saudi organizations, most of the respondents reported that the COBIT processes and domains are neither audited nor formally conducted in their organizations. From a practical standpoint, managers and practitioners alike stand to gain from the findings of this study. The study provides useful information for senior management, IT managers, accountants, auditors, and academics to understand the implementation phase and the impact of COBIT on ITG in Saudi organizations.

Key words: COBIT, information technology, IT Governance, Saudi Arabia, empirical study.

1. INTRODUCTION

Information technology (IT) has become widely integrated into most organizations. Therefore, implementing effective information technology governance (ITG) has become a necessity as many organizations have developed critical dependencies on IT for their successes (Posthumusa and Solms, 2005; Bodnar, 2006). Effective ITG helps ensure that IT supports business goals, optimizes business investment in IT, and appropriately manages IT-related risks and opportunities.

Control Objectives for Information and Related Technology (COBIT) has become one of the most important

guidelines for ITG, which provides organizations with a useful tool to start evaluating their own ITG systems. COBIT introduces an ITG framework and supporting toolset that allows IT managers to bridge the gap between control requirements, technical issues and business risks (Lainhart IV, 2000; Bodnar, 2003; Hardy, 2006; and Williams, 2006). COBIT was created by the Information Systems Audit and Control Association (ISACA), and the IT Governance Institute (ITGI) in 1992. The first edition of COBIT was published in 1996; the second edition in 1998; the third edition in 2000, and the on-line edition became available in 2003. The fourth edition of COBIT was issued in December 2005.

COBIT has 34 objectives which have been categorized under four domains: planning and organization, acquisition and implementation, delivery and support, and monitoring (Lainhart, 2001; Hadden, 2002; Bodnar, 2003 and 2006; Brown and Nasuti, 2005b; Violino, 2005, and Hardy, 2006). COBIT's framework also identifies which of the seven information criteria (effectiveness, efficiency, confidentiality, integrity, availability, compliance and reliability), as well as which IT resources (people, applications, technology, facilities and data) are important for the IT processes to fully support the business objective (Bodnar, 2003). COBIT is now being increasingly used as a generally accepted framework ITG by IT auditors who map to Sarbanes-Oxley (SOX) requirements. The standard is becoming vital as companies strive to comply with regulations and the requirement the SOX Act. COBIT was actually released as an IT process and control framework, linking IT to business requirements (Chan, 2004; Ramos, 2004; Brown and Nasuti, 2005b, Violino, 2006).

It is argued that the most important guidelines for ITG are COBIT, issued by the IT Governance Institute, and the Information Systems Auditing Guideline titled "IT Governance," issued by the Information Systems Audit and Control Association (Bodnar, 2003). Williams (2006) also stated that except for COBIT, there is no non-proprietary framework that comprehensively covers the total spectrum of structures and processes relevant to ITG. However, COBIT itself is often in danger of being regarded as the "allpurpose miracle cleaner" of ITG frameworks in the way it has been promoted as ITG, process and management control and IT audit tool." According to Lainhart, (2000) COBIT is now achieving worldwide recognition as the authoritative source on ITG, IT Control Objectives, and IT Audit. It is being used globally in a variety of ways by private industry, public accounting firms, governments, and academia. It is being used by boards of directors, audit committees, chief executive officers (CEOs), heads of governmental organizations, chief information officers (CIOs), security managers, and information systems auditors.

The objective of this study is to explore the current status of the implementation of COBIT framework for ITG in Saudi organizations. It investigates and assesses the formality, auditing, and responsibility and accountability of COBIT processes for ITG in Saudi Organizations. The current study intends to develop a roadmap for Saudi organizations which looks forward to compliance with COBIT and adoption of ITG principles. The study provides useful information for senior management, IT management, accountants, auditors, and academics to understand the implementation phase and impact of COBIT on the ITG in Saudi organizations.

This study is organized in six sections as follows: the first section introduces the statement of the research problem, states the research questions, and highlights the research objectives, and the second section introduces and analyzes the literature review related to the COBIT and ITG, while section three states the research questions. Section four describes the research methodology used in the current study. In section five, the main results of the empirical survey are analyzed and discussed. Finally, the last section introduces the conclusion and recommendations for further research.

2. LITERATURE REVIEW

Reviewing the literature on the evaluation of ITG reveals a paucity of available studies in this area of research. According to Williams (2006) few studies have been carried out in this particular research area. These studies, however, have concentrated on the difficulties that many organizations experience in developing, implementing, maintaining and monitoring effective ITG structures and processes.

It is argued that there are few published papers in academic literature which investigate the utilization of COBIT

(Ridley et al., 2004; Brown and Nasuti, 2005b). It is also argued that COBIT and its related sources are highly investigated by many academic authors. A handful of studies that benchmark the adoption and use of COBIT have been published by peer reviewed sources (Guldentops et al., 2002; Fedorowicz, and Ulric, 1998; Tongren and Warigon, 1997). On the other hand, Brown and Nasuti (2005b) stated that the ITG Institute does provide the investigator an excellent source of case studies on COBIT outcomes. Case studies from the IT Governance Institute, as well as personal contacts in companies that are currently following COBIT, are two primary sources available to assist in the evaluation of the implementation of COBIT in an IT organization. Council (2006) also argued that despite the myriad of literature on COBIT, there existed very little rigorous research. Council (2006) addressed the shortage of COBIT research area and introduced the unexplored challenges of medium sized institutions of higher learning. He also provided guidance to practitioners for implementing ITG programs to medium sized institutions of higher education

Hardy (2006) argued that organizations need a strong governance model in place to approve, prioritize and manage IT investments on an ongoing basis. This is necessary to align IT investments with the business requirements needed to deliver IT value to an organization. The process of ITG must involve the business units at the highest level in a partnership with IT to ensure that effective strategic alignment is achieved. However, COBIT provided a useful instrument to help organizations get started evaluating their own ITG systems. The ITG self-assessment checklist helps auditors to determine each of the COBIT processes. COBIT also provides a sound approach for implementing ITG - related initiatives in a well-controlled environment. It identifies a set of 34 high-level control objectives were grouped into four domains: plan and organize, acquire and implement, deliver and support, and monitor and evaluate (Hardy, 2006).

In his paper, Lainhart (2001) introduced many successful case studies belonging to different organization types that have customized COBIT for their unique needs and managed their ITG. These organizations include: Sears, Roebuck & Co., Fidelity Investments, The Office of the State Auditor of Massachusetts, the United States Federal Financial Institutions Examination Council, Daimler-Chrysler, the United States Federal Information Systems Control Audit Manual, and the United States Critical Infrastructure Assessment Office.

Sohal and Fitzpatrick (2002) investigated the ITG and management of information in Australian organizations using a questionnaire survey that was mailed to the most senior IT officer within the organization. The respondents were categorized into three groups based on the intensity with which the company uses information, namely high tier, medium tier and low tier industries. The findings revealed some interesting differences among the three groups regarding the measurement and accountability of IT delivery. The majority of senior IT executives surveyed believed it was imperative that their organizations addressed aligning their IT with their business strategy in the near future. The results also show that most ITG activities occur at a corporate level, and IT decision/governance responsibilities are centralized. The centralization of IT decision making activities was represented by the use of steering committees comprising senior level management or director level management who are primarily responsible for setting IT policies and strategy. Whilst the outsourcing levels amongst high tier industries in Australia were comparable to the international level, there may still be some scope for increased outsourcing.

Hadden (2002) examined the role of audit committees in monitoring IT risk using a self-administered survey, mailed to 1,000 audit committee members in US companies. The instrument was developed from the 34 high-level control objectives identified in the COBIT model. Each of the 34 high-level control objectives was grouped into one of the following four business processes: planning and organization, acquisition and implementation, delivery and support, and monitoring. The results of the study indicated that audit committee IT expertise, company size, and financial service industry classification were positively associated with perceived audit committee oversight of IT risks. The results also revealed that audit committee oversight assessments were partially affected by prior COBIT experience.

Bodnar (2003) introduced an overview of the concept of ITG as it is documented in the internal audit literature.

Bodnar's article also examined the extent to which the concept of ITG is embraced by other parties who are active in this area.

In recent years, control and governance of internal services such as IT have become quite critical in organizations due to the enormous size of their expenditure. As a result, managers have faced growing pressure to measure the performance of IT departments. Several concepts have been developed during the last few years such as ITG, IT scorecards, and benchmarking that have been considered by IT and business executives. But surprisingly, a recent study by the IT Governance Institute (ITGI) that covered 335 CEOs and CIOs in 21 countries, reported that while more than 91 percent of executives recognize that IT is vital to the success of their businesses, more than two-thirds of CEOs were not comfortable answering questions about governance and control over their IT processes. The study validates that the major problem continues to be "the inadequate view of how well IT is performing" (Son et al. 2005).

In 2005, a survey was carried out by Price Waterhouse Coopers on behalf of the ITGI. The results of the survey revealed that 75 percent of organizations currently using COBIT found it either very useful or somewhat useful, while 15 percent of the respondents were undecided and less than 10 percent had a negative response. The main negative issue identified by the respondents was the perceived complexity of the framework (Williams, 2006).

Posthumusa and Solms (2005) discussed the need for more participation of board level in the way an organization is directed and controlled, with specific interest in IT related issues. Their paper motivates the institution of an IT oversight committee to help advising the board of directors in enhancing the ITG and other strategic IT-related issues.

In 2006, the IT Process Institute conducted a study to investigate the affect of IT controls on operations, security, and audit measures. The study was designed to explore the importance of the IT controls to improve performance by studying the top-performing IT organizations. The study aimed to identify the specific IT controls that have the greatest impact on performance improvements for organizations. The study surveyed respondents from 98 IT organizations in many industries. The survey asked a broad range of questions designed to support analysis of COBIT control activities and key operations, security, and audit performance measures. The results of the study provided empirical evidence that performance is improved when IT organizations focus ongoing audit- and control-related resources on those foundational control activities that have been proven to improve performance measures. The results of the survey revealed that the increased use of IT controls correlates with higher performance across a broad range of operations, security, and audit performance measures. The presence of a correlation between control activities and performance measures indicates that the best practices outlined in the COBIT framework improve performance measures.

In their study, Luthy and Forcht (2006) compared COBIT and COSO for the purpose of compliance with rules and regulations. The results of the comparison revealed that both COSO and COBIT take an organization-wide view. However, COBIT only considers an organization-wide view to the extent of ensuring that ITG is aligned with overall business objectives and organization governance. COBIT also provides very detailed IT control suggestions within its presentation of detailed control objectives. The study also concluded that COSO on its own may not provide sufficient guidance for organizations and auditors as they consider compliance with laws and regulations. The study also suggested that it may be useful, if not necessary, to use more than one framework for assessing compliance with rules and regulations.

Council (2006) investigated the difficulty of implementing COBIT's Systems Security using the case study of South Louisiana Community College (SLCC). The study examined the managerial aspects of introducing COBIT's fifth Delivery and Support process (DS5) successes, and the needs of a medium sized institution of higher education. The DS5 process pertains to ensuring network security. Council (2006) used COBIT's critical success factors, key goal indicators, key performance indicators, maturity models, audit guidelines, and diagnostic tools. The study used the general analytical approach to answer the research questions and to

develop the descriptive framework for the casestudy. The study revealed that COBIT DS5 matched the environment at SLCC with a few exceptions and modifications. The study also provided a useful guidance to practitioners for implementing ITG programs in medium sized institutions of higher education.

Hardy (2006) studied the case of Unisys as one of the leading international IT service companies in the USA. Hardy studied the importance of having a standardized IT strategy to support Unisys' global operations, align the IT infrastructure with the company's overall business strategy and help comply with SOX. Unisys evaluated its options and adopted COBIT to provide an effective IT control and ITG framework. As a result of implementing COBIT, business processes within IT were improved and SOXrelated controls were established. Unisys has also utilized COBIT as a guideline for developing its approach for outsourcing work to third parties by identifying processes and tasks within the domains of COBIT that can be outsourced. The results of the study revealed that Unisys' business process within IT had improved as a result of using COBIT for ongoing SOX compliance and other ITG -related projects.

Abu-Musa (2007) performed an empirical study to explore the performance of ITG in Saudi organizations using the balanced scorecard model introduced by the ITG Institute (ITGI, 2005). The results of the study revealed that the vast majority of respondents reported the importance of ITG performance measures. A majority of them reported it had been measured, but a smaller number believe that such measures have actually been used in evaluating the ITG performance in their organizations. The results of this study suggest that Saudi organizations should achieve better governance of their IT in order to ensure that an organization's IT strategy is aligned with and supports the overall organization's strategy - that IT supports the organization's ability to exploit opportunities and maximize benefits. The results also suggest that Saudi organizations should use their IT resources more responsibly and manage their IT-related risks appropriately in order to champion the IT development for the success of their businesses.

Tuttle and Vandervelde (2007) empirically examined internal consistency of the conceptual model that underlies the COBIT internal control framework as it applies to an audit setting (including operational, compliance, and financial audit settings). The study investigated the auditor perceptions of audit risk related to complexity, client importance, client attention, and process risk combined to represent IT process risk in the manner asserted by COBIT. The results of the study revealed that that superimposing COBIT's conceptual model onto audit relevant assessments made by a panel of highly experienced IT auditors confirmed the internal consistency between the underlying constructs of COBIT. The results also revealed that COBIT's conceptual model predicts auditor behavior in the field related to their seeking help and giving help as evidenced by their postings to a general IT audit. From a practical standpoint, the results of the study of Tuttle and Vandervelde (2007) suggested that it is very important and potentially very useful for the audit profession to seek academic examination of its practices. The findings suggest that the COBIT framework is significantly related to overall risk assessments of the COBIT processes for which they are associated. The results should give auditors and policy-makers assurance that COBIT is an appropriate supplement to COSO in an IT setting.

Neirotti and Paolucci, (2007), analyzed the strategic value of IT in the insurance industry in the US and Europe through case studies and an analysis of 30 Italian firms. The results of the study revealed that technological and business path dependencies, along with time compression diseconomies, resulted in diversities in IT adoption dynamics due to their differences in ITG and management practice. The results also suggested that most of the firms in the Italian insurance sector increased their productivity through IT regardless of their IT management capabilities. It also showed that competitive advantages were not correlated with both IT spending levels and the type of IT investments that made general productivity growth in the insurance industry. The study also found that little attention had been given to analyzing the effect of IT management capabilities on firms' IT resources accumulation processes over a long-time horizon, and to considering the implications of this process on competitiveness.

Bowen et al. (2007) studied the main factors influencing the ITG effectiveness and project implementation

success. They addressed the gap that exists between theoretical frameworks, prior empirical research, and contemporary practices on effective ITG. Bowen et al. (2007) developed a model of the factors influencing ITG effectiveness in an organization. Data were collected from a single case site in which the governance structural variables were studied at the corporate level and ITG process variables were studied at the project level. The results obtained supported the propositions in a small number of instances. The study suggests that to carry out more in-depth case studies across a variety of industries, as well as a large scale survey of enterprise practices would likely provide valuable insights.

3. RESEARCH QUESTIONS

The current study attempts to answer the following research questions:

- * RQ1: Who performs COBIT processes in Saudi organizations?
- * RQ2: Who is accountable for the COBIT processes in Saudi organizations?
- * RQ3: Are the COBIT processes and their controls formalized in Saudi organizations?
- * RQ4: Are COBIT processes audited in Saudi organizations?
- * RQ5: Are there any significant differences among Saudi organizations regarding the adequacy of implemented COBIT domains and processes?
- * RQ6: Are there any significant differences among respondent groups regarding the adequacy of implemented COBIT domains and processes in Saudi organizations?

4. RESEARCH METHODOLOGY

In this study an empirical survey, using a self-administered questionnaire (Appendix: 1), was conducted to explore and evaluate the performance and implementation of ITG in Saudi organizations. The questionnaire was developed based on the COBIT selfassessment checklist of ITG introduced in its fourth edition. The questionnaire was pretested on selected members of academic staff and accounting practitioners, and it was piloted on a selected sample of Saudi organizations. Comments and suggestions were considered in the development and revision of the final questionnaire. The ITG 34 highlevel control objectives were grouped into four domains: plan and organize, acquire and implement, deliver and support, and monitor and evaluate, in accordance with COBIT's domains and processes in the forth edition issued in 2005.

Five hundred copies of the revised questionnaires were randomly distributed to different organizations (manufacturing companies, merchandising companies, banks, services companies, oil and gas companies, governmental units and others) in five main cities (Al-Khoubar, Dammam, Dhahran, Jeddah and Riyadh) in Saudi Arabia. After excluding incomplete and invalid questionnaires, the research ended up with one hundred and twenty seven valid and usable questionnaires - representing a 25.4 percent response rate. The author also conducted unstructured interviews with a selected number of respondents in Saudi organizations.

A reliability test was carried out on the collected data using the Cronbach Alpha model, to explore the internal consistency of the questionnaire, based on the average inter-item correlation. The result of the reliability test shows that the questionnaire design is highly reliable, and the collected data are highly reliable and consistent (Alpha = 0.8421). The student test (t test) was also carried out to investigate if there were any significant differences between early responses (90 questionnaires) and late responses (37 questionnaires). The results of the student test revealed no significant differences between early and late responses (at significance level $p = 0.05$), providing evidence of a representative and unbiased research sample.

The collected data was processed using the Statistical Package for Social Sciences (SPSS) version 16.

Descriptive statistics of the collected data was analyzed for the purpose of understanding the main characteristics of the research variables. Nonparametric tests such as Kruskal-Wallis were carried out on the collected data to investigate the significant differences among respondent groups as well as organization types related to the investigated COBIT's processes research objects. The enclosed ITG self-assessment checklist would help managers, IT users and IT auditors to determine existence and adequacy of implementation for each of the COBIT processes in their organizations.

5. RESULTS AND DISCUSSION

The collected data show that 26 of the respondents are manufacturing companies and 24 are merchandising companies, representing 20.5 percent and 18.9 percent of the total responses respectively (Table I). While 33 respondents are banks and financial institutions (26 percent) and 15 of the respondents - representing 11.8 percent of the total responses - are health care and medical organizations. 18 respondents are equally divided between the oil and gas industry and the governmental sector, representing 7.1 percent of the total response each. Finally, 11 respondents (8.7 percent of the total) belong to other organizations, such as fisheries, hotels, car rental organizations, décor and carpentry firms, publishing and printing organizations, accounting and auditing firms, construction companies and design organizations.

Table 1 also shows that 35 of the respondents representing 27.6 percent of the total response) are accountants and 25 respondents (19.7 percent) are internal auditors. 20 respondents (15.7 percent) are IT specialists and 11 respondents (8.7 percent) are EDP auditors. 13 respondents are executive managers, and 11 respondents (8.7 percent) are controllers.

The responses to the questionnaire, and their statistical analysis, are given in table 2 for the performing body of COBIT domains and processes to Saudi organizations, and in table 3 for the Auditable and formality of COBIT domains and processes by Saudi organizations. Both these tables are placed at the end of this paper. Figures 1 to 8 are used to illustrate features of the responses in the discussion below.

Planning and Organization of IT

Robinson, (2005) stated that ITG should not be approached in a haphazard manner. ITG demands careful thought about who makes decisions and how those decisions are made. Invariably, not all these decisions will be favorably received by the stakeholders, so communication is vital. Implementation plans and schedules need to be formalized, and all initiatives should have executive sponsorship and be supported by all levels of leadership within the organization. Posthumusa and Solms (2005) also argued that in light of recent ITG failures, it is necessary to ascertain whether or not any currently active board committees, including the audit committee, have the expertise required to advise the board on IT matters. The results of the study reveal that the majority of the respondents reported that stating the IT strategic plan and defining information architecture are performed internally by the IT department in their organizations, 71.7 percent and 66.1 percent respectively (Figure 1). Approximately 64 percent of the total respondents confirmed that defining the IT organization and relationships is decided internally though their IT departments. Furthermore around 58 percent of the total respondents reported that determining the technological directions and managing IT investments are carried out internally through the IT departments in their organizations (Table 2).

It is also observed that almost 42 percent of the respondents confirmed that communicating management aims and direction related to the IT issued is usually done though the IT department, while a similar percentage of the respondents (42.5 percent) reported that such a mission is not the responsibility of the IT department and it is usually carried out by the general management of their organizations (Figure 1). The statistical results also show that 60.3 percent of the respondents confirmed that managing IT human resources is performed by the human resources management rather than IT departments, while 30.7 percent reported that managing human resources and its activities especial training, promoting, rotating and firing of IT employees is carried out by IT departments in their organizations (Table 2).

The statistics also show that only 26 percent of the respondents reported that ensuring IT compliance with the external requirements is performed by IT departments (Table 2), 47.2 of the respondents confirmed that such compliance tests are carried out by other departments inside their organizations such as research and development departments, marketing departments, or customer services departments. While, approximately 12 percent of the respondents reported that ensuring IT compliance with the external requirements is outsourced. It is also observed that 32.3 percent of the total respondents reported that assessing IT risks is performed by IT departments, while 41 percent of the respondents reported that the task is carried out internally by internal audit

departments and 8.7 percent of the total reported that assessing IT risks are carried out by a third party outside their organizations (Table 2).

The results show that 35.4 percent of the respondents believe that managing IT projects is performed by IT departments, 6.3 percent by outsiders, and approximately 49 percent of the total confirmed that it was done by the other departments in their organizations (Figure 1). The respondents are not in agreement regarding the management of IT quality; 42.5 of the respondents mentioned that it is performed by IT departments, 7.1 percent by outsiders, and 40.2 percent of the total respondents confirmed managing IT quality is carried out by other departments such as quality assurance and control in their organizations (Table 2). According to the statistical results of the Kruskal- Wallis tests, it seems that there are no significant differences among different Saudi organizations as well as different respondent groups regarding the performing bodies of planning organization activities of COBIT processes at $P = 0.05$ (Table 2).

The results of the study reveal that the majority of respondents reported that planning and organization activities of COBIT processes are not audited in Saudi organizations (Figure 2). According to the results of the Kruskal- Wallis tests, it seems that there are no significant differences among different Saudi organizations related to auditing of COBIT' planning and organization processes at significance level $P = 0.05$ (Table 2). It is observed that, in organizations which have a sufficient number of IT specialists, EDP auditors pay more attention to auditing COBIT' planning and organization processes.

The great majority of respondents also reported that COBIT' planning and organization processes are not formally carried out in Saudi organizations (Figure 3). The results of the Kruskal-Wallis tests show significant differences in the opinions of respondent groups regarding the formality of conducting the following COBIT' planning and organization processes: defining the information architecture; determining technological direction; managing IT investment, and communicating management aims and direction in Saudi organizations at $P = 0.05$ (Table 2). Only EDP auditors, IT specialists, and internal auditors gave high rank to the formality of conducting COBIT' planning and organization processes in their organizations. It is suggested that informality of conducting COBIT' planning and organization processes may be due to the lack of IT specialists and EDP auditors in Saudi organizations.

Acquisition and Implementation

COBIT indicated that individuals at the board level and executive management are responsible for IIG as an integral part of their overall enterprise governance program. Trites (2004) raised a question of whether the directors have the expertise to evaluate if the procedures in place are appropriate or effective. He argued that even IT specialists would need to do a considerable amount of work to be able to make such an evaluation. Moreover, the directors are generally not appointed because of their expertise in evaluating controls, but rather to bring to bear their extensive business knowledge and mature judgment. This would rely on others, such as management and auditors, to determine whether the procedures in place are appropriate and effective. Normally, the auditors carry out such work and report to the management and the audit committee on the results.

The statistical results show the majority of respondents (73.2 percent) reported that developing and maintaining IT procedures are performed internally by IT departments, approximately 8 percent by outsiders, and 10 percent by other internal departments, especially internal audit departments (Figure 4). The statistics also show that 79 respondents- representing 62.2 percent of the total- reported that acquiring and maintaining application software; acquiring and maintaining technology architecture; and installing and accrediting IT systems are performed by IT departments in their organizations (Table 2). 59.1 percent of the respondents confirmed that identifying IT solutions is always carried out by IT persons, 7.1 percent by outsiders, and 22 percent by other departments inside their business. The results also show that almost 57 percent of the respondents confirmed that managing IT changes are preformed by IT departments, 10.2 percent by outsourcing, and 29 percent by other departments within their organizations (Table 2).

The statistical results of the Kruskal-Wallis tests show no significant differences among different regarding the performing bodies of IT acquisition an implementation activities Saudi organizations at $P = 0.05$ (Table 2). Moreover, the results does not reveal any significant differences in the opinions of respondents groups regarding the same issues at a significance level $P = 0.05$ (Table 2).

Regarding the audit of the COBIT' acquisition and implementation processes, the statistics show that the majority of respondents (77.2 percent) claimed that managing IT changes are not audited in their organizations (Figure 5). Moreover, around 69 percent of the respondents reported that acquiring and maintaining application software, and installing and accrediting systems are not regularly audited. Almost two-thirds of the total respondents (66.1 percent and 64.6 percent respectively) reported that identify solutions, and develop and maintain it procedures are not audited in their organizations. Furthermore, around 60 percent of the total respondents confirmed that acquiring and maintaining application software activities are not audited in Saudi organizations (Table 3).

The statistical results of the Kruskal-Wallis tests reveal no significant differences among Saudi organizations related to auditing COBIT' acquisition an implementation processes at significance level $P = 0.05$. Moreover, the results show no significant differences in the perception of respondent groups regarding the audit of COBIT' acquisition and implementation processes in Saudi organizations at level $P = 0.05$ (Table 3).

In order to explore the formality of performing the COBIT' acquisition and implementation process in Saudi organizations, the respondents were asked to indicate whether these processes are formally or not formally conducted in their organizations. The statistics show that around 70 percent of the respondents reported that there are informal procedures to identify IT solutions, and to acquire and maintain application software in place. 77.2 percent of the respondents reported the existence of informal and unwritten procedures for installing and accrediting IT systems in their organizations (Figure 6). Moreover, 66.1 of the respondents reported that there are no formal written procedures for managing IT changes (Table 3). The statistical results also show that more than 60 percent of the respondents reported that there are no formal procedures for acquiring and maintaining application software, and installing and accrediting systems in their organizations (Figure 6).

According to the statistical results of the Kruskal-Wallis tests, it seems that there are no significant differences among Saudi organizations regarding the formality of conducting the COBIT' acquisition an implementation processes at $P = 0.05$ (Table 3). Except for acquiring and maintaining technology architecture, installing and accrediting IT systems, and managing IT changes, the results of the Kruskal-Wallis tests also show significant differences in the opinions of different respondents groups regarding the formality of conducting COBIT' acquisition an implementation in Saudi organizations at significance level $P = 0.05$ (Table 3).

Delivery and Support

COBIT encourages the creation, evaluation, and continuing improvement of IT services in order to achieve business objectives. ITG processes involve the implementation of IT management techniques and procedures in compliance with established IT strategies and policies. IT investment processes involve the identification, acquisition, implementation, and ongoing operation and maintenance activities of IT applications. As a continuous process, effective ITG provides transparent IT decision making, clear accountabilities, and acceptable and actionable IT measurements.

Figure 7 shows that managing data (69.3 percent), operations (56.7 percent), and IT configurations (59.5 percent) are mainly performed by IT departments in Saudi organizations. Approximately 67 percent of the respondents reported that assessing and advising IT customers are performed by IT departments. It is also observed that 56 percent of total respondents consider ensuring system security as a mission to be carried out by IT departments, 20.5 percent by outsiders, and almost 20 by other departments such internal audit departments and audit quality and assurance departments (Table 2). It is also observed that 57.6 percent of the respondents confirmed that managing IT problems and incidents is carried out by IT departments, and 32.3 percent of these problems and incidents are solved by other internal departments such as internal audit

departments, while only 5.5 percent of such problems are dealt through outsourcing (Table 2).

Merely half of the respondents report that managing IT facilities are carried out by IT departments, only 6.3 percent by outsiders, and 38.6 percent by other departments in their organizations (figure 7). It is also observed that less than half of the total respondents reported that the following IT delivery and support COBIT processes are carried out by IT departments in Saudi organizations: defining IT service levels (41.7 percent), managing third-party IT services (36.2 percent), managing IT performance and capacity (48.8 percent), ensuring continuous IT services (47.2 percent), Identifying and attributing costs (40.9 percent), and educating and training users (47.2 percent). While the others confirmed that such IT delivery and support COBIT processes are performed either by outsiders or other internal departments in Saudi organizations (Table 2). The statistical results of the Kruskal-Wallis tests show are no significant differences among different Saudi organizations as well as different respondents groups regarding the performing bodies of IT delivery and support activities of COBIT processes at $P = 0.05$ (Table 2).

It is observed the vast majority of the respondents (80.3 percent) reported that assisting and advising IT customers programs are not audited in their organizations. It is also observed that more than 70 percent of the total respondents reported that the following COBIT processes of IT delivery and support are not audited in their organizations: defining IT service levels; managing IT third-party services, managing IT performance and capacity, identifying and attributing IT costs, educating and training IT users, managing IT configuration, and managing IT problems and incidents (Figure 8). The statistical results also revealed that more than 60 percent of the total respondents reported that managing data and IT facilities, and ensuring continuous IT services and systems security are not audited in Saudi organizations (Table 3). According to the statistical results of the Kruskal-Wallis tests, it seems that there are no significant differences among different organizations as well as different respondents groups related to auditing of COBIT processes of IT delivery and support in Saudi environment at $P = 0.05$ (Table 3).

The statistical results reveal that more than two-thirds of the respondents reported that the following IT delivery and support COBIT processes are not formally conducted in their organizations: defining IT service levels; managing IT third-party services, managing IT performance and capacity, ensuring continuous IT services, assisting and advising IT customers managing IT configuration, and managing IT problems and incidents (Table 3). It also observed that more than 60 percent of the respondents confirmed that the other remaining IT delivery and support COBIT processes are not formally conducted in Saudi organizations (Table 3).

The statistical results of the Kruskal-Wallis tests show significant differences among different Saudi organizations regarding the formality of ensuring systems security at a significance level $P = 0.05$ (Table 3). It is observed that banks and financial, health care organizations and most of services organizations have formal written security policies and procedures compared with the others. On the other hand, the results of the Kruskal-Wallis tests show significant differences in the opinions of the respondents groups regarding the existence of the formal procedures of the following IT delivery and support COBIT processes: ensuring systems security, identifying and attributing IT costs, educating and training IT users, assisting and advising IT customers, and managing IT data at a significant level $P = 0.05$ (Table 3). It is also observed that executive managers, IT specialists, EDP auditors and internal auditors confirmed the existence of formal written procedures for the above IT delivery and support COBIT processes in their organizations.

Monitoring

Trites (2004) stated that IT plays a serious role in any modern business system, and therefore, IT considerations play an important part in the controls that are necessary to preserve and protect corporate assets from misappropriation, loss and misuse. However, many, if not most, directors do not have a strong understanding of the controls issues raised by IT and do not even know what questions they should ask to place themselves in a position to address their responsibilities. Trites (2004) also argued that the directors cannot be expected to become experts in technology or current IT trends. Their prime focus must be to determine whether

there are processes in place for the company to monitor such trends and to consider new technological developments in their strategic initiatives.

The statistical results show a high percentage of the respondents (61.4 percent) reported that monitoring IT processes is carried out by IT departments (Figure 10), 8.7 percent by outsiders through outsourcing, and 22 percent internally by other departments, especially internal audit departments in their organizations (Table 2). Regarding the assessment of adequacy of IT internal controls, the statistical results reveal that it is performed by IT departments in 42.4 percent, by outsiders 15.7 percent, and 33.1 internally through internal audit departments in Saudi organizations.

It is also observed that approximately 47 percent of the total respondents reported that providing for independent audit is performed by IT departments, 15 percent by outsider independent auditors, and 29 percent is performed internally by the internal audit departments. The statistical results also show that 38 percent of the respondents reported obtaining IT independent assurance through IT persons, 17.3 percent through outsourcing, and 33.1 percent is carried out internally through either internal audit departments or quality and assurance controls departments in their organizations (Table 2). Again, the results of the Kruskal-Wallis tests, reveal no significant differences among Saudi organizations regarding the performing bodies of IT monitoring activities of COBIT processes at $P = 0.05$ (Table 2). Furthermore, no significant differences have been observed in the opinions of the respondents groups regarding the same investigated issues at $P = 0.05$ (Table 2).

The statistical results reveal that more than two-thirds of the total respondents reported that monitoring the IT processes, assessing the adequacy of IT internal control, and obtaining independent assurance activities is not audited in their organizations (Figure 11). The Kruskal-Wallis tests show no significant differences among Saudi organizations as well as different respondents groups related to auditing IT monitoring activities of COBIT processes at $P = 0.05$ (Table 3).

It is also observed that the vast majority of respondents (more than three-quarters) reported that IT monitoring activities of COBIT processes are informally conducted in their organizations (Figure 12), and there are no significant differences among different organizations and different respondent groups regarding these issues in Saudi organizations at a significant level $P = 0.05$ (Table 3).

6. CONCLUSION

The current exploratory study is an attempt to empirically investigate the impact of emerging COBIT framework to evaluate and enhance the implementation of ITG in Saudi organizations. The current study investigates the formality, auditing, and responsibility and accountability of COBIT processes for ITG in Saudi Organizations. An empirical survey, using a self-administered questionnaire, was carried out to achieve this purpose. The results of the study reveal that the majority of respondents reported that IT departments have the responsibility of implementing COBIT processes and domains in their organizations. However, most of the respondents reported that the IT COBIT processes and domains are neither audited nor formally conducted in Saudi organizations. This study has provided valuable empirical results regarding the utilization of COBIT framework for ITG in the Saudi organizations. The results of the study enable managers and practitioners in the Saudi environment to better understand, evaluate, implement and manage ITG and champion IT for their business success. The study provides background and useful information for senior management, IT management, accountants, auditors, and academics to understand the implementation phase and impact of COBIT on the ITG in Saudi organizations. The study intends to develop a roadmap for Saudi organizations which are looking forward to compliance with COBIT and adoption of ITG principles. It is recommended to extend the scope of the current study to other countries in the Middle East (e.g. Egypt) and Gulf countries (e.g. Bahrain, Kuwait, Qatar, and United Arab Emirates) to explore the potential influence of cultural and other differences on their perception of the importance and implementation of COBIT processes in their organizations.

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AuthorAffiliation

Ahmad A. Abu-Musa. Tanta University. Egypt. aabomosa@kku.eud.sa

Assunto: Studies; Standards; Information technology; Management; Accountability;

Localização: Saudi Arabia

Classificação: 9178: Middle East, 9130: Experiment/theoretical treatment, 5220: Information technology management

Título: Exploring COBIT Processes for ITG in Saudi Organizations: An empirical Study

Autor: Abu-Musa, Ahmad A

Título da publicação: International Journal of Digital Accounting Research

Volume: 9

Páginas: 99-126

Número de páginas: 28

Ano de publicação: 2009

Data de publicação: 2009

Ano: 2009

Editora: International Journal of Digital Accounting Research

Local de publicação: Huelva

País de publicação: Spain

Assunto do periódico: Business And Economics--Accounting

ISSN: 15778517

Tipo de fonte: Trade Journals

Idioma de publicação: English

Tipo de documento: Feature

Artigo principal do documento: Tables;Graphs;References

ID do documento ProQuest: 197412484

URL do documento: <http://search.proquest.com/docview/197412484?accountid=14643>

Copyright: Copyright International Journal of Digital Accounting Research 2009

Documento 11 de 28

Building a Governance Foundation

Autor: Nelson, Adam.

Informações da publicação:: Baseline 91 (Dec 2008): 34-35,38.

[Link para o documento do ProQuest](#)

Resumo: First published in 1996, Control Objectives for Information and Related Technology (COBIT) provides a set of generally accepted best-practice objectives to help maximize the benefits derived through IT use. It further aids in developing appropriate IT governance and control in an organization. Managed by the Information Systems Audit and Control Association and its research body, the IT Governance Institute (ITGI), COBIT became the IT governance standard against which auditors measured process and control maturity in support of compliance with the Sarbanes-Oxley Act of 2002.

This is achieved by providing tools to assess and measure the performance of 34 high-level processes that cover 214 control objectives, which are categorized in four domains: Plan and Organize; Acquire and Implement; Deliver and Support; and Monitor and Evaluate. By implementing processes and procedures supporting the COBIT objectives and identifying and monitoring associated controls, users and auditors will recognize greater reliability and performance throughout the enterprise.

Plan and Organize (PO) provides direction to solution delivery (AI) and service delivery (DS); Acquire and Implement (AI) provides the solutions and passes them to be turned into services; Deliver and Support (DS) receives the solutions and makes them usable for end users; and Monitor and Evaluate (ME) monitors all processes to ensure that the direction is followed.

The state government achieved several COBIT objectives through its planning process, which had the goal of developing a long-term strategic plan - not overtly aligning with the COBIT framework. This is a model of success that other standard and framework maturity programs can learn from.

Texto completo: Headnote

IT management needs an overarching governance model to ensure that investments in technology generate business value and mitigate risks.

INFORMATION TECHNOLOGY GOVERNANCE defines the overall structure, policies, processes and relationships necessary to provide the desired standardization and consistency across an IT ation. It encompasses systems, performance measures risk management procedures, helping organizations make informed decisions about their operations and investments. While organizations have similar goals - such as controlling costs and achieving data consistency- IT departments across government, rporations and nonprofits operate differently.

Even after a rigorous focus on compliance initiatives- and the widespread acknowledgment that large-scale, complex, strategic IT projects commonly progress beyond scope and budget without due attention- standardization around IT governance models is still being sought.

When organizations are examined and the use of best-practice disciplines are polled, a number of frameworks

and standards for varying aspects of IT operations are found. These frameworks typically include:

- * IT infrastructure Library (ITIL), developed by the United Kingdom's Office of Government Commerce, focuses on service support and service delivery.
- * iso/IEC 27001 (iso 27001) consists of a set of best practices to implement and maintain an information security program.
- * AS8015 2005 is the Australian Standard for Corporate Governance of Information and Communication Technology.
- * capability Maturity Model Integration focuses on software engineering, people and implementation.
- * Balanced Scorecard is a strategic planning and management system used to align business activities to the organization's vision and strategy.
- * Six Sigma is a manufacturing-based system focusing on quality assurance.

IT management needs an overarching governance model to ensure that investments in technology generate business value and mitigate associated risks. The model should also provide a common language for IT and users, enable more focused planning, and create a level of standardization, consistency and predictability

ENTER COBIT

First published in 1996, Control Objectives for Information and Related Technology (COBIT) provides a set of generally accepted best-practice objectives to help maximize the benefits derived through IT use. It further aids in developing appropriate IT governance and control in an organization. Managed by the Information Systems Audit and Control Association and its research body, the IT Governance Institute (ITGI), COBIT became the IT governance standard against which auditors measured process and control maturity in support of compliance with the Sarbanes-Oxley Act of 2002.

COBIT provides a control- and objective-based foundation upon which decisions and investments can be based. These include defining a strategic plan; defining the information architecture; acquiring the necessary hardware and software to execute a strategy; managing projects; ensuring continuous service; and monitoring the performance of the IT system.

This is achieved by providing tools to assess and measure the performance of 34 high-level processes that cover 214 control objectives, which are categorized in four domains: Plan and Organize; Acquire and Implement; Deliver and Support; and Monitor and Evaluate. By implementing processes and procedures supporting the COBIT objectives and identifying and monitoring associated controls, users and auditors will recognize greater reliability and performance throughout the enterprise.

OVERCOMING CHALLENGES

Throughout IT organizations, common themes are described as areas of opportunity: improve project planning and investment; increase collaboration and information sharing; facilitate effective communication and transition across the lifecycle; control cost while providing efficient operations and support; enhance service delivery; and improve security. These themes are usually approached as individual programs or are carefully orchestrated as an overarching organizational transformation related to technology operations.

Certain areas, such as security and managing data across an enterprise, require heavy investment and monitoring. These are also areas that auditors commonly spend time scrutinizing and directing change for heightened control.

When remediation is essential, reactive solutions are typically implemented. Though necessary, these solutions can be costly and inefficient. Once a baseline is set, however, and the auditors leave, it is far more efficient for IT management to proactively design and support an improvement plan with cross-functional reach. The COBIT model can help with this.

By understanding the four domains and the underlying process areas, IT management and staff can begin communicating from a common frame of reference. Leveraging the COBIT toolkits, IT management can promote a standard set of metrics, process structures, improvement plans and self-assessment mechanisms.

This allows each area to initiate, report and monitor in a similar fashion.

In almost every change-management or operational-improvement approach, stakeholder involvement is critical, yet this is often where things fall apart. Think how many project managers ask for executive stakeholder meetings to communicate issues and detailed plans. Now ask how many IT managers have enough time to devote to such detail. The answer would be "very few."

With an understanding of COBIT and having a common approach to managing and measuring processes, IT management will have an informed understanding of the objectives to be achieved. This understanding allows IT management to focus on the actions that require their attention, enabling the program to stay on track based on meaningful risk and opportunity reviews.

From the ITGI COBIT 4.1 framework document, the four domains and their relationships are described and the related process areas listed. The relationships can help IT management focus on areas of opportunity or risk. Plan and Organize (PO) provides direction to solution delivery (AI) and service delivery (DS); Acquire and Implement (AI) provides the solutions and passes them to be turned into services; Deliver and Support (DS) receives the solutions and makes them usable for end users; and Monitor and Evaluate (ME) monitors all processes to ensure that the direction is followed.

A governance framework is worthwhile only if it is actually used; otherwise, it becomes a waste of money and a burden to the staff. To be effective, its language must permeate regular conversations among the leadership team and find its way into dashboards and documents.

By using COBIT tools, IT management can quickly assess strengths, weaknesses and opportunities. It can then reduce costs, improve the top-line, enhance customer service, or meet compliance and regulatory reporting by balancing risk mitigation and process improvement in a proactive fashion.

COLLABORATION AND SUPPORT

As an example, one state government's IT strategic planning group wanted higher levels of collaboration and a stronger sense of support. The sense of buy-in across multiple agencies would strengthen appropriation requests for strategic initiatives, allowing for economies of scale, including:

- * Solutions that address and automate inter- and intra-agency business processes
- * smaller, more focused teams to drive progress more quickly
- * More statewide, standardized technology platforms and toolsets
- * Enhanced information sharing and increased reusability
- * Lower total cost of ownership for solutions

To achieve its goals, the state government embarked on a more collaborative planning effort, beginning with an agency director approach. This top-down model was meant to align agencies having similar business-oriented goals and challenges. Facilitated discussion and collaborative decision making identified and defined capabilities that would help alleviate challenges in support of goals that could be met through technology. This transition - from business-driven need to technology-based capability - also allowed the agency directors to communicate more effectively with the IT directors.

The transition to technology occurred when enabling capabilities, such as business intelligence, were identified. More than 50 agencies were represented and more than 100 directors, chiefs of staff, and IT leads collaborated in the process to iterate balanced objectives and identify existing and new initiatives.

The state's intent for the strategic planning process was a set of IT-oriented priorities that support state and agency business goals and can be translated into a set of recommended projects and budgets. With the iterative, collaborative process utilized, it was essential to be sensitive to time and competing priorities. In support of the process, the state established a legislative technology committee and formalized the agency director advisory committee.

The state's approach - developing output for the framework - was designed to facilitate discussion and move quickly toward decisions in a collaborative fashion that built support and consensus.

Looking at COBIT's Planning and Organizing domain, the very first process area is Define a Strategic IT Plan. This satisfies the business requirement for IT to sustain or extend the strategy and governance requirements, while still being transparent about benefits, costs and risks.

Another COBIT process area, Define the IT Processes, Organization and Relationships, has several applicable objectives. These include Defining an IT Process Framework, Establishing an IT Strategy Committee and Establishing an IT Steering Committee.

The state government achieved several COBIT objectives through its planning process, which had the goal of developing a long-term strategic plan - not overtly aligning with the COBIT framework. This is a model of success that other standard and framework maturity programs can learn from.

ENABLING IT GOVERNANCE TRANSFORMATION

The steps enabling transformation- in the context of an IT governance, compliance or enterprise risk management initiative- describe a business process. Similar to any other business process, it must be documented, followed with discipline and improved with every iteration.

For a successful COBIT experience, always begin from a perspective of knowledge and leverage experienced support. Implementing an enterprise risk management, compliance or IT governance program is like any other transformation: It must have the support of a dedicated team to be successful.

Lessons taken from enabling organizational transformation hold true for an IT governance program to reduce cost and effort, while enhancing chances of success and building support across an organization. There are only so many tasks that one person or a group working part-time can push forward simultaneously.

For an IT governance effort to succeed, therefore, dedicated resources must be allocated, IT management must have a common understanding to allow for more focused decision making, and progress must not be predetermined by an arbitrary schedule, such as a quarterly earnings call.

Sidebar

PLAN AND ORGANIZE

- * Define a strategic IT plan.
- * Define the information architecture.
- * Determine the technological direction.
- * Define the IT processes, organization and relationships.
- * Manage the IT investment.
- * communicate management aims and direction.
- * Manage IT human resources.
- * Manage quality.
- * Assess and manage IT risks.
- * Manage projects.

ACQUIRE AND IMPLEMENT

- * Identify automated solutions.
- * Acquire and maintain application software.
- * Acquire and maintain technology infrastructure.
- * Enable operation and use.
- * Procure IT resources.
- * Manage changes.
- * Install and accredit solutions and changes.

DELIVER AND SUPPORT

- * Define and manage service levels.
- * Manage third-party services.

- * Manage performance and capacity.
- * Ensure continuous service.
- * Ensure systems security.
- * Identify and allocate costs.
- * Educate and train users.
- * Manage service desk and incidents.
- * Manage the configuration.
- * Manage problems.
- * Manage data.
- * Manage the physical environment.
- * Manage operations.

MONITOR AND EVALUATE

- * Monitor and evaluate IT performance.
- * Monitor and evaluate internal control.
- * Ensure compliance with external requirements.
- * Provide IT governance.

Sidebar

A governance framework is worthwhile only if it is actually used; otherwise, it becomes a waste of money and a burden to the staff.

Sidebar

Please send questions and comments on this article to editors@baselinemag.com
 AuthorAffiliation

Adam Nelson is director of 'management and IT consulting at Keane, a global IT consulting firm headquartered in San Ramon, Calif.

Assunto: Information technology; Standardization; Best practice; Corporate governance; Strategic planning;

Localização: United States--US

Classificação: 5220: Information technology management, 2310: Planning, 9190: United States

Título: Building a Governance Foundation

Autor: Nelson, Adam

Título da publicação: Baseline

Edição: 91

Páginas: 34-35,38

Número de páginas: 3

Ano de publicação: 2008

Data de publicação: Dec 2008

Ano: 2008

Seção: IT GOVERNANCE

Editora: Ziff Davis Enterprise Inc.

Local de publicação: New York

País de publicação: United States

Assunto do periódico: Business And Economics--Computer Applications

ISSN: 15413004

Tipo de fonte: Trade Journals

Idioma de publicação: English

Tipo de documento: Feature

Artigo principal do documento: Illustrations

ID do documento ProQuest: 213473395

URL do documento: <http://search.proquest.com/docview/213473395?accountid=14643>

Copyright: Copyright Ziff Davis Enterprise Inc. Dec 2008

Última atualização em: 2010-07-09

Base de dados: ABI/INFORM Complete

Documento 12 de 28

A New Look at IT Governance

Autor: Higgins, Leslee N; Sinclair, Debra T.

Informações da publicação:: The Journal of Corporate Accounting & Finance 19. 5 (Jul/Aug 2008): 31-36.

[Link para o documento do ProQuest](#)

Resumo: The 2008 IT Governance Global Status Report compiled responses from 749 IT professionals who were interviewed in an effort to determine their sense of the importance of IT governance, as well as their use of the tools and services available to help ensure effective IT governance. Frameworks for IT governance include ITIL/ISO 20000, ISO 9000, COBIT, IT Balanced Scorecard, Six Sigma, Val IT, COSO ERM, and Sys Trust. The 2008 IGGSR reports that COBIT is used exclusively by about 30 percent of respondents. More than half the respondents in the IGGSR either already apply or plan to apply Val IT principles. Although risk management is one of the five focus areas of IT governance identified by the ITGI and 80 percent of the respondents to IGGSR believe that IT risk management is important, only 30 percent have implemented measures to improve IT risk management. Management must develop an overall consistent strategy toward IT governance.

Assunto: Systems management; Information technology; Risk management; Compliance; Corporate governance; Polls&surveys; Statistical data;

Localização: United States--US

Título: A New Look at IT Governance

Autor: Higgins, Leslee N; Sinclair, Debra T

Título da publicação: The Journal of Corporate Accounting&Finance

Volume: 19

Edição: 5

Páginas: 31-36

Ano de publicação: 2008

Data de publicação: Jul/Aug 2008

Ano: 2008

Editora: Wiley Periodicals Inc.

Local de publicação: Hoboken

País de publicação: United States

Assunto do periódico: Business And Economics, Business And Economics--Banking And Finance, Business And Economics--Accounting

ISSN: 10448136

Tipo de fonte: Trade Journals

Idioma de publicação: English

Tipo de documento: Feature

Artigo principal do documento: Tables;References

ID do documento ProQuest: 201613546

URL do documento: <http://search.proquest.com/docview/201613546?accountid=14643>

Copyright: Copyright Wiley Periodicals Inc. Jul/Aug 2008

Última atualização em: 2012-01-26

Base de dados: 2 bases de dados; -ABI/INFORM Complete; -ProQuest Hospital Collection; ;

Documento 13 de 28

Standardise IT compliance systems to ease burden, urge BCS delegates

Autor: Richards, Justin.

Informações da publicação:: Computer Weekly (Sep 18, 2007): 68.

[Link para o documento do ProQuest](#)

Resumo: IT governance frameworks, such as Cobit, ITIL and Coso, have an important role in the IT landscape as a result of legislation such as the US Sarbanes-Oxley Act and the Patriot Act, which can land firms with heavy penalties for non-compliance. European regulations with implications for IT include Basel 2 and the Markets in Financial Instruments Directive.

Texto completo: Headnote

BRITISH COMPUTER SOCIETY

KEY POINTS

- * Governance and compliance have become large industries
- * Effective data governance can improve management of information
- * Compliance packages cannot keep pace with changing laws
- * Compliance experts in demand despite lack of formal qualifications

Stronger IT governance is needed across the industry, a BCS conference has been told. Although IT has never before had such an important role in business, there is less control over it now than there once was, attendees said.

IT governance frameworks, such as Cobit, ITIL and Coso, have an important role in the IT landscape as a result of legislation such as the US Sarbanes-Oxley Act and the Patriot Act, which can land firms with heavy penalties for non-compliance. European regulations with implications for IT include Basel 2 and the Markets in Financial Instruments Directive.

It is because of regulations such as these that governance and compliance have become a large industries, employing many thousands of people, the conference heard.

As well as facilitating adherence to Financial Services Authority initiatives, compliance can improve the integrity and management of a firm's data, attendees said.

IT compliance in the financial services sector promotes shareholder and customer value, and helps avoid financial scandals such as those that occurred at Enron and WorldCom. But too much governance bureaucracy can become a costly tick-box exercise.

The average bank needs between Ei5m and £25m to implement a typical IT-compliance programme, the conference heard. This prohibitive expense means that some smaller financial firms may shun IT governance best practice.

This lack of commitment to governance, and in turn to compliance, can result in disparate IT systems being used as a cost-cutting measure, attendees said.

Packaged compliance systems are now a common sight in the IT industry. However, the ever-changing nature of compliance means that there is still a demand for experts, even though compliance education has not yet been formalised.

Research suggests that no single technology or supplier can provide an IT system that solves all the problems that compliance presents. As a result of this, a multitude of systems and technologies are needed to achieve this goal, attendees said.

They suggested that a move towards standardised IT compliance systems would reduce the need for specialists across the industry and would result in more efficient governance practices. Compliance should be seen as an outcome and a value driver, not as a function in its own right, attendees said.

Sidebar

computer.weekly@rbi.couk

Sidebar

Risk management an IT director's guide

www.computerweekly.com/226615

Information about BCS membership: www.bcs.org/membership

Assunto: Conferences; Information technology; Information management; Federal regulation; Data integrity; Compliance;

Localização: United Kingdom--UK

Empresa/organização: British Computer Society; NAICS: 813910; Duns:);

Título: Standardise IT compliance systems to ease burden, urge BCS delegates

Autor: Richards, Justin

Título da publicação: Computer Weekly

Páginas: 68

Número de páginas: 1

Ano de publicação: 2007

Data de publicação: Sep 18, 2007

Ano: 2007

Seção: Career Moves

Editora: Reed Business Information UK

Local de publicação: Sutton

País de publicação: United Kingdom

Assunto do periódico: Computers

ISSN: 00104787

CODEN: COMWAA

Tipo de fonte: Trade Journals

Idioma de publicação: English

Tipo de documento: News

ID do documento ProQuest: 237049022

URL do documento: <http://search.proquest.com/docview/237049022?accountid=14643>

Copyright: Copyright Reed Business Information UK Sep 18, 2007

Última atualização em: 2010-06-11

Base de dados: ABI/INFORM Complete

Download your free COBIT update

Autor: Anonymous.

Informações da publicação:: CIO Canada 15. 5 (Jun 2007): N_A.

[Link para o documento do ProQuest](#)

Resumo: "The framework supports IT's achievement of business objectives, ensures business-IT alignment, and improves IT efficiency and effectiveness," said Roger Debreceeny, chairman of ITGI's COBIT Steering Committee, in a press release. The best practices laid out in COBIT are said to help companies provide a framework for IT governance.

Texto completo: By:

IT shops that want to ramp up their IT governance efforts and prove to auditors that those controls align with industry regulations might download a free, updated version of the Control Objectives for Information and related Technology, which was made available last month.

The IT Governance Institute (ITGI), a group established in 1998 by the Information Systems and Audit Control Association to advance IT governance standards, has made available an updated and free download of Version 4.1 of COBIT.

In this version, the groups says it included enhanced performance measurement tips, including performance drivers and outcome measures, as well as improved control objectives focused on management and updated guidance around compliance with internal policies and contractual requirements.

"The framework supports IT's achievement of business objectives, ensures business-IT alignment, and improves IT efficiency and effectiveness," said Roger Debreceeny, chairman of ITGI's COBIT Steering Committee, in a press release. The best practices laid out in COBIT are said to help companies provide a framework for IT governance.

The standard was designed with business accountability, and subsequent policy and regulatory audits in mind.

Assunto: Information technology; Internet access; Software; High performance systems; Information systems;

Empresa/organização: IT Governance Institute; NAICS: 541512; Duns:);

Título: Download your free COBIT update

Autor: Anonymous

Título da publicação: CIO Canada

Volume: 15

Edição: 5

Páginas: N_A

Número de páginas: 1

Ano de publicação: 2007

Data de publicação: Jun 2007

Ano: 2007

Editora: Laurentian Technomedia Inc.

Local de publicação: Downsview

País de publicação: Canada

Assunto do periódico: Business And Economics--Computer Applications

ISSN: 11956097

Tipo de fonte: Trade Journals

Idioma de publicação: English

Tipo de documento: News

ID do documento ProQuest: 217427639

URL do documento: <http://search.proquest.com/docview/217427639?accountid=14643>

Copyright: Copyright Laurentian Technomedia Inc. Jun 2007

Última atualização em: 2010-06-09

Base de dados: ABI/INFORM Complete

Documento 15 de 28

Adaptive IT governance framework: integration and harmonization of structure, IT decision and the control mechanism.

Autor: Harso Supangkat, Suhono; Rahmad, Basuki.

Informações da publicação:: WSEAS Transactions on Information Science and Applications 3. 10 (Oct. 2006): 1931-1939.

[Link para o documento do ProQuest](#)

Resumo: This paper is aimed to propose the new IT Governance, based on the integration and harmonization of IT decision, structure, and control mechanisms. We have elaborated existing 'claimed framework' such as COBIT, ISO 17799, ITIL and AS 8015-2005. Based on the analysis of strength and weakness of each frameworks, supported by elaborated researches explicitly state the need of structure-process-mechanism, we propose the new IT Governance Framework. The architecture of our IT Governance framework consists of four main components: IT Governance Design - High Level Business Model, IT Governance Decision Arrangement, and IT Governance Mechanisms.

Termo do artigo :

Termo do assunto: Information technology, Positioning, Design engineering, Architecture, Adaptive structures, Adaptive control systems, Business, Strength

Classificação: 80: Computer Applications (General) (CI)

Identificador / palavra-chave: Article

Título: Adaptive IT governance framework: integration and harmonization of structure, IT decision and the control mechanism.

Autor: Harso Supangkat, Suhono¹; Rahmad, Basuki¹School of Electrical&Informatic Engineering, Institut Teknologi Bandung, Jl. Ganesha 10 - Bandung, INDONESIA suhono@inkubator.itb.ac.id

Autor da correspondência: Harso Supangkat, Suhono

Endereço de e-mail do autor: suhono@inkubator.itb.ac.id

Título da publicação: WSEAS Transactions on Information Science and Applications

Abreviação de periódico: WSEAS Trans. Inf. Sci. Appl.

Volume: 3

Edição: 10

Páginas: 1931-1939

Número de páginas: 9

Data de publicação: Oct. 2006

Ano de publicação: 2006

Ano: 2006

Editora: World Scientific and Engineering Academy and Society, Ag. Ioannou Theologou 17-23, Athens, 15773, Zographou, Greece, [mailto:info@wseas.org], [URL:http://www.wseas.org]

ISSN: 1790-0832

Tipo de fonte: Scholarly Journals

Idioma de publicação: English

Tipo de documento: Journal Article

Subarquivo: Computer&Information Systems (CI)

Atualizar: 2007-07-01

Número de registro: 200707-80-090709 (CI)

ID do documento ProQuest: 29881349

URL do documento: <http://search.proquest.com/docview/29881349?accountid=14643>

Última atualização em: 2011-11-12

Base de dados: Technology Research Database

Documento 16 de 28

A helping hand with IT governance

Autor: Williams, Paul.

Informações da publicação:: Computer Weekly (Sep 19, 2006): 26-28.

[Link para o documento do ProQuest](#)

Resumo: Of course, with the possible exception of Cobit, there is no non-proprietary framework that comprehensively covers the total spectrum of structures and processes relevant to IT governance. And Cobit itself is often in danger of being regarded as the "all-purpose miracle cleaner" of IT governance frameworks in the way it has been promoted as an IT governance, process and management control and IT audit tool.

Texto completo: Headnote

GOVERNANCE There's no need for wrong turns on the road to achieving effective IT governance. Frameworks can offer a clear path to better risk management and value

Headnote

Opinion

Within many organisations IT governance is up there with military intelligence and rap music as one of the great oxymorons of our time. To more enlightened organisations, however, IT governance is a central component of their business culture, leading to enhanced management of risk and the delivery of measurable and sustainable stakeholder value from IT-related investments.

A KPMG study on IT governance from 2004 contained references from a number of CIOs of major UK companies with quotes such as "the potential benefits of governance include the significant elimination of waste and improved strategic focus", and "improved communication is one of the most important achievements of governance".

Studies such as this are not short of ringing endorsements for the value that a positive approach to IT governance can bring. Few such studies, however, concentrate on the difficulties that many organisations experience in developing, implementing, maintaining and monitoring effective IT governance structures and processes.

Many organisations embarking on the road of IT governance seek assistance from other, perhaps more mature, organisations among their peers or from external advisers. Such help can be invaluable in helping to avoid the pitfalls and in enhancing their ability to achieve success in the shortest time.

However, external help will never be low cost, and peer group assistance will always be inhibited by competitive pressures. Equally, a fully independent approach can be a lonely and unpredictable course, prone to blind alleys, self doubt and frustration.

Set against this background, therefore, it is surprising that relatively few organisations to date have started to use existing IT governance frameworks to help them in their endeavours.

Indeed, the same KPMG study identified that fewer than 20% of organisations were using frameworks such as the Control Objectives for Information and Related Technology (Cobit), the Capability Maturity Model (CMM), ISO 17799 and the IT Infrastructure Library (ITIL) to assist with their IT governance implementation. Why is this?

Of course, with the possible exception of Cobit, there is no non-proprietary framework that comprehensively covers the total spectrum of structures and processes relevant to IT governance. And Cobit itself is often in danger of being regarded as the "all-purpose miracle cleaner" of IT governance frameworks in the way it has been promoted as an IT governance, process and management control and IT audit tool.

The existence of these (and other) standards has often caused some confusion with IT and business managers who often ask which of these they should use, or which is the most appropriate for their environment.

Of course it is not a simple matter of selecting the right one for your organisation. The fact is that all of these frameworks are potentially useful and, depending on your specific needs, they may be used collectively but in a practical and selective way.

Due to the confusion, the recently published management briefing from the IT Governance Institute (ITGI), which is responsible for Cobit, and the UK Office of Government Commerce (OGC) - the sponsor of ITIL - is to be welcomed. The IT Service Management Forum (itSMF) has also endorsed its content.

This joint briefing paper makes the point that to achieve alignment of best practices to business requirements, Cobit should be used at the highest level. This will provide an overall control framework based on an IT process model that should generically suit most organisations, regardless of industry or whether private or public sector. Specific practices and standards such as ITIL and ISO 17799 cover discrete areas and can be mapped up to the Cobit framework, thus providing a hierarchy of guidance materials.

Cobit has the major advantages of being globally accepted and promoted as an open standard which is available to be used by any organisation for their own IT governance and related purposes at no cost. If used intelligently, it has the flexibility to be totally adaptable to the needs of each different organisation.

A 2005 survey carried out by PricewaterhouseCoopers on behalf of the ITGI has indicated that, of those entities currently using Cobit, 75% found it either very useful or somewhat useful, with 15% undecided and less than 10% showing a negative response. The main negative issue identified by the respondents was the perceived complexity of the framework.

Most users recognise that to cover the comprehensive ground that it does, a degree of complexity is unavoidable, but this can be overcome by an initially selective implementation leading towards full implementation over a sensible period of time.

To help with this there is a "lite" version of Cobit called Cobit Quickstart which, although originally designed for small-to-medium-sized enterprises, can be used to support an initial implementation of Cobit in larger enterprises.

However, whichever framework is selected, if IT governance is going to be successful and deliver real value within your organisation, it is essential that there is a proper balance between the IT function's ability to operate in an entrepreneurial way, and seeking to comply with a set of rules and appropriate behaviours.

This is a key reason why the implementation of IT governance using a supporting framework has to be done using intelligence and discretion.

The solution has to be appropriate to the need, thus it requires a proper understanding of the business, its value drivers, its appetite for risk, the relevant regulatory framework and the corporate culture.

However, with the aid of such an understanding the use of a governance framework can significantly reduce the pain and effort required to ultimately reap the benefits of IT governance.

Sidebar

Showing the way: a mixture of frameworks such as Cobit, ITIL, CMM and ISO 17799 can help organisations with their IT governance implementations

Sidebar

It is surprising that relatively few organisations to date have started to use existing IT governance frameworks to help them in their endeavours

KEY POINTS

- * Fewer than 20% of firms using IT governance frameworks, says study
- * Frameworks can be used collectively, depending on specific needs
- * Cobit framework is globally accepted and promoted as an open standard
- * Must be proper balance between operational needs of IT and compliance

Sidebar

WHAT IS COBIT

The Control Objectives for Information and Related Technology (Cobit) is an IT governance framework and supporting toolset that allows IT managers to bridge the gap between control requirements, technical issues and business risks.

Created by the Information Systems Audit and Control Association (ISACA), and the IT Governance Institute (ITGI) in 1992, Cobit enables clear policy development and good practice for IT control throughout organisations.

Cobit provides IT managers, auditors and IT users with a set of generally accepted measures, indicators, processes and best practices to assist them in maximising the benefits derived from IT and developing appropriate IT governance and control in a company.

Guidance: although Cobit can appear complex, this can be overcome with an initially selective implementation

Sidebar

It is essential that there is a proper balance between the IT function's ability to operate in an entrepreneurial way, and seeking to comply with a set of rules and appropriate behaviours

Sidebar

More on IT governance: www.computerweekly.com/itmanagement

Author Affiliation

Paul Williams is an independent consultant specialising in IT governance, and a past international president of the IT Governance Institute

Assunto: International; Business community; Enterprisewide computing; Systems management; Standards; Models;

Localização: United Kingdom, UK

Título: A helping hand with IT governance

Autor: Williams, Paul

Título da publicação: Computer Weekly

Páginas: 26-28

Número de páginas: 2

Ano de publicação: 2006

Data de publicação: Sep 19, 2006

Ano: 2006

Seção: Management

Editora: Reed Business Information UK

Local de publicação: Sutton

País de publicação: United Kingdom

Assunto do periódico: Computers

ISSN: 00104787

CODEN: COMWAA

Tipo de fonte: Trade Journals

Idioma de publicação: English

Tipo de documento: Commentary

ID do documento ProQuest: 237020608

URL do documento: <http://search.proquest.com/docview/237020608?accountid=14643>

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Última atualização em: 2010-06-11

Base de dados: ABI/INFORM Complete

Documento 17 de 28

WHAT'S NEW IN COBIT 4.0

Autor: Bodnar, George H.

Informações da publicação:: Internal Auditing 21. 4 (Jul/Aug 2006): 37-44.

[Link para o documento do ProQuest](#)

Resumo: Control Objectives for Information and related Technology (CobiT) 4.0 is a publication that is directed at helping management discharge its responsibilities with respect to an organization's IT assets by "bridging the gaps" between business risks, control needs, and technical issues. CobiT provides "good practices" across a domain and process framework and presents activities in a manageable and logical structure. Effective IT governance has become a necessity as organizations have developed critical dependencies on IT. Reporting on IT governance involves auditing at the highest level in the organization. Sarbanes-Oxley compliance is an important area that makes CobiT extremely vital to internal audit. While it is not specifically targeted at Sarbanes-Oxley compliance, CobiT 4.0 may be used to address this issue. Indeed, one of the CobiT 4.0 byproducts issued by the IT Governance Institute is titled IT Control Objectives for Sarbanes-Oxley. This resource is primarily of interest to governance, assurance, control, and security professionals, including internal auditors and information systems auditors.

Texto completo: Headnote

The latest edition of this IT control framework will help organizations get a handle on IT governance and Sarbanes-Oxley compliance.

Management must satisfy quality, fiduciary, and security requirements for the organization's information assets as it must for all of the organization's assets. Management should also optimize the use of an organization's available resources, including information technology (IT) resources, and must understand the status of an

organization's IT systems and determine the levels of security and control that these systems should provide. CobiT 4.0 is a publication that is directed at helping management discharge its responsibilities with respect to an organization's IT assets by "bridging the gaps" between business risks, control needs, and technical issues.¹ CobiT provides "good practices" across a domain and process framework and presents activities in a manageable and logical structure. CobiT's term "good practices" means that these practices represent a consensus of IT experts. These practices will help management optimize the organization's information investments and will provide measures that may serve as benchmarks to be judged against when activities and events do not go according to plan.

CobiT development and IT governance

CobiT is an acronym for Control Objectives for Information and related Technology. It is an open standard for control over IT, available for free download online at www.isaca.org/cobit.

CobiT identifies 34 IT processes, a high-level approach to control over these processes, and 318 detailed control objectives and audit guidelines to assess the IT processes. It provides a generally applicable and accepted standard for IT security and control practices and is designed to guide and assist management in determining and monitoring the appropriate level of IT security and control for an organization.

"IT governance" is an inclusive term that encompasses the variety of elements that interact to provide IT services within an organization. These elements include communication, business, legal, and other issues, as well as management, IT users, IT staff, suppliers, auditors, and other parties. IT governance has the objective of enhancing and ensuring the efficient application of IT resources as a critical success factor.

The IT Governance Institute is the publisher of CobiT 4.0, and was the primary publisher of CobiT 3rd Edition in July 2000. The third edition expanded the work that was initially published by the Information Systems Audit and Control Foundation (ISACF) in 1996. The second edition was published two years later in 1998. Also in 1998, the Information Systems Audit and Control Association (ISACA) and the ISACF created the IT Governance Institute for the purpose of advancing the understanding and adoption of IT governance principles.

CobiT 3rd Edition reflected the influence of the IT Governance Institute through the addition of a management guidelines component and its expanded and enhanced focus on IT governance. The management guidelines were comprised of:

- * maturity models, which provided for strategic choice and benchmark comparison;
- * critical success factors, which provided for getting IT processes under control;
- * key goal indicators, which provided for monitoring achievement of IT process goals; and
- * key performance indicators, which provided for monitoring performance within each of CobiT's 34 IT processes.

CobiT 4.0 continues and enhances this work.

ISACF's control objectives served as the foundation of the first edition of CobiT. CobiT has subsequently been expanded and enhanced through the assimilation of current and emerging international technical, professional, regulatory, and industry-specific standards. The resulting control objectives are applicable to organization-wide information systems. With respect to IT, the phrase "generally applicable and accepted" is explicitly used in CobiT to have the same type of meaning as the phrase generally accepted accounting principles (GAAP) in the financial environment.

CobiT is designed to be used by management, IT users, and auditors. Management can use CobiT to assist in balancing risk and control investment in the often unpredictable IT environment. Users of IT can use CobiT to obtain assurance concerning the security and associated controls of IT services that are provided by internal or third parties. Auditors can use CobiT to substantiate their opinions and/or provide advice to management on internal controls.

Cross-references between CobiT 3rd Edition and CobiT 4.0

Development of the CobiT framework content is supervised by the CobiT Steering Committee, which consists of

international representatives from industry, academia, government, and the IT governance, assurance, control, and security professions. International working groups have been established for the purpose of quality assurance and expert review of the project's interim research and development deliverables. Overall project guidance is provided by the IT Governance Institute.

The update to the control objectives in CoMT 3rd Edition, based on new and revised international references, was conducted by members of ISACA chapters, under the guidance of the CobiT Steering Committee members. The intention was not to perform a global analysis of all material or a redevelopment of the control objectives, but to provide an incremental update process. The results of the development of the management guidelines were then used to revise the framework, especially the considerations, goals, and enabler statements of the high-level control objectives.

Appendix V of CobiT 4.0 provides crossreferences between CobiT 3rd Edition and CobiT 4.0 in three categories: framework-level changes, detailed control objectives, and management guidelines.

The major changes to the CobiT framework as a result of the CobiT 4.0 update are as follows:

- * The M domain has now become ME, standing for Monitor and Evaluate.
- * M3 and M4 in CobiT 3rd Edition have been removed, as they were audit processes.
- * ME3 is now the process related to regulatory oversight, which was previously covered by P08.
- * ME4 now covers the process of governance oversight over IT.
- * PO8 now becomes Manage Quality, the old PO11 process. The PO domain now has 10 processes instead of 11.
- * AI5 is now the procurement process. Old A15 has become AI7. The AI domain now has seven instead of six processes.

Despite these changes to the framework, there remain 34 control objectives.

Comparison of presentation format: CobiT 4.0 vs. CobiT 3rd Edition

There is a significant structural difference in the overall presentation format of CobiT 4.0 versus CobiT 3rd Edition.

In CobiT 3rd Edition, the framework, management guidelines, and control objectives were each published as a separate book. Each control objective was separately presented in each of these different books, in a format appropriate to the context. As a printed document, each management guideline was two pages. On the left-hand page, every management guideline provided a process identification statement, a goal statement, and others items, including critical success factors, key goal indicators, and key performance indicators. A maturity model was provided on the right-hand page of each guideline. The framework book had a single page for each control objective. This page illustrated a "waterfall" diagram for each control objective. The control objectives book presented detailed descriptions for each of the high-level control objectives. The control objectives book also contained the "waterfall" diagram for each high-level control objective that was in the separate framework book.

CobiT 4.0 is a single document rather than a collection of separate books. Thus, the overall presentation is integrated. The equivalent items are grouped together and presented only once for each control objective. In CobiT 4.0, each high-level control objective is presented with the following collection of items.

- * CobiT navigation diagram: This is an updated version of the "waterfall" diagrams that were presented for each control objective in CobiT 3rd Edition.
- * Detailed control objectives: These are similar and the equivalent of those contained in a separate book in CobiT 3rd Edition.
- * Management guidelines: These are presented as charts and figures, rather than narrative text.
- * Maturity model: These are very similar and the equivalent of those contained in the separate management guidelines book in CobiT 3rd Edition.

Each of these elements is compared and contrasted between 4.0 and the 3rd Edition.

Framework navigation

CobiT 4.0 navigation diagram. For each of the CobiT IT processes, a high-level control objective statement is provided, together with key goals and metrics in the form of a waterfall diagram. Each framework step is successively indented to give the diagram a waterfall-like appearance, as shown in Exhibit 1.

In addition, each of the corners in the diagram contains a graphic that provides additional context:

- * In the upper left corner, a 3-D bar chart of information criteria is shown with the following labels in individual bars: Effectiveness, Efficiency, Confidentiality, Integrity, Availability, Compliance, and Reliability. In each diagram, one of these criteria is indicated as primary and another as secondary by including P or S on the bar that contains the criteria.
- * In the upper right corner, the four CobiT domains are shown in button-like graphics: Plan and Organize, Acquire and Implement, Deliver and Support, and Monitor and Evaluate. The relevant domain is indicated with an enlarged button.
- * In the lower left corner, a pentangle figure of IT governance focus areas is shown with the following labels in individual segments: Strategic Alignment, Performance Measurement, Value Delivery, Risk Management, and Resource Management. One of these focus areas is indicated as primary and another as secondary by shading the appropriate segment P (dark) or S (gray).



- * In the lower right corner, a 3-D bar chart of IT resources appears with the following labels in individual bars: Applications, Information, Infrastructure, and People. Checkmarks indicate resources that are of concern to the process.

Comparison to CobiT 3rd Edition navigation diagram. The navigation diagram as it appeared in the 3rd Edition is also shown in Exhibit 1. The obvious difference is that there are four rather than five steps. The second step, "which satisfy business requirements," has been expanded to two steps in CobiT 4.0, "that satisfies the business requirement for IT of/summary of most important business goals" and "by focusing on/summary of most important IT goals." The third and fourth steps, "is enabled by/control statements" and "considering/control practices," is changed in CobiT 4.0 to "is achieved by/key controls" and "and is measured by/key metrics." The change of the last step highlights the fact that one of the major changes has been the effort to make metrics more representative and measurable.

Only three of the corners in the 3rd Edition contained a graphic-the lower left corner was empty. Thus, the pentangle figure of IT governance focus areas is new in CobiT 4.0. Also, in the lower right corner, the 3-D bar chart of IT resources listed five resources: People, Applications, Technology, Facilities, and Data. The change

to four resources in CobiT 4.0 means that Information and Infrastructure replace Technology, Facilities, and Data.

Detailed control objectives

The updating of the CobiT framework has significantly changed the detailed control objectives within it. These components have been reduced by almost one third, from 318 to 215. This reduction occurs as all generic materials are now retained only at the framework level and are not repeated in each process. Also, all references to applications controls were moved to the framework and specific control objectives were aggregated into new statements. In order to support transitional activity in relation to control objectives, Appendix V of CobiT 4.0 contains two detailed tables that provide cross-references between the two sets of detailed control objectives.

Management guidelines

The presentation of management guidelines has both changed and expanded in CobiT 4.0. The management guidelines component was first included in the 3rd Edition and demonstrated the expanded and enhanced focus on IT governance. The guidelines were the result of research conducted by industry experts, analysts, and academics from around the world. They addressed management's need for control and measurability of IT by providing tools to assess and measure an organization's IT environment against the 34 IT processes identified by CobiT.

Overall risk management and assurance are dependent on specific management practices. In order to successfully discharge its obligations, management requires condensed and up-to-date information that enables it to make difficult decisions on risk and control in a timely fashion. Conceptually, this process is likened to the use of dashboards to "keep the ship on course," scorecards to achieve results that are satisfactory for the largest possible group of stakeholders, and benchmarking to enable the organization to adapt to trends and developments in the environment. Dashboards are constructed with indicators, scorecards record measurements, and benchmarking implies and thus requires some type of measurement scale to enable comparison.

As first issued in the 3rd Edition, the management guidelines were comprised of maturity models, critical success factors, key goal indicators, and key performance indicators. Maturity models provided for strategic choice and benchmark comparison. Critical success factors provided for getting IT processes under control. Key goal indicators provided for monitoring achievement of IT process goals. Finally, Key performance indicators provided for monitoring performance within each of CobiT's 34 IT processes.

As CobiT 4.0 is the first revision to CobiT since the original issuance of the management guidelines, it is not surprising that these have been significantly modified. Stated changes are summarized as follows:

- * Inputs and outputs have been added to illustrate what processes require from other processes and what the processes typically deliver.
- * Activities and associated responsibilities have also been provided.
- * Inputs and activity goals replace the critical success factors of CobiT 3rd Edition.
- * Metrics are now based on a consistent cascade of business goals, IT goals, process goals, and activity goals.
- * The CobiT 3rd Edition metrics set has also been reviewed and enhanced to make it more representative and measurable.

It is noted that while this material is collected from hundreds of experts, following rigorous research and review, the inputs, outputs, responsibilities, metrics, and goals are illustrative but not prescriptive or exhaustive. They provide a basis of expert knowledge from which each enterprise should select what efficiently and effectively applies to it based on enterprise strategy, goals, and policies.

Inputs, outputs, and activities. Inputs, outputs, and activities collectively replace the critical success factors of CobiT 3rd Edition. Critical success factors provided for getting IT processes under control. They consisted of important activities that contribute to the IT process achieving its goals, and could be strategic, technical,

organizational, process, or procedural in nature. The "critical success factors" concept in CobiT 3rd Edition was likened to a standard feedback control system in which one sets room temperature (the standard) and the heating system (process) constantly checks (compares) temperature (the control information) and will signal (act) the heating system to provide more heat. The following were examples of critical success factors that usually would apply to any process: defined and documented processes, defined and documented policies, clear accountabilities, and consistent measurement practices.

In CobiT 4.0, the process inputs indicate what the process owner needs from other processes. Inputs are presented in a two-column table indicating the source of the input and the input in question. As an illustration, the first two of the eight inputs for process PO1, Define a Strategic IT Plan, are cost/benefits reports and risk assessment.

The process outputs are what the process owner has to deliver. This is also presented as a table. The first column indicates the output, while subsequent columns may vary in number and indicate the destination of the output. As an illustration, the first two of the six outputs for process PO1 are strategic IT plan and tactical IT plan.

Documentation and assignment of activities in a RACI chart is a new feature in CobiT 4.0. A RACI chart identifies who is Responsible, Accountable, Consulted, and/or Informed. Activities are listed in the first column of the chart, while subsequent columns identify functions that receive assignments. The roles in the RACI chart include the CEO, CFO, executives, the CIO, and business process owners, among others, including compliance, audit, risk, and security-functions with control responsibilities but which do not have operational IT responsibilities. For example, the first activity in the RACI chart for process PO1 is "Link business goals to IT goals," which is assigned as follows: CEO-C (consulted); CFO-I (informed); business executive-A/R (accountable/ responsible); CIO-R (responsible); and business process owner-C (consulted).

Goals and metrics. Goals and metrics show how the process should be measured. The presentation of this material in CobiT 4.0 has been restructured to emphasize goals within each process. Activity goals are measured by key performance indicators (KPIs). Process and IT goals are measured by key goal indicators (KGIs). CobiT 3rd Edition emphasized the metrics within each process; critical success factors, KPIs, and KGIs were each presented as separate tables and goals were not explicitly specified.

KPIs are measures that indicate that a process is achieving its business requirements by monitoring the performance of the enablers of the process. They are lead indicators of whether or not a goal will likely be reached. KPIs are process-oriented and often express how well resources are utilized. They are usually expressed as a number or percentage. A "good" KPI will accurately predict success or failure of attaining a process goal. KPIs are concerned with "how," and should have a cause-and-effect relationship with the KGIs of an activity. As an illustration, the following are the KPIs shown for the activity goals for process PO1:

- * delay between updates of business strategic/tactical plan and updates of IT strategic/tactical plan;
- * percentage of strategic/tactical IT plan meetings where business representatives have actively participated;
- * delay between updates of IT strategic plan and updates of IT tactical plans;
- * percentage of tactical IT plans complying with the predefined structure/contents of those plans; and
- * percentage of IT initiatives/projects championed by business owners.

KGIs are representations of the goals of an IT process-they are targets to be achieved and measurable indicators of the process achieving its goals. KGIs are lag indicators, as they can only be measured after the fact. They are usually expressed in positive terms but may be expressed negatively, i.e., in terms of the impact of not attaining a goal. They should be explicit and measurable as a number or percentage. Management should set specific targets that need to be met, taking into account the past performance and future goals of an IT process. As an illustration, the following are the KGIs shown for the process PO1:

Process KGIs:

- * percentage of IT objectives in the IT strategic plan that support the strategic business plan;

- * percentage of IT initiatives in the IT tactical plan that support the tactical business plan; and
- * percentage of IT projects in the IT project portfolio that can be directly traced back to the IT tactical plan.

IT KGIs:

- * degree of approval of business owners of the IT strategic/tactical plans;
- * degree of compliance with business and governance requirements; and
- * level of satisfaction of the business with the current state (number, scope, etc.) of the project and applications portfolio.

Maturity models

In CoMT 4.0, the maturity model component is the capstone of the management guidelines presentation. It is used to evaluate an organization's relative level of achievement of IT governance. The defined levels in the scale are numbered 0 to 5, ranging from nonexistent (0) to optimized (5). The overall structure of this important component is the same as it was in CobiT 3rd Edition.

The maturity model shows what has to be done to improve. Risk and controls in IT management processes are inherently subjective and imprecise topics that are not amenable to the more mechanistic approach that is found in the maturity models for software engineering. Scales need to be practical to apply and reasonably easy to understand. The advantage of a maturity model approach is that it is relatively easy for members of management to place themselves on the scale and appreciate what is involved if they need to improve performance. The 0-5 scale indicates how a process evolves from nonexistent to optimized. The scale includes 0 because it is quite possible that no process exists at all.

CobiT 4.0 provides generic, qualitative descriptions of the six levels (0 to 5) in its maturity model. (See Exhibit 2.) The generic model is identical to the model in CobiT 3rd Edition. An organization might use a similar but different maturity model. CobiT suggests that whatever model an organization decides to use, the scales should not be too granular. Too many levels would make the model difficult to use and, more important, suggest a precision that is not justifiable. Rather, management should concentrate on maturity levels based on a set of conditions that can be met unambiguously.

The maturity model offers a way of measuring how well developed management processes are and how well developed they should be. Management can map each of CobiT's 34 processes to the levels defined in the maturity model to determine:

- * the organization's current status-where it is today;



- * the current status of the "best-in-class" in the industry-the benchmark;
- * the current status of international standards-an additional comparison; and
- * the organization's strategy for improvement-where the organization wants to be.

The maturity model scale is used to quantify and illustrate what is inherently a subjective evaluation. Using the maturity model for a process, multiple parties share this quantification experience by using the same measurement scale. This should help internal audit professionals explain to managers where IT management shortcomings exist and set targets for where they need to be by comparing their organization's control practices to the best-practice examples. The organization's business objectives and environment influence the appropriate maturity level for any process. The organization's dependence on IT, the level of technological sophistication, and the value of its information will determine the appropriate level of control maturity.

The importance of CobiT to internal audit

The IT governance auditing guideline. IT governance is the central focus of CobiT. The Information Systems (IS) Auditing Guideline "IT Governance," promulgated by ISACA, has been effective for all information systems audits since July 1, 2002. IS Auditing Guidelines provide guidance in applying IS Auditing Standards. Though not mandatory, certified IS auditors are expected to be prepared to justify a departure from the guidelines. This guideline provides a framework for an audit of IT governance in an organization. It discusses the appropriate organizational position of the IS auditor who is to undertake the audit, issues to consider when planning the audit, and evidence to review when performing the audit.

Discussion of the need for the guideline begins with several statements drawn from the executive summary in CobiT 3rd Edition that concern the general nature of organizational and management responsibilities. Effective IT governance has become a necessity as organizations have developed critical dependencies on IT.

Reporting on IT governance involves auditing at the highest level in the organization. The IS auditor should confirm that the terms of reference of an IT governance audit state the scope of work, the reporting line to be used where IT governance issues are identified to the highest level of the organization, and the IS auditor's right of access to information. The IS auditor should consider whether his or her organizational status is appropriate for the nature of the planned audit of IT governance. Where this is not considered to be the case, the appropriate level of management should consider the hiring of an independent third party to manage or perform the audit of IT governance.

The Sarbanes-Oxley Act. Sarbanes-Oxley compliance is an important area that makes CobiT extremely vital to internal audit. While it is not specifically targeted at Sarbanes-Oxley compliance, CobiT 4.0 may be used to address this issue. Indeed, one of the CobiT 4.0 byproducts issued by the IT Governance Institute is titled IT Control Objectives for Sarbanes-Oxley. This resource is primarily of interest to governance, assurance, control, and security professionals, including internal auditors and IS auditors. It provides guidance on how to ensure Sarbanes-Oxley compliance for the IT environment based on the CobiT control objectives and addresses the importance of IT in the design, implementation, and sustainability of internal control over disclosure and financial reporting.

Technology is a vital component of every organization's efforts to comply with the Sarbanes-Oxley Act. The importance of IT controls is implicit in the COSO internal control framework, but IT managers and internal auditors need detailed guidelines to establish, document, and/or evaluate their company's controls. CobiT 4.0 is an IT control framework built in part upon the COSO internal control framework. For Sarbanes-Oxley attestation, corporations must be sure that the IT systems that house, move, and transform data are secure. The CobiT framework was designed to address these IT concerns. Thus, CobiT can help IT managers and auditors address specific control objectives for Sarbanes-Oxley compliance.²

Although the SEC suggests that public companies consider the control components of the COSO framework when seeking to comply with the Sarbanes-Oxley Act, neither the SEC nor the Public Company Accounting Oversight Board has openly endorsed a specific IT control framework. Thus, practical questions exist

concerning the relationship and alignment between the COSO internal control framework and CobiT 4.0, and guidance is required. Interested readers can refer to the IT Governance Institute's IT Control Objectives for Sarbanes-Oxley and Sally Chan's article "Mapping COSO and CobiT for Sarbanes-Oxley Compliance," which maps COSO internal control components to CobiT domains, though this refers to CobiT 3rd Edition.³

Sidebar

AUDITORS CAN USE COBIT TO SUBSTANTIATE THEIR OPINIONS AND/OR PROVIDE ADVICE TO MANAGEMENT ON INTERNAL CONTROLS.

Sidebar

AS COBIT 4.0 IS THE FIRST REVISION TO COBIT SINCE THE ORIGINAL ISSUANCE OF THE MANAGEMENT GUIDELINES, IT IS NOT SURPRISING THAT THESE HAVE BEEN SIGNIFICANTLY MODIFIED.

Sidebar

MANAGEMENT SHOULD SET SPECIFIC TARGETS THAT NEED TO BE MET, TAKING INTO ACCOUNT THE PAST PERFORMANCE AND FUTURE GOALS OF AN IT PROCESS.

REPORTING ON IT GOVERNANCE INVOLVES AUDITING AT THE HIGHEST LEVEL IN THE ORGANIZATION.

Footnote

NOTES

1 The IT Governance Institute, CobiT 4.0 (Control Objectives for Information and Related Technology) (Rolling Meadows, IL: The IT Governance Institute, 2005).

2 See, e.g., IBM-Tivoli Group, "Addressing the Key Implications of Sarbanes-Oxley," available online at The Business Forum, www.bizforum.org/whitepapers/ibm.htm (accessed June 2006).

3 See Sally Chan, "Mapping COSO and CobiT for Sarbanes-Oxley Compliance" (October 1, 2004), available online at IT Audit, www.theiia.org/ITAudit/?act=itaudit.archive&fid=5553 (accessed June 2006).

AuthorAffiliation

GEORGE H. BODNAR, Ph.D., is an associate professor at Duquesne University's A.J. Palumbo School of Business. He received his doctorate from the Wharton School. Dr. Bodnar can be contacted via e-mail at bodnar@duq.edu.

Assunto: Information technology; Information control; Best practice; Internal auditing; Public Company Accounting Reform&Investor Protection Act 2002-US;

Localização: United States--US

Classificação: 9190: United States, 5220: Information technology management, 4320: Legislation, 4130: Auditing

Título: WHAT'S NEW IN COBIT 4.0

Autor: Bodnar, George H

Título da publicação: Internal Auditing

Volume: 21

Edição: 4

Páginas: 37-44

Número de páginas: 8

Ano de publicação: 2006

Data de publicação: Jul/Aug 2006

Ano: 2006

Editora: Thomson Professional and Regulatory Services, Inc.

Local de publicação: Boston

País de publicação: United States

Assunto do periódico: Business And Economics--Accounting

ISSN: 08970378

Tipo de fonte: Trade Journals

Idioma de publicação: English

Tipo de documento: Feature

ID do documento ProQuest: 214394090

URL do documento: <http://search.proquest.com/docview/214394090?accountid=14643>

Copyright: Copyright Thomson Tax and Accounting d/b/a RIA Jul/Aug 2006

Última atualização em: 2010-06-08

Base de dados: 2 bases de dados; -ABI/INFORM Complete; -ProQuest Hospital Collection; ;

Documento 18 de 28

How IT Governance Is Changing

Autor: Khan, Kamal.

Informações da publicação:: The Journal of Corporate Accounting & Finance 17. 5 (Jul/Aug 2006): 21-25.

[Link para o documento do ProQuest](#)

Resumo: IT governance must be a top concern that appears on the board agenda and is regularly addressed by senior executives in cooperation with finance and the IT and IT security departments. After a series of major international business scandals, legislation such as the Sarbanes-Oxley Act increased requirements for control of information and increased scrutiny of the IT processes that underlie the financial systems of organizations. One key facet of ensuring governance and control over IT is providing adequate security for an organization's information and IT. Financial and IT managers around the world have increased focus on implementing data-storage networks to help them manage data more efficiently and cost-effectively. The IT Governance Institute developed COBIT 4.0, an internationally recognized framework for governance, security, and control over IT. It

is necessary for senior executives and board members to give attention to IT governance. Boards and management should be informed of the many reasons IT needs to be governed.

Assunto: Information technology; Corporate governance; Risk management; Data integrity; Information storage;

Localização: United States, US

Título: How IT Governance Is Changing

Autor: Khan, Kamal

Título da publicação: The Journal of Corporate Accounting&Finance

Volume: 17

Edição: 5

Páginas: 21-25

Ano de publicação: 2006

Data de publicação: Jul/Aug 2006

Ano: 2006

Editora: Wiley Periodicals Inc.

Local de publicação: Hoboken

País de publicação: United States

Assunto do periódico: Business And Economics, Business And Economics--Banking And Finance, Business And Economics--Accounting

ISSN: 10448136

Tipo de fonte: Trade Journals

Idioma de publicação: English

Tipo de documento: Feature

Artigo principal do documento: tables;references

ID do documento ProQuest: 201627969

URL do documento: <http://search.proquest.com/docview/201627969?accountid=14643>

Copyright: Copyright Wiley Periodicals Inc. Jul/Aug 2006

Última atualização em: 2012-01-26

Base de dados: 2 bases de dados; -ABI/INFORM Complete; -ProQuest Hospital Collection; ;

Documento 19 de 28

IT Auditors Turn to Cobit for Sarb-Ox Guidance

Autor: Thibodeau, Patrick.

Informações da publicação:: Computerworld 40. 20 (15 May 2006): 9-9.

[Link para o documento do ProQuest](#)

Resumo: Increasingly, to keep themselves and their companies out of trouble, IT auditors are going by the book -- the Cobit book on IT governance. Cobit, formally known as the Control Objectives for Information and Related Technology, is a framework for governing IT and evaluating internal system controls. The guidelines have been around since the early 1990s, but the need to comply with the Sarbanes-Oxley Act is fostering new interest in them. The framework also gives IT and business managers a common language on system controls. Cobit takes issues to a higher level inside a company by focusing on meeting business needs.

Texto completo: _TVM:UNDEFINED_

Termo do artigo :

Termo do assunto: Information technology, Control systems, Books, Business, Control equipment, Meetings, Guidelines, Focusing

Classificação: B9: World Industry News, Company Information, General Issues (MB), 90: Computing Milieux (General) (CI)

Identificador / palavra-chave: Article

Título: IT Auditors Turn to Cobit for Sarb-Ox Guidance

Autor: Thibodeau, Patrick

Autor da correspondência: Thibodeau, Patrick

Título da publicação: Computerworld

Volume: 40

Edição: 20

Páginas: 9-9

Número de páginas: 1

Data de publicação: 15 May 2006

Ano de publicação: 2006

Ano: 2006

Editora: Computerworld, Inc.

ISSN: 0010-4841

Tipo de fonte: Scholarly Journals

Idioma de publicação: English

Tipo de documento: Journal Article

Subarquivo: Materials Business File (MB); Computer&Information Systems (CI)

Atualizar: 2010-01-01

Número de registro: 201001-B9-0148558 (MB), 201001-90-0134957 (CI)

ID do documento ProQuest: 36276245

URL do documento: <http://search.proquest.com/docview/36276245?accountid=14643>

Última atualização em: 2011-11-14

Base de dados: Technology Research Database

Documento 20 de 28

Sorting The Standards

Autor: Violino, Bob.

Informações da publicação:: Computerworld 40. 16 (Apr 17, 2006): 46-47.

[Link para o documento do ProQuest](#)

Resumo: Many companies are using standards and frameworks to deal with certain aspects of information security. Some of the most popular ones, including the Control Objectives for Information and Related Technology (Cobit), ISO 27001, the IT Infrastructure Library (ITIL) and Statement on Auditing Standards (SAS) No. 70, offer guidelines for improving some elements of security. Developed in 1996 by the Information Systems Audit & Control Association and the IT Governance Institute, Cobit provides a framework for users and IT, security and auditing managers. ISO 27001 (Information Security Management -- Specification With Guidance for Use) is designed to help organizations establish and maintain effective information security controls through continual improvements. ITIL is more of an operations standard, something you use to improve the maturity of your IT operations. A SAS 70 audit shows whether an independent accounting and auditing firm has examined a service provider's controls for IT and related processes.

Texto completo: Headnote

Like pieces of a puzzle, frameworks help companies meet specific security goals. By Bob Violino
MANY COMPANIES are using standards and frameworks to deal with certain aspects of information security, These models can help protect systems and data, but each plays a very different role in an overall security plan.

Some of the most popular ones, including the Control Objectives for Information and Related Technology (Cobit), ISO 27001, the IT Infrastructure Library (ITIL) and Statement on Auditing Standards (SAS) No. 70, offer guidelines for improving some elements of security. But experts say these models are more like pieces of a puzzle than comprehensive security standards.

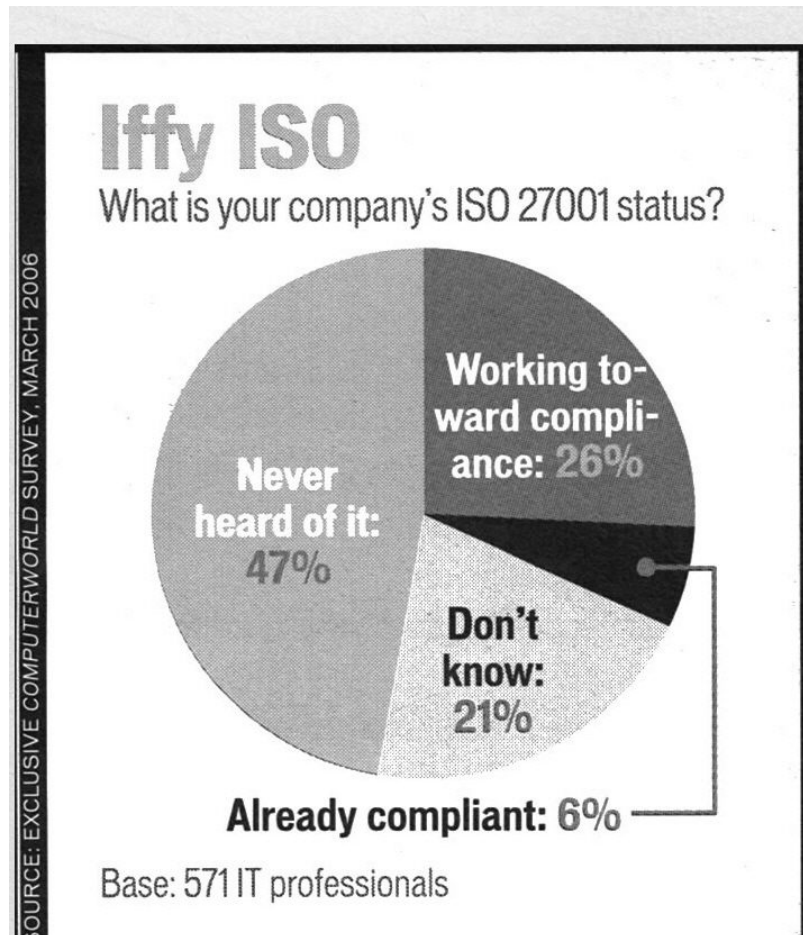
"All of these frameworks supply IT with repeatable processes that are consistent across the various IT functions" and help technology executives provide better service, says Kimberly Sawyer, vice president of computing and network services at Lockheed Martin Corp.'s IT department, known as Enterprise Information Systems, in Orlando.

But none of the standards alone provides full security, Sawyer says. "They contain various information security concepts that must be interpreted, integrated and incorporated into the daily operations," she says.

"Comprehensive security requires discipline and integration across all aspects of planning, service delivery, risk

management architecture, tool selection, policy development and audits."

Lockheed Martin is using Cobit, ITIL and ISO 27001 for different purposes: Cobit for measuring and assessing IT controls, ITIL to improve internal IT services, and ISO 27001 for IT governance. Although each helps to bolster security, none is a stand-alone solution, Sawyer says. "IT organizations must integrate the frameworks to ensure [that] best practices are integrated across the information security discipline," she says.



Here's a look at some of the key standards and their roles in a security plan.

Cobit

Developed in 1996 by the Information Systems Audit and Control Association and the IT Governance Institute, Cobit provides a framework for users and IT, security and auditing managers. It's gaining acceptance as a good practice for controlling data, systems and related risks.

"Cobit has enabled us to more systematically approach audit issues to identify root causes of deficiencies," says Sawyer.

The framework includes tools to measure a company's capabilities in 34 IT processes. Among them are a list of critical success factors that provides best practices for each IT process, maturity models to help in benchmarking and performance-measurement elements. The standard is becoming vital as companies strive to comply with regulations such as the Sarbanes-Oxley Act.

"Cobit only has one security module, but when you look at [the standard] from a broad perspective, it addresses a lot of elements of security," says Mike Nelson, president of secureNet Technologies Inc., a consulting firm in San Ramon, Calif., that focuses on information security. "Where it begins to break down is in providing details of the 'how.' It gives detail of controls and objectives of controls" but doesn't explain how to implement them, he

says.

ISO 27001

ISO 27001 (Information security Management - Specification With Guidance for Use) provides more of the detail that's needed, Nelson says. The standard, which is based on an earlier standard, ISO 17799, is designed to help organizations establish and maintain effective information security controls through continual improvements.

Developed in October 2005 by the International Standards Organization, ISO 27001 implements principles of the Organization for Economic Cooperation and Development on governing the security of information and networks. The standard creates a road map for the secure design, implementation, management and maintenance of IT processes in an organization.

"ISO 27001 is a laundry list of controls; it gives more of framework for an effective security program," says Paul Proctor, an analyst at Gartner Inc. in Stamford, Conn. "Cobit and ISO 27001 are the most popular [standards] out there."

ITIL

ITIL is a set of best practices, published as books designed to help reduce the cost of using technology and to improve the quality of services delivered throughout the organization. ITIL consists of rules on how to deliver services more efficiently by improving management processes across IT departments that support networks, applications and databases.

In the late 1980s, the U.K. Office of Government Commerce developed the standards for service providers to follow in delivering IT services to the British government. ITIL covers seven main areas: service support, service delivery, planning to implement service management, infrastructure management for IT and communications technology, applications management, security management, and the business perspective.

"ITIL is strong in process management and delivery but fairly narrowly focused on those areas," says Nelson. "It only peripherally deals with security as a component in service management. From a pure security point of view, it's relatively weak, but it was not designed to address that."

Adds Proctor, "Cobit is better for meeting regulatory [requirements]. ITIL is more of an operations standard, something you use to improve the maturity of your IT operations. We find a lot of companies either choose ITIL or Cobit. Some do both, but that is rare."

Ruben Melendez says ITIL is becoming the standard of choice for many vendors and is useful for improving security. He is president of The Glomark Group Inc., a consulting firm in Columbus, Ohio, that works with IT vendors and end-user organizations to develop return-on-investment strategies.

"The companies I've worked with are all ITIL implementers," Melendez says. "We've done a lot of work with [CA] on security-related products. If you look at their literature, when they talk about security, they emphasize ITIL and not the others."

According to Melendez, other vendors pushing ITIL include Microsoft Corp., Intel Corp. and Oracle Corp.

SAS 70

SAS 70 is an auditing standard that was created by the American Institute of Certified Public Accountants (AICPA) in 1992. A SAS 70 audit shows whether an independent accounting and auditing firm has examined a service provider's controls for IT and related processes.

SAS 70 isn't a predetermined set of control objectives or activities. Auditors must follow the AICPA's standards for fieldwork, quality control and reporting and issue a formal report to the service provider that includes the auditor's opinion once the audit is completed.

There are two types of reports: one describes a service provider's controls at a specific point in time, and the other describes the controls and includes detailed testing of the service provider's control activities and processes over a minimum six-month period.

Service providers must demonstrate that they have adequate safeguards when they host or process client

information. SAS 70 enables service organizations to disclose their controls to their clients and their clients' auditors in a uniform reporting format.

The benefit to companies is that they receive detailed information about a service provider's controls and an independent assessment of whether the controls are operating effectively. They can present this information to their own auditors when necessary.

SAS 70 lets organizations know if their existing controls are working, but it doesn't tell them if all the right controls are in place, Nelson says.

Each of these standards has a potential role to play in helping organizations protect their systems and data.

Companies that are looking to create an overall security strategy need to explore the frameworks to see which provides the best fit.

AuthorAffiliation

Violino is a freelance writer in Massapequa Park, N.Y. Contact him at bviolino@optonline.net.

Assunto: Computer security; Information technology; Statements on auditing standards; Technology standards; Information control; ISO standards;

Localização: United States--US

Classificação: 9190: United States, 5220: Information technology management, 5140: Security management, 4130: Auditing

Título: Sorting The Standards

Autor: Violino, Bob

Título da publicação: Computerworld

Volume: 40

Edição: 16

Páginas: 46-47

Número de páginas: 2

Ano de publicação: 2006

Data de publicação: Apr 17, 2006

Ano: 2006

Seção: KNOWLEDGE CENTER SECURITY

Editora: Computerworld, Inc.

Local de publicação: Framingham

País de publicação: United States

Assunto do periódico: Computers--Microcomputers, Computers--Personal Computers, Computers

ISSN: 00104841

CODEN: CMPWAB

Tipo de fonte: Trade Journals

Idioma de publicação: English

Tipo de documento: Feature

Artigo principal do documento: Charts

ID do documento ProQuest: 216101657

URL do documento: <http://search.proquest.com/docview/216101657?accountid=14643>

Copyright: Copyright Computerworld Inc. Apr 17, 2006

Última atualização em: 2010-06-09

Base de dados: ABI/INFORM Complete

Documento 21 de 28

Using IT Governance

Autor: Brobst, Jan; Council, Chip.

Informações da publicação:: Community College Journal 76. 2 (Oct 2005): 30-33.

[Link para o documento do ProQuest](#)

Resumo: The discussion in this article is intended to provide an examination of why top management, IT management, and internal auditors should be interested in IT governance. Some aspects of IT management will be described including implementation, auditing, availability, security, and alignment. One governance framework, COBIT, will be utilized as a sample framework.

Assunto: Audits (Verification); Information Technology; Administration; Governance; Computer Security; Community Colleges; Higher Education;

Identificador / palavra-chave: Iowa, Louisiana, Higher Education, Two Year Colleges

Nível de escolaridade: Higher Education, Two Year Colleges

Título: Using IT Governance

Autor: Brobst, Jan; Council, Chip

Autor da correspondência: Brobst, Jan

Título da publicação: Community College Journal

Volume: 76

Edição: 2

Páginas: 30-33

Número de páginas: 4

Ano de publicação: 2005

Ano: 2005

Editora: American Association of Community Colleges. One Dupont Circle NW Suite 410, Washington, DC 20036. Tel: 202-728-0200; Fax: 202-833-2467; Web site: <http://www.aacc.nche.edu/bookstore>

ISSN: 1067-1803

Tipo de fonte: Scholarly Journals

Revisado por especialistas: Sim

Idioma de publicação: English

Tipo de documento: 141 Reports: Descriptive, 080 Journal Articles

Número de registro: EJ847684

ID do documento ProQuest: 61843890

URL do documento: <http://search.proquest.com/docview/61843890?accountid=14643>

Última atualização em: 2011-09-15

Base de dados: ERIC

Documento 22 de 28

A model for CIO success

Autor: McFarlane, Graham J.

Informações da publicação:: CIO Canada 13. 7 (Jul 2005): n/a.

[Link para o documento do ProQuest](#)

Resumo: The IT management framework under COBIT helps facilitate the dialogue with senior management. Not only does it educate executives about IT service and project delivery, but it also prompts worthwhile discussion on senior management's role and decision privileges in overall IT governance. In addition, the CIO and senior management now have a framework for discussions with the Board of Directors, who typically are becoming increasingly concerned about governance on all fronts.

Internal and external auditors should find these frameworks invaluable in working with IT leadership to plan and scope audit programs and to discuss their priorities. Furthermore, there is now a framework to determine control points and objectives for compliance with external regulators. Auditor cooperation, using the COBIT framework, can be enlisted in helping to control "rogue" IT activities in the organization. Often, in IT shops, there are friction points among groups over roles and responsibilities during service delivery or decisionmaking. Sometimes this occurs with outsourcers in trying to determine the scope of their process responsibilities, input into other processes, and decisionmaking powers. A management framework can lend focus to the discussion in trying to reconcile these problems.

Texto completo: For well over 25 years, we have been besieged with methodologies, particularly in the application development and project management domains. During the last few years, however, it has been refreshing to see new management-oriented models emerging. These range from detailed process guides for

infrastructure services delivery and support (e.g., ITIL - Information Technology Infrastructure Library), to methods of measuring maturity in various disciplines (e.g., CMM - Capability Maturity Models), to high-level IT governance models, such as COBIT (Control Objectives for IT).

COBIT is particularly interesting as it approaches the management of IT from the perspective of the CIO. It demonstrates the functional breakdown of the IT business (planning and organizing, acquisition and implementation, delivery and support) and the processes required to successfully execute each function (34 processes in all). In essence it describes the complete IT lifecycle from a management perspective.

It is particularly valuable in that it not only describes processes in detail, but also outlines their control objectives and critical quality criteria. It also provides a guideline for self-assessing your level of maturity in executing each process.

I am finding there is tremendous interest in this model, mainly from the perspective of the control objectives for each process. Largely, this is driven by the need to demonstrate adequate control mechanisms in IT management for regulatory compliance (e.g., Sarbanes- Oxley). In my work with these models, however, I think their value goes well beyond this.

Value of a management framework

The COBIT model provides a common vocabulary for an IT leadership team to discuss the business of IT. Once it is understood by each team member, there should be little need for clarification over process terminology or in-scope activities. Furthermore, a leadership team could do its own self-assessment on the level of maturity it has reached for each process and its desired level of maturity. In turn, this allows the team to determine priorities for continuous improvement programs within the IT shop.

The IT management framework under COBIT helps facilitate the dialogue with senior management. Not only does it educate executives about IT service and project delivery, but it also prompts worthwhile discussion on senior management's role and decision privileges in overall IT governance. In addition, the CIO and senior management now have a framework for discussions with the Board of Directors, who typically are becoming increasingly concerned about governance on all fronts.

COBIT and the business

The business (user) community should be introduced to an IT management framework to learn more about how IT services are delivered and how the business can most effectively work with IT service providers. The business community, of course, participates in several of these processes. Having a generally accepted framework could lead to more fruitful discussions on roles and responsibilities in both project and day-to-day service delivery.

Internal and external auditors should find these frameworks invaluable in working with IT leadership to plan and scope audit programs and to discuss their priorities. Furthermore, there is now a framework to determine control points and objectives for compliance with external regulators. Auditor cooperation, using the COBIT framework, can be enlisted in helping to control "rogue" IT activities in the organization. Often, in IT shops, there are friction points among groups over roles and responsibilities during service delivery or decisionmaking. Sometimes this occurs with outsourcers in trying to determine the scope of their process responsibilities, input into other processes, and decisionmaking powers. A management framework can lend focus to the discussion in trying to reconcile these problems.

Having a standard IT management framework model has several benefits in furthering the understanding of the IT business with internal and external stakeholders. It can be an invaluable tool for most CIOs.

-- Graham J. McFarlane, P.Eng., ISP, FCMC is a consultant who has worked with IT management, both in Canada and internationally, since 1978, focusing on improving IT effectiveness. Prior to this, he spent ten years with IBM Canada.

Assunto: Management; Information technology; Chief information officers;

Classificação: 9172: Canada

Título: A model for CIO success

Autor: McFarlane, Graham J

Título da publicação: CIO Canada

Volume: 13

Edição: 7

Páginas: n/a

Ano de publicação: 2005

Data de publicação: Jul 2005

Ano: 2005

Editora: Laurentian Technomedia Inc.

Local de publicação: Downsview

País de publicação: Canada

Assunto do periódico: Business And Economics--Computer Applications

ISSN: 11956097

Tipo de fonte: Trade Journals

Idioma de publicação: English

Tipo de documento: Commentary

ID do documento ProQuest: 217431727

URL do documento: <http://search.proquest.com/docview/217431727?accountid=14643>

Copyright: Copyright Laurentian Technomedia Inc. Jul 2005

Última atualização em: 2010-06-09

Base de dados: ABI/INFORM Complete

Documento 23 de 28

Evolving technology barbarians will need new tools to prove their value to the board

Autor: Jennings, Tim.

Informações da publicação:: Computer Weekly (Feb 22, 2005): 26.

[Link para o documento do ProQuest](#)

Resumo: For governance, the Control Objectives for Information and Related Technology (Cobit) provide a reference framework for IT governance, information control and security. Issued by industry body the IT Governance Institute, Cobit comprises a process model and 34 high-level controls to achieve, spanning all areas of IT management.

Texto completo: Headnote

MEASUREMENT Changing CIO role shows limits of traditional approach to measuring IT
Headnote

Opinion

There is an adage that as a young company matures, its leadership evolves from being barbarians to bureaucrats, and a similar shift is currently taking place within the IT function of many organisations. Whereas in the past, IT has not been seen to be subject to quite the same rules as other business functions, it is now being required to demonstrate its value to the organisation, to maintain the disciplines of planning, budgeting and cost management, and to assess and mitigate any potential risks to the organisation, in the same way as other departments.

As the leader of the IT function, the focus of the chief information officer is therefore turning further away from the detail of technology such as server availability, network performance and application functionality. Instead it is moving towards the strategic issues of IT budgeting and investment planning, governance, service quality, risk management and outsourcing.

Most business functions have well-established methodologies for cost and value measurement. However, enlightened CIOs seeking to prove their worth are finding a distinct lack of recognised tools and procedures that can be applied to this task.

Where chief financial officers have the Generally Accepted Accounting Principles, production directors have quality control and improvement techniques, and sales directors can rely on revenue figures, the tools available to the CIO still have a technology bias.

At the lowest level, technology management tools abound - systems management, application lifecycle management and performance management being examples.

For IT service management there is the Information Technology Infrastructure Library (ITIL), developed by the government's Central Computer and Telecommunications Agency in the late 1980s, and now managed by the Office of Government Commerce. ITIL defines a best practice framework for the management and delivery of IT services.

For governance, the Control Objectives for Information and Related Technology (Cobit) provide a reference framework for IT governance, information control and security. Issued by industry body the IT Governance Institute, Cobit comprises a process model and 34 high-level controls to achieve, spanning all areas of IT management.

Both ITIL and Cobit identify that cost and value measurement is an important aspect of IT management, but neither do much to tell the CIO how to go about it.

And although both methods help to define a framework for management and control, they are also both IT-centric, doing little to help close the gap between business and IT.

Giving a briefing on ITIL or Cobit to your chief executive is not likely to convince them that you have a firm handle on how IT is making an invaluable contribution to the business strategy.

Better methodologies for cost and value measurement in IT are now emerging, but they have not yet reached the tip-over point where there is broad acceptance, and where the techniques are incorporated into widely available frameworks and the associated tools.

For now, the CIO is therefore faced with something of a best-of-breed approach, and the most effective step that an organisation can take to improve the quality of its cost and value measurement is to implement an IT portfolio management solution.

IT portfolio management is a technique that applies formal methods and quantitative analysis to the process of IT investment planning, control and evaluation.

It allows senior executives in a business to compare the merits of IT initiatives that are competing for limited resources, and make an informed decision on where IT investment should best be directed to achieve business objectives.

By linking portfolio management to programme and project management functions, it is possible to complete the loop of planning, executing, monitoring and optimising.

Sidebar

The most effective step that an organisation can take to improve the quality of its cost and value measurement is to implement an IT portfolio management solution



AuthorAffiliation

Tim Jennings is research director at analyst company Butler Group

Assunto: International; Information technology; Corporate culture; Measurement techniques; Quality control; Business metrics;

Localização: United Kingdom, UK

Título: Evolving technology barbarians will need new tools to prove their value to the board

Autor: Jennings, Tim

Título da publicação: Computer Weekly

Páginas: 26

Número de páginas: 1

Ano de publicação: 2005

Data de publicação: Feb 22, 2005

Ano: 2005

Seção: Management

Editora: Reed Business Information UK

Local de publicação: Sutton

País de publicação: United Kingdom

Assunto do periódico: Computers

ISSN: 00104787

CODEN: COMWAA

Tipo de fonte: Trade Journals

Idioma de publicação: English

Tipo de documento: Commentary

ID do documento ProQuest: 237010470

URL do documento: <http://search.proquest.com/docview/237010470?accountid=14643>

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Última atualização em: 2010-06-11

Base de dados: ABI/INFORM Complete

Documento 24 de 28

What ERP systems can tell us about Sarbanes-Oxley

Autor: Brown, William; Nasuti, Frank.

Informações da publicação: Information Management & Computer Security 13. 4 (2005): 311-327.

[Link para o documento do ProQuest](#)

Resumo: Purpose - To provide background for senior and middle management in information technology organizations who may be in the implementation phase of compliance for Sarbanes-Oxley (SOX). As the information technology (IT) organization looks forward to additional compliance or other IT control frameworks such as COBIT, the paper can help construct a roadmap. Other audiences include senior management, accountants, internal auditors, and academics who may wish to evaluate the impact of SOX on the information technology organization. Design-methodology-approach - SOX is surveyed to understand the four major compliance areas that must be supported in the IT organization. Recently published works are integrated into an evaluation of enterprise resource planning (ERP) research to identify several ongoing themes that point to practical advice for implementing SOX. The private sector of US business is saturated with ERP applications and provides a useful benchmark of what to expect with SOX compliance. The sections of this report include: SOX and IT governance; ERP systems: recurring themes; after the initial implementation of SOX; frameworks to support SOX compliance; IT governance and SOX: where we go from here; to best practice and competitive advantage; and conclusion. Findings - Competencies in several related core disciplines including project management, change management, and software integration should be the top priority for SOX implementation.

Enterprise architecting and related areas such as security and outsourcing can be managed more effectively with the appropriate competencies. Research limitations-implications - The authors' observations are based on several research reports but are not exhaustive, and are not specific to a particular industry. Originality-value - The content is a very useful source of information for senior management, IT management, accountants, auditors, and academics to understand the impact of SOX on the IT organization and how to develop a roadmap to respond.

Termo de objeto :

Termo do assunto: Processes, Domains, Barriers, Internal, Reliability, Models, Organization, Operation, Concepts, Sei

Termo estatístico: reliability, systematic

Título: What ERP systems can tell us about Sarbanes-Oxley

Autor: Brown, William¹; Nasuti, Frank¹Minnesota State University, Mankato, Minnesota, USA

Autor da correspondência: Brown, William

Título da publicação: Information Management&Computer Security

Volume: 13

Edição: 4

Páginas: 311-327

Número de páginas: 17

Ano de publicação: 2005

Ano: 2005

Editora: Emerald Group Publishing Limited

País de publicação: United Kingdom

Assunto do periódico: Computers--Information Science And Information Theory

ISSN: 0968-5227

Tipo de fonte: Scholarly Journals

Revisado por especialistas: Sim

Idioma do sumário: English

Idioma de publicação: English

Tipo de documento: Journal Article

DOI: 10.1108/09685220510614434

Atualizar: 2010-02-01

Número de registro: 11598449

ID do documento ProQuest: 809352605

URL do documento: <http://search.proquest.com/docview/809352605?accountid=14643>

Última atualização em: 2011-10-25

Base de dados: 3 bases de dados; -Library and Information Science Abstracts (LISA); -Sociological Abstracts; -Technology Research Database; ;

Documento 25 de 28

What ERP systems can tell us about Sarbanes-Oxley

Autor: Brown, William; Nasuti, Frank.

Informações da publicação:: Information Management and Computer Security 13. 4 (2005): 311-327.

[Link para o documento do ProQuest](#)

Resumo: Purpose: To provide background for senior and middle management in information technology organizations who may be in the implementation phase of compliance for Sarbanes-Oxley (SOX). As the information technology (IT) organization looks forward to additional compliance or other IT control frameworks such as COBIT, the paper can help construct a roadmap. Other audiences include senior management, accountants, internal auditors, and academics who may wish to evaluate the impact of SOX on the information technology organization. Design/methodology/approach: SOX is surveyed to understand the four major compliance areas that must be supported in the IT organization. Recently published works are integrated into an evaluation of enterprise resource planning (ERP) research to identify several ongoing themes that point to practical advice for implementing SOX. The private sector of US business is saturated with ERP applications and provides a useful benchmark of what to expect with SOX compliance. The sections of this report include: SOX and IT governance; ERP systems: recurring themes; after the initial implementation of SOX; frameworks to support SOX compliance; IT governance and SOX: where we go from here; to best practice and competitive advantage; and conclusion. Findings: Competencies in several related core disciplines including project management, change management, and software integration should be the top priority for SOX implementation. Enterprise architecting and related areas such as security and outsourcing can be managed more effectively with the appropriate competencies. Research limitations/implications: The authors' observations are based on several research reports but are not exhaustive, and are not specific to a particular industry. Originality/value: The content is a very useful source of information for senior management, IT management, accountants, auditors, and academics to understand the impact of SOX on the IT organization and how to develop a roadmap to respond. (Original abstract)

Assunto: Information technology; Computer applications; Enterprise Resource Planning; Compliance; Companies;

Título: What ERP systems can tell us about Sarbanes-Oxley

Autor: Brown, William; Nasuti, Frank

Autor da correspondência: Brown, William

Título da publicação: Information Management and Computer Security

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Número de páginas: 17

Ano de publicação: 2005

Ano: 2005

ISSN: 0968-5227

Tipo de fonte: Scholarly Journals

Revisado por especialistas: Sim

Idioma de publicação: English

Tipo de documento: Journal Article

Artigo principal do documento: refs. tbls.

Atualizar: 2006-01-18

Número de registro: 397658

ID do documento ProQuest: 57634432

URL do documento: <http://search.proquest.com/docview/57634432?accountid=14643>

Última atualização em: 2011-12-16

Base de dados: Library and Information Science Abstracts (LISA)

Documento 26 de 28

IT excellence starts with governance

Autor: Robinson, Nick.

Informações da publicação:: Journal of Investment Compliance 6. 3 (2005): 45-49.

[Link para o documento do ProQuest](#)

Resumo: Purpose - To explain how information technology (IT) governance enables an organization to achieve three vital objectives: regulatory and legal compliance, operational excellence, and optimal risk management. Design/methodology/approach - Describes the role in IT governance of functions such as value creation (distilling company's mission and strategic direction into business needs for IT applications), value delivery (formal project management methodology and system development life cycle), value preservation (integrated control and risk management program), resource management, performance management (capability maturity model, balanced scorecard, Six Sigma), and oversight. Describes governance frameworks such as COBIT, ITIL, and ISO/IEC 17799: 2000. Offers advice on getting started. Findings - When governance is effective, IT becomes a valued asset, inseparable from the business and regarded as an asset, not a cost. Originality/value - Helps a compliance officer think about the connection between effective IT and compliance systems.

Texto completo: _TVM:UNDEFINED_

Termo do artigo :

Termo do assunto: Information technology, Mathematical models, Risk management, Business, Methodology, Project management, Resource management, Financing, Missions, Control systems, Information systems,; Balancing, Organizations, Life cycle engineering, Resources management, Preservation, Legal, Design engineering, Distillation

Classificação: B7: Management, Training, Regulations, Marketing (MB)

Identificador / palavra-chave: Article

URL: <http://www.emeraldinsight.com/Insight/viewContentItem.do;jsessionid=F98E5D5>

Título: IT excellence starts with governance

Autor: Robinson, Nick

Autor da correspondência: Robinson, Nick

Título da publicação: Journal of Investment Compliance

Abreviação de periódico: J. Investm. Compliance

Volume: 6

Edição: 3

Páginas: 45-49

Número de páginas: 5

Data de publicação: 2005

Ano de publicação: 2005

Ano: 2005

Editora: Emerald, 60/62 Toller Lane, Bradford, West Yorkshire, BD8 9BY, UK,
[URL:<http://www.emeraldinsight.com>]

ISSN: 1528-5812

Tipo de fonte: Scholarly Journals

Idioma de publicação: English

Tipo de documento: Journal Article

Subarquivo: Materials Business File (MB)

DOI: 10.1108/15285810510659310

Atualizar: 2009-03-01

Número de registro: 200903-B7-0038454 (MB)

ID do documento ProQuest: 33025988

URL do documento: <http://search.proquest.com/docview/33025988?accountid=14643>

Última atualização em: 2011-11-14

Base de dados: Technology Research Database

Documento 27 de 28

BUSINESSWORLD (PHILIPPINES): Think tank releases IT management guidelines

Informações da publicação:: BusinessWorld (Dec 28, 2000): 1.

[Link para o documento do ProQuest](#)

Resumo: To help executives discharge fiduciary responsibilities and understand their IT systems, the IT Governance Institute has released COBIT - Control Objectives for Information and related Technology - 3rd Edition, an international IT governance and control framework, announced the Information Systems Audit and Control Association (ISACA).

ISACA has 22,000 members in 100 countries. It established the IT Governance Institute in 1998 to be a "think tank" offering presentations at both ISACA and non-ISACA conferences, publications and electronic resources for greater understanding of the roles and relationship between IT and enterprise governance.

Título: BUSINESSWORLD (PHILIPPINES): Think tank releases IT management guidelines

Título da publicação: BusinessWorld

Páginas: 1

Número de páginas: 0

Ano de publicação: 2000

Data de publicação: Dec 28, 2000

Ano: 2000

Editora: The Financial Times Limited

Local de publicação: Manila

País de publicação: United Kingdom

Assunto do periódico: Business And Economics--Chamber of Commerce Publications

ISSN: 01163930

Tipo de fonte: Trade Journals

Idioma de publicação: English

Tipo de documento: PERIODICAL

ID do documento ProQuest: 233883671

URL do documento: <http://search.proquest.com/docview/233883671?accountid=14643>

Copyright: Copyright Financial Times Information Limited Dec 28, 2000

Última atualização em: 2010-06-11

Base de dados: ABI/INFORM Complete

Documento 28 de 28

Why IT governance is a top management issue

Autor: Lainhart, John W, IV.

Informações da publicação:: The Journal of Corporate Accounting & Finance 11. 5 (Jul/Aug 2000): 33-40.

[Link para o documento do ProQuest](#)

Resumo: Companies striving for success in today's information economy must integrate information technology (IT) with business strategies to attain their business objectives, get the most value out of their information, and capitalize on the technologies available to them. Enterprise governance, the system by which companies are directed and controlled, drives and sets information and technology governance. The Information Systems Audit and Control Foundation has published an IT governance tool that helps nontechnical managers understand and manage risks associated with information and related IT. Called Control Objectives for Information and related Technology (COBIT) 2nd edition, this comprehensive framework of control objectives is based on 36 international source documents, ensuring a global view and a best practice point of view. COBIT helps managers communicate and bridge the gap with respect to control requirements, technical issues, and business risks. It facilitates the development of clear policy and good practices for IT control throughout an organization worldwide.

Assunto: Corporate governance; Information technology; Risk management; Software packages; Information systems;

Localização: United States, US

Título: Why IT governance is a top management issue

Autor: Lainhart, John W, IV

Título da publicação: The Journal of Corporate Accounting&Finance

Volume: 11

Edição: 5

Páginas: 33-40

Ano de publicação: 2000

Data de publicação: Jul/Aug 2000

Ano: 2000

Editora: Wiley Periodicals Inc.

Local de publicação: Hoboken

País de publicação: United States

Assunto do periódico: Business And Economics, Business And Economics--Banking And Finance, Business And Economics--Accounting

ISSN: 10448136

Tipo de fonte: Trade Journals

Idioma de publicação: English

Tipo de documento: Feature

ID do documento ProQuest: 201610774

URL do documento: <http://search.proquest.com/docview/201610774?accountid=14643>

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Última atualização em: 2012-01-26

Base de dados: 2 bases de dados; -ABI/INFORM Complete; -ProQuest Hospital Collection; ;

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Citation style: Associação Brasileira de Normas Técnicas

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