Article **ECORFAN Journal-Mexico**
COMPUTING December 2011 Vol.2 No.5 362-374

IT Governance through COBIT 4.1 and expected changes in COBIT 5.0

MARTÍNEZ- Eduardo†*´, GARCÍA- Juan´´

´Universidad ISEC, Del Valle, Mier y Pesado 133, Del Valle Centro, Benito Juárez, 03103 Ciudad de México, Distrito Federal, México.
´´ESIME –Culhuacán- IPN, Av Santa Ana 1000, San Francisco Culhuacan, Coyoacán, 04430 Ciudad de México, Distrito Federal, México

Received October 27, 2011; Accepted December 26, 2011

The organizations started considering the IT area as a key partner in the achievement of the corporate strategy and objectives. The IT Governance is the system that guide and control the actual and future usage of the IT resources. COBIT is a set of control objectives that help to implement this system in the organization, its version 4.1, is considered as the foundation for the establishment of IT Governance.

Cobit, IT governance, Domains, Processes, Changes

Citation: Martínez E., GarcíaJ., IT Governance through COBIT 4.1 and expected changes in COBIT 5.0. ECORFAN Journal-Mexico 2011. 2-5:362-374

*Correspondence to Author (email: eduardo.estebanes@itelcel.com)
† Researcher contributing first author.

Introduction

The common practice of companies in the world is not considered important in the areas of information technology (IT), causing them to have a small staff, limited budget and identified as the area of support for the end user's computer.

However, over time, adding new trends in technology emerged in developed countries, have increased very significantly the role and influence of IT, causing them, form a fundamental part in the operation and development of organizations.

This change in perception of IT is due to the emergence of frameworks, which now are seen as key tools to perform this Renaissance figure of IT.

All these frameworks are independent of the item or size of the organization. These aim to provide methodologies for IT resources have a structured and organized manner, supporting the organization to achieve its strategic objectives.

Today most of the investment in infrastructure and new IT applications seek to support specific functions of the organization. Some organizations include in them, better known as stakeholders internal processes to partners or customers. Such trends causes CEOs (CEOs) and CIOs (CIOs) are compromised with the need to reduce as much as possible the gap in the relationship between IT and the business.

Because of this the effective management of information and related technologies have become critical to the survival and success of organizations factor. This criticality arises from the:

- The increasing reliance on information and the systems that provide that was generated in organizations.

- And increased in the vulnerability and risk, as the "cyber threats" and information warfare.

- The significant increase in the cost of current and future IT investments.

- The immense potential of IT to bring about a radical change in organizations and business practices, this in order to gain new opportunities and cost reduction. (NETWORK-SEC, 2010)

Considering all these factors, we can say that a change in the role is necessary in the areas of IT to achieve maximum performance of an investment in addition to use technology as a competitive weapon in the marketplace. Thus we get the attitude of IT versus business undergoes a metamorphosis and we cease to be merely reactive becoming proactive, achieving anticipate the needs of the organization. (NETWORK-SEC, 2010)

IT Government

In order to define IT governance, we must start by defining the Corporate Government, which can be described as the set of responsibilities and practices implemented by the board and management in order to provide strategic direction. (ISACA, 2010) But How is the way to provide correct strategic direction for the organization?

- Ensuring that the objectives are achieved.

- Establishing that risks are managed appropriately.

ISSN-Print: 2007-1582- ISSN-On line: 2007-3682

- Verifying that company resources are used responsibly.

As can be seen, three important aspects that influence performance, such as objectives, which constitute the main purpose of the organization are taken into account. In addition to risk management, which are all factors that the organization should take into account as potential threats, which should mitigate with analysis and business continuity plans; resources and finally the key to the operation of the organization element, whether financial, human and infrastructure.

With the given description, it is clear that what purports to corporate, government, we explain that IT governance is an integral part of corporate governance and consists of the leadership, organizational structures and processes that ensure that the enterprise IT sustain and extend strategies and organizational goals. Therefore, IT governance is a shared responsibility of direct board and executive management of the organization. (ISACA, 2010)

The ISO / IEC 38500 Corporate Governance of Information Technology, standard defines it as "The system by which directs and controls the current and future of information technology" (Villuendas, 2011)

Why IT Governance?

In organizations, over time, management is realizing the significant impact that information can have the success of a company, resulting in the expected direction a high understanding of how IT is operated and the possibility to be successfully exploited for competitive advantage.

The IT governance framework should help senior management to know if the information given is possible to ensure the achievement of objectives, being flexible, have good risk management and acting appropriately recognizing their opportunities according to them. (IT Governance Institute, 2007). In turn, define the alignment of IT strategy with organizational strategy, ensure the reduction of risk appetite, provide organizational structures that facilitate the implementation of strategies and goals, and that flow gradually in the company.

It will also create constructive relationships and effective communication between business and IT, as well as with external partners; and finally will measure IT performance. With the above, we can say in general that IT governance is a discipline about making IT decisions in intensely involved or should be involved, the senior management of organizations.

IT Management, however, refers to the decisions that are basically taken by professionals, although part of the senior management or other managers. (Villuendas, 2011)

Implementing IT Governance

The implementation of a framework for IT governance is carried out taking into account the different conditions and circumstances in an organization, these mainly determined by factors like are:

- Achieve an interaction of IT governance ethics and culture of the organization, which is the subjective element, it is vital to understand the environment and labor organization habits, communication is the vital part they have to staff.

ISSN-Print: 2007-1582- ISSN-On line: 2007-3682

- Adhere to laws and regulations (whether internal or external) to compliance governance framework, because is essential not to let go all those internal regulations established in the organization, nor the regulatory laws in the region, country or state where it is situated.

- Consider the mission, vision and values of the organization to have a correct parallel government IT into the current and future goals of the organization, also considering the same values.

- The organizational structure, the Government IT support for operation in the organizational business to also assign activities, roles and responsibilities comprising.

- Strategies and tactics of the organization to have this guideline the way in which the organization makes its decision-making and implementation of activities, IT governance will have to reinforce the achievement of organizational goals. (NETWORK-SEC, 2010)

IT Governance Approach

The approach has given the IT Governance is primarily to be a working solution, dealing with the challenges presented by IT, improve performance and enable competitive advantage as support to prevent problems.

Also, make IT governance a shared responsibility between the business (customer) and provider of IT services, with the full commitment and guidance from senior management.

Another point is to align IT governance with a broad corporate governance, including the board and executive management to provide necessary leadership and organizational structures emphasizing good management and process control. (BDO Consulting, 2008) In Graphic 1, we see the focus areas of IT governance.

Areas of IT Governance

Graphic 1

- Strategic Alignment: Focuses on ensuring strategic alignment between business plans, IT and align IT operations with business operations. (IT Governance Institute, 2007)

As already stated, the IT strategy must respond to the strategies of the organization from which it is concluded that applications must meet the functional requirements and process information, which in turn, support the achievement of strategic objectives. Thus the cycle is complete:

- The IT Strategy borns Business Strategy and supports.

- Applications are born of IT strategy and supporting processes.

- The processes supporting the Business Strategy.

ISSN-Print: 2007-1582- ISSN-On line: 2007-3682

- Delivering Value: Refers to execute value propositions throughout the delivery cycle, always ensuring that IT delivers the promised benefits of the strategy, with an emphasis on optimizing costs and proving the intrinsic value of IT. (IT Governance Institute, 2007)

The IT function should be managed to meet the requirements of decision support and organizational processes (strategic, mission and support).

- Resource Management: This is the optimal investment and proper management of critical IT resources: applications, information, infrastructure and people.

The key issues related to the optimization of knowledge and infrastructure. (IT Governance Institute, 2007)

The responsibility goes beyond IT to manage the resources under management. These resources should be used optimally to deliver information products for which they were acquired.

- Risk Management. Requires risk awareness by senior executives of the company, a clear understanding of risk appetite, that the company, understand compliance requirements, transparency about the significant risks to business and the inclusion of management responsibilities risk within the organization. (IT Governance Institute, 2007)

IT governance must ensure that any event prevent the delivery of products and IT service continuity.

To this must be done a proper risk management of IT function and processes supported by IT, by the officer of the organization who is assigned this responsability.

- Performance Measurement: Track and monitor strategy implementation, project completion, resource usage, process performance and service delivery, the use of tools like Balance Score Card that translate strategy into action to achieve measurable goals beyond conventional record. (IT Governance Institute, 2007)

Compliance with the IT strategy is achieved by administration of IT resources through proper management of the processes of Planning and Organization (PO), Acquisition and Implementation (AI), Deliver and Support (DS) and Monitoring and Evaluation (ME). These processes should be measured to establish the contribution they make or do not do in achieving the IT strategy, using indicators that demonstrate the results of the management of these processes.

Map of implementing IT governance for the organization

In Graph 2, the map recommended for the implementation of IT Governance shows the different steps and activities of each of them to achieve IT governance. The steps to develop a solution IT Governance are:

- Identify the needs of the organization is a key point that involves activities such as promoting awareness and gain commitment from all levels of the organization, analyze business goals and IT, making the selection of processes and controls, analyze risks and define scope.

ISSN-Print: 2007-1582- ISSN-On line: 2007-3682

- Provide troubleshooting, where the ability and maturity of IT processes is selected, then for each objective and appropriate levels of maturity are defined and achievable evaluated.

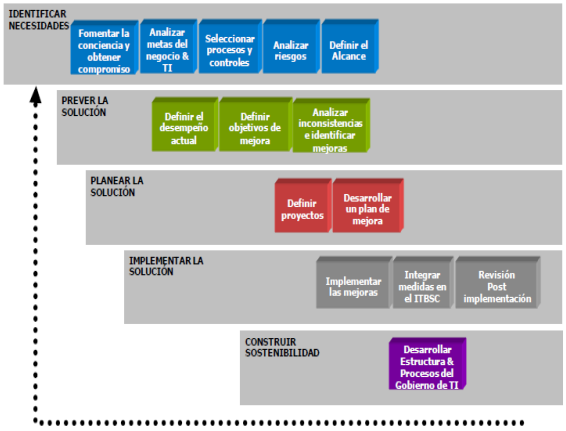
- Plan the solution is to identify priority initiatives and feasible improvements in translating justifiable projects aligned with the original business value and risk factors.

- After evaluating these projects should be included in a strategy for improvement and a practical program to carry out the solution.

- To implement the solution, while the improvement plan is carried out, projects governed by established methodologies and change management, the successful achievement of the desired business results secured by: feedback and lessons learned post-implementation. The monitoring of the improvements on the performance of the corporation and IT Balance Scorecard.

- The last point on the map is to achieve sustainability. They are built by integrating IT governance with corporate governance of the organization, and responsibility for IT across the enterprise, with appropriate organizational structures, policies and controls to determine clearly, cultural change driven from top management, continuous improvement processes, and monitors and reports optimal.

Map of implementing IT governance in organizations



Graphic 2

COBIT

COBIT stands for Control Objectives for Information defined and related Technology (Control Objectives for Information and Related Technology), which is a framework created by ISACA (Information Systems Audit and Control Association (Systems Control and Audit Information) for IT management and IT governance. It is set of support tools that allows the management of organizations to bridge the gap between control requirements, technical issues and business risks. (IT Governance Institute, 2007)

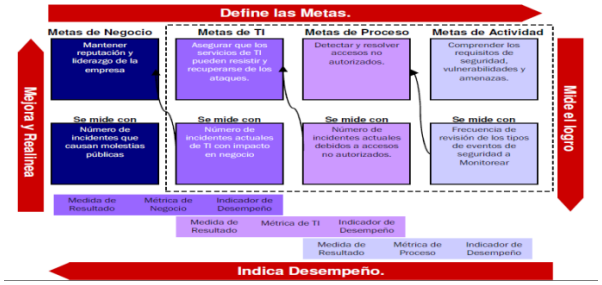
This framework provides activities and presents good practices for IT Governance in a manageable and logical structure. COBIT's good practices meet the consensus of experts, who will help optimize IT investment and provide a mechanism for measuring the activities when goes to the wrong way.

The COBIT mission is to research, develop, publish and promote a set generally accepted control objectives, authorized, updated by ISACA for use in day by day management of the business, IT professionals and security.

ISSN-Print: 2007-1582- ISSN-On line: 2007-3682

In Graphic 3 we see that also defines a processes, goals and metrics for control. (IT Governance Institute, 2007).

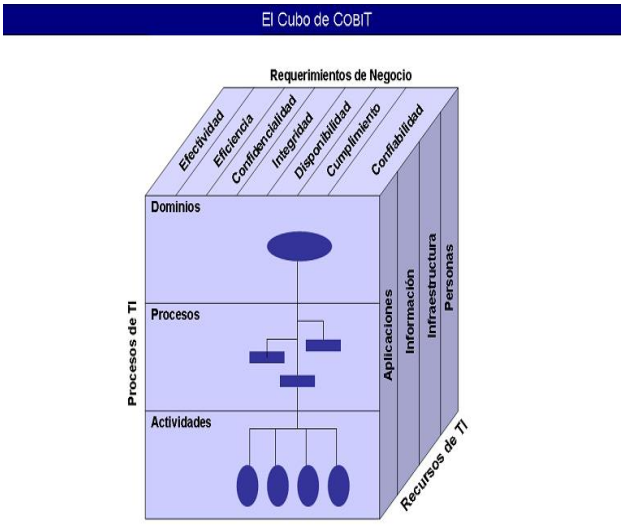
Diagram mission COBIT



Graphic 3

The basic principle of the COBIT framework is represented in the diagram of Graphic 4. Resources are managed IT processes to achieve IT goals that respond to business requirements.

COBIT Cube



Graphic 4

History versions of COBIT

To date, COBIT has published four major versions:

In 1996, the first edition of COBIT was published. This included the collection and analysis of recognized international sources and was conducted by teams in Europe, USA and Australia.

In 1998, was published the second edition; the main change was the addition of management guidelines. By 2000, the third edition was published and in 2003, the online version already was available on the site of ISACA.

It was after 2003 that the COBIT framework was revised and enhanced to support increased management control, introduce performance management and more development of IT Governance.

In December 2005, the fourth edition was published and in May of 2007, version 4.1 which is currently handled was released.

The number 5 of COBIT is planned for release in 2012, this edition will consolidate and integrate frameworks of COBIT 4.1, Val IT 2.0 and Risk IT. This new framework is composed mainly of the Business Model for Information Security (BMIS, Business Model for Information Security) and the Framework for Assurance Information Technology (ITAF, Information Technology Assurance Framework).

COBIT 4.1

The Framework of COBIT 4.1, consists of 34 high level Control Objectives, all designed for each of the IT processes, which are grouped into four major best sections known as domains, they will be equipped to traditional areas IT to plan, build, run and monitor.

ISSN-Print: 2007-1582- ISSN-On line: 2007-3682

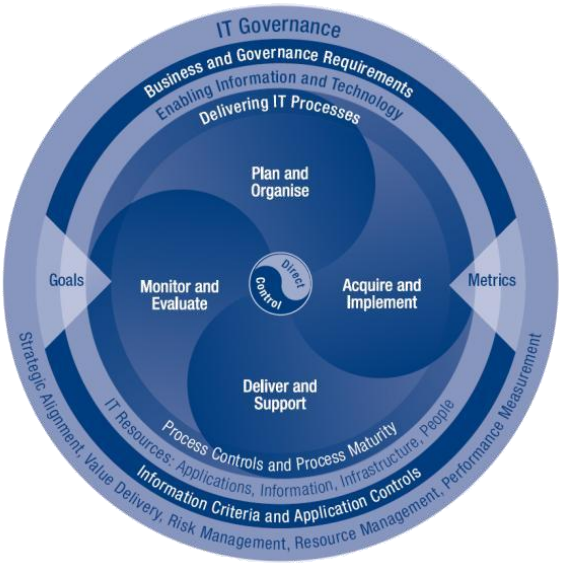
- Planning and organization, provides leadership for the delivery of solutions and services.

- Acquisition and Implementation, provides solutions and develop to convert them in services.

- Delivery of services, hosting solutions and makes them usable for end users.

- Support and Monitoring, monitors all processes to ensure that it follows the established direction.

Diagram of the four domains of COBIT



Graphic 5

This structure, exemplified in Graph 5, covers all aspects of information and technology that supports it. (IT Governance Institute, 2007) and defines the domains as follows:

Domain, Plan and Organise (PO) - This domain covers strategies and tactics, and has to do with identifying how IT can better contribute to the objectives of the business.

It is noteworthy that the realization of the strategic vision needs to be planned, communicated and managed for different perspectives; and finally, the implementation of an appropriate organizational and technological structure. (IT Governance Institute, 2007)

Management expects to cover the alignment of IT strategy with business, optimize the use of resources, understand of IT objectives by the organization, risk management and quality of IT systems to business needs .

Domain, Acquire and Implement (AI) - In order to meet an IT strategy, IT solutions need to be identified, developed or acquired, as well as implemented and integrated into the business process. Furthermore, change and maintenance of existing systems will be covered to ensure that the solutions continue to meet business objectives. (IT Governance Institute, 2007)

Management in this domain aims to cover that new projects generate solutions that meet business needs, to be delivered on time and within budget, the new systems once implemented work properly and that the changes do not affect current operations business.

Estate, Deliver and Support (DS) - involves the actual delivery of required services, including service provision, management of security and continuity, support for service users, management of data and operational facilities. (IT Governance Institute, 2007)

ISSN-Print: 2007-1582- ISSN-On line: 2007-3682

The goal is to ensure that IT services be delivered according to business priorities, optimization of costs, ensure that the workforce use systems in a productive and safety way and implement the confidentiality, integrity and availability.

Estate, Monitor and Evaluate (ME) - All the IT process should be evaluated regularly in time for its quality and compliance with control requirements. This domain includes performance management, monitoring of internal control, regulatory compliance and government enforcement. (IT Governance Institute, 2007)

This will result in the detection of problems through performance measurement ensures that internal controls are effective and efficient, linking IT performance with business goals as well as measuring and reporting risk besides the control, compliance and performance.

Another key concept of COBIT, is the identification and systematic improvement of process maturity, which has 6 levels (0 to 5) to measure the level of maturity of IT processes:

0 Inexistent – There is no information or knowledge about IT governance.

1 Initial / ad hoc – In the process there are undefined tasks, but there is confidence in the initiative.

2 Repeatable but intuitive– The process has quality staff and defined tasks.

3 Definite – Defined and institutionalized process with policy, standards and established procedures.

4 Manageable and measurable– The process has complete structures of control and analysis of performance.

COBIT Processes

Table 1 shows the names and keys 34 clos forming the COBIT processes and their classification in each of the four domains.

COBIT Processes

PO	PLANEAR Y ORGANIZAR
P01	Definir un plan estratégico de TI
P02	Definir la arquitectura de la información
P03	Determinar la dirección tecnológica
P04	Definir los procesos, organización y relaciones de TI
P05	Administrar la inversión de TI
P06	Comunicar las aspiraciones y la dirección de la gerencia
P07	Administrar recursos humanos de TI
P08	Administrar la calidad
P09	Evaluar y administrar los riesgos de TI
P10	Administrar proyecto

AI	ADQUIRIR E IMPLEMENTAR
AI1	Identificar soluciones automatizadas
AI2	Adquirir y mantener software aplicativo
AI3	Adquirir y mantener infraestructura tecnológica
AI4	Facilitar la operación y el uso
AI5	Adquirir recursos de TI
AI6	Administrar cambios
AI7	Instalar y acreditar soluciones y cambios

DS	ENTREGAR Y DAR SOPORTE
DS1	Definir y administrar los niveles de servicio
DS2	Administrar los servicios de terceros
DS3	Administrar el desempeño y la capacidad
DS4	Garantizar la continuidad del servicio
DS5	Garantizar la seguridad de los sistemas
DS6	Identificar y asignar costos
DS7	Educar y entrenar a los usuarios
DS8	Administrar la mesa de servicio y los incidentes
DS9	Administrar la configuración
DS10	Administrar los problemas
DS11	Administrar los datos
DS12	Administrar el ambiente físico
DS13	Administrar las operaciones

ME	MONITOREAR Y EVALUAR
ME1	Monitorear y evaluar el desempeño de TI
ME2	Monitorear y evaluar el control interno
ME3	Garantizar el cumplimiento regulatorio
ME4	Proporciona gobierno de TI

Table 1

ISSN-Print: 2007-1582- ISSN-On line: 2007-3682

COBIT and control objectives

For each of the 34 processes defined in the four domains of COBIT, has generated a control objective. We can define "control" as the policies, procedures, practices and organizational structures that are designed to provide reasonable assurance that business objectives will be achieved and undesired events will be prevented or detected and corrected. (IT Governance Institute, 2007)

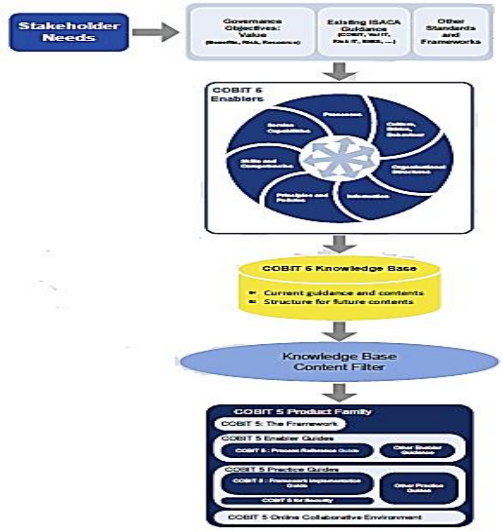
These IT control objectives provide a complete set of high-level requirements to be considered by management for effective control of each IT process. These controls are statements of management actions that need to increase the value or reduce risk in business, generally consist of policies, procedures, practices and organizational structures, which provide reasonable assurance that business objectives will be achieved.

But, What kind of management needs to take decisions in relation to these control objectives? First, select those that are applicable to the business, decide which were implemented and choose how to implement them (how often stretching automation). In addition to accepting the risk of not implementing those that are necessary in the organization.

COBIT 5

The focus of COBIT 5, shown in Graphic 6, will be the governance and management of corporate information. Additional shown a great interest in incorporating standards and best industry practices in IT governance.

COBIT 5 Focus



Graphic 6

Process

The orientation of COBIT 5 is in process and there are 36 separate processes as areas of Government and Administration. (ISACA, 2011)

Area: IT Governance

- Assess, Manage and Monitor (EDM) - 5 processes

Area: Corporate IT Management

- Align, Plan, Organize (PO) - 12 processes
- Construction, Acquisition and Implementation (BAI) - 8 processes
- Delivery, Service and Support (DSS) - 8 processes
- Monitoring, Evaluation and Reporting (MEI) - 3 processes

New processes are the EDM

ISSN-Print: 2007-1582- ISSN-On line: 2007-3682

- EDM1 - Establish and maintain the framework of the Government
- EDM2 - Ensuring Value Optimization
- EDM3 - Ensure risk optimization
- EDM4 - Ensure value for money
- EDM5 - Ensure transparency for stakeholders

The processes of availability and capacity were mixed:

BAI4 - Manage availability and capacity.

The service has been removed as part of the name of a process, which now includes:

DSS4 - Manage service requests and incidents

COBIT 5 volumes are three.

- Volume 1: The Framework ~ 60pp - principles and models of IT governance
- Volume 2: Reference guide of Process ~ 200pp - Detailed Reference Guide of processes
- Volume 3: Implementing and continually improve corporate governance (COBIT 5 Update - it's almost ready, 2011)

COBIT 5 changes

COBIT 4.1 referred to ITIL; CMM, ISO 17799, PMBOK, PRINCE2. One of the objectives of COBIT 5 is still improve compatibility with other good practice guides and standards.

New maturity model

So far COBIT proposed ists own model for measuring the "maturity" of the processes of the organization. The new version of COBIT take precisely the maturity model defined by ISO best known as SPICE (Software ProcessImprovementCapability Determinación de la Capacidad de Mejora del Proceso de Software) (ISACA, 2011) ISO / IEC 15504 standard.

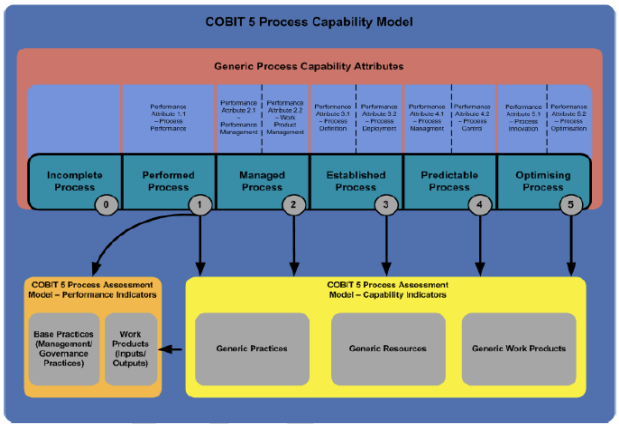
The levels defined in SPICE model are:

- Level 0: Incomplete
- Level 1: Realized
- Level 2: Managed
- Nivel 3: Established
- Nivel 4: Predictable
- Level 5: Optimized

As shown in Graphic 7, there are still six levels, according to the adoption of ISO 15504 model are now called capacity levels. These are attributes related to nine processes. This change ensures compliance with the standard while is giving a better focus on how well the processes are being implemented and whether they are achieving their purpose.

ISSN-Print: 2007-1582- ISSN-On line: 2007-3682

Capacity Model processes



Graphic 7

Process Structure

The structure is similar to the previous process. After the changes, there are a total of 36 processes (34 in version 4.1). When you take a first look you found that many of the processes are already adopted in the organization: Supplier management, change management, configuration management, incident management and problem management.

COBIT 5 proposes three processes for monitoring and evaluation. Surely in many organizations these three processes are grouped and implemented as a single process.

Analysis

One of the many advance features of COBIT 5 is the increased attention to the integration of business and IT. This guidance will improve communication, clarify roles and responsibilities and reduce incidents related to information and technology that could harm the organization.

COBIT 5 integrates all the best practices scattered in different frameworks ISACA - COBIT, Val IT, Risk IT, BMIS (Business Model for Information Security) and ITAF (Framework for IT Assurance) - into a single knowledge base, that allows to have a consistent approach of value, risk and safety in the organization. The architecture of COBIT 5 brings together stakeholders, concerns, interests and needs as well as the knowledge base of ISACA.

COBIT 5 has five principles.

- As an integrator: A framework for governance and management related information and technology that begins by assessing technology needs of the stakeholders.
- Motivated by the value to stakeholders.
- Focused on the business context.
- Based on enablers, as defined in the framework as resources that enable IT success.
- Structured in government and management.

In essence, COBIT 5 covers comprehensively the organization and provides a basis for integration of other frameworks, standards and best practices that organizations that may be already in use.

Table 2 shows the main differences between versions:

ISSN-Print: 2007-1582- ISSN-On line: 2007-3682

Comparison of versions

Characteristics	Version 4.1	Version 5
Knowledge Areas	Únique	IT Corporate Governance and Corporate IT Management
Domains	4 (PO, AI, DS, ME)	5 (EDM, PO,BAI, DSS, MEI)
Process	34	36
Processes for domain	PO – 10 process AI – 7 process DS – 13 process ME – 4 process	EDM – 5 process PO – 12 process BAI – 8 process DSS – 8 process MEI – 3 process
Maturity levels	6, Own model	6, based in ISO 15504, capacity levels

Table 2

Conclusions

Organizations today have begun to worry about the need to make their IT areas protrude and contribute to achiev the core objectives of the organization.

IT governance was designed for those organizations wishing to leverage IT to support the achievement of those objectives.

COBIT is a framework that helps to support IT governance, establishing a set of activities and controls to ensure that IT processes are integrated into the strategies of the organization to achieve business objectives.

Upon the release of COBIT 5 with the information obtained so far we can only get a general idea of what will be this version. However, the prominent changes in the draft to which access has introduced major changes regarding COBIT 4.1. This leads us to believe that the new version will not be very different from today and therefore be easy to adapt the models based on COBIT 4.1 to COBIT 5.

References

BDO Consulting. (2008). *Gobierno de Tecnología de Información (TI).*Panamá: BDO Consulting.

Cobit 5 Update - it's almost ready. (19 de Abril de 2011). Recuperado el 2 de Noviembre de 2011, de ITSM portal: http://www.itsmportal.com/columns/cobit-5-update-%E2%80%93-it%E2%80%99s-almost-ready

Institute, I. G. (2007). *Cobit Quickstart 2nd edition.* USA: ITGI.

ISACA. (2011). *Cobit 5 The Framework (Exposure draft).*IL,USA: CRISC.

ISACA. (2009). *Transforming Enterprise IT.* USA: ISACA.

IT Governance Institute. (2008). *Alineando Cobit 4.1, ITIL v3, ISO/IEC 27002 en beneficio de la empresa.*USA: ITGI.

IT Governance Institute. (2007). *Cobit 4.1.* USA: ITGI.

IT Governance Institute. (2005). *Keys to IT Governance.* USA: ITGI.

MIRBAHA, M. (2008). *IT Governance in financial, comparing two sectors using Cobit 4.1.*Estocolmo: KTH.

NETWORK-SEC. (2010). *Implantación de Gobierno de TI.*Valencia: NETWORK-SEC.

TOOMEY, M. (2009). *Impulsando el liderazgo de TI através del buen gobierno corporativo con las TI.* Australia: Atos consulting.

Villuendas, A. (19 de 09 de 2011). *Defínción de Gobierno de TI.* Recuperado el 02 de 10 de 2011, de www.tgti.org: http://www.tgti.es/?q=node/57

ISSN-Print: 2007-1582- ISSN-On line: 2007-3682