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Administration of Sustainable Environmental Information Technologies based on COBIT5 E SGE21

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Abstract

It is shown a work framework for Information Technology Governance (onwards IT) highly recognized as is Cobit5.0:2012, which is strengthened with the incorporation of sustainable aspects in its environment dimension.

This research use environmental aspects inputs such as environment norm SGE21:2008 and for IT government aspects, the framework Cobit5.0:2012. This investigation framework does not pretend to define which could be the best input otherwise to determinate if it is feasible the incorporation of environment aspects to the IT government and as study scenario was proposed Cobit5.0:2012 y la SGE21:2008. This study work is one of several whereby the inputs for environmental sustainability and IT government change.

This study determinate environment and IT government activities, a mapping is done to determinate the environment activities related to the IT Government that allow defining constraints to define the IT government sustainable, this sustainable model will strengthen with the activities of the IT government that need to be implemented with environmental focus, new environmental activities that were added to the IT government and new process with environmental objectives to the IT government.

The result of work allows to the enterprises apply an IT framework with environmental focus that project to a sustainable and efficient future, with capacity to create Enterprise value for the organizations and to reduce costs to help to maintain the benefits.

Keywords: COBIT 5.0:2012, SGE21:2008, Environment, Sustainability, IT Government.

INTRODUCTION

Nowadays, there are risk factors of business continuity as: China's Deceleration, low oil prices and geopolitical tensions. The IMF worried advice about the significant risks on the principal economies of the market and the diminution of the global economic growth for 2016 and 2017, this actual economic environment, generate an ideal climate for the organizations project a more sustainable and efficient future with capacity for creating enterprise value to the organizations and to reduce costs for helping to maintain benefits. [1] [2].

The sustainability is increasingly important and is considered as a main competence of the senior management, it has a multidimensional affectation because it generate changes in the commercialization, investment, innovation, business and human conduct. [2]

ISACA, in its sustainability article [2], it reference the definition of Gro Harlem Brundtland, Noruegan Doctor where it indicates that the sustainability is "Meet the needs of the present without compromise the capacity of the future generations to satisfy its needs" [3], while International Organization for Standardization (ISO) and the European Union (UE) indicate that the sustainability implies a balanced approach for organizations to integrate the concerns of the actors in the business operations, in a way that look the organization's benefit, as well as its internal and external actors" [4] ISACA 2011 holds that sustainability is related with the normative compliance, business ethics, and the environment, In terms of terminology of sustainability it is related with (people, planet and earnings) , "enterprise social responsibility" (RSE) y "be ecologic" [2]

The technology has been converted on a authentic strategic ally of companies, beyond a simple support. That is why is necessary that the Information Systems of the company provide the value end the efficiency that require both the business and the users. To confirm, it is recommendable to do in first place an evaluation and diagnostic process of the IT Government of the organization. The IT government analysis, in the framework of a strategic reflection, It is going to allow the identification of the key aspects on the value and optimization contribution of the IT function inside of the organizations who want to compete at first level. [3].

Thus, in this scenario, the concept of IT Government was introduced as the responsible of integration and institutionalize the best practices of IT Management to guarantee that the IT on the Enterprise support the business objectives and take full advantage of your

information, the benefits are maximized, the opportunities are capitalized and competitive advantages are won.

This work is a contribution in form of a IT Government framework sustainable which allow focus the aspects of IT Government with an environment perspective generating a contribution to the research in the field of Informatics Sustainability.

In this field, the research manifest that [5], until the year 2011 there are several efforts on Green IT but there is a lack of models, [6] shows an study in which it is determinate that only 36 articles has been published, by which the research is related with the technology and environment and several of them are analyzed from a partial point of view, for example they talk about energetic efficient computers, server virtualization and other technique aspects that focus on the components been the main weakness not to consider the sustainability environmental from an integral aspect, [7] perform a mapping between COBIT5.0, COBIT4.1 y GRI G4 but does not concluded with some solution model, [8] this study check an outstanding IT Government framework, COBIT 5, to determinate the grade which supports dimensions of sustainability, especially related with the acquisition, use and disposition of the IT actives. Based on the analysis, its concluded that COBIT 5 does not address adequately the aspects of sustainability that organization face nowadays.

COBIT 5.0 Sustainable Limitations. The authors of the reference [8] claim that COBIT 5.0:2012 has deficit of sustainability, because this Government framework has not in count the environment and, in part, the social aspects of the triple baseline.

"This failure is principally because to the absence between the social and environmental, and the needs and objectives inside COBIT 5.0:2012" [9].

Chart 1. COBIT 5.0:2012 Limitations

N°	Limitations
1	The lack of emphasis in the attitude of the organization towards sustainability.
2	IT Policies that surround the origin, use and disposition of the IT actives who does not have in count the sustainability.
3	The lack of emphasis in the sustainable IT policies application on the daily operations inside an enterprise.
4	The lack of emphasis on the importance of IT sustainable practices to guarantee the environmental security.
5	The lack of consideration of the society organization responsibility to act in a sustainable way.
6	The lack of considerations of insurance with a sustainability focus.
7	The lack of emphasis on the interdependencies between business and the environment in ehich operates.
8	It is not considered the sustainability as an Enterprise management problem.

9	The lack of support to control and application of the sustainable information management.
10	Narrow application to support the control and implementation of an integral, sustainable, informatics system.

Source: [7]

2. BACKGROUND

Sustainability

The sustainability arises as the main unifying idea more necessary at this time because of the serious threat of the future of mankind described as a planetary emergency that is how Bybee defines it. A threatened future makes organization to introduce the sustainable development to satisfy the necessity without compromise future generation necessities. [9]

The use of the term sustainable development appeared for the first time on the Brundtland Comission report in 1987, introduced the sustainable development concept through the document our common future, WCDE (World Commission on Environment and Development). This investigation develops the capacity to "satisfy the necessity of the present without compromise the capacity of the future generations to satisfy their necessity"[6]. According [10] mentions that the sustainability do reference to the search of ambient, social and economic quality as equal with viable result in a long-term; Besides it define a set of guided criteria to the ethical behavior with everything that surround us. The sustainability is oriented to the objective of achieve the balance should exists between human being and the nature, generating a world according to a society of sustainable knowledge.

The impact of the sustainability appears permanently on the organizations and becomes an obligation for enterprises who want to innovate, because the behavior of the business itself matters. The sustainability every day is important and attracts marketing attention, inversion, innovation and technology. [11]

Norma SGE21:2008

The SGE21 (Ethical and Socially Responsible Management System), the general director of forethic German Granda deduce that SGE is the first European norm that constitute the requirements organization must complete to include in its strategy and the social responsibility management. Moreover, the SGE21 is the first instrument which is available to the organizations to integrate voluntarily its social, environmental preoccupations, also the relations with its interest groups. [12]

According to [13], the SGE21 is applicable to any organization independently of the size and sector that you want to go beyond legislative compliance and to get a social and sustainable, social responsible management.

José Lluch mentions that the principal function of the SGE21 norm is when Ethical and Socially Responsible Management get evaluated on enterprises, besides to be optional,

it requires of three essential elements which are: The integration of the strategy and the organization process; the dialogue and the knowledge of the expectative of the interest groups, the promotion of transparency and the communication. [14]

Business IT Government

It is a fundamental part of corporate governance and consists of organizational leadership, organizational structures and processes that expand organizations' organizational strategies and objectives; That is, it is a shared responsibility of the direct board and executive management of the organization. [15]

Over time organizations realize the positive impact of success on organizations, maintain a high understanding so that IT is operated and leveraged to offer a competitive advantage. The IT Governance approach is primarily to be an operational solution that addresses the challenges presented by IT, improves performance and enables the competitive advantage to prevent problems. [15]

Reference [16] indicates that the IT governance framework concept can be considered as a derivation, at least in time, of the broader concept of corporate governance. In recent years, the latter concept has been managed both in the public and private spheres, as if it were something new, arising from the economic growth of the first years of the 21st century. The fact is that, as the size of private organizations has grown and their power and influence has increased, the way in which they are governed has become increasingly important for the whole economy and society.

Cobit5.0 for Information Security

IT Governance Institute defines COBIT as a generic process model, all these processes found in IT functions, provide an understandable reference model for IT and business managers. [17]

According to José Peña, COBIT is the Framework that helps support the IT Government, establishing a set of activities and controls to ensure that IT processes are integrated with the organization's strategies to achieve its objectives. [18]

Government IT is understood as the various activities carried out by the IT area, which consists of a structure of relationships and processes aimed at directing and controlling the company, in order to achieve its objectives. In short, it can be said that COBIT is a framework and a set of tools of Information Technology (IT) Government that allows to develop clear policies and good practices for the control of the same in the organizations.

Key Areas of Government and Management of COBIT 5.0. "COBIT is not a prescriptive governance framework, but it does define that companies implement governance and management processes so that key areas are covered," as shown in Figure 2. [19]

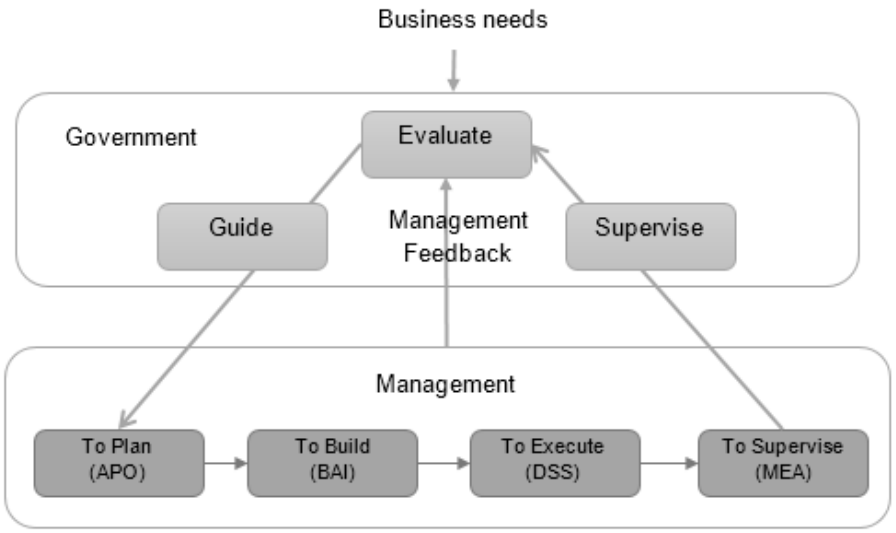


Figure 1. Key Areas of Government and Management of COBIT 5 .0

Sostenibilidad en el contexto de gobierno de TI. "Sustainability presented in IT governments is one way for these companies to achieve greater profitability, many companies are creating governance structures that foster behavior that leads to the achievement of the company's business performance goals" [4], Thus defining a sustainable IT government as one that fosters a desired behavior in the use of IT.

It is important to mention that sustainable IT "minimizes damage to the environment, as well as changing the way companies carry out their activities and encourage companies to promote low emissions, save money and leave a lower footprint in the environment, while striving to meet corporate goals." [3]

It is necessary to emphasize that a sustainable IT strategy must be aligned with the sustainability strategy of the whole company, in order to minimize the negative economic, environmental and social impacts of an activity. [5]

The following are the corporate IT Governance processes together with the activities of each task, information obtained from the COBIT 5.0 "Catalytic Processes" Guide. [20]

COBIT 5.0: 2012 is divided into 5 (five) business IT governance processes, each of which has three (three) governance practices (Evaluate, Orient, Supervise); The following is a list of government processes with their respective practices:

EDM01: Ensure the establishment and maintenance of the governance framework.

EDM02: Ensure the delivery of benefits.

EDM03: Ensuring Risk Optimization.

EDM04: Ensure the optimization of resources.

EDM05: Ensure Transparency to Stakeholders.

Mapping of activities between the SGE21: 2008 standard and the IT governance framework COBIT 5.0: *2012.* This process of mapping analyzes each activity of the Environmental Sustainability input (SGE21: 2008), to determine if it has any relation to the activities of the COBIT 5.0: 2012 Government processes, the symbology defined in Table 2 was used. Need to explain what it means:

Mapping of activities between the SGE21: 2008 standard and the IT governance framework COBIT 5.0: 2012. This process of mapping analyzes each activity of the Environmental Sustainability input (SGE21: 2008), to determine if it has any relation to the activities of the COBIT 5.0: 2012 Government processes, the symbology defined in Table 2 was used.

Need to explain what it means. Partially complies.

The requirement of the Environmental Sustainability activity is met by IT Governance activity, but SGE21: 2008 has the environmental focus COBIT has a focus on technologies.

Does not comply. - That the requirement of the Environmental Sustainability activity is not related to IT Governance activities.

Complies. - That the requirement of the Environmental Sustainability activity is fulfilled with the activity of IT Governance.

Table 1. Symbology used in Mapping

Symbol	Description
x:	An x is used when both activities have nothing in common, i.e. they do not comply with the environmental activity of the SGE21.
◐:	This symbol is used when both activities have something in common, that is to say that they partially fulfill with the environmental activity.
✓:	A visa is used when both activities fully comply with their characteristics, ie if they comply with the environmental activity.

Source: Own Elaboration

Chart 2. Mapping between the activities of the EDM01 Process and the SGE21

MAPPING BETWEEN THE ACTIVITIES OF COBIT5.0: 2012 AND THE SGE 21: 2008 STANDARD																							
			EDM01. "Ensure the establishment and maintenance of the governance framework"																				
			Evaluate									Guide									Supervise	
		ACTIVITIES OF COBIT5.0	Analyze and identify the factors of the internal and external environment (legal, contractual and regulatory obligations) and trends in the business	Determine IT rematch and its role with regard to the business.	Consider external regulations, legal and contractual obligations and determine how they should be applied in the IT governance of the	Align the use and ethical processing of information and its impact on society, the natural environment and the interests of internal and external	Determine the implications of the joint control environment of the enterprise with respect to IT.	Articulate the principles that guide the design of decision making on IT governance.	Understand the corporate culture of decision making and determine an optimal model in decision making for IT.	Determine appropriate levels for delegating authority, including threshold rules, for IT decisions.	Communicate the principles of IT governance and layer with the executive manager on how to establish informed and committed leadership.	Establish or delegate the establishment of government structures, processes and practices in line with agreed design principles.	Assign responsibility, authority and responsibility for the implementation of agreed governance design principles, decision-making models and	Ensure that notification and communication mechanisms provide adequate information to those responsible for monitoring and decision-making.	Guide staff to follow relevant guidelines for ethical and professional behavior and ensure that the consequences of non-compliance are known	Guide the establishment of a reward system to promote desirable cultural change.	Evaluate the effectiveness and performance of stakeholders who have been delegated responsibility and authority to the company's IT governance.	Periodically assess whether the agreed IT governance mechanisms (structures, principles, processes, etc.) are effectively established and	Evaluate the effectiveness of government design and identify actions to rectify any deviation.	Maintain oversight over the extent to which IT meets obligations (regulations, laws, common laws, contractual), internal policies, standards and professional guidelines.	Provide oversight of the effectiveness of, and compliance with, the company's control system.	Monitor routine and regular mechanisms to ensure that IT usage meets relevant obligations (regulatory, legislation, common laws, contractual), standards and guidelines.
SGE 21 ACTIVITIES			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
PHASES	1	1.1 Fair competition	x	x	◐	x	x	x	x	x	x	x	x	x	◐	x	x	x	x	x	x	x	
	2	2.1 Principles of Quality	x	x	x	◐	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
		2.2 Compliance with Legislation and Regulations.	x	x	◐	x	x	x	x	x	x	x	x	x	x	x	◐	◐	x	◐	◐	◐	
		2.3 Transparency of information.	x	x	x	◐	x	x	x	x	x	x	x	◐	x	x	x	x	x	x	x	x	
		2.4 Security of the information.	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
		2.5 Responsible shopping.	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
		2.6 Product or Service Security.	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
	3	3.1 Dialogue with stakeholders.	x	x	x	x	x	x	x	x	x	x	x	◐	x	x	x	x	x	x	x	x	
		3.2 Transparency with the environment.	x	x	x	x	◐	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
		3.3 Cooperation and Partnerships.	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
		3.4 Collaboration with the Administrators.	x	x	x	x	x	x	x	x	◐	x	x	x	x	x	x	x	x	x	x	x	
	4	4.1 Ethical and Socially Responsible Management Policy (PGE).	x	x	x	x	x	x	x	x	x	x	x	x	◐	x	x	x	x	◐	x	x	
		4.2 Anti-corruption policy.	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	◐	x	x	
		4.3 Responsible Advertising Policy.	x	x	x	x	x	x	x	x	x	x	x	x	◐	x	x	x	x	x	x	x	
		4.4 Code of Conduct.	x	x	x	x	x	x	x	x	x	x	x	x	◐	x	x	x	x	x	x	x	
		4.5 Responsible for Ethical Management / Social Responsibility	x	x	x	x	x	x	x	x	x	x	◐	x	x	x	x	x	x	x	x	x	
		4.6 Good government.	◐	x	◐	◐	x	◐	x	x	◐	◐	x	x	x	x	◐	x	x	x	◐	◐	
		5.1 Objectives and Indicators.	x	x	x	◐	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
		5.2 Ethical and Socially Responsible	x	x	x	x	x	x	x	x	◐	x	x	x	x	x	x	x	x	x	◐	x	

		Management Committee																				
		5.3 Identification of activities and impacts	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	5	5.4 Diagnostic and evaluation system.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	◐	x	x	x	x	x
		5.5 Evaluation and monitoring of impacts (ISO 14001).	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	◐	x
		5.6 Risk plan.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		5.7 Environmental communication.	**x**	x	x	x	x	x	x	x	◐	x	x	x	x	x	x	x	x	x	x	x
		5.8 Pollution prevention and strategic response to climate change.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		5.9 Environmental management program.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		5.10 Social Responsibility and Communication Report.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		5.11 Responsible research, development and innovation.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		5.12 Social action.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	◐	x	x	x
	6	6.1 RSC strategic plan	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
FASES	**7**	7.1 Encourage good practices, support and improvement measures.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		7.2 Have channels for conflict resolution.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	8	8.1 Field Deployment	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	9	9.1 Accessibility	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		9.2 Monitoring and evaluation	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	◐	◐	x	x	x	x
		9.3 Present Report on environmental aspects.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		9.4 Management review and continuous improvement.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

Source: *Own Elaboration*

Chart 3. Mapping between the activities of the EDM02 Process and the SGE21

MAPPING BETWEEN THE ACTIVITIES OF COBIT5.0: 2012 AND THE SGE 21: 2008 STANDARD																							
			EDM02. ENSURE THE DELIVERY OF BENEFITS																				
			Evaluate								Guide							Supervise					
		ACTIVIDADES DE COBIT5.0	Understand the requirements of stakeholders; Strategic IT issues, such as dependence on IT; And understand the technology and its capabilities	Understand the key governance elements necessary for the reliable, secure	Understand and discuss regularly the opportunities that could arise from the changes enabled in the company by the current, new or emerging	Understand what is understood by value in the company and consider how well it has been communicated, understood and applied through the processes	Evaluate The effectiveness of the integration and alignment of IT strategies	Understand and consider how elective are the current roles, responsibilities,	Consider how well aligned is the management of IT investments, services	Evaluate the alignment of the portfolio of investments, services and assets with the strategic objectives of the company; With the value of the financial and non-financial company; With the risk of both service and profit; With	Define and communicate the portfolio and investment types, categories, criteria and weights relative to criteria that allow relative value scores.	Define the requirements for stage-gate and other reviews for the importance of the investment for the company and the associated risk, schedule of the	Guiding the direction to consider innovative IT potential uses that enable the company to respond to new opportunities and challenges, to conduct new	To orient the necessary changes in the assignment of imputations and responsibilities in the execution of the portfolio of investments and the	Define and communicate at enterprise level the value delivery objectives and outcome measures to enable effective control.	Orient the necessary changes in the portfolio of investments and services to realign them with the current and expected objectives of the company and /	To recommend the consideration of potential innovations, organizational changes or operational improvements that from the IT initiatives could impel	Define a balanced set of performance objectives, metrics, goals and benchmarks. The metrics should cover the activity and the measurement of results, including indicators of delay and progress of results, as well as an	Collect pertinent, timely, complete, reliable and accurate data to inform about the advances in the delivery of value with respect to the objectives. Obtain a succinct, high-level, complete view of the portfolio, program and IT	To obtain regular and relevant reports of the portfolio, program and IT performance (technological and functional). Review the progress of the company towards the objectives identified and the degree to which the	After reviewing the reports, take the appropriate management measures as	After reviewing reports, make sure that appropriate corrective actions are initiated and controlled.
ACTIVIDADES DE SGE 21			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
PHASES	**1**	1.1 Fair competition	◐	x	x	x	x	x	x	x	x	x	◐	x	x	x	x	x	x	x	x	x	
	2	2.1 Principles of Quality	x	◐	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
		2.2 Compliance with Legislation and Regulations.	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
		2.3 Transparency of information.	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	◐	x	x	x	
		2.4 Security of the information.	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
		2.5 Responsible shopping.	x	x	x	x	x	x	x	◐	x	x	◐	x	x	x	x	x	x	x	x	x	
		2.6 Product or Service Security.	**x**	◐	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
	3	3.1 Dialogue with stakeholders.	**x**	x	x	◐	x	x	x	x	x	x	x	x	◐	x	x	x	x	x	x	x	
		3.2 Transparency with the environment.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
		3.3 Cooperation and Partnerships.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
		3.4 Collaboration with the Administrators.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
	4	4.1 Ethical and Socially Responsible Management Policy (PGE).	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
		4.2 Anti-corruption policy.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
		4.3 Responsible Advertising Policy.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
		4.4 Code of Conduct.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
		4.5 Responsible for Ethical Management / Social Responsibility	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
		4.6 Good government.	**x**	◐	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
	5	5.1 Objectives and Indicators.	**x**	x	x	x	◐	x	x	x	x	x	x	x	x	x	x	◐	x	◐	x	x	
		5.2 Ethical and Socially Responsible	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	

		Management Committee																				
		5.3 Identification of activities and impacts	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		5.4 Diagnostic and evaluation system.	**x**	x	x	x	x	x	x	◐	x	x	x	x	x	x	x	x	x	x	x	x
		5.5 Evaluation and monitoring of impacts (ISO 14001).	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		5.6 Risk plan.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		5.7 Environmental communication.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		5.8 Pollution prevention and strategic response to climate change.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		5.9 Environmental management program.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	◐	◐	x	x
		5.10 Social Responsibility and Communication Report.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		5.11 Responsible research, development and innovation.	**x**	x	x	x	x	x	x	x	x	x	◐	x	x	x	◐	x	x	x	x	x
		5.12 Social action.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	6	6.1 RSC strategic plan	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	7	7.1 Encourage good practices, support and improvement measures.	◐	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		7.2 Have channels for conflict resolution.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	8	8.1 Field Deployment	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	9	9.1 Accessibility	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		9.2 Monitoring and evaluation	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		9.3 Present Report on environmental aspects.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		9.4 Management review and continuous improvement.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	◐	◐

Source: *Own Elaboration*

Chart 4. Mapping between the activities of the EDM03 Process and the SGE21

MAPPING BETWEEN THE ACTIVITIES OF COBIT5.0: 2012 AND THE SGE 21: 2008 STANDARD																			
			EDM03. ENSURE RISK OPTIMIZATION																
			Evaluate						Guide						Supervise				
		COBIT5.0 ACTIVITIES	Determine the level of IT-related risks that the company is willing to take to meet its objectives (risk appetite).	Evaluate and approve proposals for IT risk tolerance thresholds against levels of risk and opportunity acceptable to the company.	Determine the degree of alignment of the IT risk strategy with the business risk strategy.	Proactively assess IT risk factors prior to outstanding business strategic decisions and ensure that company decisions are made aware of the risks.	Determine whether IT use is subject to appropriate risk assessment and assessment as described in relevant national and international standards.	Evaluate risk management activities to ensure alignment with the company's capabilities for IT-related losses and leaders' tolerance for them.	1. Promote a consistent culture of IT risks and encourage the company to proactively identify IT risks, opportunities and potential impacts on the business.	Guide the integration of IT risk operations and strategy with strategic business decisions and operations	Guide the development of risk communication plans (covering all levels of the company), as well as risk action plans	Guide the implementation of appropriate mechanisms to respond rapidly to changing risks and promptly notify appropriate levels of management, supported agreed escalation principles (what to report, when, where and how)	Guide that risk, opportunities, problems and concerns can be identified and reported by anyone at any time. The risk must be managed in accordance with published policies and procedures scaled to relevant decision makers	Identify the key objectives and indicators of governance and risk management processes to be monitored and approve the approaches, methods, techniques and processes for capturing and	Monitor the extent to which the risk profile is managed within risk appetite thresholds	Monitor key management goals and metrics for governance processes and risk management with respect to objectives, analyze the causes of deviations, and initiate corrective actions to address the underlying causes.	Facilitate the review by key stakeholders of the company's progress toward identified objectives.	Report any risk management issues to the Board or the Steering Committee.
SGE 21 ACTIVITIES			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASES	**1**	1.1 Fair competition	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	2	2.1 Principles of Quality	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		2.2 Compliance with Legislation and Regulations.	◐	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		2.3 Transparency of information.	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		2.4 Security of the information.	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		2.5 Responsible shopping.	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		2.6 Product or Service Security.	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	3	3.1 Dialogue with stakeholders.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		3.2 Transparency with the environment.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		3.3 Cooperation and Partnerships.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		3.4 Collaboration with the Administrators.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	◐
	4	4.1 Ethical and Socially Responsible Management Policy (PGE).	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		4.2 Anti-corruption policy.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		4.3 Responsible Advertising Policy.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		4.4 Code of Conduct.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		4.5 Responsible for Ethical Management / Social Responsibility	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		4.6 Good government.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	5	5.1 Objectives and Indicators.	**x**	x	x	x	x	x	x	x	x	x	x	◐	x	x	x	x

		5.2 Ethical and Socially Responsible Management Committee	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		5.3 Identification of activities and impacts	**x**	x	x	x	x	◐	◐	x	x	x	x	x	x	x	x	x
		5.4 Diagnostic and evaluation system.	**x**	x	x	x	◐	x	x	x	x	x	x	x	x	x	x	x
		5.5 Evaluation and monitoring of impacts (ISO 14001).	◐	x	x	◐	◐	x	x	x	x	x	x	x	x	x	x	x
		5.6 Risk plan.	◐	◐	x	◐	◐	◐	x	x	◐	x	◐	x	x	◐	x	x
	5	5.7 Environmental communication.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		5.8 Pollution prevention and strategic response to climate change.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		5.9 Environmental management program.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		5.10 Social Responsibility and Communication Report.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		5.11 Responsible research, development and innovation.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		5.12 Social action.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	6	6.1 RSC strategic plan	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	7	7.1 Encourage good practices, support and improvement measures.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		7.2 Have channels for conflict resolution.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	8	8.1 Field Deployment	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	9	9.1 Accessibility	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		9.2 Monitoring and evaluation	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		9.3 Present Report on environmental aspects.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		9.4 Management review and continuous improvement.	**x**	x	x	x	x	x	x	x	x	x	x	x	x	x	x	◐

Source: Own Elaboration

Chart 4. Mapping between the activities of the EDM04 Process and the SGE21

MAPPING BETWEEN THE ACTIVITIES OF COBIT5.0: 2012 AND THE SGE 21: 2008 STANDARD																
			ACTIVIDADES DE COBIT5.0	EDM04. ENSURE RESOURCE OPTIMIZATION												
				Evaluate					Guide					Supervise		
				Review and evaluate current and future strategy, options for IT resource provision and develop capabilities to meet current and future needs (including procurement alternatives).	Define the principles to guide the allocation and management of resources and capabilities so that IT can meet the needs of the enterprise, with the skill and capacity required according to agreed priorities and budgetary constraints.	Review and approve the resource plan and company architecture strategies for value delivery and risk mitigation with assigned resources.	Understand the requirements for aligning resource management with financial and human resource planning.	Define the principles for the management and control of the architecture of the company.	Communicate and drive the adoption of resource management strategies, principles and the resource plan and agreed corporate architecture strategies.	Allocate responsibilities for the execution of resource management.	Define key objectives, measures and metrics for resource management.	Establish principles related to the protection of resources.	Align the management of resources with the HR and financial planning of the company.	Supervise the allocation and optimization of resources according to the objectives and priorities of the company through agreed objectives and metrics.	Supervise IT procurement strategies and enterprise architecture and IT resources and capabilities to ensure the company's current and future needs can be met.	Monitor the performance of resources against objectives, analyze the causes of deviations and initiate corrective actions to address the underlying causes.
ACTIVIDADES DE SGE 21				1	2	3	4	5	6	7	8	9	10	11	12	13
PHASES	1	1.1 Fair competition		x	x	x	x	x	x	x	x	x	x	x	x	x
	2	2.1 Principles of Quality		x	x	x	x	x	x	x	x	x	x	x	x	x
		2.2 Compliance with Legislation and Regulations.		x	x	x	x	x	x	x	x	x	x	x	x	x
		2.3 Transparency of information.		x	x	x	x	x	x	x	x	x	x	x	x	x
		2.4 Security of the information.		x	x	x	x	x	x	x	x	x	x	x	x	x
		2.5 Responsible shopping.		x	x	x	x	x	x	x	x	x	x	x	x	x
		2.6 Product or Service Security.		x	x	x	x	x	x	x	x	◐	x	x	x	x
	3	3.1 Dialogue with stakeholders.		**x**	x	x	x	x	x	x	x	x	x	x	x	x
		3.2 Transparency with the environment.		**x**	x	x	x	x	x	x	x	x	x	x	x	x
		3.3 Cooperation and Partnerships.		**x**	x	x	x	x	x	x	x	x	x	x	x	x
		3.4 Collaboration with the Administrators.		**x**	x	x	x	x	x	x	x	x	x	x	x	x
	4	4.1 Ethical and Socially Responsible Management Policy (PGE).		**x**	x	x	x	x	x	x	x	x	x	x	x	x
		4.2 Anti-corruption policy.		**x**	x	x	x	x	x	x	x	x	x	x	x	x
		4.3 Responsible Advertising Policy.		**x**	x	x	x	x	x	x	x	x	x	x	x	x
		4.4 Code of Conduct.		**x**	x	x	x	x	x	x	x	x	x	x	x	x
		4.5 Responsible for Ethical Management / Social Responsibility		**x**	x	x	x	x	x	x	x	x	x	x	x	x
		4.6 Good government.		**x**	x	x	x	x	x	x	x	x	x	x	x	x

	5	5.1 Objectives and Indicators.	**x**	x	x	x	x	x	x	◐	x	x	x	x	◐
		5.2 Ethical and Socially Responsible Management Committee	**x**	x	x	x	x	x	x	x	x	x	x	x	x
		5.3 Identification of activities and impacts	**x**	x	x	x	x	x	x	x	x	x	x	x	x
		5.4 Diagnostic and evaluation system.	**x**	x	x	x	x	x	x	x	x	x	x	x	x
		5.5 Evaluation and monitoring of impacts (ISO 14001).	**x**	x	x	x	x	x	x	x	x	x	x	x	x
		5.6 Risk plan.	**x**	x	x	x	x	x	x	x	x	x	x	x	x
		5.7 Environmental communication.	**x**	x	x	x	x	x	x	x	x	x	x	x	x
		5.8 Pollution prevention and strategic response to climate change.	**x**	x	x	x	x	x	x	x	x	x	x	x	x
		5.9 Environmental management program.	**x**	x	x	x	x	x	x	x	x	x	x	x	x
		5.10 Social Responsibility and Communication Report.	**x**	x	x	x	x	x	x	x	x	x	x	x	x
		5.11 Responsible research, development and innovation.	**x**	x	x	x	x	x	x	x	x	x	x	x	x
		5.12 Social action.	**x**	x	x	x	x	x	x	x	x	x	x	x	x
	6	6.1 RSC strategic plan	**x**	x	x	x	x	x	x	x	x	x	x	x	x
	7	7.1 Encourage good practices, support and improvement measures.	**x**	x	x	x	x	x	x	x	x	x	x	x	x
		7.2 Have channels for conflict resolution.	**x**	x	x	x	x	x	x	x	x	x	x	x	x
	8	8.1 Field Deployment	**x**	x	x	x	x	x	x	x	x	x	x	x	x
	9	9.1 Accessibility	**x**	x	x	x	x	x	x	x	x	x	x	x	x
		9.2 Monitoring and evaluation	**x**	x	x	x	x	x	x	x	x	x	x	x	x
		9.3 Present Report on environmental aspects.	**x**	x	x	x	x	x	x	x	x	x	x	x	x
		9.4 Management review and continuous improvement.	**x**	x	x	x	x	x	x	x	x	x	x	x	x

Source: *Own Elaboration*

Chart 5. Mapping between the activities of the EDM05 Process and the SGE21 Standard

MAPPING BETWEEN THE ACTIVITIES OF COBIT5.0: 2012 AND THE SGE 21: 2008 STANDARD														
			COBIT5.0 ACTIVITIES	EDM05. ENSURE TRANSPARENCY TO INTERESTED PARTIES										
				Evaluate			Guide				Supervise			
				Examine and judge future reporting requirements regarding the use of IT within the enterprise (regulation, legislation, general laws and contractual requirements). Including scope and frequency.	Review and judge current and future reporting requirements for other stakeholders regarding the use of IT within the enterprise, including scope and conditions.	Maintain communication principles with external and internal stakeholders, including formats and channels of communication and the principles of acceptance and approval of reports by stakeholders.	Guide the establishment of the communication strategy for external and internal stakeholders.	Orient the implementation of mechanisms to ensure that the information meets all the criteria of mandatory corporate requirements in terms of IT reporting.	Establish mechanisms for validation and approval of the mandatory reporting.	Establish scaling mechanisms in Reporting.	Periodically evaluate the effectiveness of the mechanisms to ensure the accuracy and reliability of the mandatory reporting.	Periodically evaluate the effectiveness of the mechanisms and outputs of communication with external and internal stakeholders.	Determine whether the requirements of different stakeholders are being met.
SGE 21 ACTIVITIES				1	2	3	4	5	6	7	8	9	10
PAHSES	**1**	1.1 Fair competition		x	x	x	x	x	x	x	x	x	x
	2	2.1 Principles of Quality		x	x	x	x	x	x	x	x	x	x
		2.2 Compliance with Legislation and Regulations.		◐	x	x	x	x	x	x	x	x	x
		2.3 Transparency of information.		x	x	x	x	x	x	x	x	x	x
		2.4 Security of the information.		x	x	x	x	x	x	x	x	x	x
		2.5 Responsible shopping.		x	x	x	x	x	x	x	x	x	x
		2.6 Product or Service Security.		**x**	x	x	x	x	x	x	x	x	x
	3	3.1 Dialogue with stakeholders.		**x**	x	◐	◐	x	x	x	x	◐	x
		3.2 Transparency with the environment.		**x**	x	x	x	x	x	x	x	x	x
		3.3 Cooperation and Partnerships.		**x**	x	x	x	x	x	x	x	x	x
		3.4 Collaboration with the Administrators.		**x**	x	◐	x	x	x	x	x	x	x
	4	4.1 Ethical and Socially Responsible Management Policy (PGE).		**x**	x	x	x	x	x	x	x	x	x
		4.2 Anti-corruption policy.		**x**	x	x	x	x	x	x	x	x	x
		4.3 Responsible Advertising Policy.		**x**	x	x	x	x	x	x	x	x	x
		4.4 Code of Conduct.		**x**	x	x	x	x	x	x	x	x	x
		4.5 Responsible for Ethical Management / Social Responsibility		**x**	x	x	x	x	x	x	x	x	x
		4.6 Good government.		**x**	x	x	x	x	x	x	x	x	x
	5	5.1 Objectives and Indicators.		**x**	x	x	x	x	x	x	x	x	x

		5.2 Ethical and Socially Responsible Management Committee	**x**	x	x	x	x	x	x	x	x	x
		5.3 Identification of activities and impacts	**x**	x	x	x	x	x	x	x	x	x
		5.4 Diagnostic and evaluation system.	**x**	x	x	x	x	x	x	x	x	x
		5.5 Evaluation and monitoring of impacts (ISO 14001).	**x**	x	x	x	x	x	x	x	x	x
		5.6 Risk plan.	**x**	x	x	x	x	x	x	x	x	x
		5.7 Environmental communication.	**x**	x	x	◐	x	x	x	x	x	x
		5.8 Pollution prevention and strategic response to climate change.	**x**	x	x	x	x	x	x	x	x	x
		5.9 Environmental management program.	**x**	x	x	x	x	x	x	x	x	x
		5.10 Social Responsibility and Communication Report.	◐	x	x	x	x	x	x	x	x	x
		5.11 Responsible research, development and innovation.	**x**	x	x	x	x	x	x	x	x	x
	5	5.12 Social action.	**x**	x	x	x	x	x	x	x	x	x
	6	6.1 RSC strategic plan	**x**	x	x	x	x	x	x	x	x	x
	7	7.1 Encourage good practices, support and improvement measures.	**x**	x	x	x	x	x	x	x	x	x
		7.2 Have channels for conflict resolution.	**x**	x	x	x	x	x	x	x	x	x
	8	8.1 Field Deployment	**x**	x	x	x	x	x	x	x	x	x
	9	9.1 Accessibility	**x**	x	x	x	x	x	x	x	x	x
		9.2 Monitoring and evaluation	**x**	x	x	x	x	x	x	◐	◐	x
		9.3 Present Report on environmental aspects.	**x**	x	x	x	x	x	x	x	x	x
		9.4 Management review and continuous improvement.	**x**	x	x	x	x	x	x	x	x	x

Source: *Own Elaboration*

Alignment of the activities of the SGE21:2008 standard with the IT Management processes of Cobit5.0: 2012

It is important to emphasize that this research work performs an analysis comparing the activities of the SGE21: 2008 standard with each one of the processes of the Business IT Management of Cobit5.0: 2012. In which it was considered the processes of Business IT Management because it is intended to analyze if the Management model has characteristics of sustainability, taking into account the latest version of Cobit5.0: 2012 in which it contains 32 processes for IT management Demonstrating that they meet certain characteristics of the framework SGE21: 2008.

Below is a list of the activities of the SGE21: 2008 framework with the IT Management processes of Cobit5.0: 2012.

Chart 6. COBIT 5.0 Management Processes 2012 vs. SGE21 Standard: 2008

SGE21	COBIT5.0
1.1 Fair competition	APO07 Manage Human Resources
2.1 Principles of Quality	APO11 Manage Quality
2.2 Compliance with Legislation and Regulations.	APO01 Manage the IT management framework
2.3 Transparency of information.	APO13 Manage Security
2.4 Security of the information.	APO13 Manage Security
2.5 Responsible shopping.	APO10 Manage providers
2.6 Product or Service Security.	None
3.1 Dialogue with stakeholders.	APO01 Manage the IT management framework APO02 Manage strategy
3.2 Transparency with the environment.	APO08 Manage Relationships
3.3 Cooperation and Partnerships.	APO08 Manage Relationships
3.4 Collaboration with the Administrators.	APO08 Manage Relationships
4.1 Ethical and Socially Responsible Management Policy.	APO01 Manage the IT management framework
4.2 Anti-corruption policy.	APO01 Manage the IT management framework
4.3 Responsible Advertising.	APO01 Manage the IT management framework
4.4 Code of Conduct.	APO01 Manage the IT management framework
4.5 Responsible for Ethical Management / Social Responsibility.	APO01 Manage the IT management framework
4.6 Good government.	APO01 Manage the IT management framework
5.1 Objectives and Indicators.	APO02 Manage strategy
5.2 Ethical and Socially Responsible Management Committee.	APO01 Manage the IT management framework

5.3 Identification of activities and impacts.	APO012 Manage Risks APO08 Manage Relationships
5.4 Diagnostic and evaluation system.	APO10 Manage Suppliers
5.5 Evaluation and monitoring of impacts.	APO12 Manage Risks BAI04 Manage availability and capacity
5.6 Risk plan.	APO12 Manage Risks
5.7 Environmental communication.	APO01 Manage the IT management framework APO02 Manage strategy
5.8 Pollution prevention and strategic response to climate change.	DSS03 Manage problems
5.9 Environmental Management Program.	BAI01 Manage programs and projects
5.10 Social Responsibility and Communication Report.	None
5.11 Responsible research, development and innovation.	APO04 Manage Innovation
5.12 Social action.	None
6.1 RSC strategic plan	APO02 Manage Strategy
7.1 Encourage good practices, support and improvement measures.	APO10 Manage Suppliers
7.2 Have channels for conflict resolution.	BAI03 Manage the Identification and Construction of Solutions
8.1 Field Deployment.	BAI08 Manage Knowledge
9.1 Accessibility.	BAI04 Manage availability and capacity
9.2 Monitoring and evaluation.	BAI06 Manage changes
9.3 Present Report on environmental aspects.	BAI10 Manage Settings
9.4 Management review and continuous improvement.	APO01 Manage the IT management framework

Source: Own Elaboration

Identification of Limitations

Limitations between the activities of the processes COBIT5.0 with SGE21. Below in Table 2the type of limiting belonging each activity detailed standard SGE21: 2008 with its respective justification, it noteworthy that is important to note that some activities may be part of the enterprise IT management COBIT5.0: 2012 to avoid activities that cannot be incorporated sustainability into IT governance framework. The type of limitation shall consider the following:

Table 2. Type Limiting

Limiting Type	Description
None	When not comply with any activity.
Focus	When complies in part with one or more activities of the five IT governance processes.
activity	When there is not description of the activity; taking into account that the activity creates help incorporate environmental sustainability means the IT Governance Framework.
Process	When environmental activity is not satisfied with any of the activities of government and IT management COBIT5.0: 2012; if such activity does not exist in any of the five processes of government, but if it is necessary to strengthen the environmental sustainability the IT Governance Framework can create a process.

Source: Own Elaboration

To others, is important emphasize that the purpose of this analysis is achieve environmental sustainability for IT governance framework, as developed as follows:

Table 8: Limitations between COBIT5.0: 2012 and SGE21: 2008

Environmental Activity	Limiting Type	Justification
1.1	Focus	On the activities 3; 13 process **EDM01** and activities 1; 11 process **EDM02** IT governance of Cobit5.0 establishes rules and laws that the staff must follow, but not fully account with activity *1.1 Fair competition* with a rule to respect the property rights of its competitors, so only you add the focus of environmental sustainability as it would not be necessary create an activity to strengthen sustainability in IT governance.
2.1	Focus	On Cobit5.0 Governance processes this activity does not meet *quality 2.1* Principles, generating reliable and secure delivery a product or service, but it noteworthy that this activity if meets enterprise IT management, considering the main focus of environmental sustainability.
2.2	Focus	On activities 3; 15; 16; 18; 19; 20 process **EDM01** and activity 1 process **EDM03** IT governance satisfy in full with activity *2.2*

		compliance with laws and regulations, however what would be added that this activity is specifically applied in the sector, environment and atmosphere where it is made, for that reason Cobit approach lacks of environmental sustainability.
2.3	focus	On governance processes Cobit5.0 activities 4; 12 process **EDM01** and activity 17 process **EDM02** partly met with this activity *2.3 Transparency of information* satisfy most, so that makes use of the transparency of certain information to the external parts of IT government, missing detail the approach to environmental sustainability.
2.4	Approach	In all activities of the five processes of government IT Cobit5.0 there is no statement of information security. Note that this activity *2.4 Information security* is within the IT Business Management Cobit5.0; so, it is considered that the focus of environmental sustainability adds ".
2.5	Activity	The activities 6; 7; 8 process **EDM02** ITCobit5.0 Government comply in part with this activity *2.5 Purchases responsible* since they have a relationship with the investments made for innovations that can generate improvements in the company, but does not specify the main feature that generates have a responsible purchase, is for that reason an activity is generated in the process **EDM02** section Evaluate the following: "Determine criteria for responsible purchasing taking into account ethical and environmental aspects that exceed legal requirements of sustainability assigned to frame IT governance ".
2.6	Approach	In Activity 2 process **EDM02** and activity 9 process **EDM04** IT Cobit5.0 Government fully meet with the activity *2.6 Safety product or* service; but Cobit comprises elements of government, while the standard SGE21 comprises aspects of health, safety and environmental sustainability. This feature could be added to Cobit5.0 approach, for the reason that comprises the reliable and dependable product delivery or service generated within IT governance.
3.1	Approach	The activities of the Government of Cobit5.0 processes, which are: the activity 12process, **EDM01** activities 4; 13 process **EDM02** 3 and activities; 4; 9 process; **EDM05** satisfy in full with activity *3.1 Dialogue with the* stakeholders, however Cobit5.0 must add the approach to environmental sustainability it requires SGE21 implementing standard IT within government.

3.2	Focus	Activity 5 process **EDM01** government IT Cobit5.0 partly complies with this activity *3.2 Transparency with the environment,* so that this activity is only increases the focus of environmental sustainability.
3.3	Focus	Cobit5.0 1has the activity 10 process **EDM01** the IT governance that complies partly with this activity *3.3 Cooperation and Partnerships;* but you need to implement activity exchange experiences with their competitors, so that the environmental sustainability approach is incorporated.
3.4	Focus	Activity 9 process, **EDM01** activity 3 process **EDM05** and activity 16 of process **EDM03** the IT governance met partly with activity *3.4 Collaboration with* administrators, but what be added to Cobit5.0 is the approach environmental sustainability, since this activity apply culture of ethical and socially responsible management, for reason Cobit lacks environmental sustainability focus.
4.1	Activity	All activities of government processes that meet Cobit5.0 partly with this activity *4.1 Ethics Policy and Socially Responsible Management (PGE)* not satisfied in full, since it is known that Cobit performs other policy for the company as mentioned in activities 13 and 18 of process, **EDM01**it is for that reason that an activity is added in the process **EDM01** - Evaluate with the description "Determine and consider what important it is implement a policy of ethical management within the IT governance framework should complement where environmental sustainability ".
4.2	Approach	In the process activity 18 **EDM01** Cobit5.0 Government complies partly with this activity *4.2 anticorruption policy,* as both satisfy obligations towards policies; but Cobit IT addresses within the government, while the SGE21 standard contains policies against corruption; for that reason, it is only increases the focus of environmental sustainability.
4.3	Focus	Is considered that the activity *responsible 4.3 Advertising* for SGE21 standard complies partly with activity 13process **EDM01** ITCobit5.0 government, for the reason that both perform responsibilities that act on the product for sale, but this activity is focused on environmental sustainability, while COBIT is oriented enterprise IT governance.
4.4	Focus	Activity 13process **EDM01** COBIT government complies partly with activity *4.4 ethical code of conduct,* but note that there such activity in the management of enterprise IT AP001, for that reason alone would missing from this activity assign the

		focus of environmental sustainability means to IT governance framework.
4.5	Focus	activity exists At least 11process **EDM01** governmentCobit5.0that complies partly with this activity *Responsible Management 4.5 Ethics / Social Responsibility*, because is knowledge that establishes Cobit5.0 responsible for the charges and authorities company to design IT governance, this activity is added environmental sustainability.
4.6	Focus	Although activity *4.6 Good governance* is considered that the activities 1; 3; 4; 6; 9; 10; 15; 19; 20 process **EDM01** and activity 2 process **EDM02** governance Cobit, satisfies in full but what differentiates them is that COBIT focuses on IT governance, while the SGE21 standard focuses on environmental sustainability.
5.1	Approach	In process activity **EDM01** 4, activity 5; 16 process **EDM02** and activity 12 process, **EDM03** Cobit5.0 government fully meet with activity *5.1 Objectives and* indicators, because both defined performance objectives and indicators with the difference that Cobit5.0 made according to IT governance while SGE21 standard establishes environmental sustainability, where this approach is added to this activity.
5.2	Activity	On activities 1 and 19 of process **EDM01** governance Cobit5.0 complying in part with activity *5.2 Ethics Committee and Socially Responsible Management*, meets with leadership committed to the organization but is very important for sustainability have an ethics committee management for that reason is necessary add an activity in the process **EDM01** in the section *Evaluate* "Determining an ethics committee and socially responsible within the framework of IT governance that ensures the material and financial human resources, through which it will have the environmental sustainability means ".
5.3	Focus	On activities 6 and 7 of process **EDM03** ITCobit5.0 government that complies partly with activity *5.3 Identification of activities and* impacts, but fully meet Cobit5.0 is oriented to IT, while the standard SGE21 focuses on the environmental sustainability of the organization, through which this approach to environmental sustainability is added to these activities.

5.4	Focus	On Activity 15 of the process **EDM01** activity 8 of process **EDM02** and activity5process **EDM03** IT Cobit5.0 Government; They satisfy in full with activity *5.4 System diagnosis and* evaluation, but the government Cobit is not addressed directly to provider while the Management Enterprise IT APO10 if it does, is why the focus of sustainability is implemented environmental.
5.5	Approach	In all activities Cobit governance processes that comply in part with activity *5.5 Assessment and monitoring of impacts* satisfied in full, since the activities 1, 4 and 5 of the process **EDM03** IT Government Cobit5.0 They take into account the impact assessment presented in the company, with the only difference that does not contain environmental sustainability.
5.6	Focus	On activities 1; 2; 4; 5; 6; 9; 11 and 14 of process **EDM03** Government ITCobit5.0 satisfy in full with activity *5.6 Risk* Plan, since the activities of the process EDM03 assess, prevent and manage the risks that arise in the activities of the company Cobit the difference does not establish environmental sustainability, is why the focus of environmental sustainability IT activities government plans manifest environmental risks, taking corrective and preventive measures implemented.
5.7	Focus	Although there are activities that comply in part with activity *5.7 Environmental communication* satisfies in full, as activity 9process **EDM01** and activity 4process **EDM05** establish communication with stakeholders of the organization, with the difference COBIT does not employ environmental sustainability, which is why the focus of environmental sustainability activity is added.
5.8	Activity	None of the activities of government processes Cobit5.0 met partly with activity *5.8 Pollution prevention and strategic address climate change* for the reason that there no prevention against contamination in products and set strategies when some climate change within the organization by Cobit, arises is why an activity is added within the process **EDM03** in the section *Monitoring* "Monitoring the pollution generated by its operators and products can be identified in time to prevent applying strategies for sustainability in a framework of IT governance, focused the environment. "
5.9	Activity	In this activity *5.9 Environmental management program* are very few activities of governance processes Cobit complying in part because its goal is improve the impacts on the environment, and is considered that the activities 17 and 18 of process

		EDM02 establish IT programs, but is very important have an activity that specify this type of program, in which increases in the process **EDM02** - *Evaluate* the following description: "Establish programs of environmental management objectives and targets, improving the impacts produced in the environment and assessing annually their environmental sustainability of IT governance."
5.10	Focus	On activities of government processes Cobit5.0 there only one activity that complies partly with the activity *5.10 Social Responsibility and Communication* but is very important for sustainability reporting for that reason is considered that activity 1 the process **EDM05** it relates to important reports (regulation, laws, legislation, etc.) for enterprise IT, for the reason that having Cobit includes environmental sustainability.
5.11	Approach	Although there are activities Cobit5.0 governance processes that comply in part with the activity *5.11 Research, development and responsible innovation* meets in full, since the activities 11 and 15 of process **EDM02** innovations to consider the company increase competitiveness, using the approach to environmental sustainability means to IT governance framework.
5.12	Focus	Although only ctivity 17 of a process **EDM01** Cobit5.0 IT government complies partly with the activity *Social Action 5.12* is not fully detailed social actions carried the organization, but note that both consider assess and identify actions to help in the social aspect, with the difference that is considered Cobit5.0 IT level government while the norm is considered SGE21 company level; in which it is necessary add the approach to environmental sustainability.
6.1	Activity	None of the activities of government processes do not meet Cobit5.0 activity 6*.1 RSC Strategic Plan,* but note that there performing strategies to achieve their goals and also processes IT Management APO02 establishes a strategic plan with the difference that the SGE21 rule this plan focuses the environment, is why an activity is added within the process **EDM01** in the section *Evaluate* "Determining the strategic plan of corporate social responsibility (CSR) to IT governance framework better know their environment and respond to changes minimizing social and environmental risks "where this activity will be focused on environmental sustainability."
7.1	Approach	In Activity 1 process **EDM02** IT governance Cobit5.0 partly complies with activity *7.2 Promoting good practices, support measures and improvements,* for the reason that there no such

		possibility of collaborating with suppliers but note if you are in the process of IT Management APO10 it is why you add only the focus of environmental sustainability.
7.2	Approach	In none of the activities of the processes of government activity meets Cobit5.0 *7.12 Have channels for conflict resolution but* in the process of enterprise IT management if this activity has BAI03, for that reason you add the focus of environmental sustainability.
8.1	Approach	The activities of government processes do not meet Cobit5.0 activity *8.1 Deployment in field,* but enterprise IT management BAI08 if complies with this activity partly for the reason that triggers all documents involved and not would be necessary create a new activity for the government if do not have to do with corporate sustainability, it is for them that you will only add the approach to environmental sustainability.
9.1	Approach	In all activities of government processes Cobit5.0 not meet the activity *9.1 Accessibility,* keep in mind that processes Enterprise IT Management BAI04 if have the willingness and ability of the product or service it is why we added the focus of environmental sustainability to this activity.
9.2	Approach	In some of the activities of Cobit5.0 governance processes, such as activities 8 and 9 of process **EDM05** fully compliant with activity 9*.2 Monitoring and evaluation* for the reason that exists in IT governance as in IT Management BAI06, you add only the focus of environmental sustainability.
9.3	Activity	In all activities of government processes Cobit5.0 activity does not comply with *9.3 submit report on the environmental aspects* must be taken into account in the processes of business management if this activity has BAI10; but an activity is added in the process **EDM05** - Evaluate "Establish mechanisms for reporting on the environmental aspects studied in the context of government IT approach environmental sustainability".
9.4	Focus	Although in the activities of governance processes that meet Cobit5.0 partly activity *9.4 Management Review and continuous improvement* implement lack of environmental sustainability activities 19; 20 of process **EDM02** and activity16 of process **EDM03** Cobit5.0 IT government fully comply but adds the environmental sustainability approach to these activities.

Source: *Own*

IT governance Model framework with environmental sustainability.

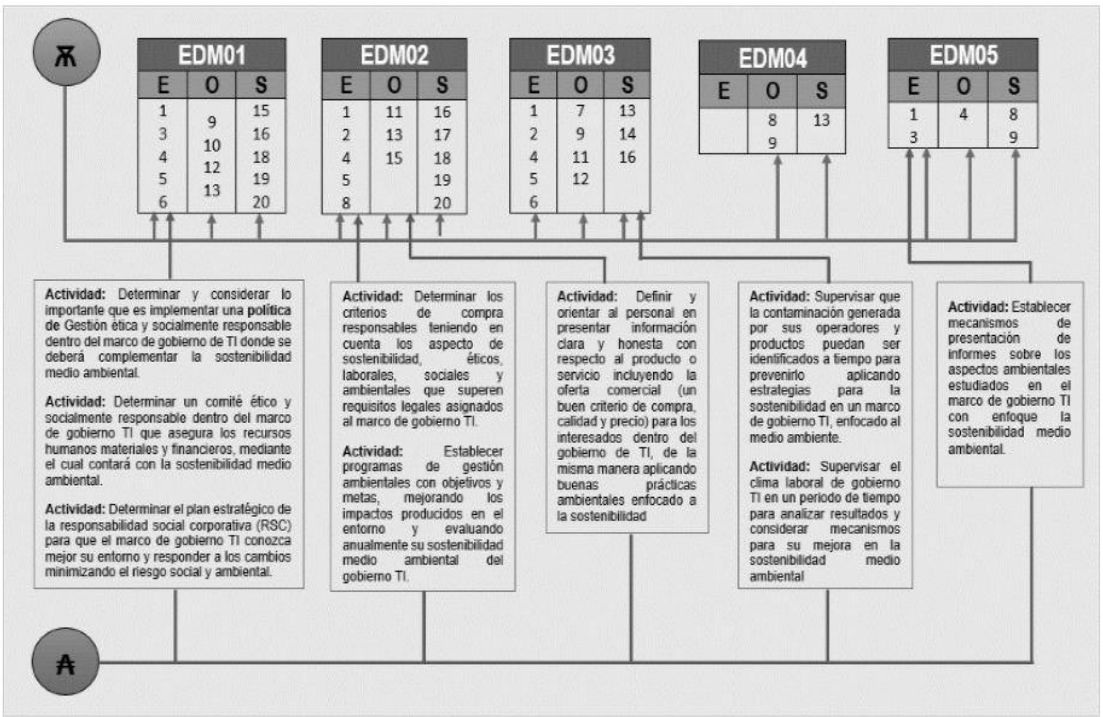
COBIT5.0: 2012 model is presented. Sustainable in which activities have been incorporated and the process previously proposed government. The present table details the symbology that has been used:

Table 3. Symbols for model COBIT5.0: 2012 Sustainable

Symbol	Name	Description
Ѫ	Approach	Represents the activities of IT governance framework COBIT5.0: 2012 that have a focus of environmental sustainability.
A	Activity	Represents a new activity is incorporated into the framework of government IT COBIT5.0: 2012.
▭	Process	Represents a new process is created when IT governance framework of COBIT5.0: 2012.

Source: Own Elaboration

Figure 3. Model COBIT5.0: 2012 for Sustainable Government IT



Source: Own Elaboration

Execution and / or assembly of the prototype

Model Proposal Description. Then the model of the proposal, which takes into consideration the following symbols are

X: Focus

A: Activity

□: Process

The following model of the proposed activities of the five IT processes COBIT5.0:2012 Government is determined and described that met in part with the activities of the Standard SGE21 adding environmental sustainability approach to such activities.is why they set *approach* to the following process activities **EDM01 ensure the establishment and maintenance of framework of government:**

Evaluate: Act 1, Act 3 Act 4 Act 5, Act 6....

Orientate: Act 9 Act 10, Act 12, Act 13.

Monitor.....Act 15, Act 16, Act 18, Act 19, Act 20.

then the process activities listed **Ensure EDM02 delivering benefits** that were added *approach:* the following

Evaluate: Act 1, Act 2, Act 4, Act 5, 8. Act

Counsel: .....Act 11, Act 13, Act 15.

Monitor: .... Act 16, Act 17, Act 18, Act 19, Act 20.

addition, the process activities **EDM03 risk optimization Ensuring** that were added the *approach* following specified:

Evaluate: Act 1, Act. ... 2 Act 4 Act 5, Act 5.

Counsel: Act 7 Act 9 Act 11, Act 12.

Monitor.....Act 13, Act 14, Act 16.

like above, activities specified **EDM04 process. Ensure resource optimization** that were *approach* the following added:

Evaluate: None.

Target: Act 8 Act 9.

Monitor...Act 13.

Finally, the process **EDM05 Ensuring transparency to stakeholders** is *approach* the following added:

Evaluate: Act 1, Act 3.

Counsel: Act. 4.

supervise: Act 8 Act 9. specifies:

in this model the new activities were increased in the respective process, which is detailed below also

in the process **EDM01** the following activities increased:

Evaluate

- *"identify and consider how important it is implement a policy of ethical management within the framework of IT governance which should complement environmental sustainability ":* This activity is considered because helps improve environmental sustainability in areas such as corruption, environmental disasters the untruthfulness of advertising, among others. It is also important that the government act TI ethical principles and values (confidence, responsibility, honesty and teamwork) used to solve the various moral problems within the organization.

- *"They determine an ethics committee and socially responsible within the framework of IT governance that ensures the material and financial human resources, through which will feature environmental sustainability":* This activity helps procreate environmental sustainability of IT Governance, as they are responsible for monitoring compliance ethical practice, advice on finding solutions to ethical problems and to encourage its use in organizations.

- *"Determining the strategic plan of corporate social responsibility (RSC) for the IT framework government better know their environment and respond to changes minimizing social and environmental risks, where this activity will be focused on environmental sustainability":* This activity considered as main objective of the strategic plan to help improve the environmental sustainability of government established government guidelines ensure ethical principles of respect for people and the environment. In addition, it can be said that the RS is the respect of the environment and one of the foundations of sustainable development and economic prosperity, also, environmental quality and social equity.

In the process **EDM02** the following activities increased:

Evaluate

- *"Determine criteria for responsible purchasing taking into account ethical and environmental aspects that exceed legal requirements of sustainability for the framework of IT governance":* This activity helps improve environmental sustainability through sustainable procurement the government can lead by example and achieve environmental policy objectives, while minimizing environmental damage. Also, take into account all aspects for the consumer to make a purchase, ask whether the consumer will make us will really satisfy.

- *"Establish programs of environmental management objectives and targets, improving the impacts on the environment and evaluating annually its environmental sustainability of IT governance":* These programs environmental management help to environmentally improve the performance of production process of the organization and giving sustainability IT governance, achieving the goals and objectives successfully implementing the monitoring and review of the programs will make the environmental performance of an improved form is activated.

Guide

- *"Guide staff to present clear and honest information about the product or service including the commercial offer (a good buying criteria, quality and price) for those interested in IT governance, in the same way applying good focused environmental practices sustainability ":* This activity is considered to help improve the environmental sustainability of IT governance because the staff is the main key to any organization that generates competitiveness also promotes good environmental practices to reduce the negative environmental impact production processes.

In the process **EDM03** the following activities increased:

Monitoring

- *"Monitoring the pollution generated by its operators and products can be identified in time to prevent implementing strategies for sustainability in a framework of IT governance, focused the environment":* This activity applies so that the organization can prevent the pollution generated by its operators and products, including climate change strategies and continuously improve their environmental performance and sustainability in IT governance.

- *"Monitoring the working environment of IT governance over a period of time to analyze results and consider mechanisms for improvement in environmental sustainability":* This activity helps to improve the environmental sustainability of the government because what is into consideration staff who are one of the keys to the competitive advantage of organizations, the development of a sustainable competitive strategy behind there always a team that has to be monitored to prevent an environmental disaster.

In the process **EDM05** the following activities increased:

Evaluate

- *"Establish mechanisms for reporting on the environmental aspects studied in the context of IT governance focused environmental sustainability":* This activity is required to verify compliance and effectiveness of responsibilities assumed by the

competent environmental authority; moreover, it is important to propose sustainability in government because you need keep track of all environmental records working in IT governance and likewise be presented to managers in the field.

- **Conclusions**

This study based on the methodology used could identify areas of environmental sustainability, strengthen IT governance.

Based on the investigation, it was found that it is possible incorporate aspects of Middle Environmental Sustainability Government IT

Government Sustainable IT proposed is a tool for IT executives in management technology to enable organizations to achieve business goals to ensure the generation of value, manage risk, etc., with an environmental focus.

This research provides the integrating sphere of environment to strategically strengthen business goals-medium technology.

- **Recommendations**

Is suggested that organizations are planned to incorporate and implement progressively short term aspects of IT Sustainable Government and this research a great tool for achieving it.

- **Future Work**

This work is one of several research studies for which the input of environmental sustainability and IT governance will be changed, in order to identify common issues, feed a doctoral work investigates models, standards, guides, etc.., most important, significant and characteristic in both areas (IT governance Environmental Sustainability and Environment) to determine a methodological framework Sustainable IT governance.

In future work, it is necessary validate the applicability of the proposal made, allowing effectively demonstrate that is possible apply the proposal and in this application, have addressed the concerns identified for current approaches.

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