Proposal of a Framework of Lean Governance and Management of Enterprise IT

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ABSTRACT
Technology and Information are vital to the success of companies. To leverage the successes in IT projects, companies have at their disposal, references globally accepted as good practices (COBIT, ITIL, PMBOK, ISO, TOGAF, etc.). In spite of this, it is still great the magnitude of spending on IT projects poorly designed or improperly implemented. This paper presents a brief description of standards and good practices related to governance and management of enterprise IT, defines the Lean Thinking, Lean IT, the Processes Management, the Portfolio, Program and Project Management, and the Work System Theory, and highlights the purpose of them, showing their characteristics and suggests a Framework of Lean Governance and Management of Enterprise IT, by demonstrating how the standards and good practices presented can work together, because it advocates that the Lean Thinking, the Process, Portfolio, Program, and Project Management, and the Work System Theory complement the standards and good practices of Governance and Management of Enterprise IT with an approach not referenced in these standards and good practices.

Categories and Subject Descriptors
K.6.1 [**Management of Computing and Information System**]: Project and People Management, Life cycle, Management techniques, Staffing, Strategic information systems planning, Systems analysis and design, Systems development, Training.

General Terms
Management, Measurement, Performance, Design, Economics, Reliability, Security, Human Factors, Standardization, Legal Aspects, and Verification.

Keywords
Enterprise IT Governance, Enterprise IT Management, Lean Thinking, Lean IT, Work System, Processes Management, Projects Management.

iiWAS2014, 4-6 December, 2014, Hanoi, Vietnam.

1. INTRODUCTION
Despite the growth in the use of standards and methodologies [1], is still large number of projects for Information Technology (IT) that result in high investments and results below the expected, such as: unstable and inflexible systems, slowness in operationalization of services, projects poorly managed, high costs with people and resources, misalignment between IT and the business, lack of visibility, among others.

In addition, the IT areas, in general, follow the same organizational structure adopted by the company. As the majority of companies have functional structures, the IT areas tend to be organized in the same way. However, the references models recognized by the market as good practices are organized by processes, such as: ITIL [2], COBIT [3] and the PMBOK [4].

The Processes Management, BPM CBOK [5], and the Lean Thinking [6] are knowledge being used in a growing number of companies in order to become, or remain, competitive. The Working System Theory [7] [8] presents a framework that shows clearly the relationship between Customer, Products and Services, Processes, Participants, Information, and Technologies.

This article presents the main concepts of Lean Thinking, Lean IT, standards for Governance and Management of Enterprise IT, Portfolio, Program and Project Management, Processes Management, and Work Systems Theory.

This work supports the hypothesis that Lean Thinking, Process, Portfolio, Program and Project Management, and the Work System Theory, can complement the models and standards of Governance and Management of Enterprise IT, with an approach not existing in these models and standards of Enterprise IT, and suggests a Framework of Lean Governance and Management of Enterprise IT.

The Framework of Lean Governance and Management of Enterprise IT shows how the presented disciplines are integrated to support the companies to produce better products, services and results, that add values to its stakeholders, through the effective use of enterprise IT.

2. THEORETICAL REFERENCES
Each paragraph below defines one discipline, or good practice, used as reference to the proposal Framework of Lean Governance and Management of Enterprise IT.

The **Lean Thinking** [6] is a philosophy and a business strategy to increase customer satisfaction through better use of resources. Lean management seeks to provide a consistent, value to customers with lower costs by identifying and supporting

improvements in primary and secondary flows (processes) value, through the involvement and the initiative of qualified and motivated people. Briefly, Lean thinking suggests five principles to improve a productive environment: 1) Identify Value to Customer, 2) Value Stream Mapping, 3) Create Flow, 4) Customer Pull, and 5) Seek Perfection. **Lean IT** is the use of the Lean Principles and Tools to improve IT quality in the creation and delivering value to customers [1, 9].

COBIT (Control Objectives for Information and related Technology) [3] is a guide to good practice presented as framework, directed to the governance and management of enterprise IT. Maintained by ISACA (Information Systems Audit and Control Association), has a number of resources that can serve as a reference model for IT management. Management experts and independent institutes recommend using COBIT as a means to optimize IT investments, improving return on investment (ROI), providing metrics to assess outcomes: Key Performance Indicators (KPI), Key Goal Indicators (KGI), and Critical Success Factors (CSF). The COBIT has 37 processes distributed in five groups of processes.

The **ITIL** [2] is the most recognized model of IT Service Management (ITSM - Information Technology Service Management) in the world. Began as an initiative from the UK government in seeking a standard for hiring IT services that would result in greater efficiency, then documented as the best and most successful organizations approached the IT Management services. The main guidance of ITIL consists of six publications: 1) Introduction to the Practice of ITIL Service Management; 2) Service Strategy (Service Strategy); 3) Project Services (Service Design); 4) Transition Services (Service Transition); 5) Service Operation (Service Operation); and 6) Continuous Improvement Services (Continual Service Improvement).

In accordance to BPM CBOK [5], **Business Process** is an aggregation of activities and behaviors performed by human beings or machines to reach one or more outcomes. They are repeated recursively within companies and their performance can, and should, be measured and related to the achievement of their overall objectives in terms of quality, delivery, cost among others. Business Process Management (BPM) is a managerial discipline that integrates strategy and the objectives of an organization with customers' needs and expectations, through the focus on end-to-end processes. The business processes can be classified in three kinds: Primary Processes, Management Processes, and Support Processes.

According to PMBOK [4], **Project** is a group of temporary activities conducted to produce a unique product, service or result. According to the same source, **Project Management** is the application of knowledge, skills and techniques to execute projects effectively. The PMI (Project Management Institute) is a nonprofit international institution of professionals of Project Management, with over 2.9 million members around the world. The **PMBOK guide**, maintained by PMI, is a set of knowledge in Project Management. It is in the fifth edition. It contains the fundamental practices that all project managers need to succeed in their endeavors.

A **Work System**, Figure 1, is a system in which human participants or machines perform work (processes and activities) using information, technology and other resources to produce products or services for internal or external customers [7], [8]. Environment includes the organizational, cultural, competitive, technical and regulatory environments within which the work system operates. The Infrastructure includes human, informational, material and technical resources, which the system needs to work. These resources must exist, and are managed out of the work system and shared with other work systems. The Strategy used by the company and the strategy used by the working system must converge and help justify why the work system operates the way it was defined.

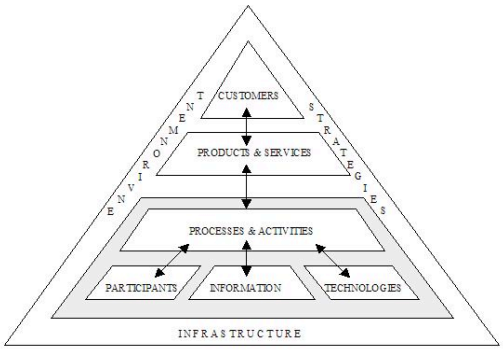

Figure 1 - The Work System Framework [7, 8]

The **ISO 38500:2008** [10] provide a governance framework to assist those at the highest level of organizations to understand and fulfill their legal, regulatory and ethical obligations regarding the use of IT in their organizations.

The **ISO 31000:2009** [11] standard provides principles and generic guidelines for risk management. Any kind of organization can use it. The standard can be applied throughout the life of an organization and a wide range of activities, including strategies, decisions, operations, processes, functions, projects, products, assets and services, it can be applied to any type of risk, whatever its nature, whether positive or negative consequences.

The **TOGAF** [12] is a model of architecture that provides the methods and tools to assist in the acceptance, production, use and maintenance of enterprise architecture. It is based on a model of iterative process based on best practices and reuses of the set of existing architecture. The ISO 42010:2011 [13] standard defines architecture as "the fundamental organization of a system, embodied in its components, relationships with others and with the environment, and the principles governing its design and evolution".

PRINCE2 (PRojects IN Controlled Environments) [14] is a universal method to manage projects, independent of the scale, complexity, culture, geography or level of innovation of the project. In July 2013, ownership of the rights to PRINCE2 was transferred to AXELOS Ltd. It is integrated to other AXELOS Global Best Practice methods (ITIL [2], P3O, P3M3, MSP [20], MoR, etc.).

The family ISMS (Information Security Management Systems) **ISO 27000:2009** [15] has the intention of guiding organizations of all types and sizes in the implementation and operation of a System of Information Security Management Family. It provides a model for establishing, implementing, operating, monitoring, reviewing, maintaining and improving the protection of information assets to achieve the business objectives based on a risk assessment and acceptance of the risk levels of the organization designed to effectively treat and manage the risks.

There are three **CMMI** (Capability Maturity Model Integration) models [16]. Part of each model shares very similar practices with the practices of the other two because these practices are applicable to any businesses. But each model has unique practices

because they have different focuses. The CMMI for Acquisition is designed for companies working with suppliers to build products or provide services. The CMMI for Development is designed for companies that focus on the development of products and services. The CMMI for Services model is designed for companies that focus on the creation, management and delivery of services.

ISO 20000:2005 [17, 18] is the international standard for managing IT services. It describes an integrated set of management processes for the effective delivery of IT services to businesses and customers. The standard consists of several parts. Part 1 is the formal specification and details the requirements for a service management system that allows the "service provider" meets the requirements of the service and provides value for both the customer and for the service provider. Part 2 provides guidance on the implementation of the service management system.

3. THE PROPOSED FRAMEWORK OF LEAN GOVERNANCE AND MANAGEMENT OF ENTERPRISE IT

The proposed Framework of Lean Governance and Management of Enterprise IT, Figure 3, is based on Work System Theory [7,8], and aligned to the Lean Thinking principles [6].

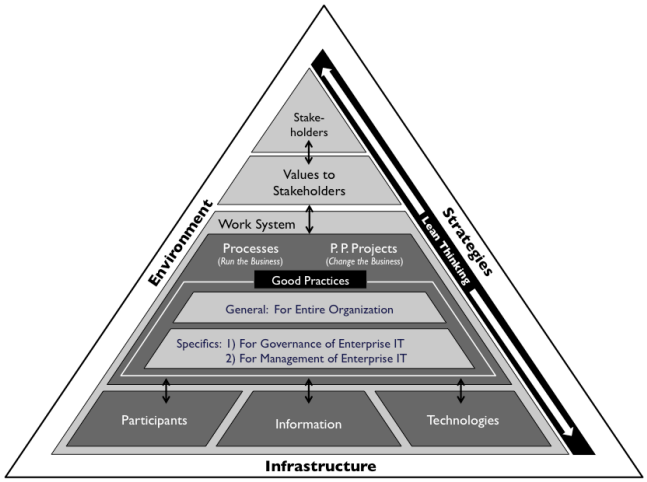

Figure 3 – The Proposed Framework of Lean Governance and Management of Enterprise IT

Compared to the Work System Framework, some changes were made, they are: Stakeholders in place of Customers; Values to Stakeholders in place of Products & Services; Processes and P. P. Projects in place of Processes & Activities and; Lean Thinking with Strategies to be considered by all elements in the proposed framework.

3.1 Stakeholders

This element of the proposed framework is aligned with the first and the fourth principles of the Lean Thinking: 1) define value to customer, and 4) customer pull, respectively. It is not possible to define the value without identify the customer. It is the customer that defines the values that are materialized through the products, services and benefits. The clients of the Governance and Management of Enterprise IT are more suitable to call them Stakeholders.

The Governance of Enterprise IT has different stakeholders than Management of Enterprise IT. The stakeholders of Governance of Enterprise IT are the board of directors, business unit managers, in special the IT manager. The stakeholders of Management of Enterprise IT are the board of directors, business units' managers, the IT Manager, the users and clients of IT, the members of IT team, the partners and suppliers of IT.

3.2 Values to Stakeholders

Values to stakeholders is aligned with the first principle of the Lean Thinking: 1) define value to customer. Once the stakeholders are known, it is necessary to define what is value to them.

For the Governance of Enterprise IT, value is related to the improvement of the processes for a good evaluation and direction of IT, and assures its use to delivery benefits to the business, balancing risks and resources with transparence to the stakeholders.

For Management of Enterprise IT, value is related the improvement of process to delivery IT services to the business units, and to the final users, and to the clients of IT, in accordance with their needs and their requirements, and aligned to the corporate polices, strategies and standards defined in the Governance of Enterprise IT level. To delivery IT services to the business, it is important to pay attention to the IT team, and to the partners, and to the suppliers of IT, because it is through them that the IT services are delivered. A clear definition of requirements, objectives and goals, a suitable environment, resources and infrastructure, access to knowledge, capacitation, financial recognition, and personal recognition, are some of values required by who works on delivering services in the level of Management of Enterprise IT.

Values must be measured in order to permit to know if the goals established to them are been reached. Even at the level of Governance of Enterprise IT, as at the level of "Management of Enterprise IT" it is necessary to define indicators to monitor the delivery of values to the business. With the suitable set of Indicators it is possible to know how the values are been delivered to the business, the quality and the performance of the IT services, the level of satisfaction of the users, and clients, with IT services, and with these information is possible to see tendency, improve processes, and take correct decisions.

3.3 Work System

The Work System elements are aligned to second, third, fourth and fifth principles of Lean Thinking, they are: 2) Value Stream Mapping, 3) Create Flow, 4) Customer Pull, and 5) Seek Perfection.

2) Value Stream Mapping – All IT processes, that delivery some value to the stakeholders, must be reviewed in order to become lean. This work is done through the analysis of each process step, including new required steps, reducing or eliminating wasting steps, and using good practices as references.

3) Create Flow – After the revision of the processes' flows, they need to be implemented, monitored, and constantly improved. The value to the business is delivered through the implementation of the lean flows. The IT processes' flows must be integrated to the value chain of the company.

4) Customer Pull – The IT works must be demanded and prioritized by the stakeholders. IT has no end on itself. In the level

of the Governance of Enterprise IT is the board of directors, and managers of the business units that define the priority of the projects. The IT services and IT products are delivered to clients and end users in response of their requisitions.

5) Seek Perfection – As important as implement a lean IT process, without or with minimal waste, is to assure that the implemented process remains lean, and more than that, the process is been monitored, and is been compared to the new good practices in order to be improved.

The Work System [7,8] has four elements: 1) Processes and Activities, 2) Participants, 3) Information and, 4) Technologies. For the purpose of the proposed Framework of Lean Governance and Management of Enterprise IT, the "Processes and Activities" were changed by "Processes and P. P. Projects", the other three elements remained the same.

3.4 Processes and P. P. Projects

The good practices for Governance and Management of Enterprise IT are oriented to processes, as it can be seen in [3, 2, 12, 10]. It is through processes that the products and services are delivered to the customers.

The Processes represent the "business as usual" [19], the necessary works to "run the business", to delivery products and services to customers. In the case of the Governance and Management of Enterprise IT the Processes represent the necessary works to delivery Values to Stakeholders. A Process is a permanent work system. Good practices, standards and tools to be used to manage processes can be found in BPM CBOK [5]. The Lean Thinking has some tools that are useful to improve processes like: VSM (Value Stream Mapping), A3, Kaizen and 5S.

But, to improve the Processes it is necessary to "Change the Business" [19], and to do it, P. P. Project (Portfolio, Programs and Projects) are recommended. Programs and Projects are temporary work system. Good practices, standards and tools to be used to manage Portfolio, Programs and Projects can be found in [4, 14, 19, 20]. The Lean Thinking has some tools that are useful to improve the projects management like, Scrum, visual information, and theory of constraints, value stream mapping, and others.

The proposed framework shows Good Practices into two blocks: General and Specifics.

General Good Practices cover standards, methodologies and practices that can be used for the entire company, including IT, for example; Corporate Governance, Process Management, Portfolio, Program, and Project Management, Work System, and Lean Thinking.

Specific Good Practices cover standards, methodologies and practices related to IT. Specific Good Practices were separated in two categories, one for Governance of Enterprise IT, and other for Management of Enterprise IT.

Some disciplines related to Governance of Enterprise IT are: COBIT [3], ISO 38500:2008 [10] and ISO 31000:2009 [11].

Some disciplines related to Management of Enterprise IT are: COBIT [3], ISO 31000:2009 [11], ITIL [2], ISO 20000-1:2011 [17], ISO 20000-2:2012 [18], ISO 27000:2009 [15], PMBOK [16], PRINCE2 [4], TOGAF [12], and CMMI [16].

These good practices are used as reference to improve the processes of Governance and Management of Enterprise IT, They are not prescriptive, and there is the need to adjust them in order to be implemented in each organization.

3.5 Participants

Participants in the work system are the people or machine that perform the tasks of the processes, or the tasks of the projects. To reach the excellence in the execution of processes and projects, the participants must know what to do, how to do, and willing to do. Without one of them the excellence in the execution of the tasks of the processes, or projects, will not be reached. Special attention is given to People in the Lean Thinking, because it is through people that the processes and projects are performed. People must be oriented, capacitated and treated with respect. Capacity to lead people, negotiation, management of conflicts, work in team, productive meeting and communication are some of the good skills to be used by the participants in all levels.

3.6 Information

Information in the work system are the data or information received to perform the processes, or projects, or the data or information produced by the processes, or projects. The information must have the appropriated format in order to simplify the executions of the processes or projects. The information can be texts, graphics, images, movies, and songs. The information can be printed, showed in the video, panel, etc. The information must be suitable to the media that will be used like radio, television, Internet web sites, Social Media, e-mail, using tablets, smartphones, computers, etc.

The information must be available in the right moment, and to the right person, it must be necessary, confident, integral, reliable, and in conformance to its application. Excess of information or lacks of information are wastes. Information on the right quantity is correct.

The indicators to monitor the delivered works, and the performance of the processes and projects are critical to the proposed framework, because they are used to improve the works. Without the indicators, is not possible to manage the performance of the processes, of the projects, neither its results achieved.

3.7 Technologies

Technologies in the work system are: software, hardware, and communication used by participants to perform the processes, or projects. Technologies must be used by participants when they aggregate some value to the processes, or to the projects, for example: it makes a process easer to be performed, it improves the performance of a process, or it makes a process more secure, etc.

3.8 Environment

Environment includes the organizational, cultural, competitive, technical, political, economical, and regulatory environments within the work system operate. Environment represents the external factors that can affect the work system. The world outside of the organization is in constant changes. The work system inside the organization must be flexible enough to adapt to these changes in order to the organization remain competitive.

3.9 Strategy

The strategy used by the company, and the strategy used by the working system must converge and help justify why the work system operates the way it was defined. The Lean Thinking is considered one of the strategies used in the implementation of the Framework of Lean Governance and Management of Enterprise

IT. The adjective "Lean" is given to the proposed Framework due to this strategy. Each organization has its own mission, vision, values, objectives, goals, and politics, and this strategic orientation must be shared with the entire organization. Thus, all business units can work aligned to this strategy.

3.10 Infrastructure

The Infrastructure includes several kinds of resources required to make the work system work, some examples are: human resources, information, materials, services, and technical resources. The Infrastructure is managed out of work system, and is shared with other work systems. Depending on the scope of the work system, a resource is part of the work system as a participant, information or technology. Otherwise it is part of the Infrastructure.

4. CONCLUSION

The Corporate Governance, among other things, aims to establish the strategic alignment between all processes, from all business units, at all levels.

The Governance of Enterprise IT is aligned to the Corporate Governance and aims to give the IT strategic alignment and directions to all business units, at all levels. This means, in practice, that the politics, standards, compliance of governance of enterprise IT, dictate the actions of IT, but also guide the actions of others business units in an organization. On the other hand, the IT business unit, and its processes and services, are also guided by financial governance, by human resources governance, among others.

This paper presented several disciplines, some of them are valid for all organization and its were called general good practices. Others disciplines were specifically to Governance and Management of Enterprise IT, and these disciplines were called specifics good practices.

The standards and methodologies of enterprise IT are mature, but as mentioned by [1], many IT projects are still associated with high values of investments and low results for the business. This paper supports the idea that integrate the general good practices with the specifics good practices is possible achieve better results.

The proposed Framework of Lean Governance and Management of Enterprise IT reinforces the importance that should be given the People, to behavioral aspects, and the principles of lean thinking to support all processes. The Working System, Alter [7, 8], emphasizes the Stakeholders at the top of the pyramid, which demand products, services and results. The products, services and results are delivered through Work Systems.

The expected benefits with the application of the proposed framework are: a) A clear understanding of who are the stakeholders of Governance and Management of Enterprise IT, and what are their requirements, and their expected values; b) A robust and holistic framework, integrated to the corporate governance, to delivery values to the stakeholders; c) The improvement of the processes and projects related to Governance and Management of Enterprise IT using the good practices as references, and Lean Thinking as strategy to empower people, delivery values and reduce, or eliminate wastes; d) Assure a continual improvement of the processes, and project of Lean Governance and Management of Enterprise IT.

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