

## **Design of an IT Strategic Management Model for a University in Cartagena, Colombia**

**Mónica Ospino-Pinedo**

Systems Engineering Program  
GIMATICA – Information and Communication Technology Research Group  
Universidad de Cartagena, Campus Piedra Bolívar  
Calle 30 # 48-152. Cartagena, Colombia

**Iván Monterrosa-Castro**

Business Administration Program  
Business Management and Development Research Group  
Fundacion Universitaria Tecnológico Comfenalco - Cartagena  
Cr 44 D N 30A, 91, Cartagena, Bolivar, Colombia

**David Franco-Borré**

Systems Engineering Program  
GIMATICA – Information and Communication Technology Research Group  
Universidad de Cartagena, Campus Piedra Bolívar  
Calle 30 # 48-152. Cartagena, Colombia

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### **Abstract**

The purpose of this paper is to describe the design of an Information Technology (IT) Strategic Management Model for a university in Cartagena, Colombia, in order to standardize and optimize the management of the institution's processes. A descriptive and qualitative research methodology was followed, implementing three phases: 1) Strategic analysis of the university institution by SWOT analysis as well as the analysis of ITIL and CobiT 5 models. 2) Description of the model designed and proposed to be implemented; and 3) Validation of the model. The implementation of the model will allow the institution to strategically manage IT

so that it can be a competitive institution in today's world, which day after day, demands greater use of IT in all the processes that are developed from all the possible instances.

**Keywords:** Validation, Improvement, Methodology, Strategic management, Project management

## **1 Introduction**

Strategic planning is the process by which leaders organize their objectives and actions over time. In fact, the concepts of strategy and planning are inextricably linked, since both the one and the other designate a sequence of actions and activities ordered in time, in such a way that one, or several objectives can be achieved [17]. History is a good teacher and the observation of many organizations over a long period of time, can teach principles that will be helpful when formulating and implementing strategies for the years to come [6].

Universities as educational organizations are to involve strategic planning in their processes. SWOT matrix is a technique used for strategic planning. This analysis allows to identify opportunities and threats, which refer to the external aspects of the organization, whose mission is to collect the positive and negative influences that the environment can radiate into the educational organization; as well as strengths and weaknesses, which are more aligned with the relationship of internal factors that contribute to energize or paralyze the vital pulse of the organization [14].

In the last decade, mass media and education systems have undergone changes due to the development and diffusion of New Information and Communication Technologies (ICT) led by the Internet. Hence, in the academic management of universities, a set of activities are conducted, which aim to facilitate the transformation of institutional conditions in a spirit of renewal and research, in search of solutions to problems or needs identified during the development of the processes [18].

As a response to the interest and need to measure the level of performance that an organization can achieve for the management of its projects, a specific type of evaluation tools has emerged since a couple of decades ago. The implementation of these tools allows to diagnose and formulate improvement plans about the maturity of these management systems. These tools are known as Project Management Maturity Models [19]. The different maturity models designed for project management allow an organization to measure the level of effectiveness in which its continuous processes are managed and aligned with their general strategy.

Since Business-IT alignment has been shown to have a positive effect on organization performance as stated by [15]; because it provides a competitive advantage and increases profitability [8], as well as it is a key factor for successful IT systems implementations [3]; it is necessary for organizations, including universities, that IT be aligned with their strategic planning processes. In order to reach this goal, researchers and governmental bodies have introduced IT frameworks such as ITIL and CobiT. Information Technology Infrastructure Library (ITIL) is a best practice framework compiled from public and private sector organizations around the world [1]. Control Objectives for Information and related Technology (CobiT) [16] is a model to verify the management and control of information systems and technology, aimed at all areas of an organization, ie, IT administrators, users and, of course, the auditors involved in the process [5].

This research work aimed to design an IT Strategic Management Model for a university institution in Cartagena, Colombia. Therefore, this document identifies strategies for the application of IT project management methodologies for this institution and recommends the best form of resolution.

## **2 Methodology**

To carry out this research work, a descriptive and qualitative research methodology was chosen and the following steps or phases were followed: 1) Strategic analysis of the university in Cartagena, Colombia, by implementing SWOT matrix or technique. Likewise, analysis of both ITIL and CobiT 5 models were developed [12]. 2) The model designed to be implemented in a university in Cartagena, Colombia, along with its different stages is described [2]. 3) Validation of the model.

## **3 Results and Discussion**

### **3.1 Strategic Analysis of the University in Cartagena, Colombia**

Perales et al [14] describes the four factors of a SWOT analysis as follows: 1) **Strengths**: synonym of potentials and advantages identified as internal factors (organizational attribute) that impact the university favorably. 2) **Weaknesses**: synonym of limitations conceived as endogenous factors that act in an unfavorable way and that limit the possibilities of taking advantage of opportunities, so it is necessary to try to avoid or mitigate them. 3) **Opportunities**: understood as real situations, potentially convenient for the organization, in terms of time, place and use of resources. 4) **Threats**: synonym of dangers. They agglutinate negative influences of the environment, those that directly affect the center. Table 1 shows the strategic analysis of a university institution in Cartagena, Colombia, through the implementation of the SWOT technique.

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> <li>Processes and IT can be adapted</li> <li>IT Equipment.</li> <li>Inclusion of technological strategies in the Development Plan.</li> <li>Infrastructure, laboratories, equipment, own IT structure.</li> </ul>	<ul style="list-style-type: none"> <li>Little access to Information and Communication Technology (ICT) tools.</li> <li>Lack of interconnected and online information systems.</li> </ul>
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> <li>Wide opportunities for the development of scientific and technological research.</li> <li>Development of new technologies.</li> <li>Global trend towards the creation of digital libraries</li> <li>Existence and application of the NEW ict to the Teaching-Learning process</li> </ul>	<ul style="list-style-type: none"> <li>Growth of prestigious private universities that employ new ICT, provide good service and compete aggressively.</li> <li>Accelerated production of scientific and technological knowledge,</li> </ul>

Table 1: SWOT Analysis. Source: Authors

### 3.2 ITIL Analysis

Information Technology Infrastructure Library (ITIL) is a set of service management standard library that focuses on the IT industry. It provides guidance to organizations and individuals on how to use IT as a tool to facilitate business change, transformation and growth. It was developed by the Central Computer and Telecommunications Agency (CCTA), which later merged with the Office of Government Commerce (OGC) of the UK government in the middle of 1980s. ITIL advocates that IT services are aligned to the needs of the business and support its core processes. The latest version of ITIL is ITIL 3.0 [10]. Table 2 shows the SWOT analysis of ITIL applied to the university of this study.

STRENGTHS	WEAKENESS
<ul style="list-style-type: none"> <li>The IT organization develops a clearer structure, becomes more effective, and focuses more on the objectives of the organization.</li> <li>Management has greater control, procedures are standardized and identified, and changes are easier to manage.</li> <li>The structure of processes in IT provides a framework to specify outsourcing services more accurately.</li> <li>Through ITIL's best practices, change in the IT culture and its orientation towards service is supported, and introduction of a quality management system is facilitated.</li> <li>ITIL provides a standard frame of reference for internal communication and with suppliers.</li> </ul>	<ul style="list-style-type: none"> <li>Time and effort necessary for its implementation.</li> <li>The improvement of the service and the reduction of costs may not be visible.</li> <li>Lack of knowledge of the methodology.</li> <li>Little involvement on the part of management.</li> <li>Medium / long term results</li> </ul>
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> <li>ISO 20000/27001 Certification.</li> <li>IT-Business Allignment.</li> </ul>	<ul style="list-style-type: none"> <li>That there is no change in the culture of the areas involved.</li> <li>That improvement is not reflected, due to lack of understanding about processes, indicators and how they can be controlled.</li> <li>That the staff does not get involved and committed.</li> <li>That investment in support tools is scarce. Processes may seem useless and service improvements will not be achieved.</li> </ul>

Table 2: SWOT Analysis of ITIL applied to the university of this study. Source: Authors

### 3.3 CobiT 5 Analysis

Control Objectives for IT and related Technology (CobiT). CobiT 5 is a framework for the governance and management of enterprise IT. It is extensively used to control IT related strategies and operations [9]. Table 3 shows the SWOT analysis of CobiT 5 applied to the university of this study.

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> <li>• CobiT 5 is an internationally recognized framework that allows the standardization of criteria related to IT controls.</li> <li>• CobiT reference framework supports the opinion of the auditors of information systems in the review of IT processes. Provides top management with:                             <ul style="list-style-type: none"> <li>• A reasonable assurance that the corresponding control objectives are being met.</li> <li>• Identification of where the weaknesses in these controls are located.</li> <li>• Justification of the risks that may be associated with such weaknesses.</li> <li>• An executive guide on the corrective measures that must be adopted.</li> </ul> </li> <li>• CobiT 5 is a framework for the preparation of specific audit plans and programs.</li> </ul>	<ul style="list-style-type: none"> <li>• It is an extensive framework designed for large organizations.</li> <li>• Implementation is complex.</li> <li>• Implementation is very expensive and only justified for medium and large organizations.</li> <li>• It is more focused on the IT audit area.</li> </ul>
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> <li>• Implementation of CobiT 5 conveys benefits for the community where it is implemented because it facilitates the understanding and control of the actions of the organization.</li> <li>• The basic services that must be provided by the organization to the community are improved when a portfolio of information systems is efficiently managed, minimizing unbalanced and isolated development and duplicity of efforts.</li> <li>• CobiT 5 allows better control of IT investments and their proper use, identifying the risks and associated controls that are implemented.</li> <li>• CobiT 5 allows the use of other more specific frameworks (eg CMMI, ITIL, etc.) without losing compatibility thanks to its general nature.</li> </ul>	<ul style="list-style-type: none"> <li>• Ignorance of the methodology.</li> <li>• There is little involvement of the essential sections such as Management and Audit.</li> <li>• IT section staff is not trained in this methodology.</li> <li>• Struggling in putting this knowledge into practice.</li> </ul>

Table 3: CobiT 5 SWOT Analysis applied to the university of this study. Source: Authors

### 3.4 Proposed Model

Taking as reference ITIL and CobiT 5 models, as well as the best practices in IT project management, it is proposed a strategic IT management model for a university in Cartagena, Colombia. This model is composed by 5 phases, as shown in Figure 1.

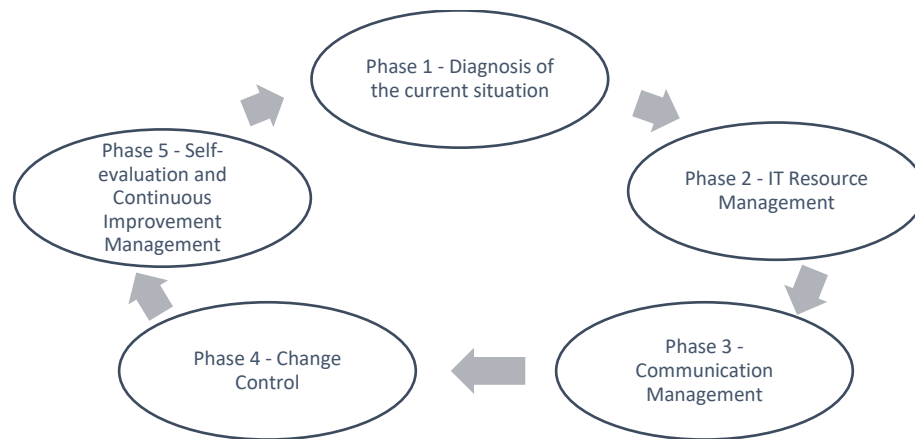


Figure 1. IT Strategic Management Model for a University in Cartagena, Colombia Source: Authors

Table 4 describes each phase of the model.

Phase	Description
<b>1 – Diagnosis of the current situation</b>	In this first phase, a prior consultation and analysis process is carried out, through which the Systems Department of the university identifies and analyzes internal factors from an eminently technological perspective and another perspective of management and factors of the environment or externalities related to the field of higher education offered by the institution, which positively or negatively affect the development of the institution, and then decide on what to focus on.
<b>2- IT Resource Management</b>	This second phase of the model aims to have a perspective of the IT resources available for the institution, to define control and management processes for the optimal use of these resources.
<b>3- Communication Management</b>	Managing communication is an extremely important phase within this methodology, since it involves defining a set of actions and procedures through which a variety of communication resources are deployed to support the processes of the institution. If communication problems arise, they will become a risk factor.
<b>4 – Change Control</b>	The only constant in organizations is change. Starting from this reality, it is necessary to establish parameters that allow orienting and integrating changes in IT processes and projects. Then, the Change Control Phase in this model will be understood as all those activities aimed at implementing actions that structure and provide accompaniment to the transformations and organizational improvements produced by the development of initiatives, strategies or projects in order to minimize the impact and the opposition in those involved and ensure success in the results.
<b>5- Self-evaluation and Continuous Improvement Management</b>	Starting from the basis that IT is relatively new field which is constantly evolving and changing, it can be said that the IT strategic management is a process that does not end within the institution. This fact poses a challenge to those responsible for carrying out this management: to know if the best possible use of the resources of the institution is being done while meeting the objectives of the organization. To be able to say if this management is being done in the best possible way, it is necessary that the concept of quality in the processes that are carried out be involved. Since quality is an attribute of something, which is often expressed qualitatively, which can be left to subjectivity, it is necessary that a set of management indicators be defined, parameters and metrics that allow it to be measured in order to obtain a quality concept that is quantitative and objective, at the same time.

Table 4. Description of each phase of the model. Source: Authors

### 3.5 Validation of the Model and Discussion

The SWOT analysis is an excellent tool to assess the current situation of the institution, analyzing its internal and external variables to proceed to design improvement strategies in the organization [7].

ITIL is born from the need to incorporate IT in organizations to achieve their corporate objectives, since in a globalized environment it is essential to have IT services with high quality standards that support compliance with said objectives [13]. ITIL has proven to provide many benefits such as cost savings, risk management and rationalization of IT operations [11], however it also faces several implementation challenges as they claim and many companies agree on that not all their processes are of equal importance and valuable to them [4].

ITIL and CobiT are globally the most recognized frameworks for IT management. They were designed primarily for large corporations or governments. Due to the immense nature of both frameworks, their complete implementation in a university institution would be very costly and complex. The model proposed involves essential elements of these frameworks to achieve an applicable model and thus be able to achieve the objectives set out in this research, allowing the institution manage IT strategically.

## 4 Conclusions

From the results shown in this paper, as well as from its analysis and discussion, the following conclusions can be drawn: 1) Implementation of models such as ITIL and CobiT is a key tool for optimization of IT strategic management. 2) The Systems Department of the institution should be encouraged to play a more important role within it, therefore it should be more proactive instead of reactive. 3) It is very important for this institution to be able to position itself competitively in the market and not be left behind in its environment, to be more efficient in IT strategic management at a lower cost. To achieve these goals, management must actively participate in the change process, not only accompanying the change but promoting it. 4) Implementation of the model proposed will allow the institution to strategically manage IT so that it can be a competitive institution in today's world, which day after day, demands greater use of ICT in all the processes that are developed from all possible instances.

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