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**Professional Thesis**

**How to establish a Project Management Methodology  
for INACOL that provides efficiency and transparency  
advantages to compete in the market?**

**Presented by**

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## ABSTRACT

Since the Colombian government has been investing in massive infrastructural projects for the past few years, the sector has become very competitive. Additionally, it presents huge corruption problems that have been affecting not only public contractors but society due to progress stagnation. For this reason, it is important that companies seek for competitive advantages that differentiate their processes and practices from the other companies’.

In order to find efficiency and transparency advantages for INACOL, a Colombian civil engineering company, a study is conducted to analyze its current project management methodology and compare it with PMI®’s standards. According to the results of this comparison, a new methodology is suggested to ensure the fulfillment of these standards. This methodology includes templates and matrices applicable to any company involved in project management.

Based on PMI® standards, 50% of INACOL’s processes are performed appropriately and need no changes. The company should work hard to apply the suggested modifications to some of its processes and add new processes to its current methodology looking forward to obtain the desired differentiation and effectiveness in its processes.

**KEY WORDS:** Colombia, Corruption, Infrastructure, Project management, PMI®, Public tenders

## 1. INTRODUCTION TO THE STUDY

### 1.1. BACKGROUND OF THE STUDY

#### 1.1.1. INACOL

INACOL is a construction company and auditor of engineering works, infrastructure, architecture, urbanism and investment projects in the public and private sectors. It offers consultancy before, during, and after the creation of a project; developing environmental diagnosis, environmental impact studies, contingency plans, and legal consultancy in the presentation and monitoring of the studies. Thus, the firm is capable of executing projects in an integral way. (INACOL Ltda., 2010)

The company counts on the necessary resources and administrative abilities to develop projects in diverse areas:

- *Road Infrastructure Projects*

Transportation Infrastructure, especially roads are significant for Colombia's development. Approximately 80% of the load in Colombia is transported by roads. There is a limited offer of roads with very low capacity, even if compared to other Latin American developing countries. (Banco de la República, 2005) INACOL has experience in the construction of roads and highways.

- Extension of the "Circunvalar" in Barranquilla, the main highway of the city.
- Construction of the highway that connects Las Vegas and Saloa in the state of Cesar.
- Reconstruction of the secondary roads and highways in the state of Magdalena, which were destructed due to the winter rains.

- *Urban Projects*

Referring to public space works such as, sidewalks, cycle paths, public parking lots and urban forestry projects which improve the well-being of the community and the dynamism of Colombian cities. INACOL has been involved in several urban projects, but the most important one was the construction of the plaza and the stations for Transmetro, Barranquilla's integrated transportation system.

- *Hydraulic Coastal and River Projects*

Currently, the Colombian government has an ambitious plan to turn the Magdalena River<sup>1</sup> into the most important “fluvial highway” in the country. For this reason, INACOL is specializing in this area where it already has some experience and where there is not much competition.

Experience:

- Deepening and dredging of the Magdalena River’s access channel to Barranquilla’s Port.
- Construction of breakwaters to protect the beaches in Puerto Colombia and Salgar.
- Works to protect the Guali River in Honda in the state of Tolima.
- Feasibility studies of the environmental works in the Dique Channel.
- Environmental studies for the state of Atlántico: environmental audit for the state and review of its aqueducts, sewer systems, drains and garbage collection.

- *Water Supply and Cleaning Up Projects*

The company has experience in the water supply sector, as well as in the management of aqueducts and the construction and maintenance of the infrastructure needed to supply a good quality service. Many of the projects involve works related to this area.

- Sewer system and drains in the Circunvalar highway in Barranquilla
- Sewer system and drains in the Transmetro plaza, designed along with “Triple AAA”, the company in charge of the aqueduct, sewer system and garbage collection in Barranquilla.
- Operation and commercialization of the secondary and home network of the aqueduct of Bogotá.
- Works in rural aqueducts and sewer systems.

- *Mining and Hydrocarbons Projects*

Due to the recent vast development in the mining (coal) and hydrocarbons industry, the company is having an incursion in this sector. Currently, INACOL is participating in alliance with a Venezuelan company in a public tender involving the enlargement of the oil duct

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<sup>1</sup> The Magdalena River is the principal river of Colombia, running about 1,540 km (950 mi) from south to north through the western half of the country.

located in the Colombian Oriental Plains. This sector is full of opportunities for the business due to the amount of investment in infrastructure it is requiring, however INACOL still has no experience in this area.

▪ *Industrial and Business Construction*

Colombia's rapid growth and improving indexes have attracted foreign investment, which has resulted in the arrival of multinational companies as well as the growth of Colombian firms. Consequently, these enterprises constantly require construction services for their new installations and warehouses or the enlargement and maintenance of the current ones. INACOL has already some experience with the private sector.

- Construction of warehouses for the Willard Batteries' factory
- Construction of warehouses for Coexito
- Construction of parking lots for Olímpica supermarkets in Barranquilla
- Construction of the sales room for Estación Central in Barranquilla

▪ *Electric power and New Systems Management*

Construction and maintenance of high, medium and low tension power supply systems in addition to domestic power services. Expanding the electric coverage and improving its quality certainly benefits the Colombian families. All of the projects involve electric power works, for this reason, INACOL has experience in this area.

▪ *International Projects*

The company will be able to offer all of the services previously mentioned in foreign countries, starting by developing countries in Latin America. Infrastructure investment plans make this region attractive and picture it as a good opportunity in terms of economic growth for many companies. Currently, INACOL has no experience in the international field, but has been developing partnerships with foreign companies in order to begin working in other countries.

(INACOL Ltda., 2010)

The company's main business sources are the government's public tenders, which are regularly published in an official contracting website, available for all the enterprises interested in engaging such projects.



The private sector is also important for INACOL since it is a good source of income and does not involve the amount of stress that public tenders generate in the employees. Private tenders and contracts are not easily found; hence, more commercial actions are needed in order to obtain contracts. These actions involve, monitoring of technological parks, contacting company owners who might need expansions or new installations, and searching in the telephone directory, amongst other procedures. Networking is crucial in this business.

### 1.1.2. INFRASTRUCTURE PROJECTS IN COLOMBIA

The high level of corruption in public contracts has distorted the elements of fair and open competition, which are the essence of public tenders. The concession processes for public contracts, especially those involving enormous quantities of money, are suited to the characteristics of the participants in previous agreements with the people in charge of the tender in exchange for attractive “commissions”. (Touchard, 2009) The tenders then ask for great amounts of paperwork, impossible to gather in time to be able to participate in the process, and this way disqualifying the majority of the possible participants in a tender. (Colombian Vice Presidency, 2002)

Unfortunately, corruption is frequently present in public administration, thus resulting in very high costs regarding the social and economic environment. Money destined for public works is reduced through bribery, and there are high costs derived from the concession of public contracts under restricted competition.

For this reason, the current administration is working very hard to eliminate the corruption issues in public contracting. Through the Colombian Infrastructure Chamber, people are able to report fraud. Hence, in addition to changing the evaluation methods in public tenders, the government is involving people in this fight against corruption.

Recently, there was a huge scandal unveiled; a corruption scandal involving a great number of public contracts in the country. Contracts that are not finished on time, that do not fulfill the quality standards required and that affect the whole country. Currently, renown contractors, politicians, and public officers, including the major of Bogotá are in

jail after discovering their participation in corrupt and illegal activities. At the moment, the mayor of Bogotá is the most important officer that has been sent to jail for this corruption scandal.

Anti-corruption methods are proving to be effective, but the government should work on finding ways to guarantee transparency and good practices on their processes as well as the contractors' in order to gain people's trust. Progress and trust are directly related; hence it is very important to eradicate corruption completely to avoid progress stagnation.

### 1.1.3. PROJECT MANAGEMENT INSTITUTE

Project Management Institute (PMI®) is a non-profit organization that improves the project management profession through globally recognized standards and certifications, collaborative communities, an extensive research program, and professional development opportunities. PMI®'s standards are the most widely recognized in the profession and increasingly the model for project management in business and government. (PMI, n.d.) These standards provide guidelines for achieving project management results as well as recognition for good practices, professional development and ethics.

Even if PMI® is a very diverse organization it is driven by a mission and a common set of core values. These are not subject to change and are fundamental and guiding principles for PMI® members' actions. PMI®'s core values are project management impact, professionalism, volunteerism, community and engagement. (PMI, n.d.)

Its members are aware of the impact that the project management competence has on organization results and society, thus they concentrate their efforts on applying it appropriately and providing guidelines that improve the general application of this competence. Additionally, they act with professionalism, which can be translated to accountability and an ethical behavior, ensuring their commitment to stakeholders. Furthermore, effective volunteer partnerships are encouraged due to the advantages they provide when accomplishing goals and objectives. The sense of community in the

project management profession facilitates the advance of the profession as well as the individuals' growth. Finally, the sense of engagement plays a very important role in this profession as diverse viewpoints are encouraged so individuals can contribute to the project management profession as well as to the PMI®. (PMI, n.d.)

In today's business climate, the importance of ethical behavior has been increasing dramatically. Ethical dilemmas are present in every project manager's duties and responsibilities. As they face these challenges while operating in political and social environments, it is not always clear how they should act when facing ethical dilemmas. For this reason, PMI® provides resources that can be used when facing this type of dilemmas to better reflect on the situation and conduct the best ethical decision. (PMI, n.d.)

The Project Management Body of Knowledge (PMBOK®) describes policies, methods, processes, and established practices that emerge from good practices recognized by professionals dedicated to project management. (PMI, 2008) They contribute to the development of the PMBOK® and its continuous update. Additionally, the PMBOK® provides and promotes a common vocabulary for the project management profession. However, it does not contain all of the lessons and knowledge; it is a guide and not a methodology. (PMI, 2008)

PMI® standards seek the presence of constant documentation on each one of the phases of a project. Since there is documentation from the Initiation phase to the Closing of the project, clarity is given to each one of the stakeholders of the project. They can have access to the information for verification purposes at any time. The existence of historic data in a project can be translated in transparency. Thus, if there are illegal actions or unethical behavior present in a project, the existence of data makes it easier to trace and identify these irregularities.

PMI® as a standard is very clear with ethical behavior as it is part of its core values. Thus, acting under PMI® standards provides confidence to the project's stakeholders.

## **1.2. STATEMENT OF THE PROBLEM**

Since the Colombian government has been investing in massive infrastructural projects for the past few years, the sector has become very competitive, involving national as well as foreign companies. Small companies and new enterprises have been able to grow with the experience of foreign firms. Colombia is the second Latin American country, after Brazil, with the largest investment forecast in infrastructure, an investment of more than 33.000 million dollars in the next five years. Colombia has an expected investment annual growth rate of 17.6% and huge projects involving energy generation, hydrocarbons and transportation. (Proexport, 2010)

In such a competitive environment, INACOL needs to identify competitive advantages that differentiate its processes and practices from the other companies'. Efficiency and transparency advantages might lead to recognition and good reputation in the public sector; a sector known for its corruption problems.

## **1.3. PURPOSE OF THE STUDY**

Analyze the current project management methodology used at INACOL and establish one based on the PMI® standards to provide efficiency and transparency advantages. These advantages will make INACOL a stronger and more reliable competitor in the market.

## **1.4. RESEARCH QUESTIONS**

- Which processes are involved in project management at INACOL?
- How are INACOL's project management processes compared with PMI® standards?
- Which changes should be made in order to follow PMI® standards?
- How does PMI® standards applied to INACOL ensure competitive advantages?
- How PMI® standards applied in public infrastructure projects could reduce corruption in Colombia?

## 1.5. IMPORTANCE OF THE STUDY

This study will not only help INACOL find competitive advantages by adopting PMI®'s standards in the company's project management methodology, but it will also help other companies evaluate their current processes and become aware of the advantages of following PMI® standards.

It suggests the adoption of PMI® standards as a tool to fight corruption in the infrastructure sector in Colombia and avoid progress stagnation. Currently, progress is being stagnated by corruption, due to the bad quality of the infrastructure works and the constant delays in the termination of these projects.

Additionally, taking into account that the PMI®'s PMBOK® is a guide and not a methodology, the study proposes templates and matrices that fulfill PMI®'s standards and that can be used by any company working on project management.

## 1.6. DEFINITION OF TERMS

- *Assumption*: parameter considered as true or real with no need of evidence or verification. (PMI, 2008)
- *Baseline*: is a point of reference of a project's approved plan. It is used to compared the executed against planned.
- *Bureau Veritas*: is a global leader in conformity assessment and certification services. (Bureau Veritas, n.d.)
- *Cash flow*: statement that measures the movements of money in a business or project. It shows how money is generated and spent.
- *Contractor*: a person or organization that provides services to another person or organization under the specifications of a contract.

- *Changes control*: Identify, document, approve or reject, and control changes in the baselines of the project. (PMI, 2008)
- *Crashing*: a specific type of schedule acceleration technique performed to take the necessary measures to decrease the schedule's total duration. It is used after analyzing several alternatives to determine how to obtain the maximum compression of the schedule at the lowest additional cost. Generally, activity durations are decreased and activity resources increase. (PMI, 2008)
- *Critical path*: a technique used to analyze the schedule and determine its flexibility level and minimum duration of the project. (PMI, 2008)
- *Deliverable*: any tangible or intangible product or service required for the development of a project.
- *Fast-tracking*: a specific type of schedule acceleration technique that changes the network logic to overlap phases that normally would be executed sequentially. (PMI, 2008)
- *ID*: a short and unique identification given to each activity to differentiate them from one another.
- *ISO 9000*: represents an international consensus on good quality management practices. It consists of standards and guidelines relating to quality management systems and related supporting standards. (ISO, n.d.)
- *Labor force*: the number of workers engaged in a specific activity or project.
- *Minute*: the official record of the proceedings of a meeting. (Merriam-Webster, n.d.)
- *Microsoft Project®*: is one of the best project management & collaboration software which provides an intuitive and easier way to successfully complete development plans, resource assignment to activities, monitor progress, and manage the budget. Microsoft Project applies procedures described in the PMBOK®. (Microsoft, n.d.)

- *Organization chart*: is a document that represents graphically the team members of the project and their hierarchical relationships. (PMI, 2008)
- *PMI®*: Project Management Institute is a non-profit organization that improves the project management profession through globally recognized standards and certifications, collaborative communities, an extensive research program, and professional development opportunities. (PMI, n.d.)
- *PMBOK®*: Project Management Body of Knowledge describes policies, methods, processes, and established practices that emerge from good practices recognized by professionals dedicated to project management. (PMI, 2008)
- *Public tender*: is a bidding process, structured by governments or government agencies for the acquisition of supplies, performance of services and construction works.
- *Project charter*: document issued by the sponsor that authorizes formally the project. It gives authority to the project manager to spend the resources in the activities of the project. (PMI, 2008)
- *QA*: Quality Assessment. The process of auditing the quality requirements and results obtained from quality control metrics. This, to guarantee the definition of adequate operations and quality policies. (PMI, 2008)
- *Risk Acceptance*: a risk response planning technique that indicates the team has decided not to change the project management plan or has not identified another strategy or adequate response. (PMI, 2008).
- *Risk Mitigation*: a risk response planning technique, associated to threats that pretends to reduce the probability or impact under an acceptable threshold. (PMI, 2008)
- *Risk Transference*: a risk response planning technique that transfers the impact of a threat to a third party, along with the response responsibility. (PMI, 2008)

- *Schedule*: dates planned for the execution of the activities of the project.
- *Scope*: the products, services and results that will be conceived as a project. (PMI, 2008)
- *SGS*: Leader Company in inspection, analysis, verification and certification. It is known as a global reference in quality and integrity. (SGS, n.d.)
- *Sponsor*: the person or group who offers financial resources for the project.
- *Stakeholder*: person who is actively involved in the project and whose interests can be affected positively or negatively by the execution and termination of the project. He/she can influence in the project's deliverables. (PMI, 2008)
- *SV*: Schedule Variation is a performance measure of a project's schedule, planned vs executed.
- *SPI*: Schedule Performance Index is an efficiency measure of a project's schedule. It's the ratio between the earned value and the planned value. (PMI, 2008)
- *Traceability department*: department in charge of tracing and tracking the execution of the project in progress to ensure the presence of quality and the fulfillment of the project's schedule.
- *WBS*: Work Breakdown Structure is a hierarchical decomposition oriented to the deliverables and related to the work that will be executed by the team, to fulfill the project's objectives and develop the required deliverables. It organizes and defines the scope of the project. It is the result of subdividing the deliverables of the project and the work of the project into smaller components easier to manage. (PMI, 2008)
- *Work package*: is the smallest component of the work breakdown structure. It is assigned to only one responsible accountable for its timely delivery.



## 2. RESEARCH METHODOLOGY

### 2.1. RESEARCH PERSPECTIVE

In an interview, the interviewer usually makes open questions and has the possibility to direct it according to the answers of the interviewee. Due to the level of detail needed to fulfill the study, personal interviews are the most suitable methodology for the collection of the data.

### 2.2. CONTEXT AND ACCESS

The person to be interviewed must be a former or current Project Manager of one of INACOL's projects. Thus, the contact is going to be made by the company and the appointments will be scheduled in Bogotá by Ignacio Rincón, INACOL's president.

### 2.3. PARTICIPANTS

Carlos Rocha is the current Project Manager of the concession for the design and construction of the stations for the Barranquilla's integrated transportation system, main station of the Romelio Martinez Stadium, and the construction of the patios and workshops of Barranquillita (center of Barranquilla). The project started at the end of 2007 and it is still in execution.

### 2.4. INSTRUMENTATION

**INTERVIEW (ROCHA, 2011)**

#### 1. Which projects have you managed in INACOL?

I am the Project Manager of "TRANSATLANTICO S.A.", the company that has the concession for the design, financing and construction of the Simple Stations, Intermediate Stations and the "Barranquillita" Terminal for TRANSMETRO S.A., Barranquilla's integrated transportation system.

**2. Do you have studies or certifications related to Project Management?**

I am an Architect and also have a Certification in building construction from the Rafael Núñez University in Bogotá.

**3. For how long have you been working in Project management?**

I have been working in project management for approximately 20 years.

**4. How do projects initiate?**

Projects begin by analyzing parameters such as the scope, studies, designs, planning, budget, schedule, financing, human resources, materials needed etc..

a. Is there any register of the project's stakeholders?

Each area or department sends a report to the others informing who is responsible for each one of the activities and who the members of the committees are. This report should also contain a small organization chart of the area/department. Each one sends the document with a copy for each one of the other areas/departments.

**5. How do you define the scope of the project during the Planning process?**

The necessary research and studies are done to define the scope according to the wishes, needs and expectations that are going to be satisfied, and taking into account the financial resources. These determine the magnitude of the project that is going to be executed; it can be the total or a percentage of the project. For example: in a building, how many floors? In a highway, how many kilometers of the highway?

a. How is the work breakdown structure created?

The activities are distributed between the different areas/departments of the company. This distribution is done by logic and there is not a written document that registers the activities and detailed information about them. Projects in INACOL are usually very dynamic and don't require paperwork in every process.

**6. How are activities programmed and how is the estimation of the duration of these activities done during the Planning process?**

The first step is to list and enumerate the activities with their description, according to their execution order. Then, an estimation of the duration of each one of the activities is made. It is important to note that there are activities that are executed simultaneously. This is done by department. Each department knows when and how to support the other departments depending on the activities being executed.

If the duration of a project wants to be modified and finished earlier, it's mandatory to increase the labor force, the working shifts among other measures.

a. Is there an estimation of the resources needed for each one of the activities?

Yes this estimation is done for the budget. Here we know how much is going to be spent on each item.

**7. How is the financial planning carried out in projects? (Costs, profit, investment)**

The first thing to do is to determine a budget according to the execution schedule. Then the cash flow of the project is constructed reflecting the required investment, its costs and future revenues. This cash flow shows the period in which an injection of funds is required (coming from the shareholders, bank loans, or in public infrastructure projects the pay outs from the contracting entity) in order to fulfill the objective of the project.

**8. Is there any planning of quality standards in order to monitor and control the project later on?**

Yes. In every project there must be two departments that carry out quality measurement methods. The first one is called traceability, which monitors permanently the resources of the project and compares the budget with the execution. This department is directly related to the purchasing department and supplies, so that the prices and quality of the acquisitions follow the specifications of the budget.

The second department is the quality department in charge of analyzing each one of the activities of the project, materials and equipment tests, its metrics and the measurement

of their results in order to have parameters to verify the fulfillment of quality according to the standards.

a. How are the quality standards determined?

Since INACOL has several quality certifications (ISO 9000, SGS, Bureau Veritas) the processes are defined and executed according to these standards. Additionally, the contracting entity has certain standards required for the acceptance of the project. For this reason, INACOL performs tests in certified laboratories that guarantee the fulfillment of these standards. If these standards are not present in the project, the project may not be accepted by its sponsor.

**9. How are the human resources needed for the project defined?**

The qualified (professional or with some kind of certification) and non qualified personnel needed for the project is defined based on the objective to be fulfilled. The amount of labor force needed depends on the expected performance of the project.

**10. How are the roles and responsibilities of the people participating in the project defined?**

When the project is going to begin and once the part to be executed is defined, the organization chart is made, the roles and functions of each position are defined, and the profiles for each post are designed. Then the searching of the people who will be covering the positions begins. Once they are selected, they are carefully informed of their responsibilities in the project.

**11. How are the communications of the project defined?**

The communication in a project should be carried out according to the organization chart. In order to assure the information flow, small follow-up committees should take place every day first thing in the morning in each department, every week a committee in charge of monitoring the operations takes place, and once in a month a general committee with the participation of the owners of the project, the manager and the heads of each department is organized to analyze every detail of the execution of the project.

**12. Is there any definition for the information that will be managed formal or informally?**

Yes, there is informal information, one that doesn't have to be registered, but when it comes to the building work it is registered in the tracking report. There is also the formal information which should be registered through numbered mail and saved in order to make it important.

**13. Is there a risk analysis done before the execution of the Project?**

Yes. There is a risk scenario. The schedule is designed in Microsoft Project®, which is a great tool that shows the critical path. We should pay close attention to the activities present in this critical path and elaborate an action plan that allows their fulfillment and thus the fulfillment of the project with no delays. Delays generally mean increases in the costs of projects.

**14. How are time, scope and cost managed during the execution of the Project?**

In order to assure the fulfillment of the project in the desired period, follow-up committees take place daily, weekly and monthly. They analyze permanently the evolution of the project (percentage completed) and if difficulties are present, the necessary measurements are taken to prevent delays and assure the execution according to the expected scope. The costs management is done by the traceability department, which monitors the purchases of materials, its quantities, quality and prices to guarantee the following of the budget. This is reviewed in the committees to avoid changes that affect the budget.

**15. Which monitoring and controlling tools are used:**

a. For changes in time, scope and cost?

- Time: The follow-up schedule designed in Microsoft Project®, which is updated daily.
- Scope: Minutes that register variations in quantities and new items.
- Cost: Traceability, monitoring of the budget in order to obtain in the end the real costs.

When there are changes in the schedule, activities are reprogrammed and Microsoft Project® immediately shows the critical path. Sometimes there are changes that require a new deadline or activities that are replaced with others

and no changes in the deadline. There are several Acts that register these changes, including their impact in the budget, schedule and costs, and are signed by the sponsor, contractor and project manager. The Act of works that are not foreseen registers the elimination of certain activities present in the schedule. The Act of smaller and bigger quantities of work registers the elimination of certain activities and the augmentation of others that were already present in the schedule.

- b. For the fulfillment of the chronogram?
  - Measuring methods for the performance of the machinery, labor and supplies to guarantee the closing of the project on time.
  
- c. For the achievement of quality?
  - Verification of the specifications according to the designs, test results and verification of the processes.
  
- d. To monitor the stakeholders' expectations?
  - The expectations or satisfaction of the stakeholders are monitored through interviews, surveys that measure satisfaction, and comments expressed during committees and appointments. Details that generate satisfaction in the client are the execution, quality, commitment, and fulfillment of specifications, among others.
  
- e. To control risks?
  - Risks are measured permanently through quality standards and with the monitoring and control of the schedule.

#### **16. Which criteria determine the closing of the project?**

First, receipt of work Act, which contains the quantities contracted and their costs. Second, the liquidation of the contract Act, in which all of the tests applied to materials, machinery and supplies are included along with their certifications and operation and maintenance manuals; and finally, the certification of the execution of the project. All of these are given by the sponsor or owner of the project to the contracting firm.

## 2.5. DATA ANALYSIS

### QUESTIONS 1, 2, 3

Even though Carlos Rocha is not a PMI® certified project manager, he has a vast experience managing infrastructure projects with INACOL and with other companies alike.

One of the most important steps to adopt PMI® processes in INACOL is building PMI® oriented capabilities. Culture must be changed to receive the new processes. For that reason the people involved in the project (and more specifically the project manager) should understand the virtues of implementing PMI®'s approach with a clear methodology.

Ideally, project managers at INACOL should be certified by PMI®, or, at least, should have received formal training on PMI® standards. This would certainly ease processes adoption and success on a going basis.

### QUESTION 4

This question was formulated to evaluate two processes in the Initiation stage; the development of a Project Charter and the identification of the project's stakeholders.

Projects should begin with the development of a Project Charter since it is a document that formally authorizes a project and registers the initial requirements to satisfy the stakeholders' needs and expectations. (PMI, 2008) According to the answer to this question, in INACOL they analyze certain parameters such as the scope, studies, schedule, financing, human resources and materials needed when initiating a project, but there should also be a document that registers and formalizes this analysis.

On the other hand, the stakeholders should be identified in a document with the most relevant information about them. Even though there is detailed information of the project's stakeholders, it is distributed into numerous documents, as stated in the answer to the question. This information should be narrowed down to one final

document and delivered to everyone before the project starts. The unification of all these documents helps align expectations between stakeholders and makes the information more trustworthy. This document is the founding of the project's scope and should be reviewed (in a detailed manner) and signed by all the stakeholders before the publication of the final document.

The project manager (if already chosen) or the sponsor of the project (in case the project manager is not already involved in the project) should lead the project charter development. It's important to note that one of the outcomes of the project charter discussion is the name of the project manager that will be appointed for the project.

The following Project Charter is suggested for INACOL in order to assure the consideration of the appropriate requirements before initiating projects:

**TABLE 1 - PROJECT CHARTER TEMPLATE**

<b>Project Name:</b>	
<b>Issued by:</b>	Project manager / Project sponsor (if PM has not been chosen).
<b>Date:</b>	Date of issue

<b>Project Manager:</b>	<p>Formalization of the person chosen to be in charge of the Project. The project manager is the owner of the approved budget, and responsible for the execution and the management in terms of scope, timing and cost.</p> <p>This person is accountable for the results and is the single point of contact for stakeholders and project's resources.</p>	
<b>Stakeholders and expectations</b>	<b>Stakeholder</b>	<b>Expectations</b>
	Stakeholder's name	Detailed information about stakeholders' needs and expectations in terms of: scope, time and cost.
<b>Purpose / Business Requirements</b>	<p>After mapping all the stakeholders' requirements, a final purpose should be defined and documented to align and to converge distant expectations.</p> <p>The requirements consider both functional (business) and technical needs and should respond to scope, time and cost needs that would finally end up being the success criteria to accept or reject project results.</p>	



<b>Project Description, Deliverables &amp; Milestones:</b>	Each of the single steps or deliverables (documents, acts, intermediate products, and milestones) that have to be accomplished in a defined order to bring the project to life according to the defined scope in the "Purpose & Business requirements" part.
<b>Assumptions &amp; Restrictions:</b>	<p><b>Assumptions:</b> Estimation of the time and resources needed for each one of the steps or deliverables. Relevant information that results from the studies.</p> <p><b>Restrictions:</b> Restrictions involving time and resources. Restrictions resulting from the research.</p>
<b>Communications &amp; Reports:</b>	Communications management. Person in charge and/or leaders, ways of communication, formal and informal means of communications applicable to the project, content and periodicity.
<b>Others:</b>	Other items that should be clear before initiating the project. For example: The existence of a Contract.

<b>Signatures:</b>	<b>Sponsor:</b>	<b>Project Manager:</b>
	_____	_____
	Name:	Name:
	<b>Stakeholders:</b>	
	_____	_____
	Name:	Name:

Note: Created by C.Rincón, 2012

## QUESTION 5

This question was included to verify the existence and evaluate three steps of the Planning process; the collection of requirements, definition of scope and development of the work breakdown structure (WBS).

To collect requirements is to define and register the stakeholders' needs in order to accomplish the project's objectives. (PMI, 2008) From the answer given to this question, it can be seen that this step is carried out in the proper way. In INACOL, research and studies are performed to find the requirements (wishes, needs and expectations) and define the scope of the project based on these requirements. Thus, the collection of requirements has a high level of importance for INACOL.

The definition of the scope is a detailed description of the project and product. It is developed based on the main deliverables, the assumptions and restrictions registered during the initiation of the project. (PMI, 2008) It is possible to modify the existing risks,

assumptions and restrictions as the project continues. There is evidence that INACOL bases the definition of the scope on the needs, wishes and expectations of the stakeholders and the financial resources, but there are other parameters that should also be taken into account. This is why the use of the following Scope Statement is recommended when defining the scope of the company's projects.

**TABLE 2 - SCOPE STATEMENT TEMPLATE**

<b>Project Name:</b>	
<b>Issued by:</b>	
<b>Date:</b>	Date of issue

<b>Project Description:</b>	Detailed description of the project.
<b>Project Justification:</b>	Purpose of the project and the needs it is going to satisfy.

<b>PROJECT OBJECTIVES</b>	
<b>Cost Objectives</b>	
<b>Program Objectives</b>	
<b>Quality Measures</b>	
<b>Other Objectives</b>	

<b>PROJECT DELIVERABLES</b>	
<b>Deliverable A</b>	Depending on the project, certain activities must happen. These are brought together into work packages or deliverables.
<b>Deliverable B</b>	
<b>Deliverable N</b>	
<b>Exclusions:</b>	Identify what is not going to be excluded of the project. Establish explicitly what items are out of scope.
<b>Acceptance Criteria:</b>	Minimum requirements the project should accomplish in order to be accepted Specific details of the deliverables that should be completed Due dates
<b>Initial Organization of the Project:</b>	Name the people that are part of the project and that have to do with the project's management. Include an organization chart with the levels or power and approval.
<b>Resources</b>	List all of the project's resources in order to have clarity from the beginning.
<b>Change Management:</b>	Give a detailed description on how are changes going to be managed during the project. Be clear on who will be in charge of managing the change and who will be involved depending on the type of changes happening.

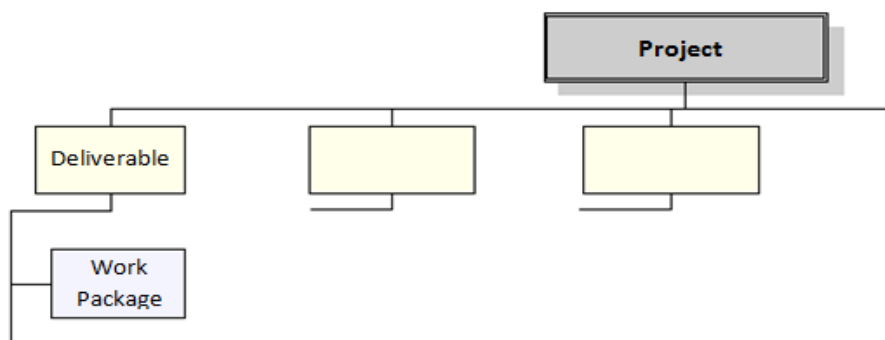
PROJECT DELIVERABLES	
<b>Assumptions, Restrictions &amp; Risks:</b>	<b>ASSUMPTIONS:</b>
	<b>RESTRICTIONS:</b>
	Time Resources Technology and Information
	<b>RISKS:</b>

<b>Signatures:</b>	<b>Sponsor</b>	<b>Project Manager</b>
	Name: _____	Name: _____

Note: Created by C.Rincón, 2012

Finally, the creation of the WBS consists in subdividing the project's deliverables into smaller components easier to manage. It is a hierarchical structure based on the deliverables that should be executed by each one of the teams to meet the project's objectives. The lowest level of the WBS's components is the work package, which can be programmed, monitored, controlled and have its costs estimated. (PMI, 2008) In INACOL, there is not a written document that describes the project's WBS. Hence, the following format can be adopted by the company looking forward to have better control of its deliverables.

**TABLE 3 - WORK BREAKDOWN STRUCTURE (WBS) TEMPLATE**



<b>Issued by:</b>
<b>Date:</b>

LEVEL	NAME
Activities should be classified according to their hierarchical level. Example: Level 1. X. Level 2. X.X Level 3 X.X.X	

**Responsible:** \_\_\_\_\_

Name:

*Note:* Created by C.Rincón, 2012

## QUESTION 6

The purpose of this question is to evaluate several processes that have to do with the project's time management. These processes are the definition and sequencing of the activities, the estimation of the resources and durations, and the development of the schedule.

To define activities, the specific actions needed to complete the project's deliverables must be identified. The sequencing of the activities consists in identifying and registering the interrelations between the project's activities. The estimation of resources consists in calculating the types and quantities of materials, people, equipment and supplies required to execute each one of the activities identified previously. (PMI, 2008)

Based on the answer to this question, INACOL defines, sequences and estimates the duration of the deliverables' activities by department, but there is not a document with the list of activities of the project as a whole. The estimation of the resources for each activity is done when developing the budget, where they determine how much is going to be spent on each activity or department.

On the contrary, according to PMI® the estimation of resources should be done before the development of the budget. A detailed identification of resources should be carried

out and should be crossed with the activities classified in the WBS. This identification should be complemented with an estimation of the amount / quantity needed of each resource. Only after that description and understanding, the budget can be estimated.

**TABLE 4 - RESOURCES REQUIREMENTS TEMPLATE**

<b>Project Name:</b>					
<b>Issued by:</b>					
<b>Date:</b>					
Category	Description	Type	Quantity	Estimated Cost	Comments
Materials, people, equipment or supplies					

*Note:* Created by C.Rincón, 2012

**TABLE 5 - ASSIGNMENT OF RESOURCES TEMPLATE**

<b>Project Name:</b>			
<b>Issued by:</b>			
<b>Date:</b>			
ID	Resources	Activity ID	Assignment of Units per Activity
Create an ID for each resource.		Write the ID of the activity that requires this resource.	

*Note:* Created by C.Rincón, 2012

The development of the schedule is a process that consists in analyzing the sequence of the activities, their duration, resources requirements, and schedule restrictions to create the project's schedule. (PMI, 2008) The schedule of the project is the gathering of the processes mentioned previously. Thus, in INACOL, this process is also done by department and not for the project as a whole.

It is important to ensure one single schedule for the project manager to monitor the execution. Having several chronograms, splitting the project's work flow into various schedules could end up causing serious difficulties in terms of project's control.

One recommendation for INACOL is to start considering a single schedule for the whole project. This will enable the project manager to identify important algorithms such as the critical path to make timely decisions such as crashing and fast-tracking, when needed.

This does not mean that having specific schedules for each department is not positive. It is very positive indeed. The only important consideration is that those smaller chronograms should be taken from the general schedule as it actually defines the relations amongst all the work packages, milestones and resources.

In order to ensure a formal document that contains a sequence of the project's activities as the whole, the following template is proposed.

**TABLE 6 - PROJECT SCHEDULE TEMPLATE**

Project Name:					
START	Date			END:	Date
ID	Department	Activity	Previous	Next	Duration
1	Deliverable to which the activity belongs. Also specify the deliverable	Name of the activity and list of the resources needed to complete the activity on time. Mention the restrictions of schedule.	Activity that has to be finished before this one starts. Include details.	Activities that can be carried out after this one is done. Include details	Period of time it takes to complete the activity. Number of working hours, shifts, periods..
2					
N					

Note: Created by C.Rincón, 2012

## **QUESTION 7**

This question was formulated to find out about the projects' cost planning in INACOL. Two processes were evaluated in the answer to this question, the estimation of costs and the determination of a budget.

The estimation of costs determines the monetary resources needed to complete the project's activities and the determination of the budget consists in adding the estimated costs for each one of the activities to establish an authorized cost baseline. (PMI, 2008) The answer to the question shows a good performance of the processes mentioned before. INACOL bases its budget on the project schedule (activities) and creates a cash flow reflecting the required investment, costs and future revenues of the project.

It is important to mention that the budget is used to measure, monitor and control the global performance of the project's costs so it should be as precise as possible.

## **QUESTION 8**

According to this question, related to the quality management planning process, INACOL's current quality management process is grounded on ensuring budget tracking against planned. However, when considering PMI®'s processes, quality management must not only be conducted towards budget execution nor to some specific processes or departments. Quality control must be ensured across the whole project and incorporates: processes, resources (not only financial resources), organizational assets, work performance, law restrictions and end product analysis, among others. (PMI, 2008) All these aspects should be brought down into specific project requirements during the quality planning process. Then, after having defined the specific requirements, all the follow up process and quality control metrics should stick to those requirements and move on to the quality assurance and the quality control stages.

Therefore, there is evidence of an insufficient quality planning process as there is not a conscious and formal quality requirements elicitation prior to the execution startup. A specific plan should be conducted to ensure quality requirements mapping that help nurture the quality tracking process. On the other two PMI® quality processes (perform

quality assurance and perform quality control), INACOL shows acceptable capabilities, ruled by the already-in-place certifications (ISO 9000 and Bureau Veritas).

It is important to have a formal and standardized template that summarizes the project's quality requirements and metrics, as well as the success criteria for each requirement. Find below the recommended template for quality planning, taking into account the previously mentioned items. This information should be controlled by the project manager and must constitute an angular stone of the monitor and control phase.

**TABLE 7 - QUALITY PLANNING TEMPLATE**

<b>Project Name:</b>
<b>Issued by:</b>
<b>Date:</b>

<b>Project Scope</b>	
<b>Quality Policies:</b>	

<b>Acceptance Criteria</b>
<b>Deliverable 1:</b>
List the quality standards related to the deliverables required by the sponsor in order to accept the project.
<b>Deliverable 2:</b>
<b>Deliverable N:</b>

<b>QA Activities</b>	<b>Controlling Plans and Stakeholders' Responsibilities</b>

<b>Signatures:</b>	<b>Project Manager:</b>	<b>Sponsor:</b>
	_____	_____
	Name:	Name:

*Note:* Created by C.Rincón, 2012



## **QUESTIONS 9, 10**

The objective of these questions was to analyze the current human resources management of projects in INACOL. Personnel is successfully defined based on project's needs and objectives, as well as a deeper definition of roles, profiles, abilities, workload intensity and life span of each human resource within the project. This detailed definition helps establish future power relations and responsibilities for each activity and has a direct impact on costs and then the overall budget.

Once the resources are defined, it is also crucial to determine all the matters related to managing the personnel; including: training, security, satisfaction and legal labor procedures.

Most of these subjects are currently managed at INACOL. However, there is a need of formal documentation of the project as a whole showing the relation between the human resources and the deliverables' activities. This should be determined and registered since the planning phase.

In order to have a systematic documentation and ensure the consideration of all of the items, the following matrix is proposed to have an understanding of both: resource – activity and activity – resource relations. This must be accompanied by a detailed job description and the way each human resource is related to the activity or deliverable (responsible, accountable, consulted and informed).

**TABLE 8 - RESPONSIBILITY ASSIGNMENT MATRIX (RAM)**

<b>Issued by:</b>				<b>Date:</b>			
POOL Activity	<b>Resource 1:</b>	<b>Resource 2:</b>	<b>Resource 3:</b>	<b>Resource 4:</b>	<b>Resource 5:</b>	<b>Resource 6:</b>	
	<b>R A C I</b>	<b>R A C I</b>	<b>R A C I</b>	<b>R A C I</b>	<b>R A C I</b>	<b>R A C I</b>	
Name of the activity or its ID.	Determine the role of each person on each activity.						
	<b>R A C I</b>	<b>R A C I</b>	<b>R A C I</b>	<b>R A C I</b>	<b>R A C I</b>	<b>R A C I</b>	

**R = Responsible      A = Accountable      C = Consulted      I = Informed**

*Note: Created by C.Rincón, 2012*

**TABLE 9 - RAM MATRIX ANALYSIS**

**Project Name:** \_\_\_\_\_

**Horizontal Analysis**

<b>WBS/Activity</b>	<b>Comments and Suggestions</b>
Name or activity ID	Name the human resources or posts involved in this activity. List their responsibilities and relationships.
2	
N	

**Vertical Analysis**

<b>RESOURCES</b>	<b>Comments and Suggestions</b>
R1	Name the activities where this person is involved. Provide details such as responsibilities and relationship (RACI).

RESOURCES	Comments and Suggestions
R2	
RN	

Note: Created by C.Rincón, 2012

### QUESTIONS 11, 12

Both questions are related to the project's communication management. Communication should be planned according to the stakeholders' information needs. This planning includes the issuing, collection, distribution, storage, recovery and final availability of the information. Additionally, there should be a definition of the information flow and crisis management procedures. (PMI, 2008) The communication process should be a team work job with the stakeholders in order to be able to fulfill their needs and exceed their expectations. When the information about the project's performance is delivered and distributed adequately there is greater response capacity.

Project managers spend about 90% of their time working on communication management. (PMI, 2008) Effective communication creates bonds between the different stakeholders and connects different organizational levels, experience levels, diverse interests and perspectives that might impact the project's result positively.

In INACOL, there is a good communications management during the execution of the project. The existence of periodic committees ensures the flow of information, but there is a lack of communications planning. The planning process enables the project manager to find an effective and efficient approach to communicate with the stakeholders. And sets the proper means to distribute, collect and keep the communication of the project. Planning communications during the planning phase of the project allows a proper assignment of resources for communication activities. (PMI, 2008)

The template below is suggested to ensure communications planning at INACOL.

**TABLE 10 - COMMUNICATIONS PLANNING**

Project Name:					
WBS/Activity	INFORMATION	DISTRIBUTION		FREQUENCY	METHOD
		ISSUER	RECIPIENT		
It can be by activity or by deliverable.	Documents, reports, communications...	People responsible of issuing the information	People to which the information is directed	Frequency with which the information should be distributed.	Method used to distribute the information Example: Email

*Note:* Created by C.Rincón, 2012

**QUESTION 13**

Risk management is one of the most important processes during the planning phase of the project, and constitutes a key part of the project management discipline. Thus, any project should follow a strict risk management methodology.

At INACOL, there is a partial risk management approach that seeks anticipation and reaction to possible risks that would impact the project in terms of cost. When compared with PMI® standard processes, INACOL’s approach appears insufficient as cost is not the only variable that should be reckoned; probability is also a vital variable within the risk management plan.

In order to develop a PMI®-based risk management analysis, some activities should be carried out: Plan risk management, identify risks, qualitative risk analysis, quantitative risk analysis, plan risk responses and monitor and control risks.

The following templates are the proposed way to map risks within the project and keep track of each of them during the whole project.

This is based on the SWOT analysis of the project, where threats and weaknesses represent possible risks or risk exposure (correspondingly). On the other hand, strengths and opportunities stand for project’s capabilities to avoid or minimize risks or risks’ impact. This template should be filled out by the Project Manager and should involve key stakeholders’ votes (from 1 to 10) given the importance / impact each item could have on the project.

**TABLE 11 - RISK IDENTIFICATION AND QUALITATIVE ANALYSIS TEMPLATE**

<b>Project Name :</b>
<b>Date :</b>

**VARIABLES**       **S**     **W**     **O**     **T**

DESCRIPTION		VOTES					TOTAL
		V1	V2	V3	V4	V5	
1.							<input type="checkbox"/>
2.							<input type="checkbox"/>
3.							<input type="checkbox"/>

**VARIABLES**       **S**     **W**     **O**     **T**

DESCRIPTION		VOTES					TOTAL
		V1	V2	V3	V4	V5	
1.							<input type="checkbox"/>
2.							<input type="checkbox"/>
3.							<input type="checkbox"/>

**VARIABLES**

S	W	<del>O</del>	T
---	---	--------------	---

DESCRIPTION		VOTES					TOTAL
		V1	V2	V3	V4	V5	
1.							<input type="checkbox"/>
2.							<input type="checkbox"/>
3.							<input type="checkbox"/>

**VARIABLES**

S	W	O	<del>T</del>
---	---	---	--------------

DESCRIPTION		VOTES					TOTAL
		V1	V2	V3	V4	V5	
1.							<input type="checkbox"/>
2.							<input type="checkbox"/>
3.							<input type="checkbox"/>

Note: Created by C.Rincón, 2012

Once risks are identified, it's important to determine how to manage them. In order to do plan the response, the recommendation is to determine both probability (% of occurrence likeability) and severity (financial impact) for each risk. Depending on each project both scales (for probability and severity) should be established as it depends on the risk aversion that stakeholders define.

**TABLE 12 - PROBABILITY AND SEVERITY SCALE**

Probability (%)		Scale
A	0% to X%	Low
B	X% to Y%	Medium
C	Y% to Z%	Med-High
D	Y% to 100%	High

Severity (\$)		Scale (e.g.)
A	0 to W	Low
B	W to X	Medium
C	X to Y	Med-High
D	Y to Z	High

Note: Created by C.Rincón, 2012

Having defined this, each identified risk should be evaluated through both variables and placed in the following matrix:

**TABLE 13 - PROBABILITY/SEVERITY MATRIX**

<b>Probability</b>	<b>D</b>	Mitigate	Mitigate	Transfer	Transfer
	<b>C</b>	Accept	Mitigate	Mitigate	Transfer
	<b>B</b>	Accept	Accept	Mitigate	Mitigate
	<b>A</b>	Accept	Accept	Accept	Mitigate
		<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
	<b>Severity</b>				

Note: Created by C.Rincón, 2012

After this analysis, each risk should be documented as recommended in the following template:

**TABLE 14 - RISK RESPONSE PLANNING**

VARIABLES:  S  W  O  T

<b>DESCRIPTION</b>	
--------------------	--

STRATEGY	RESPONSE
Exploit <input type="checkbox"/>	
Share <input type="checkbox"/>	
Improve <input type="checkbox"/>	
Accept <input type="checkbox"/>	

VARIABLES  S  W  O  T

<b>DESCRIPTION</b>	
--------------------	--

STRATEGY	RESPONSE
Exploit <input type="checkbox"/>	
Share <input type="checkbox"/>	
Improve <input type="checkbox"/>	
Accept <input type="checkbox"/>	

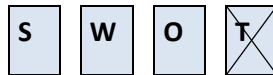
VARIABLES:



<b>DESCRIPTION</b>	
--------------------	--

STRATEGY	RESPONSE
Avoid <input type="checkbox"/>	
Transfer <input type="checkbox"/>	
Mitigate <input type="checkbox"/>	
Accept <input type="checkbox"/>	

VARIABLES:



<b>DESCRIPTION</b>	
--------------------	--

STRATEGY	RESPONSE
Avoid <input type="checkbox"/>	
Transfer <input type="checkbox"/>	
Mitigate <input type="checkbox"/>	
Accept <input type="checkbox"/>	

Note: Created by C.Rincón, 2012

#### QUESTION 14, 15 A & B

These two questions intend to find out the way the project is managed in terms of cost, scope and time. There is evidence of proper control on these 3 main variables, and they are treated as crucial elements for the project's success.

Some minor recommendations could be made to INACOL on managing that triad of variables:

Once WBS, schedule and budget are defined, it's important to establish a formal baseline for each. All the execution should be measured against those baselines in order to understand real variations vs. the committed plan.



The schedule should be monitored constantly in order to be able to update the current state of the project and determine if there are changes in the schedule that affect the project's performance and scope. It is possible to influence the elements generating changes in the schedule or manage changes appropriately as they occur. Any variation in the schedule (SV) and performance index (SPI) should be registered and communicated to the stakeholders. (PMI, 2008)

The scope control ensures the processing of all of the requested changes and corrective actions recommended through the Integrated Changes Control. (PMI, 2008) The scope control is part of other control processes. Changes that are not controlled may damage the scope of the project among other processes. It is important to mention that certain changes require updates in documents developed previously. The baseline for this piece is the WBS and any minor change in the WBS should be tracked, reported and informed.

All of these changes might generate changes in the cost baseline. For this reason, it is important to review the budget and calculate the variations that these changes mean in terms of cost. Actions should be directed to keep the additional costs in acceptable limits.

In INACOL there is a daily monitoring of the project's schedule. When changes occur they determine immediately if these affect the project's scope and how the budget is affected in terms of cost. Additionally, all the changes are registered in Acts as the PMI® standards suggest the changes control should be done.

It's important to note that these three variables (cost, time and scope) are interconnected. Any change in one of them will directly affect one (or both) of the others. Any time there are changes vs. planned occur in one of them, not only that change should be documented, but also the corresponding changes on the others.

For this regard, in the planning phase, there must also be a pre-defined limit for scope, cost and time in order to clearly recognize the changes that need to be approved by the stakeholders. All the other changes should at least be informed in periodic acts or meetings.

However, even if changes are registered, there is no evidence of an Integrated Change Control process, where change requests are reviewed and approved in order to manage change in deliverables, processes and documents. In INACOL changes are not requested, but only registered after they happen. For these reason, the template below is proposed in order to apply the change requests in INACOL and be aware of the impact they generate before they happen.

**TABLE 15 - CHANGE REQUIREMENT TEMPLATE**

<b>Project Name:</b>
<b>Required by:</b>
<b>Presented to:</b>
<b>Requirement Date:</b>

<b>Change Number</b>	<b>Name of the Change:</b>
----------------------	----------------------------

TYPE OF CHANGE REQUIRED			
Project Scope	<input type="checkbox"/>	Project Program	<input type="checkbox"/>
Budget	<input type="checkbox"/>	Other Change Which?	<input type="checkbox"/>

<b>Change Description:</b>	
<b>Justification of Change Required:</b>	

Impact in the Resources and Costs of the Project				
Description	Working Hours		Cost	
	Reduction	Increase	Reduction	Increase
<b>Total Change</b>				

Impact in Project's Program	
<b>Planned Termination Date:</b>	
<b>New Termination Date:</b>	

Action	Comments
Rejected <input type="checkbox"/>	
Delayed to: <input type="checkbox"/>	
Approved <input type="checkbox"/>	

<b>Signatures</b>	<b>Project Manager:</b>	<b>Other:</b>
	Name: _____	Name: _____

*Note:* Created by C.Rincón, 2012

### **QUESTION 15 C**

This question is related to quality monitoring and control. This topic was approached previously in question N8.

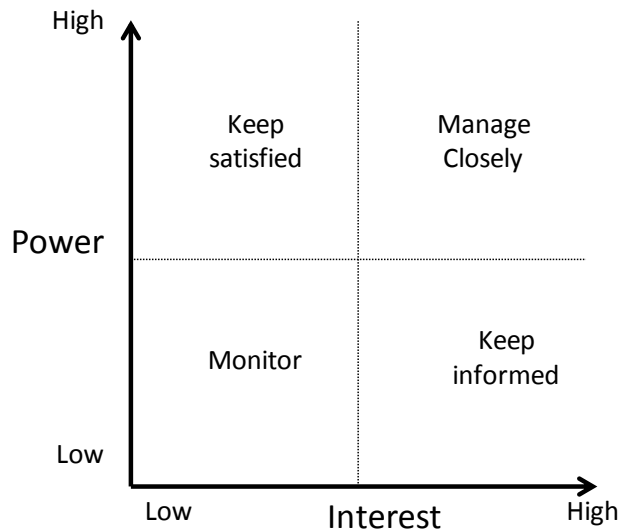
### **QUESTION 15 D**

When managing stakeholders' expectations, it is important to communicate and work with them looking forward to satisfy their needs and solve problems as they occur. Hence, communication activities should be directed to this matter. In INACOL, the expectations and satisfaction of the stakeholders are measured through interviews, surveys, comments, committees and appointments, among other methods used in the company. This evidences the importance of exceeding stakeholders' expectations and needs in the company. Managing these expectations can increase the probability of success of the project since stakeholders understand the benefits and risks involved in the project. (PMI, 2008) Thus, they can support the project actively and minimize potential negative impacts.

The only watch out for INACOL on this regard is that not all the stakeholders' expectations and needs should be equally managed. There is always a prioritization that can be taken into account before wearing out with excessive rework.

According to PMI®, the recommendation is to map stakeholders' expectations into to vectors: interest and power. Depending on the combination interest x power, there is a specific strategy that can be used to manage stakeholders' expectations: i) Monitor (minimum effort), ii) Keep satisfied, iii) Keep informed and iv) Manage closely.

**TABLE 16 - POWER/INTEREST MATRIX**



Source: PMBOK®, 2008 pg 216

The Project Manager is the person in charge of managing the stakeholders' expectations. An appropriate management minimizes the risks of not fulfilling the project's objectives due to misunderstandings among stakeholders.

**QUESTION 15 E**

Measuring and controlling risks through quality standards and control of the schedule is not enough. Periodic analysis of the project status in terms of risks should be done to ensure initial risks continue to be mitigated and under control.

Recommendation is to use the presented templates in question N13 and constantly monitor risks in the Risk matrix to avoid risks to increase their tolerance levels.

**QUESTION 16**

When closing a project, the project manager must review all of the information coming from the closing of the previous phases to be sure everything is complete and that the project has fulfilled its objectives. At INACOL, closing is determined by the presence of Acts, the work Act which contains the quantities contracted and their costs, the Contractual Act containing all of the tests and metrics applied to materials, machinery, supplies and final product, certifications and maintenance and the certification of the execution of the project.

According to PMI®, closing should not only include the documents that result from the activities of the project and the closing documents, but also historic information. This information refers to the lessons learned during the project in order to be able to transfer the acquired knowledge and use it in future projects. Thus, mistakes are avoided and projects become more efficient. It is important to document historic information throughout the project, it is recommended to do it at least at the end of each deliverable.

INACOL should include the following template in order to enrich its closing process and register the lessons learned during projects and apply them in future ones.

**TABLE 17 - LESSONS LEARNED**

<b>Lesson Number:</b>	<b>Name of the lesson learned:</b> The name and number both help identify the lesson learned
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PROCESS	ACTION
Initiation <input type="checkbox"/> Planning <input type="checkbox"/> Execution <input type="checkbox"/> Control <input type="checkbox"/> Closing <input type="checkbox"/> General <input type="checkbox"/>	<ul style="list-style-type: none"> <li>▪ The process refers to the phase in which the lesson is presented. When the lesson is applied during the whole project, use the “General” box.</li> <li>▪ The action refers to the activity where the lesson took place.</li> </ul>

<b>Which was the result?</b>
Specify the consequences of the action that was taken.
<b>Which is the lesson learned?</b>
The lesson is the result of good or bad decisions taken during the project and that will help for improvement strategies in project management.
<b>How can this lesson be used in this project?</b>
Mention the strategy to be taken during the rest of the project according to the lesson learned.
<b>How can this lesson be used in future projects?</b>
Mention the strategy to be taken in future projects according to the lesson learned.

Who should be informed about this lesson learned?		
Executives <input type="checkbox"/>	Project Manager <input type="checkbox"/>	Project Office <input type="checkbox"/>
Others <input type="checkbox"/>	Who?	

How should this lesson be communicated?			
E-mail <input type="checkbox"/>	Intranet/Website <input type="checkbox"/>	FAQ <input type="checkbox"/>	File <input type="checkbox"/>
Other <input type="checkbox"/>	How?		

*Note:* Created by C.Rincón, 2012

### 3. RESEARCH FINDINGS

#### 3.1 RESEARCH FINDINGS

The PMBOK® provides guidelines in the project management profession and describes the processes that should take place in every project. The following matrix contains the status of INACOL’s processes based on PMI®’s standards.

**TABLE 18 - INACOL’S STATUS MATRIX**

INACOL According to PMI®					
Knowledge Areas	Initiating Process	Planning Process	Executing Process	Monitoring & Controlling Process	Closing Process
Project Integration Management	Develop Project Charter N	Develop Project Management Plan N	Direct and Manage Project Execution Y	Perform Integrated Change Control N	Close Project or Phase C
Project Scope Management		Collect Requirements Y Define Scope C Create WBS N		Verify Scope Y Control Scope Y	
Project Time Management		Define Activities C Sequence Activities C Estimate Activity Resources N Estimate Activity Durations C Develop Schedule C		Control Schedule Y	
Project Cost Management		Estimate Costs Y Determine Budget Y		Control Costs Y	

INACOL According to PMI®					
Knowledge Areas	Initiating Process	Planning Process	Executing Process	Monitoring & Controlling Process	Closing Process
Project Quality Management		Plan Quality N	Perform Quality Assurance Y	Perform Quality Control Y	
Project Human Resource Management		Develop Human Resource Plan C	Acquire Project Team Y Manage Project Team Y		
Project Communications Management	Identify Stakeholders C	Plan Communications N	Distribute Information Y Manage Stakeholders Expectations Y	Report Performance Y	
Project Risk Management		Plan Risk Management N Identify Risks N Perform Qualitative Risk Analysis N Perform Quantitative Risk Analysis Y Plan Risk Responses N		Monitor & Control Risks C	
Project Procurement Management		Plan Procurements Y	Conduct Procurements Y	Administer Procurements Y	Close Procurements Y

Y = YES

N = NO

C = CHANGE

Note: Adapted from “Project Management Body of Knowledge (PMBOK)”, by C.Rincón, 2012



The processes marked with a “C” are currently carried out in project management at INACOL, but require changes to be made in order to fulfill PMI®’s standards. The processes marked with an “N” are missing in INACOL’s project management methodology according to PMI® standards. Thus, the suggestion was to include them in the company’s project management methodology.

50% of the project management processes carried out at INACOL is aligned with PMI® standards. They can continue to be carried out the way they are, however slight changes were proposed for some of them in order to improve their effectiveness and make the inclusion of new processes easier.

Many of INACOL’s processes, especially those regarding the project’s time management, such as the definition of activities and sequencing of activities, among others , are carried out individually by departments; therefore, there is not a document that narrows down the information to one document. It is important to consolidate the information of the whole project in order to have a better control of the project’s timing, resources and scope.

In general, according to PMI® INACOL requires standardization and more formal documentation of its processes to make them transparent and verifiable. Documents are evidence of the formalization of processes, of the closing of deliverables, and they make the controlling and monitoring process easier, therefore INACOL should be aware of the benefits they add to their processes.

Since the PMBOK® provides guidelines and not a methodology; a project management methodology based on PMI® standards is suggested to ensure the required standardization and documentation.

This methodology was designed for INACOL, but it can be used by any company or individual working on project management.

## **4. CONCLUSIONS**

### **4.1. CONCLUSIONS**

The PMBOK® provides project management guidelines by describing processes that should be carried during project management, but it is not a methodology. By proposing a tangible methodology based on PMI® standards, INACOL can easily adopt these standards in its current project management methodology and achieve the desired transparency and ethical advantages.

PMI® standards applied in public infrastructure projects could reduce corruption in this sector in Colombia due to the transparency provided when following these standards. PMI® guidelines seek constant documentation in each one of the project's phases. This documentation gives clarity to the project's stakeholders as they have the possibility to access this data for verification and tracking purposes no matter the stage of the project.

If there is presence of any illegal action or unethical behavior in the project it can be easily tracked and identified. For this reason, the fulfillment of these standards in any project management methodology guarantees the absence of corruption and illegal actions; and thus, gives confidence to the project's stakeholders regarding different aspects. In this particular case, the government is one of the stakeholders, and being a public entity it should be accountable to society.

When applying PMI® standards to project management, the stakeholders have the support of a globally recognized standard that gives them confidence and tranquility. Additionally, PMI can be translated to ethical behavior and good practices and finally, the whole project becomes 100% verifiable.

### **4.2. SUGGESTIONS FOR FUTURE RESEARCH**

After having a project management methodology that follows PMI® standards and that provides global recognition for transparency and good practices, INACOL should concentrate its efforts on obtaining certifications for its project managers.

This certification ensures that project managers are ready to meet the demands of the projects across the globe. Project managers can obtain their certification regardless of their education level. There are currently six credentials available to meet all the educational and skill levels. These credentials have been rigorously developed, globally accredited and are easily transferable across countries and industries. (PMI, n.d.)

The following are the six credentials currently available at PMI®:

- Certified Associate in Project Management (CAPM)®
- Project Management Professional (PMP)®
- Program Management Professional (PgMP)®
- PMI Agile Certified Practitioner (PMI-ACP)®
- PMI Risk Management Professional (PMI-RMP)®
- PMI Scheduling Professional (PMI-SP)®

(PMI, n.d.)

According to the PMI Pulse of the Profession study in 2010, a better project performance can be achieved in organizations with more than 35% PMP certified project managers. And according to a PricewaterhouseCoopers survey in 2007, 80% of high-performing projects use a credentialed project manager. (PMI, n.d.)

These statistics portray the importance of having certified project managers in the company's projects. For this reason, it is important that INACOL becomes aware of this fact and begins to encourage its project managers to get certifications or hire already certified project managers in order to improve the performance in its projects and ensure the capacity of the project manager of handling the project.

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