

## **Implementation of a Project Management Office in a Public Sector Organization: A Case Study Involving a Sanitation Institution**

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**ABSTRACT:** This paper proposes recommendations for improving the implementation of a Project Management Office (PMO) in a government organization. Such organizations can face uncertainties due to unpredicted and unexpected environmental events. The methodology used here was based on review of the literature, experience of the authors, and analysis of the process to be employed to create a PMO in the Department of Municipal Water and Sewage Systems (SEMAE), Brazil. This study aims to show how implementing a PMO can ensure proper management of strategic projects related to conservation of water resources. The PMO plays an important role in the implementation of strategic projects for public sanitation. This study also shows that the effectiveness of actions taken by the PMO is strongly influenced by how this process is implemented.

**Keywords:** Project Management Office; Sanitation Institutions; Water

**JEL Classifications:** M20

### **1. Introduction**

Water increasingly is an essential natural resource for the survival of humanity. Enterprises face new challenges in addressing water-related issues. These include shortages, declining quality and increasing demand. Worldwide, corporations are facing water-related risks, higher quality standards, growing interest of local communities in natural resources, and a growing number of research activities related to water use. Confronted with these challenges, organizations producing for large water users are beginning to realize the need for greater pro-activity and expansion of strategic actions for water management. This is also highlighting the importance of informing stakeholders and the public (Pacific Institute, 2007).

The World Resources Institute (WRI) performed expert analysis on biogeophysical sustainability, volumes of water available, and the effects of multiple uses. This analysis forecast a crisis unprecedented in human history. This crisis threatens the survival of species, including humans. These reports show significant change in mechanisms and legislation on water use, impact assessments and water availability per capita. They also show increasing awareness of the need for an integrated waste management system and the importance of contingencies to mitigate environmental disasters.

For the World Bank (1998), water resource management is a serious international issue. The United Nations and other development agencies are also concerned about the growing problem of water scarcity and the need to protect the environment and its natural resources. The Canadian Department for International Development, the French Ministry of Cooperation, the German Federal

Ministry for Economic Cooperation and Development, the U.S. International Development Administration and the United Kingdom Department for International Development have all developed strategies related to water resources as part of their strategies for foreign assistance. Thus, management of water resources has become the greatest challenge facing humanity during the twenty-first century.

Therefore, the major strategic project to be built in the coming decades needs to attend to multiple use of water as a human supply, industrial production, irrigation, energy production, and biodiversity of flora and fauna, without jeopardizing the sustainability of life. All these aspects must be addressed ensuring natural environment protection.

However, business environment is facing strong pressure from different segments of society, given the complicated challenges posed by an impending water shortage. With the growing need for new participants in this intricate scenario of tough competition for water, water-intensive industries need the most innovative concepts to build business strategies. These strategies should develop activities, projects and programs for proper management of sustainability and business. Thus, new strategies should meet business goals and environmental preservation.

Water is a limiting factor to the social, economic, cultural and environmental development when analyzed in a regional context. Therefore, water scarcity can affect the performance of companies, mainly those that depend on water for production processes. Thus, the development of projects aligned to these strategies may create new relationships among organizations and their customers, suppliers, shareholders, governments, public institutions, communities, and especially the market.

Brazilian Water Resources National Policy, established by Law 9433 of January 8, 1997, defines in its Article 1, section III, that "in situations of scarcity, the priority use of water resources will be human consumption and animal watering". Therefore, other water users should only have access to this resource after humans and animals being served. Among these water users are the sectors of industrial production, irrigation, and energy production. In addition, priority should not be given to such users when natural ecosystems, flora and fauna are in danger, that is, sustainability of life must be given priority in such cases.

With the need for new stakeholders to participate in this scenario of strong competition for natural resources, pressure on sanitation companies have grown continuously. Thus, mobility and speed in the execution of projects related to public water supply are required. Pfeiffer (2005) says, however, that "development projects, by their nature, tend to have an early high degree of uncertainty due to the following reasons: different perceptions of stakeholders about the issues to be solved; problems with participation, involvement, responsibility or rejection of an intervention; difficulties to manage the project due to external interference or influence; limited organizational and managerial capabilities of public organizations; intangible goals; difficulties to define steps to achieve goals considering resources and time needed.

Developing public projects of great complexity requires more time for implementation and great abilities to manage them. For Pfeiffer (2004), typical instruments of planning, procurement, monitoring and control are not as effective as projects developed by private initiative.

Considering the above mentioned, the main problem focused on this paper is the scarcity of water and its effects on economy, society and environment, and how this process occurs. Human consumption of water faces growing conflicts related to economic uses of this resource, leading to political, bureaucratic, legal and budgetary problems. All these factors inhibit the implementation and management of strategic projects in governmental sanitation companies.

The basic hypothesis of this study is that the Project Management Office (PMO), when properly implemented, helps government organizations manage their sanitation projects. Environments subjected to rapid and uncontrolled urban growth as well as onslaughts of political interest and economic power are especially in need for sanitation projects. Such projects can also help regions strongly affected by global warming, obsolete models of strategic planning and lack of new stakeholders.

## **2. Project Office**

PMI defines a project as "a temporary endeavor undertaken to create a unique product, service or result." Kerzner (2006) complements it stating that "a project is a venture with a well-defined objective, which consumes resources and operates under strict deadlines, budgets and quality

standards". He says "business environment is finally recognizing the importance of project management and its impact on profitability."

The main purpose of PMBOK is to provide an overview of the best practices employed in project management. These practices are recognized and applicable to most projects most of the time. However, government projects require closer attention due to their peculiar nature. In such cases, not only specific conditions of the organizations should be taken into account, but also the nature of the projects. According to Pfeiffer (2004), government projects have the following characteristics: they are created from the need to solve major problems in society; there is no business competitiveness; and they have to deal with a very complex structure of stakeholders.

However, PMBOK best practices can be adapted for public sector projects as well, because these practices follow a common line.

Peculiarities of a project determine its development process. Each stage is characterized by the completion of a particular work or service. The product or service delivered by the project is presented to the client.

Vargas (2005) states that the PMO is a central place to lead, plan, organize, control and finish project activities. It has the following goals: gather information; establish project policies and procedures; be a support center for the team; physically represent the project; and keep the team united.

Project Management Offices work as a center of competences. Thus, their implementation is essential to consolidate a culture of project management in organizations. According to Carvalho (2009), a PMO can assume different configurations and functions. It should focus on the application of concepts related to project management, helping companies to improve their strategies. The implementation of a PMO aims: to focus on projects and programs; to manage portfolios of projects; to track and generate information on the project process; to provide professional help and advice; to offer and provide management tools; to develop methodologies; to plan corrective actions; to develop and provide training on project management; to promote projects; to support data and project files.

According to Valle and Soares (2010) "in corporate literature, there are numerous contributions of different authors on PMOs (Block and Frame, 1998; Dinsmore, 1999; Bolles, 2002; Crawford, 2002; Englund et al., 2003; Kendall and Rollins, 2003; Hill, 2004; Letavec, 2006)... In The Academic Field, studies are more Recent (Dai and Wells, 2004; Hobbs and Aubry, 2007; Hurt and Thomas, 2009)".

Crawford (2002) classifies PMOs as Control - focused on controlling a single program or project; Sector -Departmental - located in one sector, department or administration; Strategic - located at the highest level of the company, thus having wider perception and scope of it.

Dinsmore (1998) proposes five evolutionary PMO models. They can be a basic sector to help project control or even a department dealing with all projects managed by the organization. The five models are: Autonomous Project Team (APT), Project Support Office (PSO), Project Management Center of Excellence (PMCOE), Program Management Office (PrgMO), Chief Project Officer (CPO)

Casey and Peck (2001) suggest three types of PMO: Weather Station, Control Tower and Resource Pool.

According to Valle and Soares (2010) the PMOs work as a guide and have didactic character, but they have not been very useful in practice, because of their various ways of implementation. The organization profile must be taken into account when choosing a type of PMO to be implemented. Each organization has its own management strategies, types of leadership, and specific projects, requiring a PMO that adapts to its needs.

PMOs should help organizations in planning strategic activities, not focusing on a specific client. As a formal organizational structure, a PMO has several purposes: support the project manager; provide training for teams involved in projects; use software to control project; establish methods, standards and forms; be an excellence reference in project management; and assume responsibility for project results.

### **3. Methodology**

The methodology used here was based on review of the literature, experience of the authors, and analysis of the process to be employed to create a PMO in the Department of Municipal Water and Sewage Systems (SEMAE), Piracicaba, SP, Brazil. Currently, a PMO is implemented at SEMAE to

preserve water sources and work with sewage systems. It aims to support public systems of treatment and distribution.

The president of SEMAE authorized us to use the organization as a case study. Data was collected through observations in situ and interviews with managers of the following departments: Planning - DEPLAN; Department of Operation and Maintenance - DOM; Hydraulic Works Department - DOH; Department of Sewage Treatment - DTE; Department of Production and Water Treatment – DPT; and Department of Civil Construction and Transportation Workshop - DCCOT. The research was also conducted in external units responsible for strategic projects: Capim Fino Water Treatment Station; and Sewage Treatment Station in Ribeirão Piracicamirim.

#### **4. Relevance of the Study**

Most sanitation companies are municipal authorities working with state and private organizations. However, these companies still do not have a wide dissemination in Brazil. Pfeiffer (2005) states that municipal authorities are under great political influence due to pressure of local stakeholders. Despite that, municipal authorities have large autonomy in finance, management and technique.

This issue has not been studied in details yet. Thus, it is difficult to find review of literature about it. Municipal authorities established themselves with own resources and inadequate political support. However, the experience learned from this process should be taken into account. Projects in sanitation companies are still implemented following traditional models. In these models, civil engineers work as project managers, but they do not apply the best practices developed in private companies in the last decades.

#### **5. Case Study: Municipal Water and Sewage Department - SEMAE**

Figure 1 shows a flow chart of project processes in the organization. The flow of information shows that a project starts when the president authorizes political and technical demands. In case of disapproval, the initiative is filled and restarted in the future. Decisions in the public sector are usually based on external suggestion of stakeholders. It reflects low strategic levels in the political sector.

According to Prahalad (2005), "in many companies, strategy is essentially the incremental tactical planning punctuated by heroic 'strategic' and often poorly designed investments. The risk is that devaluation strategy leaves many companies disoriented in a world of turbulent seas and storms". It is a current thought in the public sector, mainly when investment is based exclusively on political interest.

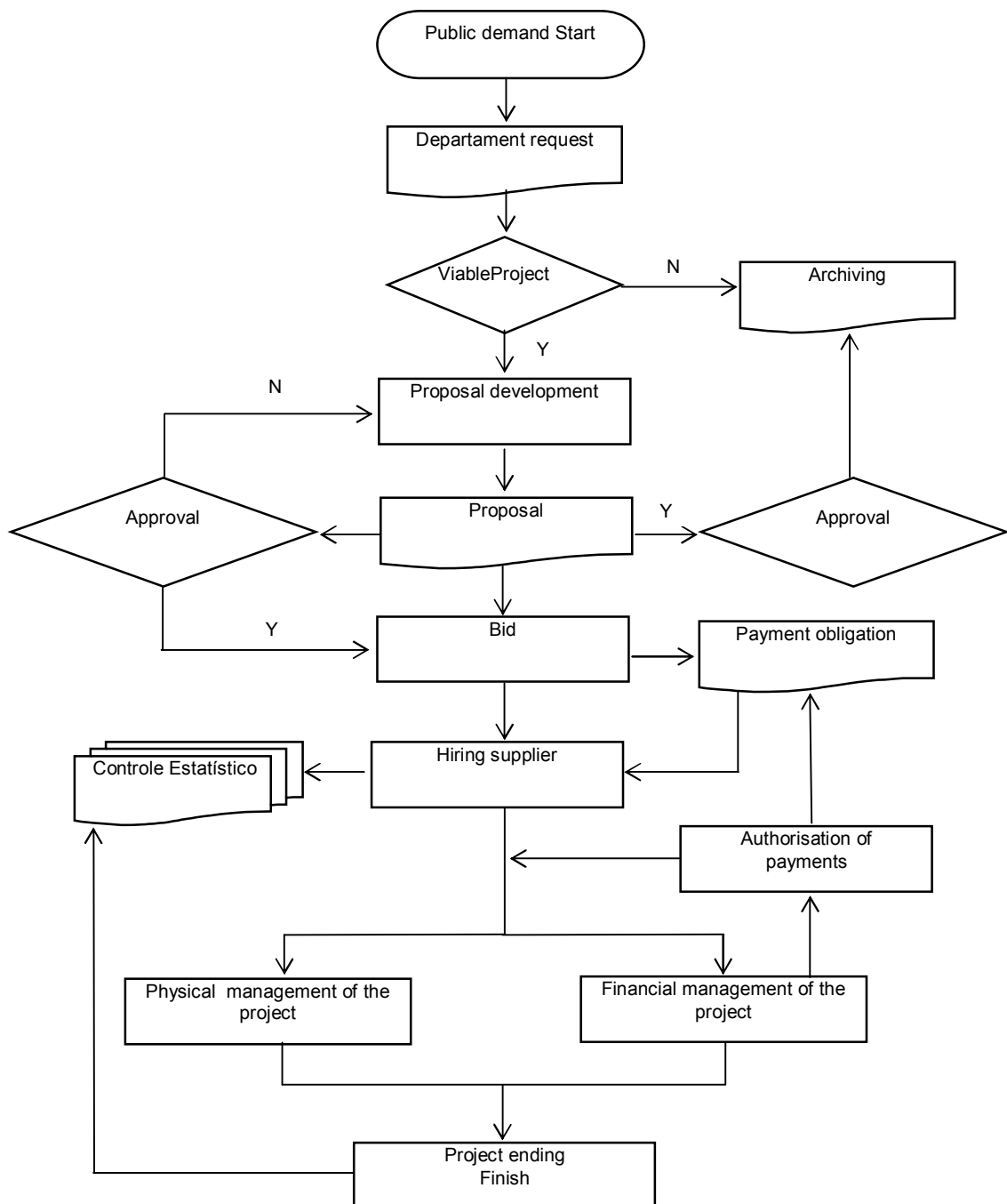
SEMAE uses a simplified project management system. Poor training of inspectors of work and engineering departments causes problems in budget, deadline, and quality. In 2009, 73% of projects experienced delays from the beginning to its completion, and 48% were completed with contract additions in their bid values. Ponte do Caixão Sewage Treatment Plant (ETE) is a remarkable example of such problems. It resulted in several controversies since its implementation and beginning, eventually being suspended.

Ponte do Caixão Sewage Treatment Plant was a strategic project aiming to reduce pollution in the hydrographic basin of Rio Piracicaba. It will be used here as an example for the analysis of project management processes at SEMAE. We will analyze problems that occurred during the construction and failures in the project management. We reached the following conclusions:

- The construction area for ETE was decided by the chief executive, not taking the surroundings into account. The region is a center of urban development, with ample commercial and residential occupation processes. Thus, the chief's decision caused extensive discussions, but there was no agreement on changing the construction site. Administration claims lack of available land in the region to build a sewage treatment plant. However, Sewer Master Plan (PDME, 2010) provides six possible areas;
- The treatment system caused unpleasant smell of sewage affecting residents surrounding the plant. It was due to a lack of technical criteria while choosing the treatment system.
- The bidding occurred routinely. As usual, questioning of competitors caused major delays in public tenders. Law 8.666/92 and its complements establish rules for public tenders. However, such rules leave gaps that inhibit the progress of the bids and cause constant halts and delays in public projects and works;

- As work began, the construction company detected geological problems regarding the underground part of the site. Such problems should have been detected in advance by the projects. Thus, initial project had to be modified increasing estimated costs.
- The winning bidder offered a price below that originally planned, which subsequently led to the decline of the bidder for the work;
- It was necessary to perform a new bid to resume work, causing a 10 months delay.

**Figure 1. Project Processes Flow Chart**



All these construction processes to build Ponte do Caixão Sewage Treatment Plant clearly show flaws in project management since its implementation:

- Absence of a stakeholder management plan;

- Absence of a project plan;
- Failure to set goals for execution techniques and processes in sewage treatment;
- Management integration did not connected the different forces driving the project;
- Lack of communication between public administration and the population to choose the construction site;
- The need for a management risk is not mentioned during the implementation project;
- It is not required that the winning bidder have a project manager;
- The organization does not have a project management;

One of the reasons identified as causing project failure was the inappropriate choice of the site for the sewage treatment plant. There were other areas in the region; however, rapid population growth requires new proposals for urban planning in cities with strong economic growth processes. Debates on global warming get stronger every day. Thus, environmental issues must be linked to strategic planning of cities.

Table 1 presents the development of the project management at SEMAE in the period from 2005 to 2009. Out of a total of 47 projects, 40.42% were completed within the period stipulated in the bidding document; 53.19% completed with a delay of more than two months; and three projects were halted after its beginning, representing 6.39%. Thus, among the projects considered strategic for environmental development of cities, which are functions of SEMAE, 59.6% do not meet requirements of time management.

**Table 1. Project Management from 2005 to 2009**

YEAR	Within	Out	Not complete	Total
2005	3	4	0	7
2006	3	4	0	7
2007	2	6	0	8
2008	2	A	3	6
2009	9	10	0	19
Total	19	25	3	47
(%)	<b>40.42</b>	<b>53.19</b>	<b>6,39</b>	<b>59.6</b>

## **6. Proposal for a Project Management Office**

We consider the PMO proposed by SEMAE the most suitable for public companies in basic sanitation, given their characteristics and specificities. Thus, with appropriate adjustments to each case, this methodology can be applied to other similar institutions.

### **6.1. Type of PMO**

The PMO must report to the administration of specified projects. These projects need to respond to municipal policies for water resources and environmental education, included in the Water and Sewage Master Plan. It will be located in the Presidency of SEMAE and must meet the political-strategic planning of the current Municipal Administration. Therefore, it will be a level 3 PMO.

### **6.2. Services of PMO and Work Team**

The PMO will be involved with all projects in the Water and Sewage Master Plan, being responsible for:

- 1) Development of methods and procedures
  - Developing methodologies and standards
  - Implementing communication and reporting plan
  - Implementing systematic management of stakeholders
  - Creating contingency plan and risk analysis
  - Preparing management plan for changes

- 2) Infrastructure management
  - Promoting appropriate structure, with equipment, software and all relevant aids.
  - Providing tools: metrics, standards and systems.
- 3) Technical Management
  - Promoting system audit of ongoing projects
  - Providing technical support
  - Creating technical database
- 4) Human Resource Management
  - Hiring staff members, third parties and / or partners
  - Training and developing project team
  - Implementing career development plan
  - Implementing systematic evaluation of performance
- 5) Integration
  - Administrating functional interfaces among the projects
  - Managing portfolio
  - Integrating with policies of the organization
  - Improving management processes

The president of SEMAE must issue a Project Charter authorizing a PMO to begin the coordination of a project. By doing so, he assumes responsibility for results of the project.

Project teams placed at PMO will be permanent and must be trained to develop the important role they will play after the implementation of the PMO.

The PMO should allocate the following positions: four civil engineers, two sanitation engineers and a sanitation business administrator, which will act in the PMO project activities. There will be no need to hire new staff. Table 2 shows the composition of technical features of the proposed PMO.

**Table 2. Composition of technical features of the proposed PMO**

Duties	Civil Engineer	Sanitation Engineer	Administrator
Coordination	A		
Methods and procedures development	A	A	A
Infrastructure Management	A	A	A
Technical management	A		
Human Resource Management			A
Integration Management			A

### **6.3. Organization chart proposed with the implementation of the PMO**

The organizational structure proposed includes the following additional structures: a Project Management Office (PMO), and a Department of Environment (DMA). Figure 2 shows how the implementation of a new structure for project management will occur.

A Department of Environment and Strategic Studies (DMAEE) will be connected to the PMO. DMAEE will provide legal, technical and strategic support in issues related to environmental aspects in all strategic projects of the organization.

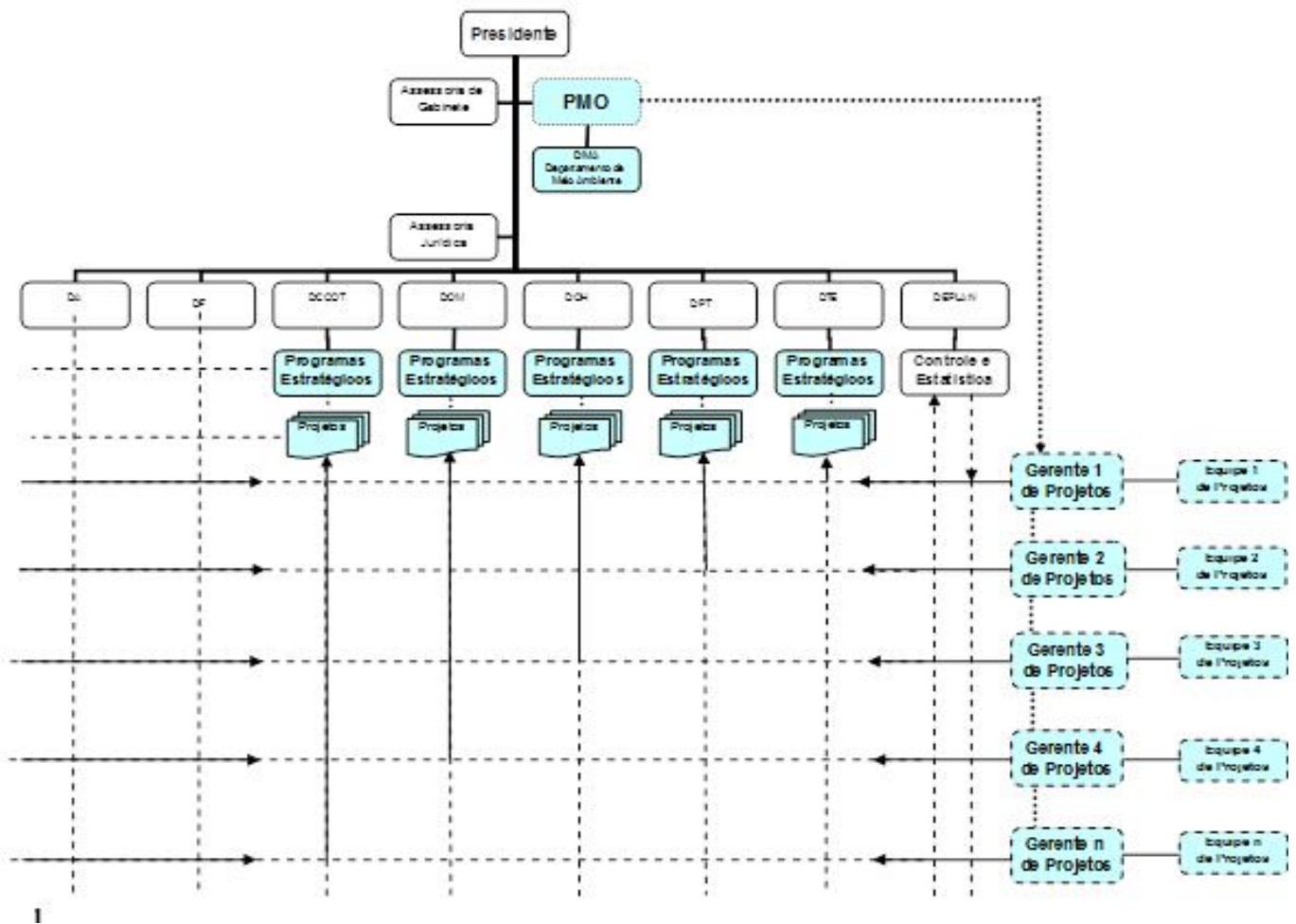
#### *Assumptions*

- Support and involvement of top management
- Physical infrastructure of 220 m<sup>2</sup>, hardware and software equipment, training and allocation of new employees.
- The PMO manager will be given responsibility and authority to act in the projects.

#### *Restrictions:*

- 50% of human resources and equipment to be used in the PMO must come from internal reallocation.
- Costs with the implementation of the PMO and acquisition of equipment are limited to R\$ 320,000.00 (about US\$ 144,000.00)

**Figure 2. Organizational chart proposed including the PMO**



**6.4. The following performance indicators will be created to evaluate the PMO:**

- Analysis of value added to all projects, comparing to projects developed before implementing the PMO.
- Project quality: the number of projects undergoing any type of change during execution, due to non-compliance and/ or feasibility, should be reduced from 40% to 20%. It should be done from the second year of implementation of the PMO.
- Project cost: bidding processes must comply with Law 8.666/92, thus offering few opportunities to change their costs during its execution. Therefore, we should increase from 90% to 95% the number of projects that meet expected costs. It should be done from the second year of implementation of the PMO.
- Deadlines for preparation and execution of projects: from the second year of implementation of the PMO, we should have only 20% of projects expiring deadlines imposed for completion.
- After the implementation of the PMO and the Department of Environment, 100% of projects aligned to the strategic planning of the organization should have their procedures for planning and executing in accordance with SEMAE "Manual for Environmental Procedures". This manual will be prepared by the Department of Environment.
- PMO and project managers of SEMAE will prioritize the Department of Environment. It will receive support in providing technical, human and legal resource to comply with environmental legislation in all projects.
- The Department of Environment must follow SEMAE guidelines for strategic planning, promoting welfare of population through projects focused on the sustainable development of the city.



h) The Department of Environment should provide training of staff focusing on environmental ethics and conservation of natural resource. Thus, the department will contribute to create and employ projects for continuous improvement.

## **7. Conclusions and Recommendations**

In the public service environment, there are three relevant stakeholders that may cause resistance to changes proposed in this paper: the civil service, the Executive and Legislative Branch. All changes in the civil service causing variance in employees' salary and benefits should follow the system. In the Executive Branch, the mayor should be convinced that a PMO, along with a new methodology for management project, can bring positive outcomes to population and political gains. Opinions of the City Council will depend on its political relationship with the Executive Branch.

Difficulties may also arise internally in sanitation companies like SEMAE. It happens due to changes that cause radical transformation in a bureaucratic routine already consolidated in processes of project management. Resistance to the implementation of a PMO in functional management structure should be accompanied by an extensive process of training in project management. Therefore, employees should be properly informed about possible changes derived from these processes.

The Legislative Branch is responsible for authorizing changes in administrative structure of public organizations. This process may open wide debates, because it involves the creation of a new municipal structure to be added to an existent one.

SEMAE needs to implement a new administrative structure to turn it into a public organization with a project-oriented structure.

The case study shows that the project management of SEMAE is far from the emerging reality that occurs in private sector companies. Besides, it still fails in following the best practices suggested by the Project Management Institute (PMI).

Strategic projects at SEMAE are treated identically to those non-strategic. Thus, important projects for urban development fail. It creates obstacle to cities that want to be prepared to make the twenty-first century a period of relevant social changes in Brazil.

However, based on the history of SEMAE project management, there is a dimension that should be used in this debate: the argument that the implementation of a PMO and a new project management methodology, based on the best practices suggested by PMBOK, can bring more efficient and effective outcomes for municipal sanitation policies. The argument that there will be a better use of public resources, with no need for large investments in physical infrastructure and new employees, may pave the way desired.

The prioritization of sanitation projects should take into account variables that range from alternative sources available in the region, internal demands of the municipality, and requirements by external stakeholders for waste collection and sewage treatment. This prioritization should also take into account availability of resources, influence of sanitation issues on public health and urban planning. Thus, all aspects related to the city should be aligned with interests of local people involving sectors of economy, politics, environment, administration and urban development.

We highlight five main points that represent risk for public water supply. They should be treated as belonging to strategic projects in the sanitation sector:

1. The *water source* is an aspect to be given more attention, because public water supply depends on it. The quantity and quality of water in a source determines the quality and regularity of supply. Thus, projects on water recovery, conservation and protection should be considered strategic for public supply.
2. The *growth in demand* for water is proportional to population growth, awareness of users, economy of the municipality and levels of local economic growth. Industries are the largest consumers of water, which represents a risk factor for public supply. Water sources of the municipality must support growth through development of projects to find new surface or underground water sources.
3. *Water distribution network* and reservoir systems in the urban area ensure public water supply. Besides, they are a guarantee against the risk of water shortages during drought periods, maintenance of pipelines, pumping stations and water abstraction stations. Furthermore, levels of

water loss in the public network should be taken into account, because they increase costs in electrical power, chemical products, and investments in infrastructure.

4. The *levels of domestic and industrial sewage treatment* indicate quality standards of water in the hydrographic basin. High levels of pollution make it impossible to use water for public supply, causing problems especially in drought periods. Therefore, projects for sewage treatment must be aligned with the strategy of the sanitation company. SEMAE treats 36% of municipal sewage.

5. *Urban development* means better socio-economic levels, improvement in quality of life, and higher *per capita* consumption of water.

Therefore, municipal water management involves complex issues and actions to meet the demands for water. Thus, it is very important to include risk management in strategic projects, in all its dimensions, including those related to other municipal departments.

It is also important to start the implementation of a PMO with the most essential and useful elements. By doing so, stakeholders can perceive the usefulness and benefits of a PMO.

Regarding the process of change, Schnider, Brief and Guzzo (1996) present six steps to Total Organization Change - TOC:

- Ensures that the organization is prepared to handle a major organizational change.
- Be aware that proposed TOCs incongruent with existing organizational climate and culture of Amounts require tremendous time and effort.
- Plan the TOC in the detail much of the possible.
- Particularly pay close attention to the organization's reward systems in order to the ensure employees are focusing on competencies and their energies implementing and sustaining the change.
- Recognize that, for the change to be sustained, resources must be allocated for maintenance as well as implementation.
- Monitor the effectiveness of the TOC. Recognize the change will need to be adjusted over time.

The development of new skills and abilities may consider the following issues presented in Table 3.

**Table 3. Core competencies and staff**

<b>Core Competencies</b>	<b>Staff</b>
Engineering and Technology	Methodologies and Project Management, Leadership and development of project teams
Administration and Human Resources	Development of project teams and leaders
Finance and Accounting	Analysis of financial viability of projects
Supervision of works	Project management and development
Data Processing Center	Development and implementation of an Information System for Project Management
Law	Creation of posts of Project Managers

With the implementation of the PMO, it was possible to notice the first positive outcomes in the company studied. The activities employed by the PMO enabled better guidance, planning and control over the projects developed by the company. Changes resulted in the following benefits:

- Involvement of top management;
- Greater control and unification of the management method;
- Defining roles of all staff involved in the processes of implementation;
- Quality assurance in project management;
- Clear communication processes;
- Centralization and dissemination of information about the best management practices and lessons learned;
- Standardization of procedures
- Support at all levels;
- Alignment of implementation activities aiming to improve project results.
- Centralized control of indicators.

Therefore, PMOs can be important elements to enable strategic projects in public sanitation companies. Besides, we conclude that the efficiency of actions developed by the Project Office is strongly influenced by its implementation process.

This study proposes changes in SEMAE aiming for a project-oriented structure. Every public organization should consider Tom Peters' proposals, because he presents gradual and sectorial changes without over jumps.

However, SEMAE is located in a city of São Paulo with the highest rates of urban growth. This city is experiencing a massive installation of new multi-sectorial and transnational corporations. Thus, it may expect a huge expansion in its urban area as a result of rapid population, economic and technological growth in the coming years.

From this perspective, this study suggests continuity in the works proposed here aiming to make SEMAE a project-oriented company. As a consequence, it can decide to promote portfolios to expand its scope of actions in the management of environmental scale projects. Thus, basic sanitation can contribute to sustainable development.

A final expectation of this study is that SEMAE assume its position as a project-oriented company in the near future. This is the mission of SEMAE as a public sector company established to promote quality of life to the population of Piracicaba aligned with the urban environmental demands of the twenty-first century.

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