



Construction Management Process from the point of view of the Public Owner

Case study in the technical office of the Rectory of the
University of Lisboa

João Pedro Neves Correia

Extended abstract

Supervisors: Prof. Dr. Vítor Manuel Azevedo Leitão
Prof. Dr. Nuno Gonçalo Cordeiro Marques de Almeida

Examination Committee

Chairperson: Prof. Dr. João Pedro Ramôa Ribeiro Correia
Supervisor: Prof. Dr. Nuno Gonçalo Cordeiro Marques de Almeida
Member of the Committee: Prof. Dr. Vítor Faria e Sousa

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João Pedro Neves Correia

Instituto Superior Técnico, University of Lisboa, Av. Rovisco Pais 1, 1049-001 Lisbon, Portugal

Corresponding author's E-mail: joao.pedro.correia@tecnico.ulisboa.pt

Abstract

This thesis aims to emphasize the importance of systematizing the processes in modern construction management, and that the owner, be it public or private, should not consider this topic secondary.

This situation was analysed during the internship in the technical office of the Rectory of the University of Lisboa. In this office it was possible to follow the different phases of a project starting from the preparation of all documents required at the tender phase up to the end of the construction phase and provisional acceptance. The existence of several projects occurring at the same time, as well as a certain repeatability in some procedures makes the purpose of this thesis real, and with direct application.

After studying the relevant literature it was possible to understand how the processes were executed, thus connecting what we saw on site to what was learned from reading articles, standards or specialty books. The documentation which governs the Rectory such as the statutes of the University of Lisboa, where what is done in the various departments is made explicit, was central to the correct systematization of processes.

The main objective of this thesis is that of fostering, within a public sector owner, improvements of the construction management processes. Some of the proposals made during the course of the internship may already be considered as having been accepted as part of the work process, the bulk of the proposals, namely the full systematization of the processes, has only now been finished, with the conclusion of this thesis and is, therefore, premature to see any results. This work allowed to have a real contact with what was learned during the civil engineering degree and was very enriching and helpful.

Keywords: Construction management, Public Owner, Rectory of the University of Lisboa, Project

I – Introduction

This thesis is the result of an internship at the Rectory of the University of Lisboa. The work was developed in a direct interaction environment with technicians working for a Public Owner, involving active monitoring activities of the phases traditionally covered by construction management, including the

development of projects, launching procedural documents and also the monitoring and supervision of construction works, as well as accepting them after the end of the warranty period. Viability studies, financing and activities of maintenance/operation are excluded from the scope of this work.

II – Basic knowledge

Before proceeding to the description of what was done, it is important to express some of the main aspects of construction projects.

The main stages of a construction project considered in this thesis are:

- Design;
- Construction;
- Operation.

The project process groups are:

- Initiating;
- Planning;
- Executing;
- Monitoring and Controlling;
- Closing.

And, the knowledge areas are:

- Integration;
- Scope;
- Time;
- Cost;
- Quality;
- Human Resource;
- Communications;
- Risk;
- Procurement;
- Stakeholder;
- Safety;
- Environmental;
- Financial;
- Claim [1], [2], [3].

III – Case studies

As mentioned above this dissertation is the result of an internship at the technical office of Rectory of the University of Lisboa and the following case studies were selected for study:

Case study A - Refurbishment of the building of the Rectory of the University of Lisboa.

The rehabilitation, of the building in figure 1, was specially made because of the following factors:

- Natural degradation of the building, marked by excessive function changes of the existing spaces, with the introduction of more and more services;
- The need for refurbishment of sanitary facilities (the ones from Aula Magna had been rebuilt previously);
- Centralisation of the services of the former Technical University of Lisbon in the same building;
- Removal of most of the files due to the increasing computerization of the system. These new spaces will serve for the introduction of new services in the building;
- Use of the areas with natural light for the creation of new offices;
- Application of fireproof doors due to new regulation requirements.



Figure 1 Case study A

Case study B - Refurbishment of a building of the Instituto para a Investigação Interdisciplinar of the University of Lisboa.

This case study aims to remodel and adapt the building spaces of Instituto para a Investigação Interdisciplinar of the University of Lisboa, present in figure 2. The major objective of this project is the adaptation to research laboratories, namely electronics, and technical areas and the administrative nature of the building concerned. Added to this, this rehabilitation will improve the building's conservation status, and will be optimized to use thanks to a functional upgrade. Finally it will also be made an adjustment considering the current legal context of security and work.



Figure 2 Case study B

Case study C - Technical consultancy and assistance (monitoring and inspection) during the construction of a building for the Faculdade de Farmácia of the University of Lisboa.

This case study aims to acquire design review services, security coordination work and supervision of the new building contract. The main objective of the contract to inspect, is to expand the college facilities through new construction of a laboratory building for teaching and research, expanding and continuing the main building that exists there, as we can see in figure 3.



Figure 3 Case study C

As mentioned before three different case studies were analysed, however in this chapter only case study A will be addressed as it is the most representative.

This case study had a maximum completion time of 210 days for the complete refurbishment of floor -1 of the Rectory, as can be seen in figure 4.

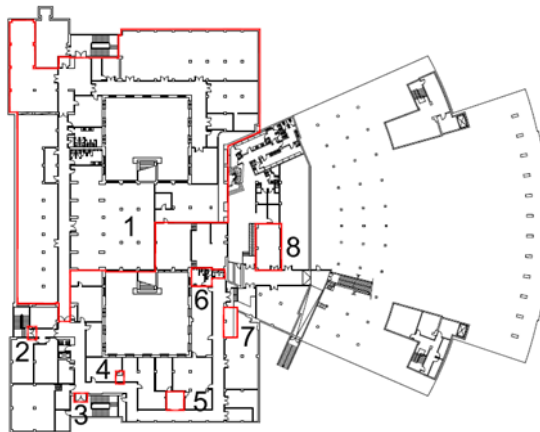


Figure 4 Area of rehabilitation of -1 Floor

The base value of this case study is € 774,000.00 (excluding VAT). This value is estimated by preparing a bill of quantities, where each item is associated to its correspondent price per unit.

There are two options when the contract exceeds € 150,000.00: public tender or a restricted tender with pre-qualification. This case study was a public tender since the contract did not present works of great specificity [4].

In this case most advantageous offer was determined by the following criteria: the price (objective) had 80% of the weight and the technical merit of the proposal (subjective) 20%.

The additional works or changes in relation to what was originally planned are recorded in the minutes of meetings and monthly progress reports.

Since the building is in full use during week days it was decided that works that could potentially cause a lot of noise should be undertaken on Saturdays.

There was a team of specialists that permanently surveyed the construction site in order to identify, quantify and qualify the types of risks in the project. The main risks identified were:

- Urgency in temporal terms;
- Rehabilitation work had to be done with the Rectory services fully operational, which implied that the work space, as well as noise were conditioned;
- If any events were scheduled in the Aula Magna and nearby the Rectory a 15 day compulsory stop of works in progress could be enforced if the owner believed it was the best option;
- Difficulty in removing construction waste from site;
- Multiple work fronts.

The three best proposals considering only the price criteria (and that represented 80% of the weight of the offer as stated before) can be seen in table 1. However, neither of this proposals were selected due to the other criteria that had to be considered (technical merit criteria).

Table 1 Values of the three lowest bids

Company	Proposal (exc. VAT, in €)
Contractor A	659 882,38
Contractor B	661 523,01
Contractor C	662 000,00

A remodeling work, usually, does not have as much environmental impact as if it was a root work. However, the waste produced by this type of intervention is not without volume, as can be seen in figure 5. The Plan for Prevention and Construction and Demolition Waste Management provides locals to take the construction waste or materials resulting from the project in question. Figure 6 shows the containers outside the building with accumulated waste, which was then sent by truck to the appropriate locations.



Figure 5 Demolitions in the project



Figure 6 Construction waste transport

V – Process Systematization and Stakeholders template

According to some of the technicians, the activities of the building area were outdated, and because of that, a revision of these activities was undertaken as can be seen in table 2. This allowed a more clear and sequential way of expressing the intervention.

Table 2 Old and new activities

Old activities of the building area:	New activities of the building area:
a) Support planning and design of new facilities	1) Support planning, including preparation of preliminary programs, new facilities or interventions in buildings and spaces of the University
b) Ensure the design and control functions of refurbishment, maintenance and repair	2) Ensure or promote the preparation of studies and projects
c) Organize and monitor the contracts process	3) Coordinate and monitor all phases of design procurement processes, review of designs, works and supervision and security coordination services and for the preparation of respective documents and submitting them to the approval of the competent bodies
d) Monitor and intervene in the development of urban plans of the areas that fall within the campus of the University	4) Ensure the management, supervision and monitoring of contracts until final acceptance of the works
e) Follow the University of built heritage registration procedures	5) Support the University of built heritage registration procedures
	6) Monitor the development of urban plans of the areas that fall within the campus of the University

Each activity has a responsible entity for its conclusion as shown in table 3.

Table 3 Entities involved

No of the activity	Entities involved
1	Technicians and coordinator of the area Organizational Units interested Rectoral Team (Dean) Possible external entity (drafting preliminary program)
2	Ensure the preparation of studies and designs (design developed within the technical office) - Technicians of the building area including architects and engineers from different specialties Promote the preparation of studies and designs (design elaborated outside the cabinet, only the procedures for that purpose within the cabinet) – all of the technicians including the coordinator of the area (preparation of procedural parts and launch of the competition) Security coordinator in design from outside or sustainability area
3	Technicians and coordinator of the area Dean
4	Technicians of the area Security coordinator at work from outside or sustainability area Inspection (Technicians of the area or from outside) Outside contractor
5	Technicians of the area
6	Technicians of the area

In table 4 we can see the inputs and the outputs of six new activities.

Table 4 Inputs and outputs of the new activities

No of the activity	Inputs	Outputs
1	Dean decision Existing documentation if the location is built Needs of the organizational units involved	Preliminary program Temporal planning for following phases/ processes
2	Existing documentation (building documents, projects, preliminary programs)	Viability studies Detail Designs Other procedural parts
3	Procedural parts Other documentation necessary to carry out the procurement of the various entities involved All procedures for hiring Approval by the competent organs	Hiring designers * Hiring design reviewers * Contractor hiring Inspection hiring * Coordination and security hiring*
4	Stakeholders concerned by the project in question (external or internal)	Provisional acceptance of the contract Final reception of the contract
5	New built heritage and existing assets not registered belonging to University of Lisboa	Heritage register built in official bodies (finance, land register)
6	Detailed plans Urbanization plans	New urban plans

Note: * - If necessary

In figure 7 is clear the sequence of these new activities.

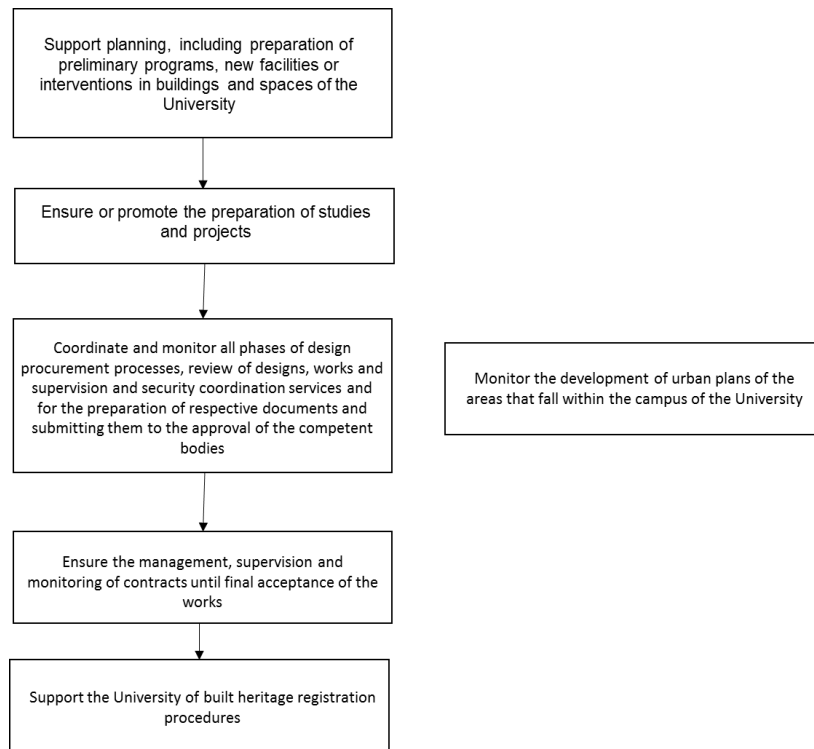


Figure 7 Process flowchart

Another contribution in the management process was the development of a model for the registration of stakeholders for each project of the Rectory of the University of Lisbon. We can see in figure 8 the model that will be used in the future.

Company logo		Stakeholders Template						
		Name of the project						
No [1]	Type [2]	Name	Organization [3]	Position and role in the project [4]	Main Responsibility in the project [5]	Email	Cell phone	Workplace [6]
1								
2								
3								
4								
5								
6								
Legend:								
[1] sequential numbering; [2] Internal/ External; [3] Name of the company / department / area; [4] Owner/ Contractor/ Supervision of constructions/ Designer/ Security coordinator at work / Security coordinator in design /Others; [5] Individual task prescribed by law; [6] Construction site/Headquarters of the Company / Office of the Rectory								

Figure 8 Stakeholders template

VI – Conclusions

When searching for recent scientific papers, within the scope of this dissertation, it was found that the most referenced knowledge area was risk management. This can be explained by the need to consolidate the study of the remaining areas of knowledge to ensure that the risk management is accurately estimated.

Another conclusion was that much of the information covered in the PMBOK and ISO 21500, which are aimed at large enterprises, but was simplified in the followed case studies, because they are smaller compared to the bibliographic sources in question.

The use of the public tender tends to be more transparent, which is positive, especially when money is public. Procurement procedures and laws are very bureaucratic, but must be followed, ensuring process integrity.

During the followed projects the concern for security was constant, and this was easily verifiable. The concern about having a preventative approach in relation to the inherent risk in the project construction was also checked.

Finally with the systematization of processes in the building area of the Rectory, it was possible to realize the importance of their preparation for correct and clear elaboration of the processes in the future.

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