

TESIS

INTERUNIVERSITY CENTRE OF RESEARCH | SYSTEMS AND TECHNOLOGIES FOR HEALTHCARE AND SOCIAL FACILITIES

Università degli Studi di Firenze | Dipartimento di Architettura – DIDA

Via San Niccolò, 89/A – 50125 Firenze - **Telefono:** +39 055.2755341 – 5342 – 5343 – 5345 **Fax:** +39 055.2755355

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FACTORS CONTRIBUTING TO THE CONTAINMENT OF COSTS THROUGH HOSPITAL DESIGN

Issues that have an impact on the costs of hospital buildings were identified in the context of that discussed at the Workshop *Containing healthcare cost through hospital design* held in Florence on 3-5 June 2014.

The basic assumption concerns the fact that, in respect of factors that have no impact or that have an indirect impact on the design decisions, there are significant and numerous influential factors for which it is necessary to correctly identify the decision-makers and the methods that should be used to make the choices.

Contextual elements that, despite being unrelated to the design, can in any case affect the choices with significant impacts in terms of costs were therefore identified upstream of the process.

Below we have analytically identified all the types of costs that relate to the process, from the initial investment costs to the management and maintenance costs in the operational phase, also considering the effects on the social costs borne by the community.

The various types of costs were then associated, in reference to the distinct process phases (planning, design and construction, operational phase), with all the choices that must be made by the various decision-makers (clients, designers, construction companies, management bodies, hospital staff, and users in general).

CONTEXTUAL ELEMENTS

Environmental contextual elements

Social contextual elements

Economic contextual elements

Geographic contextual elements

Legislative reference framework (local, regional, national; town planning, archaeological, restriction-based regulations ...)

Healthcare organization model (relationship between the healthcare network and the hospital, the role of the hospital and the use of the hospital)

Level of innovation and technological development

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Decisions	Costs
<p>DECISIONS IN THE PROGRAMMING PHASE</p> <ul style="list-style-type: none"> - Choice of location and site development Influence on the types of cost: 1-2-3-3-4-5-6-7-8 Decision-makers: Client, community - Choice of organizational and management model Influence on the types of cost: 6-7 Decision-makers: Client, management body, hospital staff - Definition of the model and course of treatment Influence on the types of cost: 1-4-5-6-7 Decision-makers: Client, management body, hospital staff - Choice of the implementation procedures Influence on the types of cost: 1-2-4-5-6 Decision-makers: Client - Choice of the forms and sources of funding Influence on the types of cost: 1-2-3-4-5-6 Decision-makers: Client, community, management body - Definition of the schedule Influence on the types of cost: 4-5 Decision-makers: Client 	<p>1 Technical costs</p> <ul style="list-style-type: none"> - Costs for the preparation of documents (from the feasibility study to the post-occupancy evaluation, including the site safety and security plan) - Administrative and legal expenses - Planning costs - Costs for contingencies <p>2 Investment costs</p> <ul style="list-style-type: none"> - Building and land costs (costs of purchase or expropriation, transformation or new construction) - Costs of adapting to environmental conditions (geological, geotechnical, hydraulic, hydrogeological aspects, environmental, historical, archaeological, landscape restrictions) <p>3 Infrastructure costs</p>

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DECISIONS IN THE PLANNING PHASE

- **Definition of the contents of the Project Program**
Influence on the types of cost: 1-2-3-4-5-6-7-8
Decision-makers: Client, designer
- **Definition of the degrees of restriction of the Project Program**
Influence on the types of cost: 1-2-3-4-5-6-7
Decision-makers: Client, designer
- **Definition of the mechanisms for controlling feedback**
Influence on the types of cost: 1-2-3-4-5-6-7
Decision-makers: Client, designer
- **Definition of the policy aspects that concern the validation (commissioning) of the project**
Influence on the types of cost: 1-4-5
Decision-makers: Client, designer
- **Definition of the methods for interacting with the bodies responsible for authorizations**
Influence on the types of cost: 1-2-3
Decision-makers: Client, designer, construction company
- **Definition of management of the construction cost controls in the design phase**
Influence on the types of cost: 1-4-5
Decision-makers: Designer, construction company

4 Construction costs

- Construction costs
- Site safety and security costs

5 Transformation costs

- Costs of the demolition/enhancement of the existing assets

6 Management and maintenance costs

- Costs of medicines
- Payroll costs
- Safety and security costs in the operational phase
- Costs for services (general services: board, laundry, IT management, pharmaceutical supplies, warehouse management, sterilization ...)
- Supplies costs
- Energy costs

7 Social costs

- Mobility costs
- Costs linked to waiting times

8 Hidden costs or transferred costs

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- **Definition of policy areas concerning the test procedures and schedules**
Influence on the types of cost: 1-4-5
Decision-makers: Client, designer, construction company

- **Definition of the technical process of constructing the works**
Influence on the types of cost: 1-4-5
Decision-makers: Client, designer

- **Definition of the size and typology of the complex**
Influence on the types of cost: 1-4-5-6-7
Decision-makers: Client, community, designer

- **Definition of the layout and relationship between functional areas**
Influence on the types of cost: 1-4-5-6-7
Decision-makers: Client, hospital staff, designer

- **Definition of the flows and routes**
Influence on the types of cost: 1-4-5-6-7
Decision-makers: Client, hospital staff, designer

- **Definition of the construction technology and building envelope**
Influence on the types of cost: 1-4-5-6
Decision-makers: Client, designer

- **Definition of the level of environmental sustainability of the complex**
Influence on the types of cost: 1-4-6
Decision-makers: Client, designer

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- **Definition of the level of flexibility, adaptability to changes and expansion possibilities**
Influence on the types of cost: 1-2-3-4-5-6
Decision-makers: Client, designer

- **Definition of the level of safety during the operational phase in the event of environmental disasters**
Influence on the types of cost: 1-2-4-5
Decision-makers: Client, designer

- **Definition of the design principles linked to the concept of Healing Design**
Influence on the types of cost: 1-4-5-6-7
Decision-makers: Client, hospital staff, designer

- **Choice of the finishes**
Influence on the types of cost: 4-5-6-7
Decision-makers: Client, hospital staff, designer

- **Choice of the system solutions**
Influence on the types of cost: 1-4-5-6-7
Decision-makers: Client, management body, hospital staff, designer

- **Definition of the maintenance project and preventive maintenance procedures**
Influence on the types of cost: 1-4-5-6
Decision-makers: Client, management body, designer

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DECISIONS IN THE CONSTRUCTION PHASE

- **Organization, logistics and site safety and security methods**
Influence on the types of cost: 1-4
Decision-makers: Designer, construction company
- **Definition of procedures for managing changes**
Influence on the types of cost: 1-4-5
Decision-makers: Client, designer, construction company
- **Definition of dispute management procedures**
Influence on the types of cost: 1-4-5
Decision-makers: Client, designer, construction company

DECISIONS IN THE OPERATIONAL PHASE

- **Definition of the level of operational efficiency of the facility in relation to its typology and size**
Influence on the types of cost: 6-7
Decision-makers: Management body, hospital staff
- **Definition of survey techniques for the post-occupancy evaluation**
Influence on the types of cost: 6-7
Decision-makers: Management body, hospital staff
- **Decision to use the results of the post-occupancy surveys**
Influence on the types of cost: 6-7
Decision-makers: Management body, hospital staff

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| <ul style="list-style-type: none">- Identification of the services to be managed in-house and outsourced
Influence on the types of cost: 1-4-5-6-7
Decision-makers: Client, management body, hospital staff
- Definition of safety and security management procedures
Influence on the types of cost: 4-5-6-7-8
Decision-makers: Client, management body, hospital staff
- Definition of the organizational model for the pharmacy and pharmaceutical spending
Influence on the types of cost: 6
Decision-makers: Client, hospital staff
- Definition of the organizational model for the inventory and warehouses
Influence on the types of cost: 6-7
Decision-makers: Management body, hospital staff
- Definition of the instrumental resources management procedures
Influence on the types of cost: 6-7
Decision-makers: Management body, hospital staff
- Choice of the type of supplies (disposable or re-use)
Influence on the types of cost: 6-7
Decision-makers: Management body, hospital staff
- Definition of how to use information and communication technology
Influence on the types of cost: 6-7
Decision-makers: Management body, hospital staff | |
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- Definition of the hospital waste management procedures	
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Influence on the types of cost: 1-4-6-7

Decision-makers: Client, management body, hospital staff

The attached matrix relates the policy choices in effect during the different development phases of the construction processes to the cost factors they have the most influence on. At the intersection of each policy choice made and the cost factors subject to possible containment are the operators involved who are responsible for the decisions to be taken.

The attached diagram graphically shows the conditioning effect that the contextual aspects have on the decisions to be made in each phase and the effects that the policy choices can have on the different cost components aimed at their containment.

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