The Application of Facility Management Principles in Hospital Planning and Operation

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1. Introduction

At a life cycle of about 50 years, the production costs of complex buildings such as hospitals, industrial plants or big administration edifices, do not even amount to 5 % of the total costs. More than 95 % of the life cycle costs only accrue after the operation of the building has been started. To a large extent, the costs of the subsequent operation are already defined during the planning and design of a new building. In spite of their high amount, they are usually dedicated too little attention before the housing start.

The consideration of Facility Management principles already in the phase of planning a new building can contribute considerably to a reduction of the life cycle costs of hospitals by way of minimising the operation and working expenses – without cutting the medical and nursing objectives.

2. Working expenses

Facility Management is aimed at an optimum operation of landed properties, which business and service enterprises require in order to achieve their respective entrepreneurial objectives. All maintenance expenses for the interior and the exterior of the building as well as all services rendered in support of the company value creation chain have to be taken into account in this context. One example with regard to this:

The core competence of a hospital is its diagnosis, therapeutic and nursing services, while the operation e.g. of a central sterilisation plant, a medical laboratory service centre or a bed centre supports the core processes, thus being recorded as a supporting, secondary service within the meaning of a holistic building management.

Operation and working therefore comprises:

**Secondary services related to the building**

Energies and media, write-offs (or rent), operation, maintenance and repair of the house and building operation technology, operating theatre, internal and façade cleaning, attendance of outdoor installations, caretaker, reception and security services, access control, car park operation, winter services, building administration, building insurances and taxes as well as construction maintenance.

**Secondary services unrelated to the building**

Data processing services, general logistics services (mail and driving services, telephone service, patient transportation service, office materials, copy service, sanitation), food and event services, removal management and other logistics services specific to hospitals, such as medicine, sterile good or laboratory supply.
The resulting annual operation expenses for hospitals amount to 15 – 35 % of the construction costs. This means that the costs for the new construction of a hospital have to be paid again every 3 to 7 years in the form of – non-medical – operation costs. Their minimisation already during the planning phase therefore has an immense subsequent effect over the whole life cycle.

3. Overall costs over the life cycle

Figure 1 shows the connection between the investment costs and the consequential charges after construction over a life cycle of 50 years. An annual rate of price increase of 2 % is assumed for the operation expenses in this context. (The value of 2 % is rather now, considering the general price development in Europe over the last 40 years.)

The operation costs are shown to be in the range of 15 – 35 %. It can be recognised that an investment of “100” (this could be e.g. € 100 million) will be left behind by the operation costs after a short time. Already after 20 years, the total costs can be found in the range of 546 to 1,140, after 30 years they are in the range of 915 to 2,002, after 50 years at 2,119 to 4,810. (The costs for a different amount of production expenses can be calculated by multiplying the given figures with the specific production costs and dividing them by 100.)

This means that after only 30 years only 5 % or 11 %, respectively, of the life cycle costs are allotted to construction, after 50 years it is only 2 % or 5 %, respectively. A reduction of the investment costs of € 100 million by 5 % saves € 5 million. But according to figure 1 a reduction of the operation expenses by 5 % reduces the life cycle costs by € 272 million in 30 years (from 35 % to 30 % or from 20 % to 15 %, respectively) and in 50 years by € 673 million, starting from production expenses of € 100 million.

In view of these amounts all parties taking part in the planning should be aware that the investment costs can be largely neglected as opposed to operation and/or life cycle costs. Usually, nevertheless, in virtually all larger construction projects it is the investment costs which are struggled for in many and long planning meetings. But 95 % of the time and expenditure of costs discussions for new buildings projects should be focussed on the following operation expenses and only 5 % of them on the production costs!

4. Planning defines the consequential costs after construction

Operation costs which can be especially well influenced during planning predominantly concern the following areas:

- Energies
- Cleaning
- Maintenance
- Construction upkeep

Interestingly enough, these areas correlate very closely with the largest part of the operation costs, which will be dealt with more in detail in Chapter 5.

But also the course for the consequential costs which are rather unrelated to the building, in the area of logistics / material management and communication / data systems engineering, is set during the planning phase.
5. Operating costs

The biggest cost factors of the operation are usually the areas of energies, technical facility maintenance (in more complex buildings) and – maybe surprisingly – cleaning. A cost inquiry in 33 German university clinics shows the following cost distribution:

- Heat/electricity: 27.5%
- Operation/maintenance: 26.9%
- Cleaning: 36.7%
- Water/sewage: 5.2%
- Waste disposal: 3.7%

The cost type “Energies” includes all technical facilities and devices of domestic technique such as machines, lifts, lighting, but especially the large consumers in the area of heating / air conditioning / ventilation and in facilities such as kitchens, washing plants or central sterilisation facilities.

But the energy consumption of the operation is also defined by the indirect influencing variables such as heat insulation, glass facades, orientation of the building in the micro-climate, etc..

In spite of its considerable relevance with regard to the consequential costs, the area of cleaning is often very much neglected during the planning phase. But 2 to 10 % of the production costs annually accrue in the area of cleaning. Studies in multifarious kinds of facilities in Germany have shown that faults in planning and materials can lead to additional annual costs of 74 % of the usual cleaning expenses.

The most frequent mistakes during building planning with regard to cleaning are the following:

- fixed windows and fanlights as well as glass surfaces reachable only with elevating trucks or alpinist equipment
- insufficient dirt-absorbing system in the entrance area
- lack of chambers for cleaning equipment
- missing water, electricity and washing machine supplies
- too light and too cleaning-intensive floor coverings.

Materials are often selected only according to aspects of architecture and design (marble or textile floors in inadequate areas, care-intensive rubber knob coverings), which considerably burdens the subsequent cleaning costs. Only for glass facades and roofs, which due to their inaccessibility or non-passability can only be cleaned with a high technical effort, the additional cleaning costs easily amount to 30 - 50 %.

6. Recommendation for the planning of new hospital buildings

It is therefore recommended already for the phase of planning a new hospital to work with a Facility Manager, who will introduce the performance targets with regard to building utilisation and cost frame into the designs of the planning architects and engineers and/or constantly check their accordance, figure 2. In this context, the further development of plan designs of the hospital architecture and equipment has to be continuously checked for its effects on the consequential costs.
The return on investment of a Facility Manager in the planning phase is incomparably high: with relatively little effort, sums amounting to a multiple of the production costs can be saved in the subsequent operation.

7. Optimisation criteria for hospital operation

In order to meet its obligation of care and to secure its competitiveness, each hospital will endeavour to optimise its core competence in the medical and nursing areas.

But the performance range of hospitals also comprises the secondary obligations of infrastructure, technical and commercial building management including the operation services unrelated to the building, which must not be underestimated in their effect on patient satisfaction (e.g. cleanliness, catering quality, security, maintenance and state of the building, etc.).

Also these services have to be constantly optimised, in which process the holistic approach of the Facility Management philosophy has the advantage of overcoming department borderlines and understanding patient care as a cross-divisional process. The strategies of optimising secondary services in hospitals were presented by the author at the IFHE congress in Edinburgh in 1998 (Facility Management in Hospitals).

8. Summary

The application of Facility Management principles already in the planning phase of new hospital buildings can considerably contribute to an optimisation of the subsequent operation and above all to the cutting of the working expenses, which, over the whole life cycle, can be distinctly above the construction costs of the building.

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Construction costs “100”, operation costs 15-35% of the construction costs, at an annual price increase of 2%

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Figure 1   Life cycle costs over 50 years
Figure 2: The Facility Manager in the life cycle during planning and operation