INTRODUCTION OF A SPACE MANAGEMENT IN A HOSPITAL

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[Hospitals are one of the most complex organisations which results from numerous interfaces between many departments. If those interfaces are unknown, there is a lot of uncoordinated and not goal-oriented work which causes unnecessary and high operational costs. The intention of the paper is to find out how medical and non-medical processes in a hospital can be supported in the best possible way to reduce the operational costs by implementing a space management tool. The research therefore includes a detailed analysis of the main departments of 13 hospitals examining their processes by expert interview, in order to find out their needs and to develop a space management tool that meets these needs. Based on this, within the framework of a research project in cooperation with the "Klinikum Region Hannover", the data necessary for the management of space were defined for all relevant processes and a pilot data collection was carried out. As a result, new processes, like space benchmarking or maintenance controlling, could be established in the department of real estate management. In addition, existing processes like the accounting of the service charges for rented space could be significantly optimized. Due to these improvements it was possible to streamline existing processes and to establish new processes without increasing the total costs. On the contrary, the total operational costs could even be reduced.]

1. INTRODUCTION

In case of the cost pressure in the health care sector in Germany, the operator of hospitals have to save more and more money. The objective of the study was to find out, how money can saved in the secondary processes without reducing the quality of the primary processes. The costs for the space owns the biggest part of the secondary costs in hospitals. Because of that, the paper describes how the management of the space could be improved.

2. FUNDAMENTALS

The goal of the management of space is to collect exact data about the existing space and to make data concerning a building accessible to all users of the hospital. Because the secondary costs in a hospital are largely due to costs for space, it is particular important to have detailed information about them.
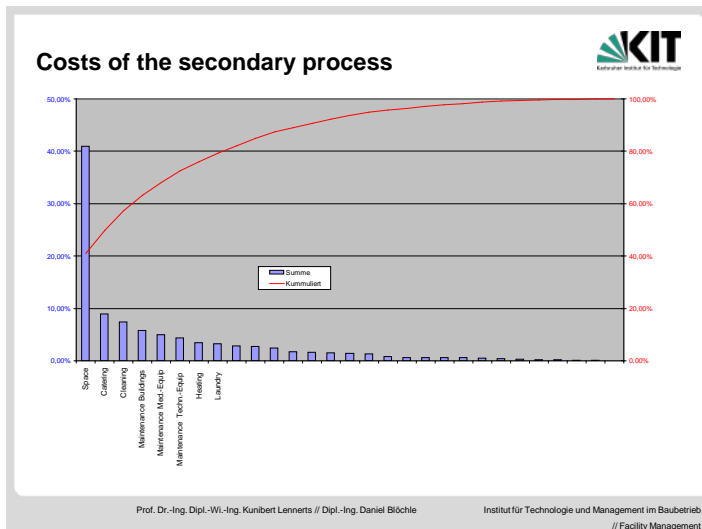
Figure 1: Costs of products in hospitals [OPIK 1, Jochen Abel, 2008]

If there is no basic information like space or room data available, these have to be acquired. The challenge in doing so is, that the right data is collected, that all future users are included, that interfaces are reduced and a redundant data management is avoided. To accomplish this, the project has been divided in 3 phases.

2.1 Division of the project in 3 phases

The introduction is being divided in 3 phases by using a model. In phase 1, an as-is-analysis is made and a target state is defined. For this purpose, business processes are analysed interdisciplinarily and the target state is defined. In phase 2, the required data is acquired and in phase 3, the space management tool with all required data is implemented. Here, business processes are improved piece by piece in their operation or new business processes are introduced.
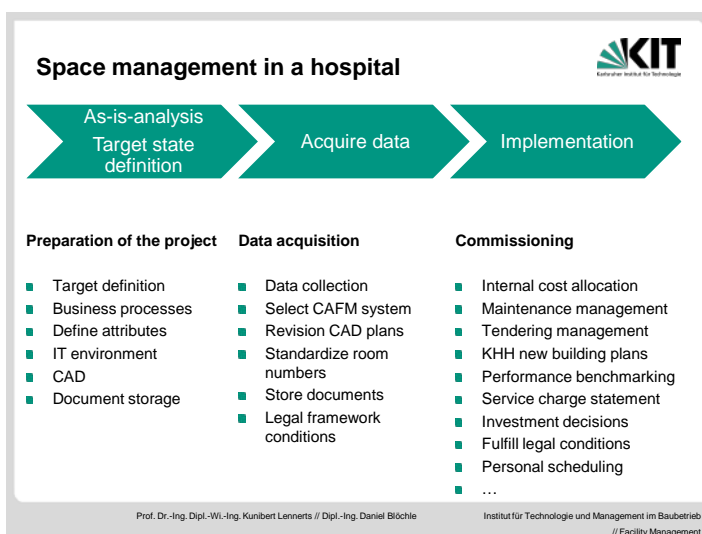

Figure 2: Space management in a hospital [own illustration]

2.2 Analysis of the business units

Only by a holistic analysis of the most important business units and the corresponding processes, it is possible to accomplish the previously mentioned targets. The management of the space is traditionally placed in the domain "construction and technology". However, many fields in a hospital are holding data which can be covered by a central management of the space. The service company, which is responsible for cleaning and preparing the food, requires data to schedule the staff requirements. For example, the space and flooring materials to be cleaned are important. The medicine- and patient management require room numbers in order to assign the patients including the number of beds to the proper rooms. The medical equipment management documents the location of medical equipment in a room book. The location of computers, copiers and other IT equipment are documented by the IT-department. In the administration, specifically the asset accounting, all depreciable equipment including their location is documented. Only if all business processes are registered and are available transparently, all interfaces can be examined and a redundant data management can be avoided. For this purpose, cooperation of the departments is very important. If departments withhold information in interviews, this leads to faults which affect all further steps and cannot be corrected. Therefore the desired optimization cannot be accomplished thoroughly. Graphically, this is clarified in Figure 2 "Holistic view of all business units".
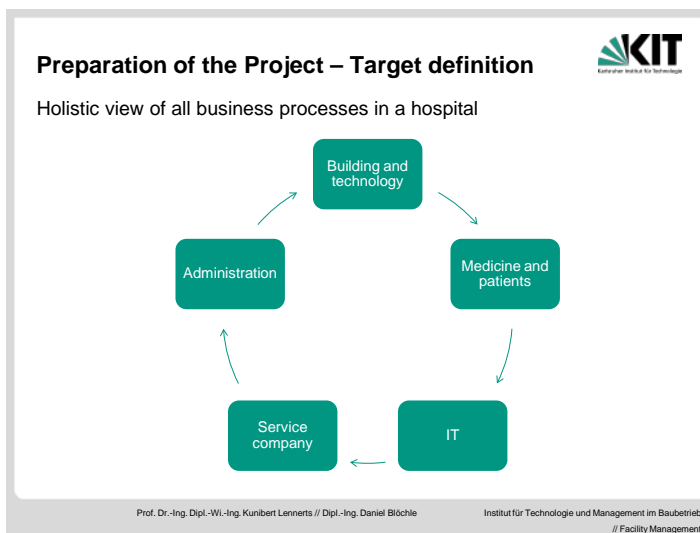

Figure 3: Holistic view of all business units [own illustration]

2.3 Analysis of business processes

Using the example of the department "construction and technology", the realization of an analysis of typical business processes is explained. Firstly, three goals of the change of business process are defined: The improvement in quality, the introduction of new business processes and the cost reduction of certain processes.

To begin with the improvement in quality, this aims at improving the quality of a business processes output. The usage benchmarking provides an example of this. The benchmarking data are to have a greater degree of detail and therefore a better quality and significance than the currently used method.

Another point which has to be examined prior to a data acquisition is the introduction of new business processes. For that purpose, users were asked for processes which are mandatory or rather are important for day-to-day operations.

The third point is the cost reduction of existing business processes. If business processes exist and are necessary, but the current operation involves a great amount of work, they fall into the point of cost reduction. Space benchmarking is taken as an example: If space data is not filed orderly and provided over a longer term, the data's are only available for a short time after the acquisition. Consequently, for every new comparison of space, which belong to certain departments or cost units, a new acquisition of space is necessary. This results in high costs, which can be reduced by a revision of the business process "space benchmarking".

Another possibility is a combination of several goals. For example, an improvement of quality can be combined with cost reduction, so that additional benefits are achieved.
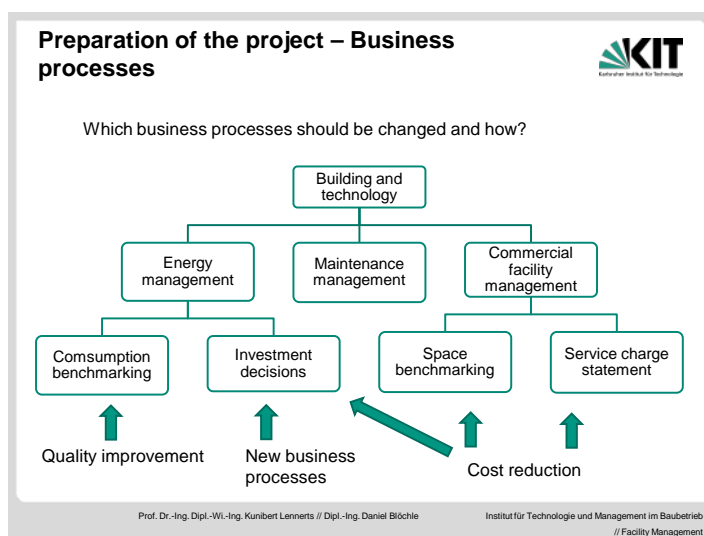

Figure 4: The three types of business process changes [own illustration]

2.4 Identification and optimization of interfaces between business units

The goal is to identify existing business processes which can be assisted by a space management tool. For this purpose, those processes which need building data are investigated, for example space benchmarking, bed occupancy and the constitution of clearing areas. These processes are collected through expert interviews and are presented graphically. For the graphical presentation, the system of event-driven process chains is being used. This shows that both pre-run and post-run of all three business processes are equal. At first, the availability of all data must be verified. If no data is available, it has to be acquired. Otherwise, data quality and whether it is up to date must be verified. If all prerequisites have been established, the actual business process can be performed. The process itself will not be presented graphically detailed, since it is irrelevant for the optimization. In the post-run, all collected, verified and possibly changed data has to be saved. The last point of the operation is the continuous updating of data. This is an expensive and laborious process, which should only be performed once.

Presentation of previous business processes
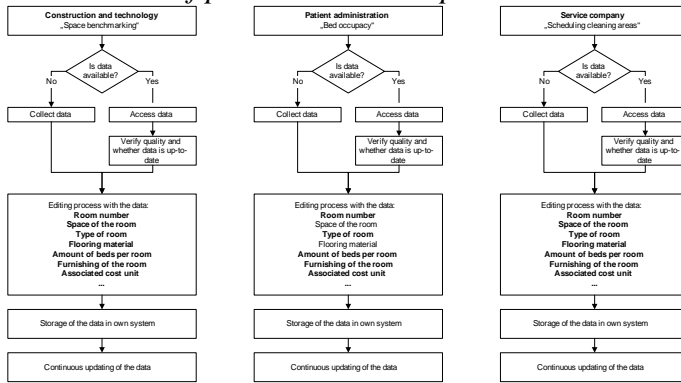
If business processes are divided, like shown in the preceding figure, this means that every domain itself is responsible for data quality and whether data is up to date, and if necessary for the collection of data. This leads to redundant data management in many areas and resources for retention, updates and collection of data are thus used several times for identical data. The aim of a space management tool is to prepare data once and make it available in order to allow all domains to use and access necessary data.

Optimization of business processes through a space management tool
With a space management tool, data can be administrated centrally. Unnecessary work can be avoided by making the required data accessible to all users like the domain of construction and technology, the patient administration or the service enterprise. In the following example, the business processes "space benchmarking", "bed occupancy" and "planning of cleaning areas" are not changed. Only the basis for the business processes, the data, is prepared centrally. This means the steps "verifying data availability" and "verifying whether data is up-to-date" can be avoided.

Presentation of optimized business processes
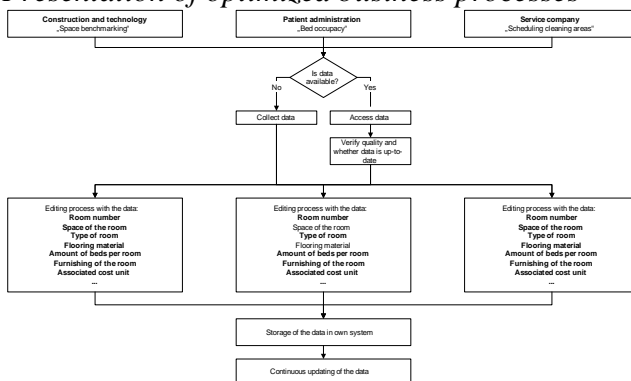
2.5 Examination of existing data and IT systems

Acquisition and evaluation of existing IT systems is required to evaluate and, if necessary, migrate existing data. For this purpose, all known IT systems, which were supposed to contain required data, have been collected and analyzed. Not only the large IT systems and CAFM systems play a role, but data in Excel, Word or PowerPoint files, in written form, HTML databases or as well in CAD files can be present. After the acquisition of all existing systems in a company, the data which is available in these systems is evaluated. Here, the type and quality of data and whether it is up-to-date are given special attention. By using this systematic approach, it could be worked out, which data was present and in which format and whether it could be migrated. The result of this step is a collection of data, which, ideally, suit the reality. However, this is not necessarily the case; if none of this data was kept up to date, outdated data is present in every system. Thus, no system suits the reality. In this case, the data has to be re-acquired with the aid of a data acquisition. This can only happen by local inspection and acquisition.
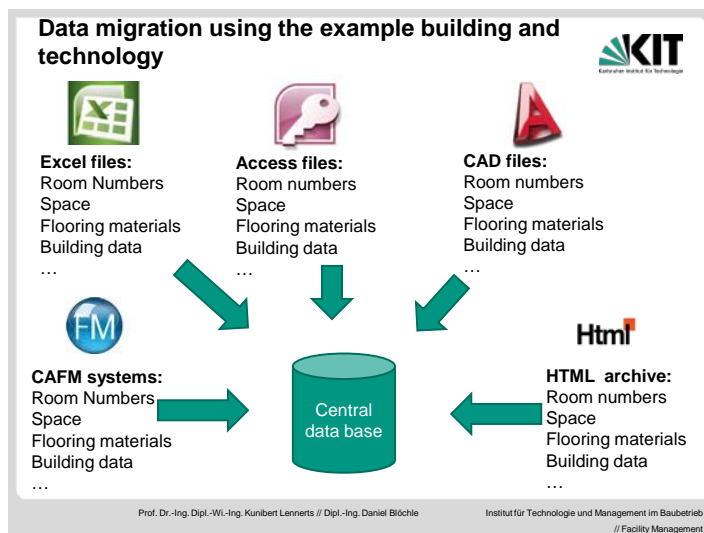

Figure 5: Data migration in a central data base [own illustration]

2.6 Defining attributes

If the business processes are transparent and the corresponding goals from the preceding section are determined, the data for the acquisition is defined. To define this data, every business process is examined and analyzed separately to figure out necessary data to achieve the determined goals. This is not restricted to a room book. The data includes, in particular, CAD drawings (floor plans and perspective views), legal framework conditions (examination periods, fire safety) as well as ownerships of buildings.

The business process "space benchmarking" is an important business process of a hospital. Space benchmarks are necessary for re-planning of departments or buildings as well as testing space consumption of particular departments. In order for these key figures to be compared to a large benchmarking pool, they were closely modelled to the key figures of a big benchmarking pool.

Space benchmarking

Attribute	Variable	Details
Room number		Technical room number B + T
Space according to DIN 277	m²	DIN 277 catalogue, 2nd layer
Space according to DIN 13080	m²	DIN 13080, 2nd layer
As-is-usage of the room	Free text	Analog to usage recording of project office "new buildings"
Amount of beds	Quantity	Per room
Amount of office workstations	Quantity	Per room
…		

The space of entire hospitals can thus be evaluated roughly. More detailed analysis can be evaluated using a kind of in-house benchmarking between the departments or functional sections. In figure 6, 7 and 8 different evaluations are shown.
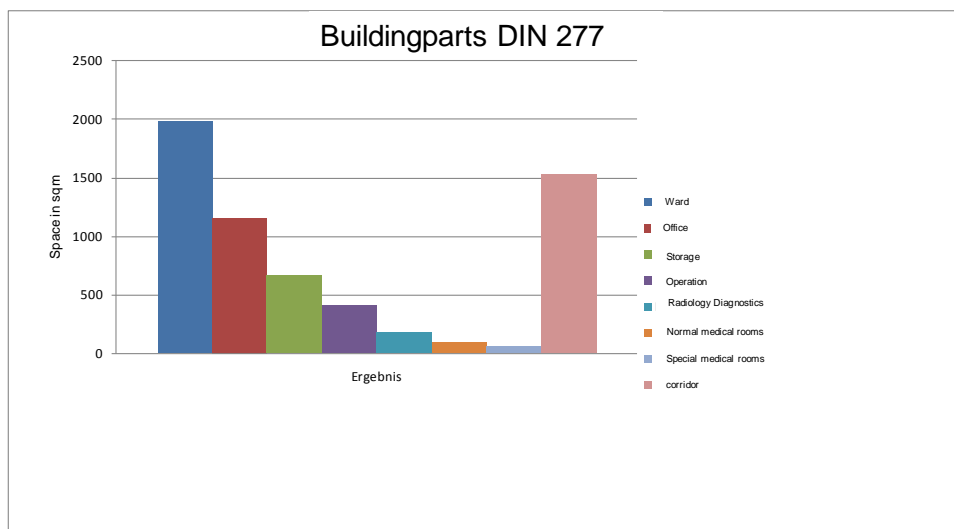

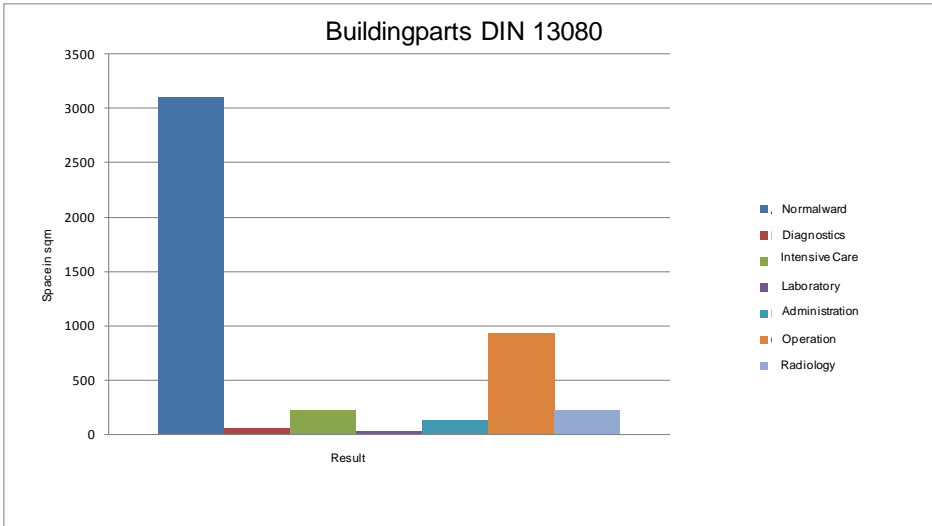Figure 6: Analyse of a complete hospital DIN 277
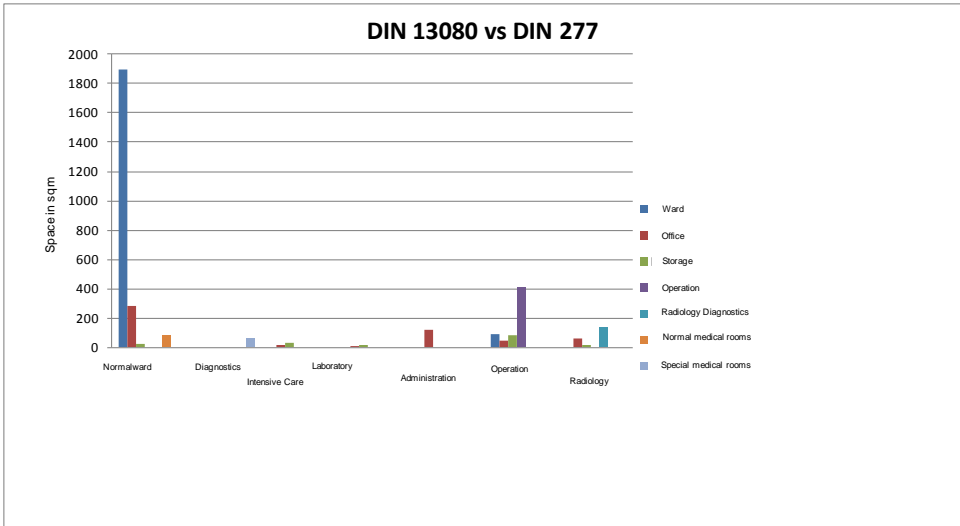
Figure 8: Analyse of a complete hospital DIN 13080

Figure 9: Analyse of a complete hospital DIN 13080 vs. DIN 277

2.7 Conclusions

Due to the increasing cost pressure in the public health sector, it becomes more and more important to examine the company as a whole and to create slim and effective business processes. The management of the space is the central management tool for all business processes in and around buildings. By introducing a space management tool, duplicate processes can be avoided and resources can be saved and shifted to other business units. Thus, an increase of quality can be achieved by improving and introducing new business processes without causing additional costs. Duplicate business processes are avoided, new processes are introduced. To make data available to the users space management is, ideally, build upon an IT platform which is accessible to all users. The three business processes which were presented only have a minimal part in all processes around buildings. Only if buildings are understood as a resource and processes are optimized, the challenges of the future can be fulfilled. The introduction of space management is an important step on the road into the future.

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