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Operating cost analyses of long-term care facilities

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Abstract

Purpose – After salary and wages, facility and real estate expenditure are the largest cost items in the semi-public sector. Especially, for long-term care facilities, there is high-saving potential from more efficient and effective use of property. The main purpose of this paper is an exploratory research study in order to analyse the operating costs of long-term care facilities.

Design/methodology/approach – The survey is based on empirical data questionnaires, data generation and semi-structured interviews at 18 long-term care facilities in Tyrol, Austria carried out during Summer 2007. In order to determine the volume and to prioritize the cost drivers computer-aided real-estate benchmarking software was used, which was developed by the Institute of Real Estate Benchmarking at the University of Applied Sciences KufsteinTirol, Austria. Statistic analyses were conducted to investigate saving potential, determine the best case of the sample and submit recommendations to the decision makers.

Findings – The main findings are the investigation and visualization of saving potential of long-term care facilities and identification of the volume and structure of the cost drivers and illuminated current best practices in effective building upkeep and operating costs of long-term care facilities in Tyrol. Furthermore, the study reveals the immense saving potential in the costs of various services.

Research limitations/implications – This survey is based on the operating costs of long-term care facilities. Other running costs such as costs for healthcare personnel as well as quality indicators are not considered in this survey. Further research activities will be necessary regarding the identification of these cost drivers by the application of regression models.

Practical implications – Professional property management of long-term care facilities will be shown to decrease the cost share in the healthcare sector. The results should help to establish cost benchmarking increasingly and develop it as a strategic planning tool in order to support management in the healthcare sector in the decision-making process.

Originality/value – The paper presents a new measuring method, which allows an holistic view of three influencing factors, namely the amount of beds, occupancy and the space consumption, to investigate weak points in cost efficiency on one chart.

Keywords Benchmarking, Facilities, Long-term care, Operating costs, Cost reduction, Austria

Paper type Research paper

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Introduction

After salary and wages, facility and real estate expenditure are the largest cost items for a company and any improvement of cost effectiveness results in a significant overall saving of costs (Finlay, 1998). Organizations cannot ignore the potential for cost saving within their real estate portfolios and increasingly they are using property-based information for corporate strategic decision making. The extent to which the information is fed back into strategic decision making varies depending on the implementation, experience in using the information produced and the collaboration between departments within the organizations concerned (Fenwick, 1998). For example, in Germany the saving potential of operation costs in public building is about €20 billion per year. A survey of 1,600 public buildings (5.2 million sqm) indicates a saving capacity of up to 60 per cent of operating costs and consumption of, e.g. energy, water, and electricity. On the other hand, the maintenance backlog is already more than 15 times higher with harmful effects on the whole buildings (Bogenberger and Schöne, 2005).

Especially, for long-term care facilities there is a high-saving potential from more efficient and effective use of property. Overall, in this sector there is a lack of transparency regarding their cost drivers and best practices. On the other hand, there are often knowledge barriers regarding the use of management tools such as benchmarking to optimize building costs. Professional property management of long-term care facilities will be claimed to decrease the cost share in the healthcare sector. Therefore, a database and benchmarking system must be built up to reduce the lack of building-related information. Also the public sector will need professional portfolio, asset and facility management.

The demographic changes in many countries will result in a lower birth rate, improved life expectancy and an obsolescence of the population. As a result of improved life expectancy and an increasing numbers of people (belonging to the post-war baby boom generations) entering the older age categories, the share of the population over the age of 65 will increase in all regions of the European Union (Lanzieri, 2007). According to Figure 1 with small differences, the demographic forecast in Austria is also based on this development. Public authorities are short on fiscal resources and in addition the demographic development will put pressure on the social systems. As a result of these effects every second-old person will need to be accomodated in long-term care facilities and it will be a big challenge for governments to deal with the increasing cost of the social system.

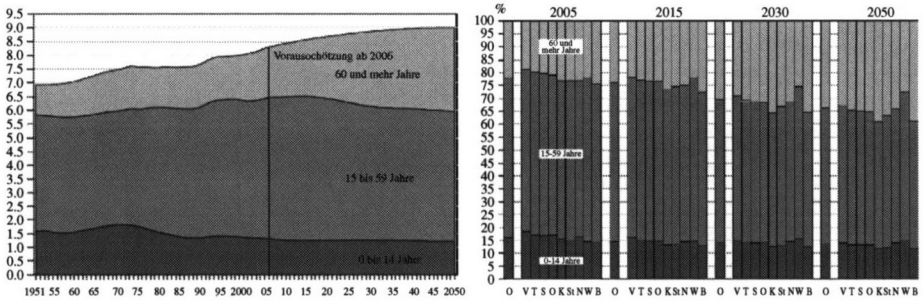


Figure 1.
Population 1951-2050 by broad age groups

Source: Statistik Austria (2007a)

The enormous pressure resulting from the cost and performance discussion will force management of long-term care facilities to reduce the cost share between increasing demand for home accommodation and the decreasing budget from the social system. Long-term care facilities have to take care to improve their performance and the efficiency of their work. Benchmarking of performance and efficiency in the healthcare sector with the aim of seeking solutions to maintain the social system will become more important in the future. To reduce the economic pressure of cost share the optimizing potential of rationalization of workflow and productivity must be known. Knowing the strengths and weaknesses is fundamental for a successful strategy. Benchmarking offers a management tool to determine cost drivers, evaluate processes and learn from the best. In comparison with traditional management tools such as controlling or quality management it allows a view from outside, learning from the best cases and even from competitors.

Benchmarking is a process used in management, in which organizations evaluate various aspects of their processes in relation to best practice. This allows organizations to develop plans on how to adopt such best practices, usually with the aim of increasing some aspects of performance. Benchmarking should be a continuous process in which organizations continually seek to challenge their practices. Therefore, management will need the relevant information concerning operation costs for their decision making. Companies are challenged by limited budgets and high-customer expectations. Decision makers are demanding more relevant data both in terms of quality and quantity. Therefore, computer-aided systems provide information on a whole range of facility management functions enabling tactically pervasive decision-making performance for strategic long-term business success (Lunn, 2000). Facility management contains the concepts of cost-effectiveness, productivity improvement, efficiency and quality of the employees' workplace.

This paper presents the research findings by using a new innovative benchmarking tool to analyze operating costs. It is part of the research project computer-aided real estate benchmarking (CAREB) which was carried out by the Institute of Real Estate Benchmarking at the University of Applied Sciences Kufstein, Tyrol, Austria. The following project focuses on a survey of operating and maintenance costs from 18 long-term care facilities in Tyrol, Austria. Specific questions in this survey were the identification of the volume and structure of the cost drivers and illumination of best practice. Highlights of the findings are the investigation and visualization of saving potential of long-term care facilities. The authors identified the volume and structure of the cost drivers and illuminated the best practices in effective building upkeep and operating costs. The output of this survey also improved the software-tool CAREB and supports management in the strategic decision-making process to optimize the operation costs of long-term care facilities. The results should help to establish cost benchmarking increasingly and to develop it as a strategic planning tool in order to support management in the healthcare sector.

Benchmarking background literature review

Benchmarking is recognized as an essential tool for continuous improvement of quality (Dattakumar and Jagadeesh, 2003). This is evident by the large number of publications in this field. Originally the term "benchmark" was used in the field of land survey. A benchmark is a point of reference. To set a benchmark as a point of reference is the assimilation of this expression into the field of economics and management. Nowadays

there are a lot of definitions for benchmarking (Karlöf and Östblom, 1994; Leibfried and McNair, 1996; Mühlstein and Schuhmann, 1995; Watson, 1993). One of the most well-known definitions describes benchmarking as the continuous process of measuring products, services, and practices against the toughest competitors or those companies recognized as industry leaders (Camp, 1998).

In European countries, real-estate benchmarking is a very young discipline with very little scientific research output. In German speaking areas, there have been several attempts to collect data and analyze building operating costs during the last few years. Well-known examples are the Office Service Charge Analyses Report – OSCAR (Jones Lang LaSalle, 2005), the Key Report Office (AtisReal, 2005), the IFMA Benchmarking Report 2006 and the RealisBench for public building (RealisBench, 2006). For a detailed overview of relevant studies see, e.g. EuroFM Report (EuroFM, 2001) and the survey by Stoy (2005). Most of them deal with general building data and do not specifically concern the healthcare sector or even long-term care facilities.

Especially, in the healthcare sector, benchmarking is one of the management tools which is not used very often (Weber and Wertz, 1999). This is according to Binnewies who additionally points out the high-saving potential of operating cost without losing quality of services in the healthcare sector (Binnewies, 2004) In Germany, a pilot project was started to implement benchmarking methods in the healthcare sector. The project focuses on human-related services (Hildebrandt, 2001). Even, Maddron (2002) mentioned that performance measurement is not a new concept. Until recently, however, its use in the old-age housing and care areas has been limited.

Most long-term care facilities do not have a positive turn over, they make a deficit. The results of a German survey on 25 long-term care facilities state that most of them do not use management tools such as controlling and benchmarking and operating figures (Wittmann, 2002). There was a difference between performance figures of about 20 and 30 per cent in the sample. According to Burk (2002), there is a recommendation to set up a benchmarking system for long-term care facilities to make operating costs transparent and thus to be able to compare them with those of competitors and use them to improve their turn over.

Despite the young research field there is no doubt that benchmarking is a management instrument that will improve building processes and operation costs. According to Blanke (2000), benchmarking also supports quality and self management in healthcare. In the healthcare sector, there are only few research projects, e.g. the research project OPIK carried out by the University of Karlsruhe (Lennerts *et al.*, 2003) or the measurement of life cycle performance in the UK National Health Service estate (Boussabaine and Kirkham, 2006). Another research study from Switzerland analyses the relationship between cost efficiency and the alternative institutional and regulation form (Crivelli *et al.*, 2001).

The secretary of the European Standardization Committee for Facility Management said that in order to perform good and reliable benchmarking, first tools need to be developed before benchmarking can be performed (van der Zwan, 2006). This was the aim of the benchmarking software tool used, CAREB, which was developed by an Austrian research team at the University of Applied Sciences Kufstein, Tyrol. At the heart of real-estate benchmarking lies the measurement and comparison of properties (Reisbeck and Schöne, 2006). The basic principle of benchmarking is to compare "apples with apples". It is exactly this requirement in real-estate benchmarking that

represents the core of the challenge, because almost every property is a "prototype" and thus a unique research subject.

Tyrolean situation

Even in the region of Tyrol, the share of the population aged over 60 will increase from 20 to 34 per cent from 2005 to 2050 (Figure 2, Statistik Austria, 2007b). In the same time span, average life expectancy will increase by about +8.6 years. Future scenarios of long-term care facilities forecast an increase of average occupation time from three up to five years. As a result of this effect a ceteris paribus scenario of the Tyrolean government forecasts an increasing need of +100 per cent (Figure 3) of long-term facilities places in Tyrol by 2031 (Amt der Tiroler Landesregierung, 2007).

At present, in the region of Tyrol there are 76 long-term care facilities with a contract with the government to reduce the gap between running costs and income from the occupants. These long-term care facilities have an overall capacity of 5,652 beds. The range size of bed capacity is from 20 to 250 beds. More than 74 per cent have a size of less than 80 beds. According to the Tyrolean government (2007), the social welfare budget for long-term care facilities increased from €28.8 (2002) to €38.9 million (2006). That means an increase of more than 35 per cent (Amt der Tiroler Landesregierung, 2007).

As a result of the missing market influence, some facilities see no need to use management tools to reduce their running costs. Despite the high-saving potential, especially for semi-public organizations, it will be a big challenge for the management of long-term care facilities and the government to reduce the running costs of each and to subsidize more long-term care facilities to respond to the demographic changes.

Data description for empirical research

In order to generate relevant statistical data which is plausible and applicable a legal cost model is required. Therefore, the survey uses the cost model of the CAREB

Population structure Tyrol 2005-2050

Year	SUM	below 15 years	15 to 60	above 60 years	below 15 years	15 to 60	above 60 years
		SUM			in %		
2005	693,651	118,836	437,069	137,746	17.1	63.0	19.9
2020	727,910	106,120	438,386	183,404	14.6	60.2	25.2
2050	738,308	98,276	383,406	256,626	13.3	51.9	34.8

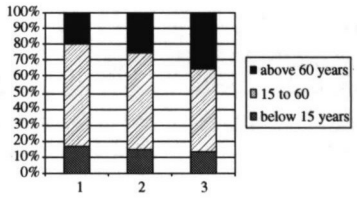


Figure 2.
Forecast population structure Tyrol

Year	Beds	act/forecast
1997	4,532	actual value
2007	5,652	actual value
2011	6,582	forecast
2021	8,275	forecast
2031	10,945	forecast

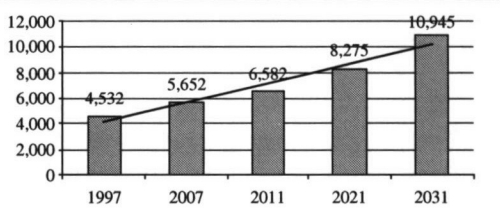


Figure 3.
Forecast of demand for long-term care beds in the Tyrolean area

software tool, which is also based on legal requirements such as ÖNORM B 1800 (1992) and GEFMA 200 (2004). The focus of this survey was the operating costs of long-term care facilities. Therefore, from the research sample, four dimensions of data were collected:

(1) *Basic claim data.* Demographic data of long-term care facilities.

(2) *Classification data.* Beds, care-grade, annual load, share single/double rooms, laundry, kitchen, special healthcare equipment, building year, add. equipment.

(3) *Space data.* Gross floor area, gross internal area, usable area, traffic space.

(4) *Operating cost.* Insurance, care, cleaning, maintenance, renovation, waste disposal, water, heating, electricity, telecommunication, laundry.

Basically, the data can be categorized into three types: the first type consists of the costs of building-related services such as cleaning, maintenance, costs for laundry, etc. The second data type is necessary to set up meaningful benchmarks. Therefore, data concerning the net floor area, the capacity and the occupancy of the long-term facilities was collected by the researchers. Moreover, there are several specific qualities of the retirement buildings which potentially have an influence on the costs of the service costs. These factors are the third group of figures which were collected for this study. Table I shows the three types of data, their abbreviations used in this study, descriptions and several units.

Description of calculation of average care level

The care level defines how much personal attention occupants of long-term care facilities need. In Austria, seven care levels are defined. Care-level 1, for example, means that people can manage their daily routine by themselves to a great extent. Care-level 7, however, defines a level of care for people who need full support in all activities of daily routine. The average care level of the long-term care facilities analyzed was calculated by applying the following formula:

$$CL_{avg} = \frac{n_{L0}*1 + n_{L1}*2 + n_{L2}*3 + n_{L3}*4 + n_{L4}*5 + n_{L5}*6 + n_{L6}*7 + n_{L7}*8}{n_{tot}}$$

CL_{avg} – average care level; $n_{L0}, \ldots, n_L$ – amount of persons in the care level; n_{tot} – total amount of persons in the analysed long-term faciliteis analyzed.

Description of calculation of fictive construction year

The original construction year is not always relevant for buildings which have been renovated. Therefore, the researchers introduced the fictive construction year, which considers renovation work carried out as follows:

$$fict\_year = year_{ren} - \frac{age_{exp}}{10}$$

fict_year – fictive construction year; $year_{ren}$ – year renovated; age_{exp} – expected useful life of long-term facilities assumed with 70 years.

	Abbreviation	Description	Unit
Type 1: service charges			
Building insurance	ins	All types of building insurance, i.e. fire, storm damage, breakage of glass	€/(m^2*a)
Caretaker	care	Self explanatory	€/(m^2*a)
Cleaning	clean	Costs for floor cleaning, facade cleaning, etc.	€/(m^2*a)
Maintenance	maint	Costs for maintenance of the technical building equipment	€/(m^2*a)
Repairs	rest	Maintenance of the building structure	€/(m^2*a)
Waste disposal	disp	Self explanatory	€/(m^2*a)
Water supply	water	Costs for fresh and wastewater	€/(m^2*a)
Heating	heat	Self explanatory	€/(m^2*a)
Electricity	elec	Self explanatory	€/(m^2*a)
Telecommunication	telecom	Costs for telephone and internet	€/(m^2*a)
Laundry	laund	Costs for the cleaning of bed-linen, staff clothes and clothes of occupants	€/(m^2*a)
Type 2: reference figure			
Gross floor area	g_f_area	Internal area of all floors except garage	m^2
Type 3: buildings properties			
Amount of beds	beds	Self explanatory	Number
Average care level	care_level	Average care grade in the retirement home	Score
Occupancy	occ	Percentage of occupied beds to the total capacity of the retirement home	Per cent
Share single to double room	room_type	Self explanatory	Per cent
Grade of outsourcing (laundry)	outsourcing_rate	Percentage of the outsourced laundry service	Per cent
Technical equipment	tec_equipment	Score of the technical equipment available in the building	Score
Personal per bed	staff_eff	Share of the number of staff to the amount of beds	Key figure
Construction year	constr_year	Self explanatory	Key figure
Fictive building year	fict_constr_year	Calculated construction year depending on the year of the last renovation of the building	Key figure
Area per bed	area_bed	Share of net floor area to number of beds	Key figure
Using area to gross floor area	using_gross	Share of using area to gross floor area	Key figure
Using area	u_area	Internal area of all floors except garage, rooms for technical building equipment and circulation area	m^2

Table I.
Description of the variables

Research method operating cost model

The survey is based on empirical data, interviews and evaluations of long-term care facilities in Tyrol carried out during Summer 2007. The variety of the 18 long-term care facilities analyzed granted a comprehensive scope of the study. The attributes and costs were collected on the basis of legal requirements (DIN 277, 2005; DIN 18960, 1999;

DIN 31051, 2003), to ensure that the results are plausible and applicable. In order to determine the volume and prioritize the cost drivers CAREB software was used. Afterwards, the statistic analyses were carried out to assess the saving potential and determine the best case of the sample and submit recommendations to the decision makers.

The basic tool for collecting and analyzing the data was the computer-aided real estate benchmarking software CAREB, which was developed by the Institute of Real Estate Benchmarking at the University of Applied Sciences Kufstein, Tyrol, Austria. The software allows users to upload their real estate data sets such as operating costs, construction costs or quality-related data online via the internet or pre-defined interfaces. After an automatic check for validity they are displayed as various diagrams or tables (Madritsch and Steixner, 2007).

According to the CAREB developed benchmarking process, the researchers had an initial meeting with the decision makers of the long-term care facilities to determine the purpose of the study. After the introduction of the cost and data model to ensure compatible dates, the data collection were carried out with the guidance of the researchers. The data were collected from the bookkeeping and the building data. Missing data were supplemented by on site findings by the researchers (Figure 4). By double-checking with other benchmarks in the software-tool the plausibility of the data examined. The following statistical analyses were done using CAREB software.

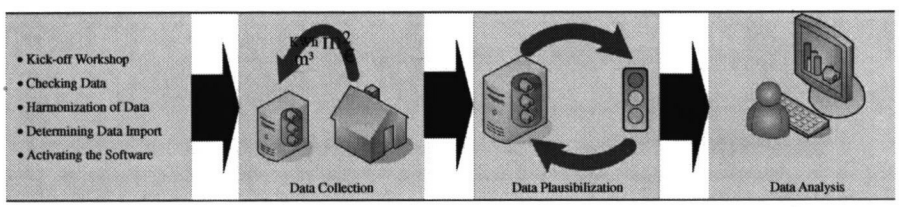
Cost analysis in long-term facilities

In the traditional field of long-term care facilities, the most common basic unit is "cost per bed". That is according to several investigations and research projects, and it is the basic unit for the governmental budget planning process in the field of long-term care facilities (Staudinger, 2007; Amt der Tiroler Landesregierung, 2007).

In the field of real estate management and corporate real estate management the basic unit is net internal area. The reference figure net internal area (sqm) corresponds with the legal requirements of space management standardization (DIN 277, 1987; DIN 276, 1998). The majority of benchmarking projects use the net internal area as their basic unit to benchmark their operating costs (see, e.g.: OSCAR (Jones Lang LaSalle, 2005), the Key Report Office (AtisReal, 2005), the IFMA Benchmarking Report 2006 and the RealisBench for public building (RealisBench, 2006)).

Figure 5 shows the correlation between the two reference parameters "cost per bed" and "cost per net internal area". The chart shows that both reference figures follow the same rule and show correlation and therefore both are legitimate and useful for the benchmarking process.

On the other hand, it should be clear that good performance measured on basis of costs per net internal area does not necessarily mean that the long-term facility is



Source: IBI (2007)

Figure 4.
Survey process

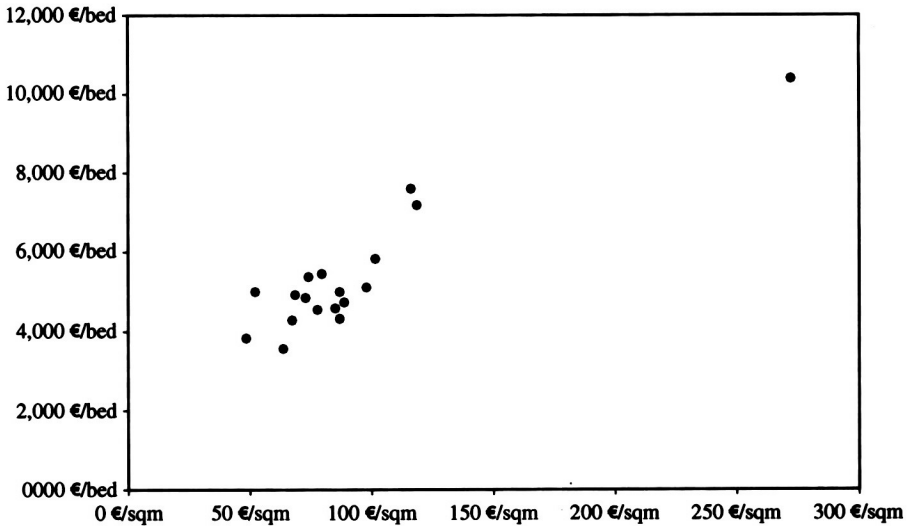


Figure 5.
Comparison of the two allocation units "costs per bed" to "costs per net internal area"

managed in an efficient way. The reason is that some long-term facilities are designed very spaciously while others are quite cramped. A simple benchmark which represents this difference in the design of long-term facilities is "area per bed", respectively, "area per resident". Figure 6 shows the different space consumption per bed in the buildings analyzed.

The space consumption in the buildings in our sample varies from <40 to >90 sqm per bed. In some cases, this could lead to misinterpretation when analyzing the operating costs. The benchmarks on the basis of sqm of a very spaciously designed building would indicate efficient operating. But analyzing the costs per bed would reveal that the low-costs per sqm are a result of the relatively big floor area in relation to the amount of beds but not of efficient operation.

The same problem arises when comparing the benchmark on the basis of beds to the benchmark on the basis of residents. The influencing factor here is the occupancy of the building. Low occupancy would lead to low costs when looking at the costs per bed, even if the costs per resident were relatively high. In the sample used in this study,

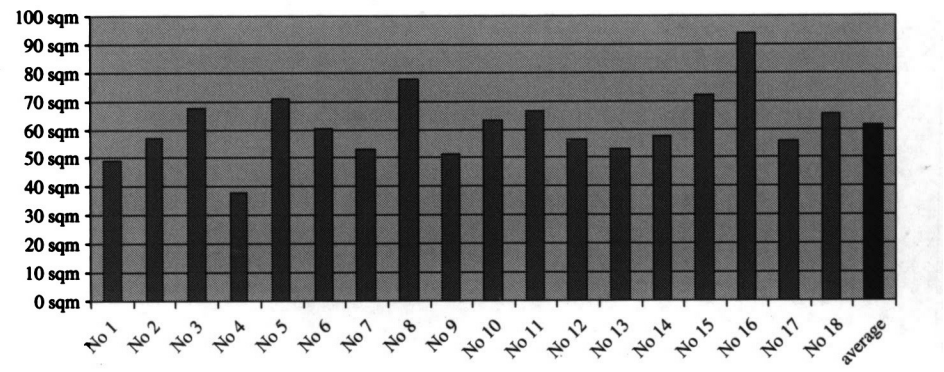


Figure 6.
Space consumption per bed

the costs per bed and the costs per resident show the same patterns because the occupancy in all residential buildings is over 95 per cent. In summary, it can be said that all three benchmarks must be considered when analyzing the operation costs of long-term facilities, because they will lead to totally different results.

To obtain plausible results, we developed a method which considers all three influencing factors, namely the amount of beds, the occupancy and the space consumption. We therefore adjusted the benchmark of costs per sqm by considering the average space consumption per bed. The advantage of this so-called "adjusted sqm benchmark" is that the compactness of the building is reflected in the calculation.

$$c_a = c_s * a_{bed}$$

c_a – adjusted sqm benchmark of service (€/(bed*a)); c_s – benchmark of service (€/(m*a); a_{bed} – factor for average space consumption per bed (m^2/bed).

The unit "€/(a*bed)" for the adjusted benchmark may seem curious at first, but the "m^2" cancel each other and therefore the reference figure is the "a*bed". To make it more tangible you could say that the unit of the adjusted benchmark is costs per year on the basis of the average space consumption per bed, so we also can say €/62 m^2 net internal area. Figure 7 shows the benchmarks for costs per bed, costs per resident and the adjusted benchmark of the service.

This chart provides valuable information concerning the analysis of the service charges. Basically, the height of the black columns for "costs per bed" indicates the general efficiency of the facilities management in the buildings. The white columns for the costs per resident represent the occupancy of the building. In the best case, the white columns can be as low as the black one, which indicates an occupancy of 100 per cent. A large gap between these two columns tells us that there is room for improvement in the field of the occupancy of the residential home. The gray columns represent adjusted costs per sqm net internal area. Columns which are higher than the

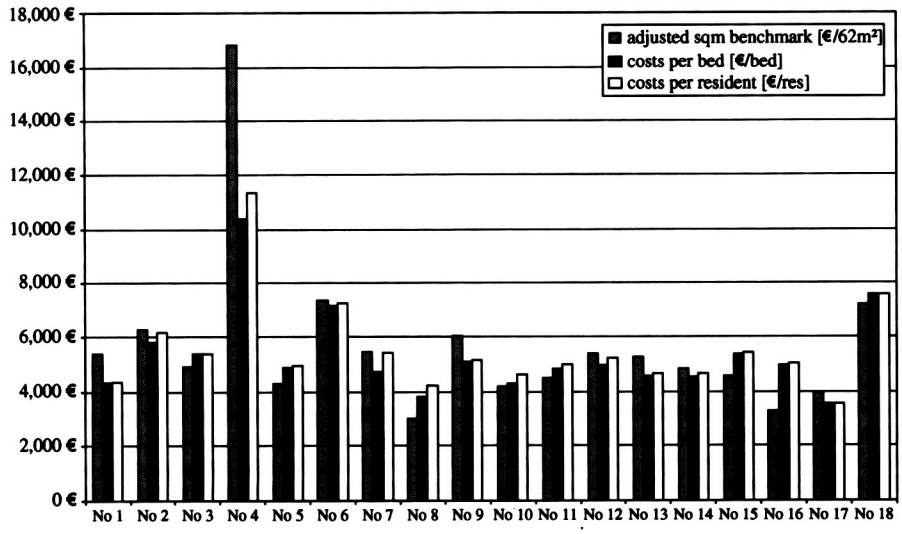


Figure 7.
Comparison of the different benchmarks

black columns indicate that there is room for improvement according to the space efficiency of the building. The advantage of this statement of facts in this combined chart is that it is clear at a glance where the weak points are, displayed by three essential influencing factors together in one chart.

Based on this new way of displaying the cost efficiency of long-term residential homes, we tried to analyze the cost structure of building-related operating costs which represent about a quarter of the total costs of long-term care facilities (Figure 8) (Staudinger, 2007).

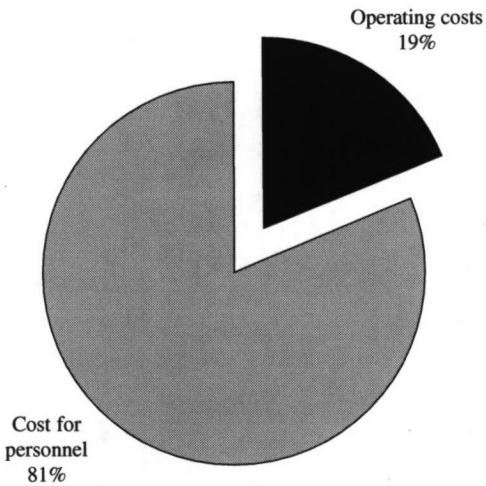
Within the portion for operating costs, cleaning costs represent the largest share with about 39.1 per cent (Figure 9). Other service charges which have a large proportion and therefore a great impact on the total costs are the costs for laundry services (17.1 per cent), heating (8.8 per cent), caretaker services (8.4 per cent) and electricity (7.6 per cent).

The main focus of this paper was to demonstrate a method to reveal the saving potential in long-term facilities. For our calculations we applied a model which is implemented in the CAREB software developed by the FH Kufstein, Tyrol. The basis of our calculations is formed by the three basic benchmarks mentioned above for each of the individual services. The deviation of these three benchmarks to the top quartile benchmarks[1] for those service costs represents the saving potential on basis of bed, resident or, respectively, 62 m^2 net internal area:

$$s_p = c_{tq} - c_s$$

s_p – relative saving potential per year [(€/(m^2 * a)) or (€/(bed * a)) or (€/(res * a))]; c_{tq} – top quartile benchmark of the service [(€/(m^2 * a)) or (€/(bed * a)) or (€/(res * a))]; c_s – costs of the service [(€/(m^2 * a)) or (€/(bed * a)) or (€/(res * a))].

To calculate the absolute saving potential (S_P), researchers multiplied the benchmark for saving potentials with the impact factor (i). This impact factor is the



Source: Staudinger (2007)

Figure 8.
Share between operating costs and expenses for personnel

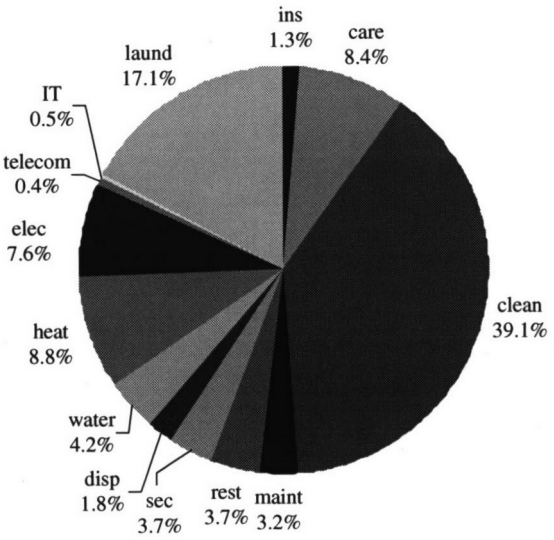


Figure 9.
Share of operating costs

capacity (bed), the occupancy or the space consumption per bed of the buildings analyzed depending on the benchmark:

$$S_P = s_p * i$$

S_P – absolute saving potential of the service (€/a); i – impact factor (m^2 or bed or res).

Figure 10 shows the saving potentials of the various service costs on the basis of the three different points of view. The absolute saving potential of the key figure which reveals the largest room for improvement is displayed for each service charge.

In the sample, this analysis partly reveals immense saving potentials to the top-quartile and leads to an average saving potential of more than €64,000 per year for cleaning, more than €26,000 – for laundry and between €3,000 and €17,000 for the rest

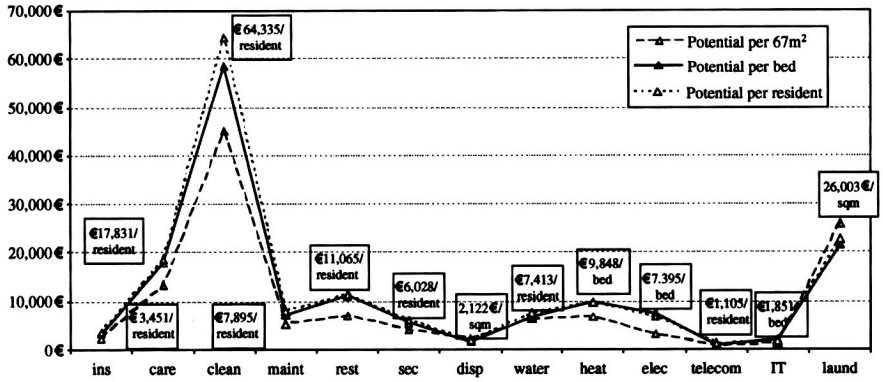


Figure 10.
Average saving potentials of various service costs

of the service costs. It seems that there is substantial room for improvement in some of the buildings analyzed. It must be noted that the sample used for the calculation is simply an example with averaged values of the whole sample. When managers of residential homes apply this method they should analyze the saving potential for the service costs separately. The key figure which reveals the largest potential gives an indication, whether a residential home has general problems with efficiency (high-costs per bed), with occupancy (costs per resident) or with the space efficiency (costs per average space consumption).

Of course, there are some other factors, which could also have an influence on the operating costs, such as the (fictive) construction year of the building, the average care level which is provided in the building or the size of the building. But as the following scatter plots (Figure 11) show, there is no obvious tendency ascertainable that they have an influence on the costs, because the scatters look more or less uniformly distributed.

Interpretation/discussion

In general, the high-saving potential in the area of cleaning is also verified in other studies such as the cost savings in the area of facility services in the study by Redlein *et al.* (2007) and the specific study by Abel and Lennerts (2006) regarding saving potential in FM in healthcare. The only difference is that the model by Abel and Lennerts is based on absolute costs, while the model developed in this survey is based on the saving potentials, which are investigated for the three dimensions described. Another difference is that this model is orientated on the best practices (top-quartile) within the sample while the model by Abel and Lennerts (2006) derives the saving potentials from the average benchmark of the service costs. Overall, both models investigate the cost drivers by benchmarking and development of a method which includes the dimension of cost share and the saving potential.

Researchers also collected data from 37 residential buildings to compare with the data of the sample of long-term care facilities (Figure 12). Of course, not all service charges of residential buildings are comparable with those of long-term care facilities. One reason, for example, is that operators of residential buildings generally do not have any costs for telecommunication, laundry or cleaning. On the other hand, some service costs are quite the same as those in long-term care facilities. It is very apparent that all more or less comparable service costs for residential buildings are lower than those of long-term facilities. For this analysis the researchers used the conventional

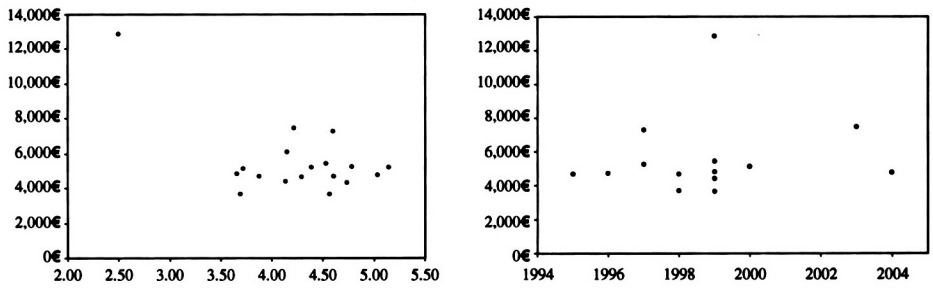
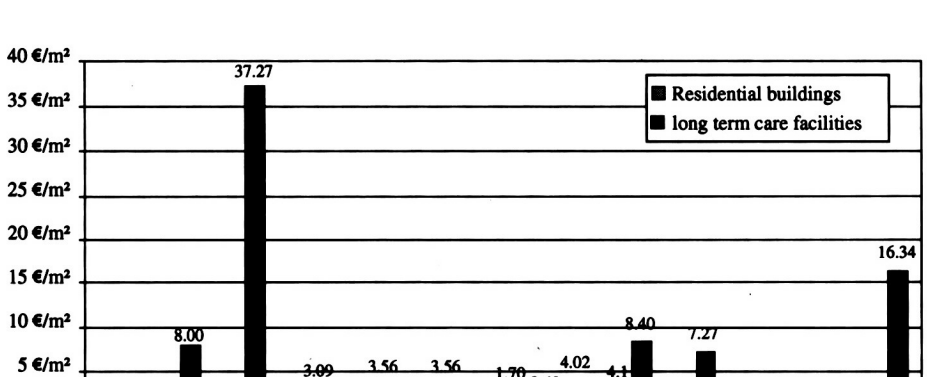


Figure 11.
Correlation between costs and fictive construction year (left), respectively, average care level (right)



Note: Residential buildings vs long term care facilities

Figure 12.
Benchmarks of cost categories per sqm net internal area

costs per sqm benchmark, because the key cost indicator is not applicable for residential buildings.

In particular, the costs for caretaker services are much higher for long-term care facilities. The reason for this large discrepancy is not yet clear and needs to be analyzed further. Other noticeable points are the costs for heating, maintenance and insurance, which are more than two times higher in long-term facilities than in residential buildings. The higher costs for maintenance can possibly be traced back to the fact that long-term facilities are equipped with special technical equipment such as medical apparatus and facilities which require more maintenance. Unclear however are the high costs for heating and insurance. There is no apparent reason why those costs are higher in long-term facilities – there may be room for improvement because those services have not yet been optimized in the long-term care facilities analyzed. On the other hand, it should be positively noted that there are also two cost categories which are only a little bit higher than those in residential buildings, namely the costs for waste disposal and the costs for water supply.

Overall, practitioners agree that benchmarking is useful and should be done to help improve the performance of buildings. But there are a lot of reservations and barriers regarding the use of benchmarking. A study by Lai and Yik (2006) identified four kinds of barriers hindering the improvement of buildings efficiency by benchmarking. They specified:

(1) *Knowledge barriers:*

- There is a lack of practical guidelines tailored to benchmarking of operating cost and practitioners did not have a great deal of knowledge about how to conduct such a benchmarking exercise.
- Whilst some overseas benchmarks have been available (IFMA, 2001; RealFM, 2001; CREIS, 2006; AtisReal, 2005), they are not directly applicable due the differences in their characteristics.

(2) *Financial barriers:*

- Building operating work is widely regarded as a kind of support service, adequate resources are seldom allocated.
- In addition to routine work, practitioners have to deal with emergency work. This hardly leaves any time to perform benchmarking exercises.

(3) *Motivation barrier:*

- In-house practitioners in particular do not need to compete with others for work; therefore there is little pressure on them to continuously improve their work.
- Contractors of outsourced operation and maintenance services will not take the initiative to undertake benchmarking, unless their contracts require them to do so.

(4) *Information barriers:*

- Generally, building information is distributed among a number of departments. Beside a typical bureaucratic attitude, the distributing departments are unwilling to share sensitive information for fear that it will undermine their own interests.
- For the same reason, practitioners working for the same owner company but in different buildings are unwilling to divulge detailed information of their own building for benchmarking purposes.
- Generally, owner companies prohibit employees to disclose sensitive information pertaining to their buildings.

This survey did not consider the quality aspects and any service level agreements in the cleaning process. According to other studies there is some coherence between the appearance of the surroundings in terms of maintenance, housekeeping and design and the perception of cleanliness, and on the other hand to the expenses for these cost factors (Whitehead *et al.*, 2007). A survey in UK National Health Services estates suggests the need to develop a more comprehensive approach, linking FM costs with appreciation to the resulting output (Boussabaine and Kirkham, 2006). These influencing factors should be examined in further investigations.

Conclusions/further research

This paper has been designed to present the research findings by using a new innovative benchmarking tool to analyze operating costs of long-term care facilities. The authors identified the volume and structure of the cost drivers and illuminated the best practices in effective building upkeep and operating costs. Furthermore, the study reveals the immense saving potential in several service costs. Therefore, researchers developed a new measure method with a key cost indicator which combines the three influencing factors, namely the amount of beds, the occupancy and the space consumption of the long-term care facilities. Compared to conventional benchmarking methods, this model allows a holistic view of the three factors mentioned and reveals the saving potentials for each dimension.

This survey is based on the operating costs of long-term care facilities. Other running costs such as those for healthcare personnel are not considered in this survey. Further research activities will be necessary regarding the identification of the cost drivers by applying regression models. Also, the influence of quality aspects of operating services such as the appearance of the surroundings, in terms of maintenance, housekeeping, cleaning, etc. should be carried out in further investigations.

Every long-term care facility is unique in its structure, age, size, and level of performance. Despite these differences the model developed will help to determine the cost drivers and the theoretical saving potential of operating costs of long-term facilities. Professional property management of long-term care facilities will be shown to decrease the cost share in the healthcare sector. The results will help to establish cost benchmarking increasingly and develop its use as a strategic planning tool in order to support management in the healthcare sector in the decision making process. The authors believe the approach outlined in this paper is very promising to guide future benchmarking activities in all long-term care facilities. More importantly, it shows the management of long-term care facilities the great opportunities to successfully manage the future challenges.

The sample of 18 long-term care facilities is just a first step and the results must be seen as not always being generally applicable. Further investigation using a larger sample of facilities will prove this first result and provide additional cost drivers and influencing factors. On the hand side, this study was a very successful test application of the new analyzing software tool CAREB and the measurement method developed with the key cost indicator.

Note

1. In our case, the top-quartile represents the benchmark of the lowest costs.

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