

# Performance Measurement for Maintenance Management of Real Estate

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*Abstract: The benchmarking of real estate performance is a commonly used tool in the efficient and sustainable maintenance management of existing facilities. Performance needs to be measured and monitored to support stakeholders' core business and maintenance strategies. Many of the performance indicators used to measure real estate are based on the area of the maintained property. The aim of this paper is to demonstrate the appropriate methodology of facility management benchmarking and to show the use of benchmarking on the Hungarian real estate market. The results are based on a questionnaire survey with corporate real estate executives as well as facility management service providers.*

*Keywords: performance; benchmarking; maintenance; facility management; sustainability*

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## 1 Introduction

Benchmarking is a multiple step process that allows an organization to compare the aspects of performance, identify the differences, seek out alternative approaches, assess opportunities for improvement, implement the change, and monitor outcomes. It should all begin with an internal evaluation, comparing performance matrices of your own organization over time. Many sources are available for analyzing facility benchmarks. Of the facility management data published by trade and professional associations for comparing efficiency in the use of facilities, nearly all rely on comparing factors on a per-square-meter of occupied space or gross area basis. Australian examples of this benchmark data include the Facilities Management Association's Benchmarking Studies, (FMA 1999 and 2002), and the Property Council Operating Cost Benchmark Series. In the UK examples include the Office Density Study (RICS 2001) which measures the amount of space used by various business activities. BCIS is the Building Cost

Information Service of the Royal Institution of Chartered Surveyors (RICS). BCIS Maintenance & Operating Costs benchmarking data - covering maintenance and operation costs such as cleaning, energy consumption and administrative costs - has long been relied on by property professionals. It provides a sound basis for early life cycle cost advice and the development of life cycle cost plans. Increasingly, this data is taking on a new importance as the industry places more emphasis on sustainability and whole life costs. The Investment Property Databank (IPD), Occupiers Property Databank, a benchmarking database in the UK, provides corporate occupiers with a comprehensive range of metrics against which to measure their facility's performance and upon which to base strategic property decisions. Many of these metrics relate costs and business performance to the area of building occupied. (Gibson, V. 2000) The International Facility Management Association (IFMA), one of the most widely recognized professional associations for facilities management, regularly published its Benchmarks Research. The survey includes data from a sampling of organizations throughout North America representing a spectrum of industry types and facility uses. The creation of large databases, like those of the IFMA in the USA and the RICS in the UK, are resources for national and international best practice comparisons.

## **2 The Importance of Performance Measurements in Field of Facilities Maintenance Management**

Maintenance costs are usually the second largest single expense component for facilities operation costs. Having a quantitative understanding of facilities operations lends itself to comparing the organisation to others. One common mistake people make when developing a benchmarking strategy is selecting only organisations within their own industry to benchmark against. It should also compare the facilities to the operation of other facility types. Comparisons across industries allows for estimating the potential that may exist for improvement. Analysis of more descriptive case studies and networking must take place in order to raise the bar. Benchmarking can be an excellent measurement tool when comparing one facility to others in the portfolio. This type of benchmarking can help set company standards for performance and raise expectations through shared best practices. The majority of the metrics used to measure property performance are cost-centred, although some quality rating systems exist. Douglas, J. (1996) concludes that facilities performance measures allow managers to evaluate performance:

- *for property portfolio review, acquisition or disposal purposes,*
- *to highlight where a building is lacking in performance,*
- *to help prioritise maintenance or remodelling works,*

- to provide identification or early warning of obsolescence in buildings and
- to assist in achieving value-for-money from building assets by aiding identification of,
- performance achievements as well as failures.

## 2.1 Benchmarking in the Facility Management Business Cycle

In the 1st edition of The Strategic Role of Facilities Management in Business Performance (RICS 2009) guidance note separates the Facilities Management cycle into five areas: Strategy, Sourcing, Operational, Review, and Continuous development and change management as they are shown in the Facilities Management cycle diagram Figure 1. Through this cycle, the facilities management function can effectively support an organisation's business strategy, which will derive value from the function rather than focus on cost. Benchmark metrics are important in any area of the cycle; the highest importance of the benchmarking is in the Strategy phase of the cycle. Benchmark data is a key tool in the facility manager's toolkit, enabling decision making by developing facility management strategy. Facility managers have a major role to play in the benchmarking process and in the financial control and reporting processes.

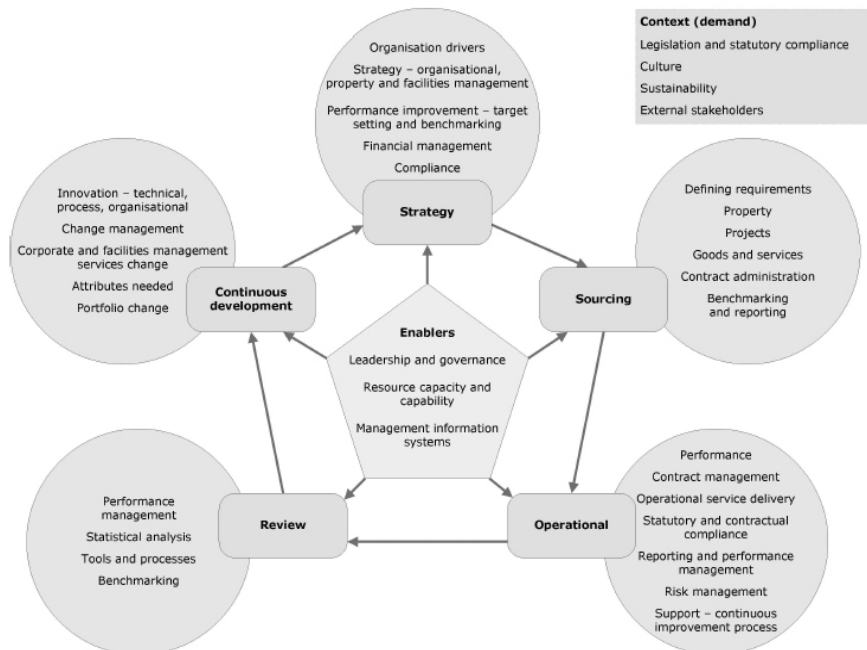


Figure: 1

Facility Management business flows

## **2.2 Benchmarking for Sustainable Maintenance Management of a Nation's Building Stock**

The growth in the significance of building maintenance has occurred due to new-build activity, as well as to a growing awareness of the need to manage the condition and the operation of the nation's building stock more effectively. The whole subject of maintenance management is the issue of Facility Management, which is a rapidly developing discipline.

Facility Management is important as regards the construction of buildings, their health and safety requirements, or their sustainability, whether they the buildings are viewed alone as an investment and/or a service. Buildings and their facilities should therefore be maintained and managed in ways that minimise their environmental impact but still meet the occupier's and owner's requirements. In this context, sustainability goes beyond the issue of environmental protection and resource conservation. Increasingly it is the drive to ensure delivery of this wider agenda which presents us with some of the biggest challenges, as legislative changes impact on building usability and increasing emphasis is placed on occupier requirements.

The opportunity should be taken at the time of replacement and/or refurbishment to introduce more sustainable components and materials. This can also provide the opportunity for extending life expectancy together with reducing environmental impact.

Architects and building engineers should accept that there is more to sustainability than just the energy-efficient design of buildings and that appropriate management and refurbishment of existing building stock is vital to meeting any form of sustainability targets. A combination of maintenance and life cycle replacement of materials, equipment and building components should therefore be designed with this in mind.

Within the real estate industry there have been different efforts to develop a method to measure environmental performance. In the United Kingdom, the most significant method defining and assessing environmental building performance is BREEAM, the BRE Environmental Assessment Method. BREEAM uses a consensus based weighting system to aggregate performance into one overall score for a building, which is then rated on a scale ranging from pass, good, very good to excellent. The main methodology used in the United States is LEED, the Leadership in Energy and Environmental Design Scheme by the US Green Building Council. This is a point-based system, similar to BREEAM, but resulting in buildings being awarded bronze, silver, gold or platinum status.

There are many performance indicators applied by the real estate industry that address maintenance performance and cost effectiveness. The currently existing indicators collected by Pati et al. (2009) are listed below. An additional Maintenance productivity indicator is under development to compare various

maintenance policies on costs and maintained building state. Maintenance productivity is defined as a ratio of a building's state and maintenance cost, and may be used for maintenance policy justification and budget allocation.

The currently existing indicators (Pati, D. et al. 2009) are:

- Building performance indicator (BPI)
- Maintenance efficiency indicator (MEI)
- Manpower sources diagram (MSD): a ratio of in-house and outsourcing expenditures
- Managerial span of control (MSC): a ratio of a manager and subordinated personnel
- Business availability in %: an available floor area over an entire floor area over year
- Manpower utilization index (MUI) in %: a ratio of man-hours spent on maintenance and total available man-hours
- Preventive maintenance ratio (PMR) in %: a ratio of man-hours spent on preventive maintenance and total maintenance
- Urgent repair request indicator (URI) and general repair request indicator (GRI): occurrence/10,000 m<sup>2</sup>
- Average time to repair (ATTR): unit repairing time in hour
- Maintenance productivity (under development)

Benchmarking is considered to be a valuable tool or process for assessing the effectiveness and efficiency of the maintenance operation. It is becoming increasingly common in maintenance management to seek benchmarks by which the performance and costs of a building or facilities can be measured against other comparable facilities or against previous cost data. However, it is imperative that true comparables are used. CEN TC 348 is the facility management standards committee operating across Europe and works on European standards development. The new CEN TC 348 prEN 1522-7, Facility Management - Performance Benchmarking has been published; it standardises the method to be used when collecting data on maintenance, operation and occupancy costs.

### **2.3 Importance of the Survey for Hungary**

Facility Management as an industry has emerged as one of the fastest growing sectors in Hungary; its weight and importance has been increasing since the mid 90s. The FM industry delivers 7% of the GDP and employs 10% of the working-age population. Facility Management services are provided entirely by Hungarian-owned small and medium enterprises (SMEs). To sustain future success, the FM industry needs a complementary FM profession, one which can bring to bear the analytical and business skills in the industry. The international ratios and metrics

cannot be adopted, because of the different bases of the survey, cultures, climates, and different legislation and economical, social, and environmental circumstances. We should create our own measures and metrics in the local business environment and local property market to support the FM industry and FM providers and clients. Although tools for measurements are widely used in the Hungarian construction industry, the measurements are focused on local measurement in the company, and national measurement and benchmarking mostly do not exist.

### 3 Methodology

The IFMA has developed a method for facility benchmarking that you may find useful to review in developing a benchmark for current FM services. The IFMA periodically sponsors benchmarking research projects, and the results are published in benchmarking reports. The Building Managers Association (BOMA), based in Washington DC, publishes an annual benchmarking report known as the BOMA Exchange Report. Another organisation that has developed a benchmarking methodology is the American Productivity and Quality Center (APQC). Facility professionals should review this organisation's benchmarking process and related information as it defines and uses benchmarking from a business perspective. APQC also has a *Code of Ethics for Benchmarking* that you may consider adopting.

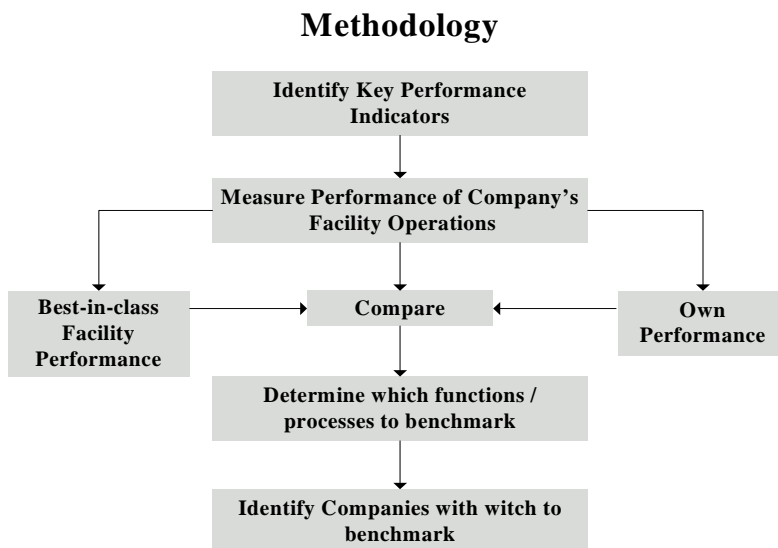


Figure 2  
IFMA Methodology of benchmarking process

### 3.1 Key Performance Indicators

In order to be able to measure the performance of the facilities, a set of so-called key performance indicators (KPI) must be defined. As regards the definition of the indicators, the following important factors should be considered:

- The indicator must be easily measurable, an most optimally it should come automatically out of a system, if possible;
- Indicators must be defined not only for monitoring the actual process, but also for controlling it. Many of the performance indicators used to measure property are based on the area of the property.

Table 1  
IFMA's 9 KPIs

1) Description of Facilities	Industries represented, Facility use, Ownership, Hours of operation, No. of occupants, Location of facility
2) Sizes and Uses of Facilities	Gross area, Rentable area, Usable area, Square footage per occupant, Building efficiency rates, Workstation utilization rates, Office space per worker, Support area
3) Office space planning	Vacancy rates, Space allocation policies, Office type and size
4) Relocation and Churn	Organizational moves, Cost of moves, Churn rate
5) Maintenance, Janitorial and Indirect Costs	Maintenance costs <ul style="list-style-type: none"> <li>• By age of facility</li> <li>• Percentage of replacement cost</li> <li>• Repair vs. preventive maintenance</li> <li>• Outsourcing of maintenance function</li> </ul> Janitorial costs, Indirect costs
6) Utility costs	Utility costs, Utility usage
7) Environmental and Life safety costs	Environmental costs, Life-safety costs
8) Support and Project costs	Security costs, Project costs, Space planning costs, Employee amenities costs
9) Financial Indicators	Replacement value of facility, Lease type and cost, Cost of operations, Cost of providing the fixed asset, Occupancy cost, Financial ratios, Total annual facility costs

### 3.2 Questionnaire Survey

The Hungarian Facility Management Society (HFMS) and the Hungarian Real Estate Association (MAISZ) developed the Facility Management Benchmarks Questionnaire in spring 2007. Questions were asked in an objective fashion in order to obtain responses that were truly representative of industry practices. The questionnaire covered several topics. The project team designed and added questions pertaining to sustainable cleaning, maintenance and utility practices.

Information was collected for the research report through surveys that were mailed to HFMS's and MAISZ's professional members. More than 26 surveys were returned with 21 deemed usable for analysis in 2009. Members were encouraged to pass the survey to the most appropriate person for completion. Respondents were asked to provide information on the facilities they manage for a 12-month period of time. Many chose to report the data for the 2008 calendar year. A total of 26 surveys were deemed usable for tabulation purposes. A completion rate of 80% was considered usable. If a certain question was left unanswered, the respondent was contacted to supply this pertinent data.

The survey questionnaire consists of two parts. The first part attempts to determine activities related to development, operation and maintenance in which the case study property has participated. In this part the survey gathers resource consumption and costs data over a 1-year period and specific operating practices related to environmental management activities and cleaning. The second part of the survey is focused on gathering information related to the management structure of the maintenance management activities inside the organisation.

Additional calculations were made to determine cost and utility consumption per square meter. Utility consumption data was changed to match the unit specified. Hungarian cost data was asked of the participants. If the data appeared out of range, the respondent was contacted to determine how the information was derived. New information was subsequently entered. A convenience sample of 26 firms was selected from a range of core businesses in Hungary.

## **4 Results of the Survey 2009**

HFMS's and MAISZ's Facility Management Benchmarks report breaks down environmental, health, janitorial, cleaning, maintenance and utility costs by facility type, industry, age, main function, and many other sorts. The report also includes staffing and utility consumption data for nearly 200,000 square meters of facilities. The first additional factor that must be taken into account when calculating the relationship between the cost and the performance of the facility is the building's age. The chart in Figure 3 shows the age of the surveyed buildings. The percentile chart shows that the 52% of the surveyed buildings are older than 26 Years.



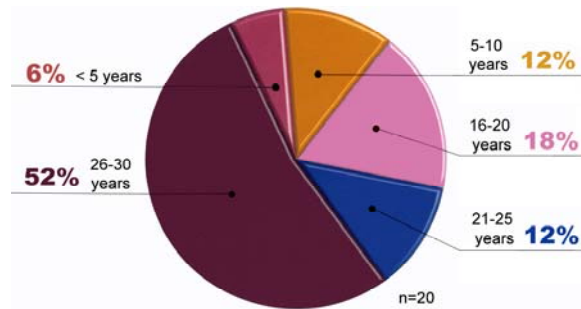


Figure 3  
Age of the buildings

The percentile charts in Figure 4 allow you to see how your operation ranks against other organisations. The data should help you identify areas where you can improve the facility operation.

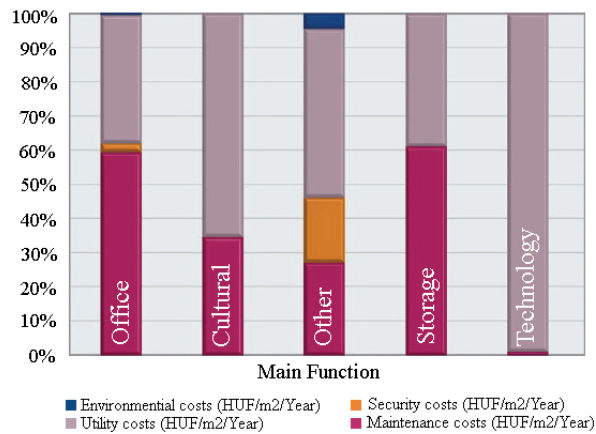


Figure 4  
Elements of function specific operation costs

Figure 4 shows the operation costs per main function in HUF/m<sup>2</sup>/Year. The main property functions are:

- Office,
- Cultural,
- Other,
- Storage,
- Technology.

The highest values of maintenance costs are for the Office function. The lowest of the operating costs for the Office function are the environmental costs.

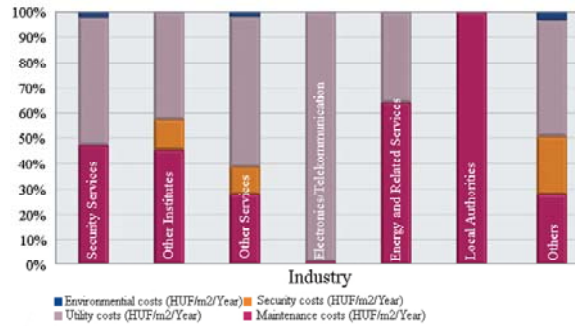


Figure 5  
Elements of industry specific operation costs

The percentile charts in Figure 5 shows that the lowest of the industry-specific operation costs are the environmental costs. Figure 5 shows the operation costs per Industry in HUF/ m<sup>2</sup> /Year. The Industry types are:

- Security Services,
- Other Industries,
- Other Services,
- Electronics/Telecommunication,
- Energy and related services,
- Local Authorities,
- Others.

The tables in Figure 6 show the maintenance costs per area by age of the buildings and by function and the distribution of values. The highest value for maintenance cost has the buildings in age between 21 and 26 years and the highest value get the function of Office.

MAINTENANCE COSTS / AREA (HUF/m <sup>2</sup> /Y)		DISTRIBUTION OF VALUES	
Age	Total: (HUF/m <sup>2</sup> /Y)	%	(HUF/m <sup>2</sup> /Y)
< 5 years	1 732	99	23 633
16-20 years	1 874	95	11 071
21-25 years	26 773	90	6 795
26-30 years	5 723	75	5 723
Older than 30 years	1 282	50	1 874
		25	1 282
		10	0
		5	0
		1	0
		Mean Value	4 548
		Lowest Value	26
		Highest Value	26 773
		Samples	19

MAINTENANCE COSTS / AREA (HUF/m <sup>2</sup> /Y)		
Function	Total: (HUF/m <sup>2</sup> /Y)	Total: (HUF/m <sup>2</sup> /M)
Office	4 885	407
Cultural	1 381	115
Others	681	57
Storage	1 282	107
Technology	26	2

Figure 6  
Maintenance cost per area by Age and Function and the Distribution of the values

The number of samples in this period of research was relatively small; therefore, the main target in the following survey is to broaden the range of data providers. To achieve the desired goal of creating a representative sample in the next period of survey, the Budapest University of Technology and Economics (BME) will take part in data collection as well as in statistical evaluation of the data.

### Conclusions

Real estate managers as well as professional bodies tend to measure performance from an operational efficiency and sustainability perspective. The benchmarking of real estate maintenance management is essential for the support of the sustainable operation of buildings. Facility Management benchmarking is the search for the best industry practices that lead to superior performance. It can be concluded that the method presented in this paper is applicable for benchmarking. It offers an opportunity for improving the organisation on a continuous basis and considers all better practices. The results of the research clearly support the case for undertaking a similar survey among other types of organisations to ascertain whether the best practice criteria are similar to those of tertiary educational institutions and whether the model can be used for other types of organisations as well. It would be interesting to carry out the same study regionally in order to find out possible culture-related differences. There is a need for further research in which descriptions of different types of relationships in the real estate industry and metrics for managing these types can be provided.

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