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### Key Performance Indicators for Sustainability in Facility Management

Authors:

Andrea Pelzeter, Professor at Berlin School of Economics and Law, [andrea.pelzeter@hwr-berlin.de](mailto:andrea.pelzeter@hwr-berlin.de)

Michael May, Professor at University of Applied Sciences HTW Berlin, [m.may@htw-berlin.de](mailto:m.may@htw-berlin.de)

#### Introduction

Certifications on sustainability in construction works have become a necessity for high quality building projects. But also in the field of Facility Management (FM) the topic of sustainability proves to be of increasing importance [1]. Products like e.g. “green cleaning” indicate this development and a lot of companies claim the implementation of sustainable measures. Hence it is hard to evaluate and rate the sustainable performance of those measures; but in order to show their effectiveness, sustainable measures need to be quantified. Also there is more to sustainability than acting environmentally friendly. Particularly in the field of FM – a very staff intensive industry – social and economical issues are just as vital for this topic as the ecological side.

On the hunt for sustainable practices in the field of FM mainly technical innovations that promise ecological efficiency are to be found [2]. These innovations seek to help inducing an economical use of limited resources like water, energy and fuel or reducing the pollution of the environment via bio-fuel or eco-friendly cleansing solutions. The tricky part is to compare those different approaches towards sustainability and evaluate which one is more effective in the sense of sustainability.

#### Research Question

In order to support the competition for the most sustainable FM service it is necessary to dispose of adequate indicators to quantify sustainability in detail. These indicators lead to the research question: Which Key Performance Indicators (KPIs) are suited to quantify sustainability in FM?

The research project “Return on Sustainability System” (RoSS) aims at defining a usable and relevant set of indicators for sustainability in FM and producing software to monitor and manage them in everyday practice.



Possible applications of the research results are:

- supporting the preparation of the sustainability report
- detection of internal potential for improvement and guidance
- supporting contract negotiations

#### Research Team

The research and development of RoSS is carried out by *Berlin School of Economics and Law, Univ. of Applied Sciences HTW Berlin* and *Beuth Hochschule für Technik Berlin*. In order to develop ‘the right’ performance indicators that fit the wide spectrum of the services the FM sector is providing, the project is vitally based on an active communication and exchange with five project partners working in the field of FM about performance indicators, relevant processes and software tools. The enterprises integrated into the research project are: Axentris, HSG-Zander, Piepenbrock, Polis Immobilien AG and Remondis. The German Facility Management Association (GEFMA) became an associated partner.

### Existing Standards

Indeed, there are different indicator guidelines which measure the sustainability performance of corporations (e.g. GRI – Global Reporting Initiative). Unfortunately, these guidelines do not fully match the needs of the service sector [3]. There is only little scientific research on which criteria advocate sustainable services and with what performance indicators we are able to value the sustainability of FM services – a gap that needs to be bridged.

Also systems to certify the sustainability of facilities may be used as a starting point in the search for KPIs on sustainability in FM services. Accepted systems are e.g.:

- LEED: Leadership in Energy and Environmental Design, developed by U.S. Green Building Council (USGBC) in 2001 (USA, <http://www.usgbc.org>)
- BRE AAM: the earliest of the sustainability labels for buildings, developed by BRE Building Research Establishment (G.B., <http://www.breeam.org/>)
- DGNB: the most recent label for sustainability in construction works, developed by German Sustainable Building Council (Germany, [http://www.dgnb.de/\\_en/index.php](http://www.dgnb.de/_en/index.php))



Again the KPIs used for the benchmarking of sustainable buildings are helpful to start the research but they are not easily transferable to FM services [4].

### Research Methods

Figure 1 shows the research agenda: workshops with the project partners correspond with a workshop at the FM'2011 conference in Frankfurt a.M. (open invitation), an online-questionnaire open to all GEFMA members, an expert workshop (individual invitation) and case studies as a final test of the outcome.

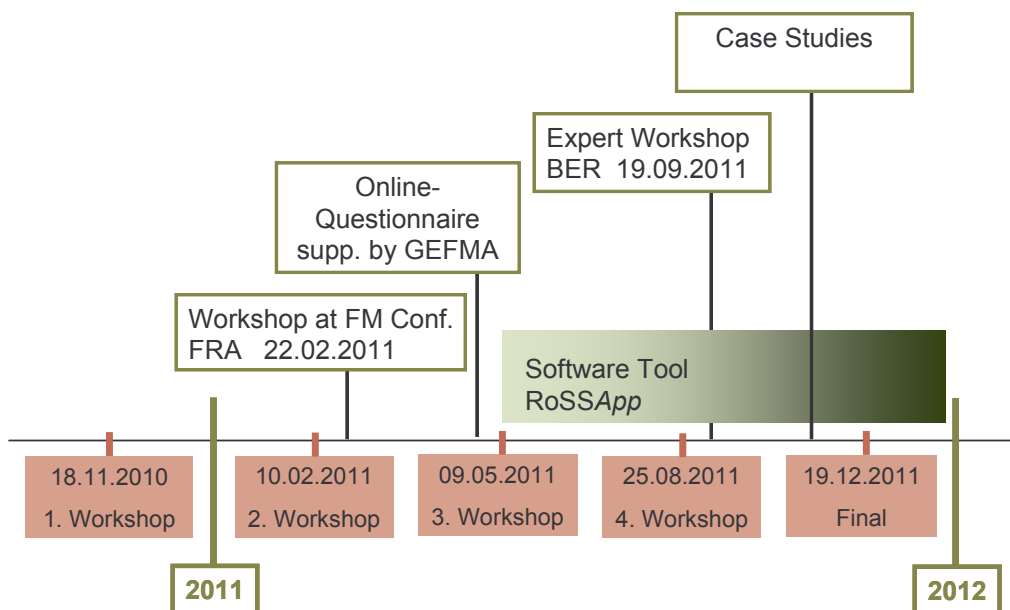


Fig. 1: research agenda

The idea of sustainability contains three core aspects, the so called triple bottom line [5, 6]. Concepts of sustainability in the field of FM should consequently include those aspects and consequently the research project does not only focus on green aspects [7]. It is designed particularly for the needs of the immaterial service industry of Facility Management. Hence, the following peculiar aspects of the FM industry were considered in detail:

- Research showed that absolute indicators do not meet the need to prove performance in a transparent and controlling way. Quantitative ratios are fulfilling the task better and are much easier to compare [8].
- The fact that FM is a staff intensive service industry – which depends crucially on the staff performance – requires a broad coverage of social and work related aspects [9].
- For the purpose of economic sustainability, evaluating only pure financial aspects is not sufficient. Hence there is a need for non-financial performance indicators like the customer retention rate. These indicators help identify nuisances which may evolve later into poor financial performance rates.
- Unlike the manufacturing industry FM services are hard to homogenize and due to individual customer needs and intangible services difficult to compare. RoSS handles these uncertainties by the use of quality performance indicators like the customer complaint rate. Clients and contractors need to act jointly especially in the phase of negotiations [10]. The RoSS software helps the different parties conflating their specific data and raises the mutual transparency. In a second step, the analysis of using natural resources of a building assists in controlling and reducing the consumption. Thus, by increasing transparency and therefore trust among contract partners the software helps establish long term work relationships.

## Findings

Around 20 KPIs were defined and investigated in detail. They are a well balanced composition of the social, environmental and economical sustainability aspects. Some of the KPIs, shown in Table 1, suit specifically sustainability in processes. These can be employed for procurement, when FM services are clearly defined, e.g. the KPIs “ratio of space occupation for FM”, “ratio of green suppliers” and “ratio of services done by own personal”. The last KPI in Table 1 is “employee volunteering” which is considered to be optional, because it was not much accepted by the FM practitioners but it is highly recommended in the sustainability literature.

Sustainability Target	Category	Key Performance Indicator	Unit
<b>Economic</b>			
ensure economic viability	business operations	earnings before interets and taxes (EBIT)	€
		equity ratio	%
	customer relationship	customer complaint ratio	%
		customer retention period	years
	economical process efficiency	ratio of space occupation for FM	%
		ratio of redone processes	%
		ratio of additional management effort	%
<b>Environmental</b>			
responsible use of natural resources	resource management	water consumption	m <sup>3</sup> per workplace
		heat energy consumption	kWh / m <sup>2</sup>
		electric power consumption	kWh / m <sup>2</sup>
	waste	amount of waste	100 kg per employee
	vehicle fleet	average fuel consumption of total fleet	l per 100 km
	environmental process efficiency	ratio of green suppliers	%
		ratio of green facilities	%
<b>Social</b>			
ensure health and safety protection	occupational safety	sickness absenteeism rate	%
		rates of injury	accidents per 1.000.000h
increase employee motivation and satisfaction	employee retention	employee turnover	%
		ratio of services done by own personal	%
		employee training	hours per employee
encourage social commitment	corporate citizenship	employee volunteering	hours per employee

Table 1: proposed set of KPIs for sustainability in FM

In order to test the practical relevance of the proposed KPIs case studies have been carried through. Polis Immobilien AG, one of the project partners, acting as owner and lesser of real estate, reported that out of 13 KPIs concerning sustainability on the management level 11 could easily be provided from existing sources. Only "customer complaint ratio" and "customer retention period" were not reported yet, but may be in the near future, see Table 2.

	KPI	chosen	source
Economic	earnings before interets and taxes (EBIT)	x	annual report
	equity ratio	x	annual report
	customer complaint ratio		
	customer retention period		
Environmental	water consumption	x	water billing
	heat energy consumption	x	heat billing
	electric power consumption	x	power billing
	amount of waste	x	billing of waste disposal contractor
	average fuel consumption of total fleet	x	from contracts for car leasing
Social	sickness absenteeism rate	x	from HR department
	rates of injury	x	from HR department
	employee turnover	x	from HR department
	employee training	x	from HR department

Table 2: Case study on availability of KPI data on the management level

### The software RoSSApp

The web-based tool *RoSSApp* (see Fig. 2) is designed to support the key processes:

- a) The users can define and provide their own KPIs and display their level of sustainability. This helps the contractual partners in terms of negotiating in the phase of contract implementation.
- b) Some of the KPIs may only be used for internal monitoring because they contain sensitive information and thus are not to be published or shared.

The software implementation of the KPI system consists of four different modules. The base module is the catalogue. Any web user has access to this module (<http://ross.htw-berlin.de/RoSSApp/>). Each individual index is described in detail. Registered users have the possibility to comment on each index.

Only if a user registered and logged-on, the full range of the application is accessible. The data acquisition module enables not only the data input but also to compute the relevant indicators. The resulting reports and statistics are then used for business and sustainability reporting.

For a high data security *RoSSApp* is based on the most recent IT security standards. Apart from the use of SSL as encryption protocol for secure data transfer via Internet a secure user administration and encryption of the business data is a fundamental requirement on the application. The entire development process of the prototype system is designed to take into account rapid changes of requirements and functionalities.



Fig. 3: RoSSApp screenshot

The research team hopes to contribute with their work to a sustainable development in Facility Management and to help create a benchmark for sustainable practices and thus promoting the topic of sustainability within the field of FM permanently.

## Conclusion

In iterative rounds of consultations with FM practitioners combined with constant literature research a set of 20 KPIs for sustainability in FM was defined. This set covers all three aspects of sustainability: economical, environmental and social indicators are recommended. In addition the KPIs not only address the management level or the facilities involved, but the broad variety of possible FM services. The indicators are usable for:

- procurement
- monitoring of projects
- sustainability reporting

The continuous collection of data for the everyday management of sustainability in FM is supported by the web-based software *RoSSApp* (<http://ross.htw-berlin.de/RoSSApp/>). There the definitions are displayed and registered users have the opportunity to monitor their KPIs over several periods of time.

## Next Steps

The project partners as well as leading organisations of the FM industry show interest in a sustainability standard especially applicable in FM based on the RoSS research results. Therefore a process of standardisation started within GEFMA in 2012. Planned outcome will be a GEFMA Guideline on Sustainability.

The complete documentation of the research project will be published in book „Nachhaltigkeit für Facility Manager“ (Sustainability for Facility Managers), to appear 2012 by Springer.

Benchmarking of sustainability in FM will be the long-term goal of this research, because it was always asked for, when parts of the project were presented to the public.

Thus the authors hope to contribute to advancing the communication about and the competition for sustainability in FM.

*Prof. Dr. Andrea Pelzeter studied architecture at the University of Stuttgart. She worked as an architect in the field of construction and revitalization. In the year 2002 she began her post-graduate studies in the field of business administration and real estate at the International Real Estate Business School. She started as a research assistant at the International Real Estate Business School and in 2006 pursued her doctoral studies at the European Business School, International University Schloss Reichartshausen. Her research topic was: "Life-cycle costs of real estate – the influence of location, design and environment". She founded her consulting agency „Pelzeter • Lebenszyklus-Management (Lifecycle-Management)“ in 2006. Since 2007 she holds a Professorship for General Business Administration, particularly facility management at the Department of Cooperative Studies at the Berlin School of Economics and Law (HWR Berlin).*

*Prof. Dr. Michael May is a Professor of Computer Sciences and Facility Management at the University of Applied Sciences Berlin (HTW Berlin) since 1994 and Head of the Competence Center FM (CCFM) at HTW Berlin. He is a board member of the German Facility Management Association GEFMA and head of GEFMA's IT Council. He represents GEFMA at the international level, e.g. at EuroFM and IFMA. Before assuming his current position he was the head of the FM research department at the IIEF institute in Berlin and with the German Ministry of Research and Technology. He earned his PhD in Mathematics in 1981 and his Habilitation in Information Technology in 1990 at the Berlin Academy of Sciences. His current research is related to FM knowledge management, Game-Based Learning, facility layout automation, IT integration, sustainability and workplace management. He is the editor and author of several books among them "The Facility Manager's Guide to IT".*

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