MEASURING CORPORATE SUSTAINABLE DEVELOPMENT IN FACILITIES MANAGEMENT WITH KEY PERFORMANCE INDICATORS

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Abstract: Real Estate owners are deeply concerned about the environmental friendliness of their buildings. However, the current topic of sustainability has not yet been fully adopted by the facilities management (FM) industry. So far the main approaches on sustainability for buildings are concerned with the way they are constructed. But in order to completely incorporate the idea of sustainability, which next to environmental ideas includes social and economic aspects, not only the construction of a building has to be considered; but the maintenance of the building, namely the services provided by facilities management, need to be run under the aspects of sustainability as well. Indeed some FM service providers have already included green products such as eco-friendly cleaning solutions into their product range. What is still missing is the measurement of the sustainability impacts of FM services. The research project "*Return on Sustainability System" (RoSS)* aims at defining a relevant and practicable set of indicators for measuring the sustainability of FM services and develops a software application to evaluate the indicators. The project is carried out by the Berlin School of Economics and Law, the University of Applied Sciences HTW and the Beuth University of Applied Sciences as well as five professional partners. As a result a set of 30 indicators is identified that reflects the different aspects of sustainability relevant to the FM industry and their specific processes. The software application facilitates the calculation and ensures a continuous evaluation of these indicators

Keywords: facilities management; key performance indicator; sustainability monitoring IT tool; sustainability reporting

I. INTRODUCTION

FM and its specifications

40 years ago the management of real estate was just a side issue without its own name. The lack of a unified concept led to different innovative ways of managing (mostly corporate) buildings which needed to be maintained, serviced and administrated. Since then the facilities service sector has established itself as a professional discipline under the name of facilities management (FM) [1].

FM is an umbrella term that contains a wide range of activities concerning the management of build assets (facilities) such as maintenance management, space management, project management for new-build and alterations and the administration of associated support services. Furthermore, FM emerged as a discipline that supports the performance of the primary processes. According to IFMA (International Facility Management Association) FM is “a profession that encompasses multiple disciplines to ensure functionality of the built environment by integrating people, place, processes and technology” (http://www.ifma.org/). This range of definitions already shows that the breadth and scope of FM are not finally defined. Today there are many companies that have specialized in the field of FM offering a

fully integrated service scheme to property industry and enterprises of any kind.

Sustainability and FM

At present sustainability is one of the main topics discussed internationally and a major challenge to mankind. The guidelines of the Agenda 21 developed at the United Nations Conference on Environment and Development (UNCED) suggest that the private sector has to play a significant role in the implementation of the multidimensional concept [2]. In order to implement the concept of sustainability in the economy and in companies a development of indicators is required. These indicators are needed to monitor the progress on the path to sustainability and thus to identify urgent demands for action [3].

As the idea of sustainability gains momentum, the real estate managers are paying attention to the environmental friendliness of their buildings. Therefore a change of thinking is inevitable for the field of FM. Since all sorts of buildings have high carbon-emissions due to the intensive use of heat energy, sustainable thinking is necessary to keep up with globalization as well as market trends. Markets are highly sensitive towards the demand for sustainable products and services which in turn supports their supply. Therefore it is more than just a passing fashion that FM corporations include sustainability into their services and reporting accordingly.

While the sustainability efforts in the real estate industry concentrate on a onetime evaluation of the eco-efficiency of buildings, the FM services are mostly ignored. Although, the operational phase of a building makes the largest contributes to the life cycle impacts. When discussing sustainable issues concerning the real estate sector, it is often stressed that buildings account for a large proportion of our energy usage, materials and resources. Many rating systems like LEED and BREEAM were developed in order to show how “green” a building is in a technical sense (a low carbon footprint and less consumption of energy for heating and/or air conditioning) [4]. This progress is due to the rising demand of companies for energy-efficient buildings with the purpose of improving their own sustainability strategy [5]. However, the sustainable performance of a building can only be achieved and valuated if the FM processes are run under sustainable aspects as well. Furthermore, considering the fact that FM is a labour intensive-industry, social indicators should be included.

The idea

Just about every company these days is claiming to implement sustainable measures. As a result it is hardly possible to evaluate and rate the sustainable performance of those instruments [6]. But sustainable measures need to be quantified in order to show their effectiveness. Also, as we know, there is more to sustainability than acting environmentally friendly; particularly in the field of FM, social and economic issues are just as vital for this topic as the ecological part.

Companies that intend to improve and report on the sustainability of their buildings need to know if the building is routinely operated and maintained sustainably. There is a notable trend in the FM service industry of subcontracting specific services, which obliges the FM sector to make their sustainability performance transparent and comprehensible through the entire value chain [7].

When hunting for sustainable practices in the field of FM there are mainly technical innovations to be found that promise ecological efficiency. These innovations seek to help encourage the economic use of limited resources like water, energy and fuel or reducing pollution via bio-fuels or eco-friendly cleansing solutions. The difficulty is to evaluate and compare the different sustainability assessments with each other. Therefore, the team of the research project "*Return on Sustainability System" (RoSS)* is working on a solution to the problem of measuring sustainability of FM services.

By placing the main focus on the often neglected operational phase of a building’s life cycle[1], the established ecologic issues are extended to include economic and social aspects [8] [9]. In order to create awareness of the underestimated social dimension, the linkage effects are especially highlighted in this project: Working conditions greatly influence the employees’ performance and thus affect the quality of service. In the long term good service will lead to satisfied customers and consequently to profitability [10].

II. The Project Return on Sustainability System: RoSS

The project team

Following the initial holistic idea of sustainability three Universities of Applied Sciences in Berlin including the University of Applied Sciences HTW Berlin, the Berlin School of Economics and Law and the Beuth University of Applied Sciences identified the FM relevant performance indicators related to sustainability and developed a web-based controlling tool that is able to evaluate and analyze these. It thus grasps the demand of chapter 40 of the UN agenda to design indicators of sustainable development.

[1] A building’s life cycle consists of the stages: conception, planning, construction, operation and maintenance, dismantling.

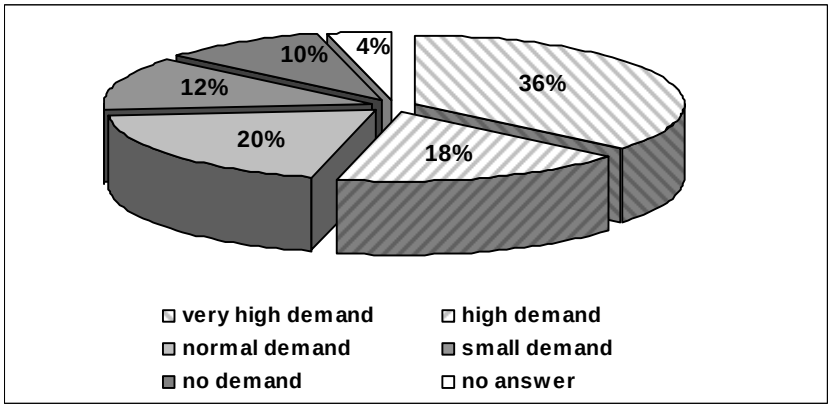

Figure 1: Demand for sustainability certification in FM

Employed materials and methods

Research results show a strong validity if the process of developing sustainable indicators involves the participation of people concerned [11]. 30 performance indicators were determined by a representative online-survey of over 50 relevant German FM companies and by workshops at important conferences. The performance indicators are a well-balanced composition of the social, environmental and economic sustainability aspects – the so called triple bottom line [12]. Furthermore, the different processes of FM services were analyzed in order to find the common ground for the various processes existing in the field of FM. It was discovered that every single FM process can be divided into four phases: sales, establishment, execution, and termination. The project team developed sustainability criteria for all four stages which are based on the triple bottom line as well as to ensure sustainability among all FM processes.
A vital aspect of the project is the constant communication and exchange with the project partners on performance indicators, relevant processes and the software tool. The pilot phase and testing of the prototype RoSS software system by those cooperation partners will be finalized by the end of 2011.

Results

The research results primarily confirm to the great demand for sustainability awareness in the FM industry. Furthermore the survey showed that 66% pay attention to the sustainability rate of their contract partners. In this respect the following chart (figure 1) shows the demand for sustainability standards and certification of FM services: Over 50% of the respondents stated a high or very high demand for such a kind of certification.

The final KPI system is divided into three classes: management-related indicators, process-related indicators and facility-related indicators. The management-related indicators measure sustainability within the organisational structures of real estate and FM companies. The process-related indicators measure the sustainability of the services provided *by* FM companies. The facility-related indicators measure the sustainability of the building itself which results mainly in the monitoring of consumption data. Figure 2 gives an overview of the indicators chosen for the management level of FM. Only relative measures are suitable to measure the level of sustainability since they are comparable. Facility-related indicators enable the comparison of the sustainable performance of a building with the aim of creating a benchmark. A comparison automatically leads to a best-in-class competition and supports the exercise of sustainable measures.

In addition, the following indicators are recommended for the process level: (a) floor space that is occupied by the FM service provider on the customer site (b) management effort for controlling subcontractors (c) time used on corrections of the provided services (d) ratio of the volume of in-house services to outsourced services (e) integration of staff into optimisation of processes (f) utilization rate of green facilities (g) green supply chain (certified)

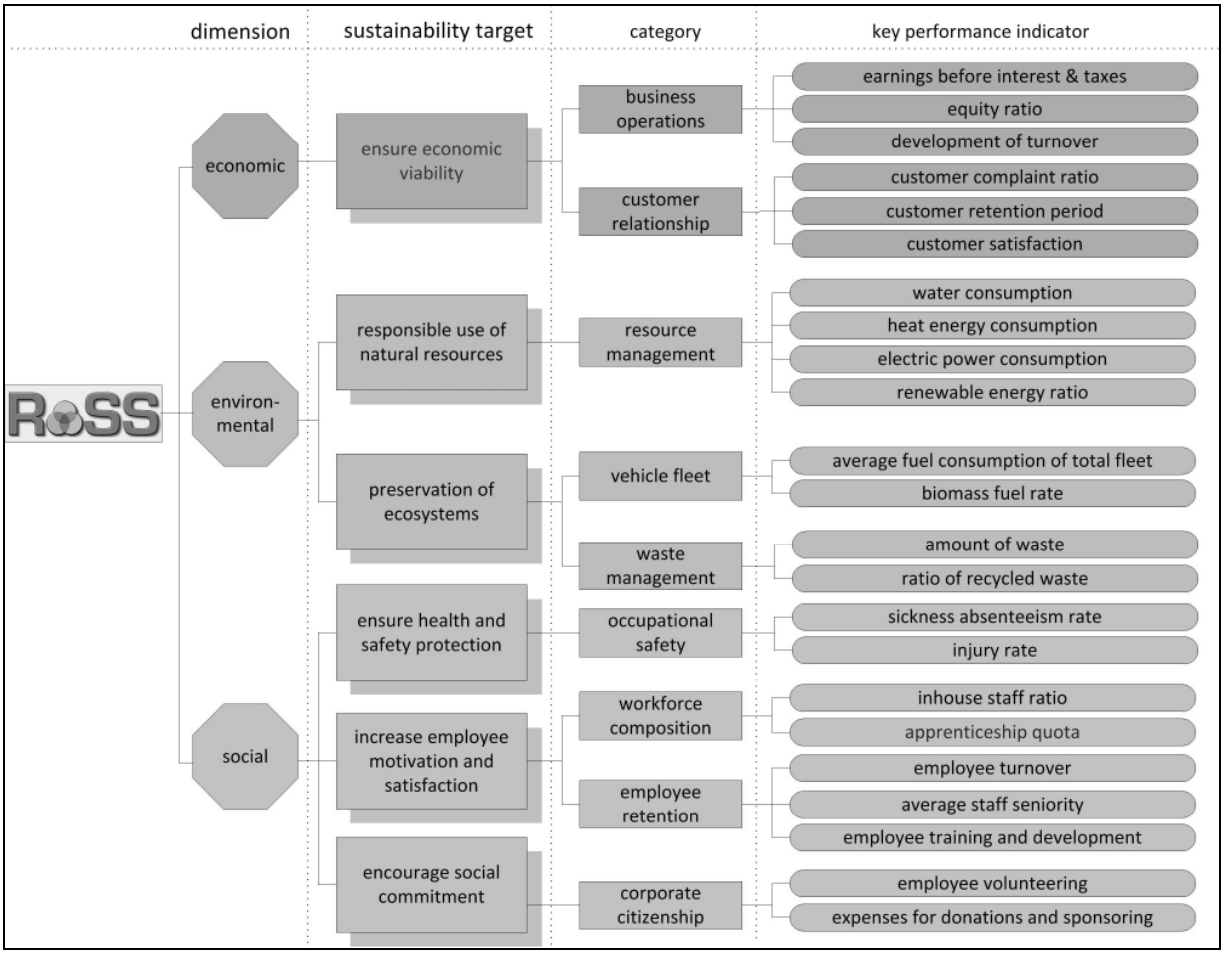

Figure 2: Indicators recommended for quantifying sustainability in FM

III. THE ROSS TOOL

One of the project's goals, as mentioned above, was to design and develop a web-based tool to assess the sustainability of FM processes. The following options support the monitoring of sustainability in FM companies:

a) The users can input their own performance indicator data and thus display their level of sustainability. This option supports the contractual partners in the course of contract negotiations.

The tool can also be used for purely internal monitoring: there is no automatic publishing or sharing of sensitive data.

Table 1 gives an example on how the indicator *Average Training Time* is defined.

Ecological Environmental **Social**

Average Training Time

Category	Staff retention and motivation
Key Performance Indicator	Calculation 1. $average\ training\ time = \frac{hours\ of\ training}{total\ number\ of\ employees}$ 2. $average\ \ expenses\ on\ training\ = \frac{expenditur\ es\ on\ training}{total\ number\ of\ employees}$ Description: 1. Average amount of hours spent on training lessons per employee 2. Average amount of expenditures that was invested in training per employee Following data is needed for calculating Amount of employees (full time equivalents) Amount of hours employees were absent for training reasons Direct costs of training measures Further classifications and basis of comparison: • Gender-specific, hierarchy-specific (e.g. executives and non-executives), type of training, employees' function within the organisation • Time comparison, target-performance-comparison, comparison of organisational units, comparison of qualifications Further information on the calculation Trainings are all educational measures that are conducted internally or externally with the company's staff and are not part of the daily duties of the employees. Aim Depending on internal company policies
Indicator for	• Managing the human and achievement potentials of the company • Increasing employee motivation • Increasing market values of the workforce • Improvement of staff deployment • Enhancement of competitiveness • Development of the entire organisation
Sustainability aspects	Building up the workforce and strengthening the human capital is a vital competitive advantage over to potential rivals. The social sustainability is increased if job trainings and education improve the employees' market value and therefore ensure their employment and thus positively affect the staff's motivation [13]. A company that invests in their employees shows appreciation and respect for their biggest asset and supports the employees' commitment to the company.
Interpretation	By evaluating the training performance, the company's willingness to improve the employee's qualification can be measured. Investments in training affect the economic and social sustainability of employers and employees positively. On the companies' side enhancing the staff qualifications leads to a growth of internal knowledge and hence to an increase of intangible assets. It also serves to develop competitive advantages and the innovative abilities of a corporation. Training and education raise the employees' market value and thus ensure employment [8]. The counterpart of this key performance indicator is the quantitative measurement of trainings: Only the amount of time or money spent on trainings is measured but not the qualitative results which a company wishes to achieve by them. Consequently, the qualitative results of the trainings as well as the economic development should be monitored alongside.

Table 1: Definition of an indicator for social sustainability in FM

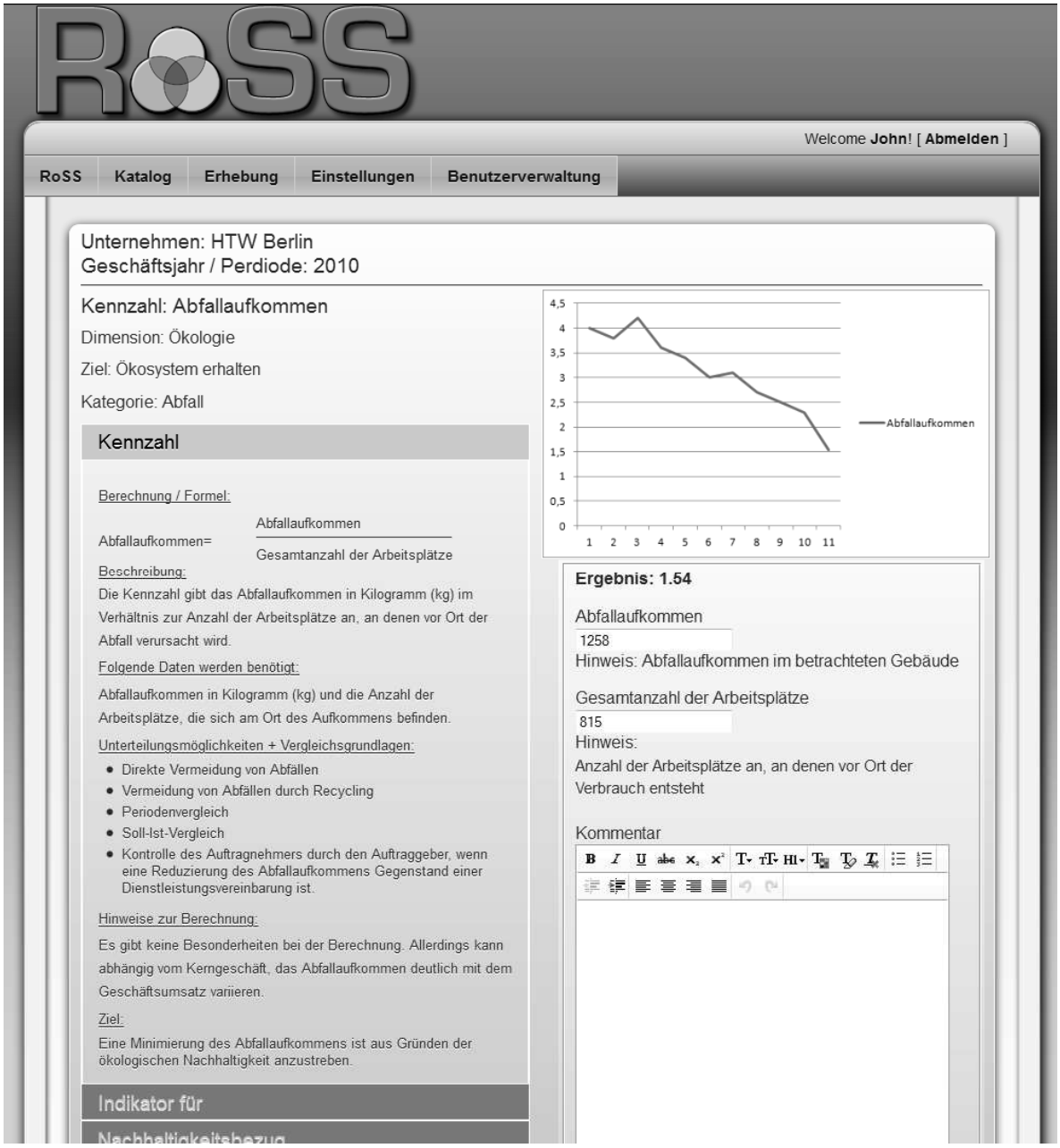

Figure 3: Sample screenshot of the RoSS software (in German)

The software consists of four different modules. The ***base module*** is the key performance indicator catalogue which is available to all users of the web application. Each indicator is defined and described (see figure 3). Registered users have access to the full range of the software application. The ***data acquisition module*** not only enables the input of the relevant data but also calculates the performance indicators.

The ***data acquisition module*** offers three different possibilities for application. The first one is the collection of management-related key performance indicators on the level of the entire organisation. For any financial year the appropriate indicators can be saved together with comments on how to interpret them.

The second application possibility relates to a partnership between two organisations with one

being the provider and the other one the demander of FM services. Such partnership can relate to tenders or contracts. These process-caused indicators are recorded for a partnership within the software. The required key figures may differ depending on the services (e.g. cleaning, security or catering) and the concerned facilities management processes. The relevant indicators are provided by the respective partners and each partner can decide on the indexes they want to disclose to their partner. The same applies to the indicators relevant to the management level. As a result both the management-related and the process-related application are the basis for proving a sustainable partnership and business relation.

The third application possibility meets the demand of controlling the consumption figures of facilities and their comparison. Each object is assigned facility-relevant indicators and key figures such as consumption of water and energy. This object-related application is mainly for in-house use and enables the monitoring of facility related consumption data over time.

The ***third module serves the analysis of key figures*** captured. Statistics and the history of different figures can be generated. The results are presented in a graphical form such as a charts. The resulting reports and statistics can be used for business and sustainability reports. Furthermore, the module enables each organization to run a number of benchmarks. Finally, ***the fourth module serves the management of the KPI catalogue*** and is designated for administrative purposes only. One of the future extensions of the RoSS system concerns the automated data import via a web service, XML or SQL interface from various legacy systems. This would simplify data capture substantially.

Another important issue is to guarantee data security. For this reason RoSS is based on the most recent IT security standards. Apart from the use of SSL (Secure Sockets Layer) as encryption protocol for secure data transfer via the Internet a secure user administration and encryption of the business data are fundamental requirements on the application.

With the development of the software solution certain criteria were identified, which any CAFM (Computer Aided Facility Management) system should fulfil, in order to quantify sustainability. These are defined interfaces for data exchange and a standardized set of rules which ensure transparency between the business partners. The software was developed as an evolutionary prototype (agile software development) and hence the entire development process of the prototype system is designed to take into account rapid changes of requirements and functionalities.

IV. CONCLUSION

Despite numerous efforts to create a universally valid set of indicators for business companies, there still remains uncertainty about how to identify the relevant *key indicators*. From a wide range of possible indicators, RoSS has chosen 30 indicators which are FM specific and can be applied by both real estate industry and service providers. The final set complies with the demand of the Agenda 21 by representing economic, environmental and social aspects. To guarantee the indicators comparability between companies, only relative, quantitative measures are applied. In addition, qualitative data is used to measure the service performance, e.g. the rate of complaint. In order to ensure practicality, the indicators have to be reliable, measurable, industry specific, and finally easy to understand and to communicate. The KPI set has been integrated into a practical web-based software application. The prototype is currently being tested by the project partners and hence there is continuous improvement. The software containing the performance indicators is to be used as a common foundation for contract tendering. This shifts the main price focus of the branch to a more sustainable approach and supplements contract decisions with environmental and social aspects. Depending on the field of business the RoSS user can select the suitable key performance indicators for their objectives. In the future the RoSS tool is supposed to support running contract partnerships and be used as a common platform for exchange and. Furthermore, it can support benchmarking, for the sake of comparison and improvement. Thus the provided frame of key performance indicators initiate the way to more sustainable measures in the world of FM.

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