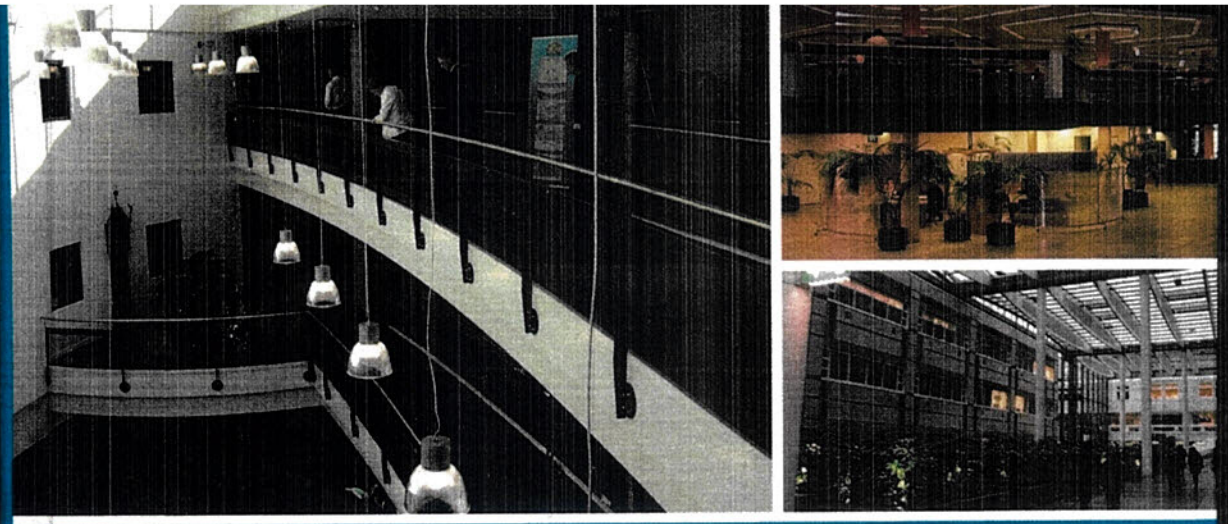


Facilities Management and Corporate Real Estate Management as Value Drivers

How to manage and measure adding value

Edited by Per Anker Jensen
and Theo van der Voordt

First published 2017
by Routledge
2 Park Square, Milton Park, Abingdon, Oxon OX14 4RN

and by Routledge
711 Third Avenue, New York, NY 10017

Routledge is an imprint of the Taylor & Francis Group, an informa business

British Library Cataloguing-in-Publication Data
A catalogue record for this book is available from the British Library

Library of Congress Cataloging in Publication Data
Names: Jensen, Per Anker, editor. | Voordt, D. J. M. van der, editor.
Title: Facilities management and corporate real estate management as value drivers : how to manage and measure adding value / edited by Per Anker Jensen and Theo van der Voordt.
Description: Abingdon, Oxon ; New York, NY : Routledge, 2017. | Includes bibliographical references and index.
Identifiers: LCCN 2016009862| ISBN 9781138907188 (hardback : alk. paper) | ISBN 9781315695150 (ebook : alk. paper)
Subjects: LCSH: Real estate management. | Facility management. | Value.
Classification: LCC HD1394 .F225 2017 | DDC 658.2--dc23
LC record available at https://lccn.loc.gov/2016009862

ISBN: 978-1-138-90718-8 (hbk)
ISBN: 978-1-315-69515-0 (ebk)

Typeset in Galliard
by Saxon Graphics Ltd, Derby

MIX
Paper from responsible sources
FSC® C013604

Printed and bound by CPI Group (UK) Ltd, Croydon, CR0 4YY

Cont

Contents

ding "Added Value"?
t five years ago facility managers
porate management level. Now
value propositions. In Sony, FM
ning part of HR around 2010,
ce of FM in relation to user

nt in connection to the concept

lue gets created.

12 Risk

Per Anker Jensen and Alexander Redlein

Introduction

Risk Management (RM) is a managerial task concerned with continuously monitoring, evaluating and maintaining the risks levels that the company is or may be subject to, and to implementing suitable arrangements to prevent or limit the consequences of unacceptable risks. Such arrangements may typically consist of prevention in the form of security installations and guarding, preparedness in the form of disaster and emergency plans, and delegation of risks to service providers or insurances, which limit the financial consequences for the organisation.

RM is a generic discipline and can be applied to FM and CREM as well. RM has a longer history than FM, but there are clear parallels in the development of the two disciplines. The development in RM over time is illustrated in Figure 12.1.

RM has changed from a mostly technical and operational focus in the 1950s towards an increasingly broad and more strategic management focus. Today, enterprise or company-wide RM is an integral part of the governance structure of many large corporations. From 2008 strategic enterprise RM has been

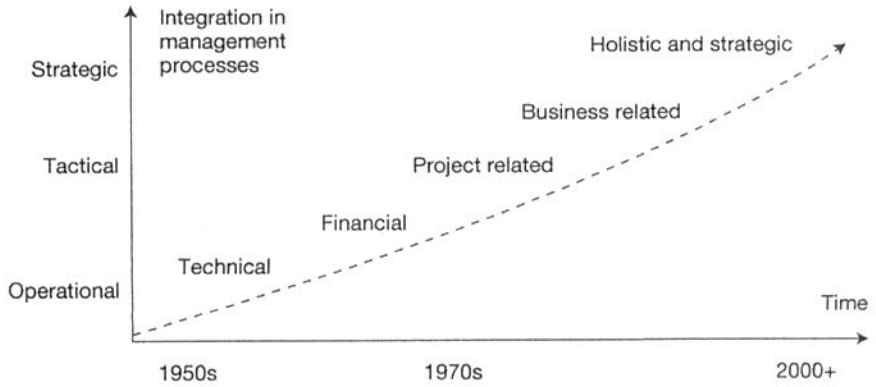


Figure 12.1 The development in RM over time (Ünver and Jensen, 2012)

obligatory for large companies in Europe due to the 8th EU Company Law Directive 2006/43/EC, providing strict requirements that entail mandatory auditing of annual and consolidated financial statements of companies with a public interest (Redlein and Giller, 2008).

Since the 1980s FM has also changed from a mainly operational focus towards an increasingly more tactical and strategic focus, as shown by Pathirage et al. (2008) in their identification of four generations of FM. In the first generation FM was merely considered as an overhead to the organisation and therefore was managed for minimum cost rather than optimal value. The second generation was characterised by an integration of processes between the FM organisation and the organisation's individual businesses. The third generation had a focus on resource and supply chain management, while the fourth generation includes an emphasis on alignment between organisational structure, work processes and the enabling physical environment in accordance with the strategic intent of the organisation.

The European FM standard on Taxonomy includes a so-called central (horizontal) function called Risk, described as "Evaluation and management of risks and threats to the (FM) organization" with a sub-function called Risk policy (CEN, 2011).

The view on risks in relation to the added value of FM/CREM varies a lot. Most Added Value frameworks presented in Chapter 1 include risk-related aspects in some form. The main exception is the CREM model by Anna-Liisa Sarasoja shown in Figure 1.2. The FM Value Map includes risk control in terms of reliability. Risk control was rated as the added value considered most important out of ten parameters in a questionnaire survey among staff in a Dutch bank (Gerritse et al., 2014). In the interview survey by Van der Voordt and Jensen (2014) risk-related aspects were not included in the top five prioritised added values from open questions, but when asked specifically the respondents' views on reliability varied a lot. One view was that reliability is at the lowest level of Maslow's pyramid of needs and therefore is not a motivation factor, which can add value. Another view was that the business continuity has become increasingly important, and for one of the interviewees it had top priority, e.g. regarding fire safety and data security. Another interviewee in a biotech company mentioned that preventing downtime is extremely important, and that compliance with legal requirements has top priority. The increasing focus on the importance of RM within FM practice is underlined by the international service provider ISS publishing a White Paper called "Managing and Mitigating risk within Strategic Facility Management" (Redlein et al., 2014).

When we look at risk in relation to added value of FM and CREM in terms of benefits versus sacrifices, risk control should definitely be seen as a benefit, while risks as such at least constitute potential sacrifices. However, RM should also help organisations to identify and take opportunities according to the Committee of Sponsoring Organizations of the Treadway Commission (COSO, 2004). Facilities managers are, according to Finch (1992), highly risk averse, which means that facility managers are inclined to avoid risk despite the favourable

probability of success. This reflects the supportive nature of FM and contrasts with the risk propensity of a property investor, who sees acquisition and sales of property primarily as a financial opportunity and only secondarily as a risk.

Risks in FM/CREM can be divided into ongoing business risks (e.g. compliance, operations responsibility, business continuity), project-related risks (e.g. budget overrun, delays), and transaction and contract-related risks (due diligence, which will be explained later in this chapter). Several risk factors in relation to FM/CREM are covered by legislation and similar regulations, for instance fire hazards, health and safety, and the external environment. This chapter will focus on business continuity and general business risk factors. Project-related risks are a normal part of project management practice and will not be dealt with specifically. Risk factors related specifically to image, health and safety, asset value and environment are dealt with in other chapters. Due diligence will be mentioned briefly in the section discussing the state of the art, but no KPIs are included.

The chapter provides a state of the art discussion in the next section with the main concepts and definitions related to RM and a literature review of the research on RM in FM/CREM. The following section presents benefits and costs of risk interventions, followed by a section on KPIs and guidelines on how to manage risks in FM/CREM. The chapter finishes with a section about perspectives and the need for new knowledge and development in relation to risk in FM and CREM.

State of the art

Risk Management (RM)

RM can be defined as: "A process where an organisation adopts a proactive approach to the management of future uncertainty, allowing for identification of methods for handling risks which may endanger people, property, financial resources and credibility" (O'Donovan, 1997, cited by Lavy and Shohet, 2010). The International Organization for Standardization (ISO) has issued the 31000 series on RM and a guide with RM vocabulary (ISO/IEC, 2009).

In the general literature on RM it is common to distinguish between Risk Management at the strategic level, concerned with decision making about how to deal with identified risks, and Risk Assessment or Risk Analysis (RA) at a tactical and/or operational level. It is also common to divide the activities in RM and RA into a number of steps as shown in Figure 12.2.

RM has been an area of focus for FM since the early days. In 1987 there were three articles in the journal *Facilities* about RM. All three articles were short and very practice based. The first article in *Facilities* mentioning a research project on RM is by Alexander (1992). Since 1995 there have been a number of research-based articles in *Facilities* and later also some in the *Journal of Facilities Management* and the *International Journal of Facility Management*. A literature review on RM in the FM literature was conducted in 2011 by Ünver and Jensen

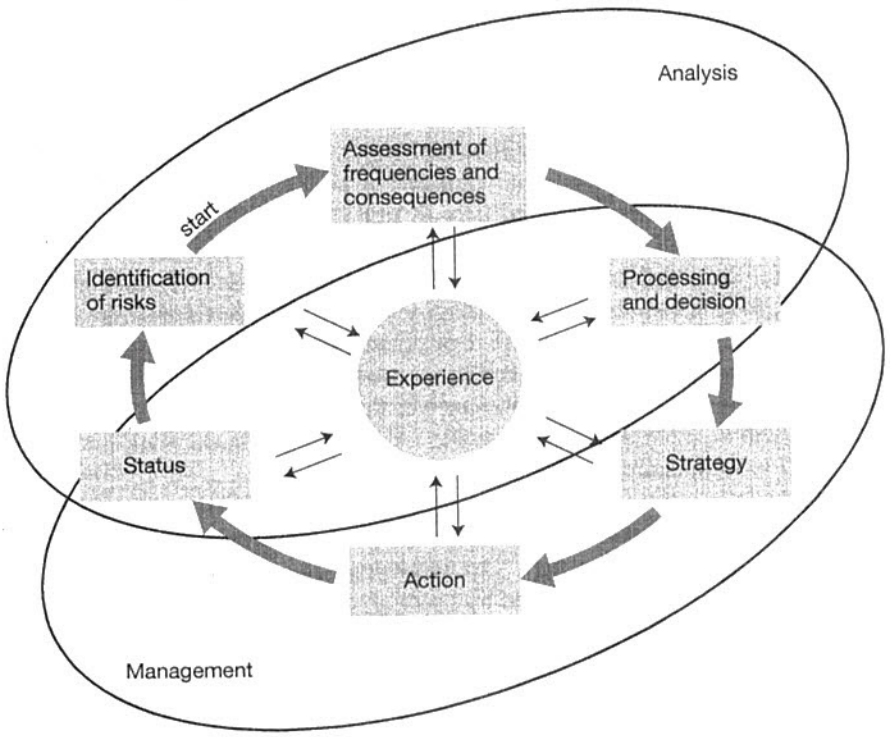
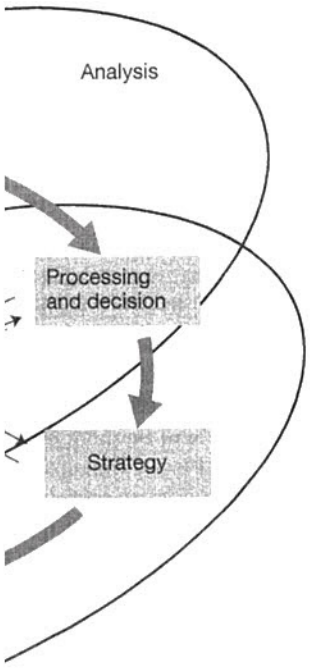


Figure 12.2 Framework for RM and RA activities (Ünver and Jensen, 2012)

(2012), revealed quite a limited number of research papers. The review concluded that the published research in general could be characterised as being very normative and prescriptive. There seemed to be a lack of more descriptive research investigating how facilities managers in practice work with RM in different companies. A new literature review conducted for this chapter shows that this has changed in recent years. A large number of research papers have been published recently, particularly in the *Journal of Facilities Management*, and many of these include descriptive empirical-based research and also the development of several conceptual models. Some of these are referred to in the following.

The treatment of risk in books on FM varies a lot. Among the first, the text book edited by Alexander (1995) includes a chapter on RM with a keynote paper (Dyton, 1995), while the text book by Barrett (1995) does not include the word "risk" in the index – not even in the third edition (Barrett and Finch, 2014). A more recent and practice oriented "desk reference" book by Wiggins (2010) includes specific chapters on Business Continuity, Fire Safety and Legislation, Electrical Supplies and Electrical Safety, First Aid at Work, Asbestos, and Security Management, as well as sections on risk in several other chapters.



r and Jensen, 2012)

search papers. The review
uld be characterised as being
ɔe a lack of more descriptive
practice work with RM in
ucted for this chapter shows
ıber of research papers have
al of Facilities Management,
based research and also the
ɔf these are referred to in the

ot. Among the first, the text
on RM with a keynote paper
'5) does not include the word
(Barrett and Finch, 2014). A
e" book by Wiggins (2010)
Fire Safety and Legislation,
Aid at Work, Asbestos, and
ı several other chapters.

RM strategies

The strategy for RM will typically be differentiated in relation to different types of risk handling. There are a number of generic RM strategies (Jensen, 2008):

- Risk avoidance
- Risk reduction
- Risk transfer
- Risk acceptance.

In the literature there is a distinction between "hazard" and "risk". Hazard is the potential for harm, while risk is a function of the probability of the harm actually occurring and the severity of its consequences (Wiggins, 2010).

Risk avoidance means that the hazard is eliminated. For instance, this can be done by changing a process, so that harmful products, substances or activities are replaced by less harmful ones. Risk reduction means that the hazard still exists but the likelihood of it occurring and/or the consequences are reduced. This can be done by preventive technical systems and by organisational preparedness like emergency planning. Risk transfer means that the hazard is unchanged, but the consequences for the company are reduced by transferring the risk (or some of it) to another party, for instance a service provider or an insurance company. More examples of such measures are provided later in the section on benefits and sacrifices of different types of interventions. Risk acceptance also means that the hazard is unchanged, but the risk is so low that the company is willing to accept the consequences, if the risk event occurs. The level of acceptance depends on the so-called "risk appetite" of the company.

Risk and legislation

There are in a number of areas of legislation related to safeguarding and safety. This concerns especially the following legislation (Jensen, 2008):

- *Construction legislation*, for instance including the building regulations with demands for house and building design, and demands of fire safeguarding, for instance
- *Preparedness legislation*, for instance with regulations for disaster planning, air-raid shelters, fire protection and preparedness in especially inflammable areas of companies, and also fire inspection in buildings with particularly large fire and/or person strain
- *Health and safety legislation*, for instance with regulations for health and safety organisation, machinery safety and design of workplaces
- *Environmental legislation*, for instance with regulations for the labelling of dangerous material and for especially polluting companies.

In relation to fire safeguarding the construction legislation aims to ensure the safety of persons and fire personnel, but not economic values, whereas the preparedness legislation, besides ensuring the safety of persons, also concerns valuable assets.

FM Risk Map

A study on RM in Austria (Redlein et al., 2014) based on the framework of "Company-wide Risk Management" (COSO, 2004) has resulted in the generic FM Risk Map shown in Figure 12.3.

The FM Risk Map builds on the best practice approach of Price Waterhouse Coopers. It defines three areas of potential risks/opportunities:

1 Strategy and goals with the sub-categories Procurement and Capital market
2 Members of staff and organisation with the sub-categories Sales market/customers and Legislative requirements and internal directives
3 Business processes with the sub-categories Technology and Rival businesses.

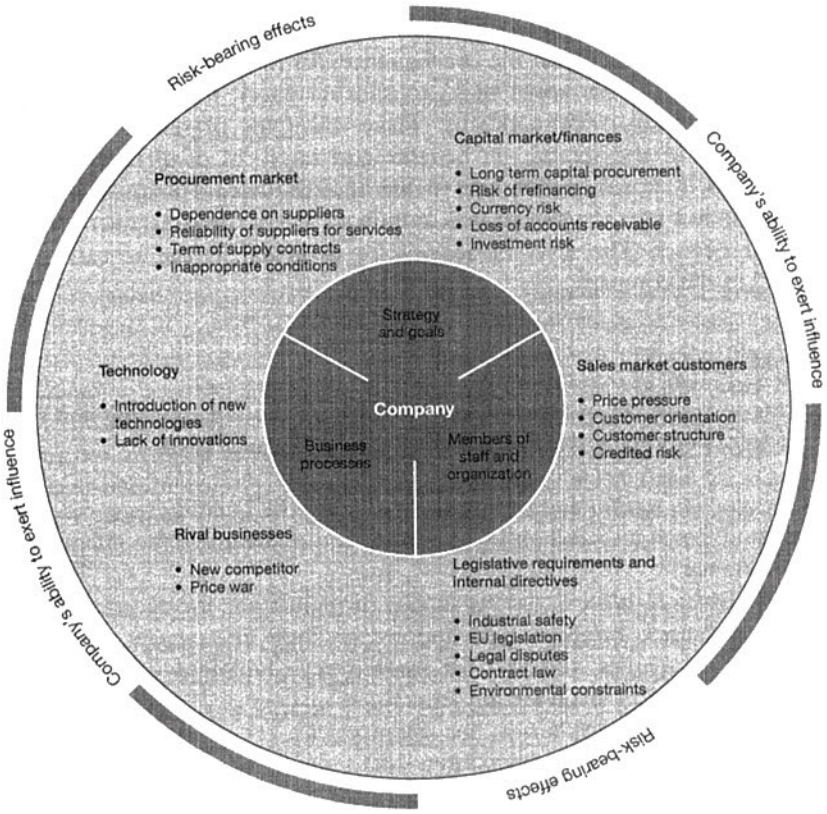


Figure 12.3 FM Risk Map (Redlein et al., 2014)

gislation aims to ensure the
nomic values, whereas the
/ of persons, also concerns

based on the framework of
has resulted in the generic

proach of Price Waterhouse
portunities:

irement and Capital market
b-categories Sales market/
rnal directives
nology and Rival businesses.

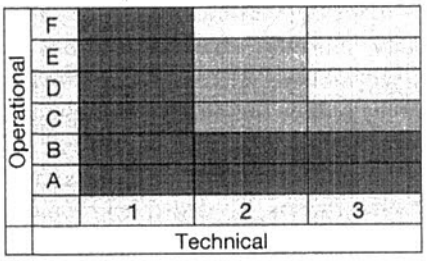
In several case studies examples of these risks/opportunities were identified together with facility managers. The facility managers stated dependency on suppliers and reliability as a major risk, especially if they want to use opportunities like economies of scale and scope and thereby reduce the number of suppliers. This example shows perfectly the trade-offs within RM. The benefits of the opportunity to attain lower prices and less coordination effort with one service provider contradicts with the sacrifice of higher threats, i.e. dependency on one supplier. The capital market involves investment and currency risks but also the opportunity to optimise assets and thereby ease the financing of the whole company (core business and real estate). The sales/customer market is especially important for the real estate business as it has a direct influence on income. The customer structure (one large tenant compared to several small ones) and orientation (offer of additional services to bind the customers) can have an important impact on risks as well. Customer orientation, including additional services to safeguard the customer, can lead to a surplus in income by up to 20% (expert interview with Deutsche Bank). The legislative requirements overlap significantly with the sub-section above on Risk and legislation. The technology sub-category also plays an important role, because it influences usability but also customer satisfaction. Too flexible and expensive technology use is a threat, but the right mix allows flexible usage and increases opportunities (Redlein et al., 2014).

Risk Assessment principles and methods

Risk Assessment (RA) involves identification of hazards and assessing the consequences and likelihood of risk events. It is an analysis of causes and effects. Dyton (1995) divides causes in natural forces, man-made forces and human acts, and the direct effects in liability for damages, property damages, loss of income and bodily injury. Besides these direct effects there can also be wider indirect effects. Dyton (1995) calls these "rippling effects", which start with victims and spread to company, industry and other technologies.

The results of RA are often presented in the form of a risk matrix showing a prioritisation of risks. An example of a risk matrix from the FM department in a large Danish industrial company is shown in Figure 12.4. It was developed in order to increase the transparency of maintenance activities and budget planning. An assessment of technical priority and operational priority according to the pre-defined values in combination determine the urgency/consequence.

Adedokun et al. (2013a and 2013b) carried out literature reviews concerning qualitative and quantitative risk analysis techniques, respectively. They identified a large number of techniques as listed in Table 12.1. For further information we refer to Adedokun et al. (2013a and 2013b).



Legend:
Dark: Critical – as soon as possible
Medium: Serious, expected within 1–2 years
Light: To be performed, but can be posponed without consequential damage or operational impact

Technical priority:
1. High risk of consequential damage
2. Reduced functionality/minor consequential damage
3. Preventive maintenance

Operational priority:
A. Safety issues (avoid personal injury)
B. Regulatory/compliance
C. Risk for production
D. Influence on indoor climate/lower service level
E. Energy efficiency, payback <4 years
F. No operational risks

Figure 12.4 Example of a risk matrix for prioritisation of maintenance activities (reproduced with permission from interviewees Søren Andersen and Søren Samuel Prahl, Interview 8)

Table 12.1 Qualitative and quantitative risk analysis techniques

Qualitative risk analysis techniques	*Quantitative risk analysis techniques*
Assumption analysis	Decision trees
Cause and effect diagrams	Event and fault trees
Checklists	Expected value tables
Data precision ranking	Fuzzy logic
Event and fault trees	Monte Carlo and Latin hypercube simulation
Flowcharts	Multi-criteria decision-making support methods (Analytic hierarchy process)
Influence diagrams	Probabilistic influence diagrams
Probability and impact description	Probability sums
Probability impact tables	Process simulation
	Sensitivity analysis
	System dynamics

Business Continuity Management (BCM)

Business Continuity is the "capability of the organization to continue delivery of products or services at acceptable predefined levels following disruptive incident" (ISO, 2012). Business Continuity Management (BCM) is furthermore defined as a "holistic management process that identifies potential threats to an organization and the impacts to business operations these threats, if realized, might cause, and which provides a framework for building organizational resilience with the capability of an effective response that safeguards the interests of its key stakeholders, reputation, brand and value-creating activities" (ISO, 2012). A research paper about challenges faced by facilities managers in Australasian universities shows that emergency management and business continuity planning was the second most important challenge, with inadequate funding being the most important (Kamarazaly et al., 2013).

Until the terrorist attack in New York on 11 September 2001 BCM mostly resided within the IT department, but since then BCM has increasingly become an important area within FM and CREM. BCM involves a prioritisation of the criticality of both organisational functions and locations. The organisational prioritisation can be made with an "organisational onion" approach, identifying the most critical functions in relation to withstanding downtime, less critical but still important core functions, and non-critical functions. The locations can similarly be divided in "hot" sites with locations in continuous operation, "warm" sites with infrastructure in place for continuous operation at short notice, and "cold" sites that can be modified to suit a specific need (Gill, 2006).

Due Diligence (DD)

The European standard on FM agreements (CEN, 2006) defines Due Diligence (DD) as the "compilation, comprehensive appraisal and validation of information of an organisation at the appropriate stage of the Facility Management agreement required for assessing accuracy and integrity at the appropriate stage of the agreement process". DD is commonly used in major business transactions like mergers and acquisitions of companies and buying and selling real estate portfolios. The purpose of DD is to disclose major risks in relation to existing transactions and contracts. DD can include financial, legal, business, technical and environmental aspects. DD is often conducted by a team of experts from a group of specialised consulting companies.

Technical Due Diligence (TDD) is a special form of condition assessment of property (Jensen and Varano, 2011). TDD can be defined as "The process of systematic review, analysis and discovery in which a prospective purchaser, occupier or financier of property gathers information about the physical characteristics of the property in order to make an informed assessment of the risks associated with the transaction" (RICS, 2009). Varano (2009) investigated the use of TDD in two Danish FM supplier companies. The cases showed that a consultant can support the starting phase of a FM contract by conducting a survey of the property before signing a contract to determine the necessary costs to manage the building, or after signing a contract as guarantee of the physical condition of the property for the client of the FM supplier.

Benefits and costs

A number of typical types of interventions that FM/CREM can implement to add value in terms of RM and business continuity is shown in Table 12.2. A general management task for all interventions is to develop policies and ensure top management commitment. The management tasks mentioned in Table 12.2 are those specifically related to each intervention. The added value is specified as the benefits and the sacrifices for each type of intervention. Here sacrifices mainly regard the costs of interventions.

Table 12.2 Interventions, management, benefits and sacrifices of RM

Interventions	*Management*	*Benefits*	*Sacrifices*
Remove hazards	Change process/product Project Management	Risk avoidance	Cost of project, including disposal
Emergency planning	Engage the organisation Negotiate with authorities Arrange training and rehearsals	Risk reduction/ preparedness	Cost of planning and training etc.
Recovery planning	Establish and train teams Arrange rehearsals	Risk reduction/ preparedness	Cost of planning and training etc.
Security system installation	Ensure procurement, training and maintenance	Risk prevention/ reduction	Cost of installation, staff and monitoring
Back-up supply installation	Ensure procurement, training and maintenance	Risk and down-time reduction	Cost of installation, staff and monitoring
Insurance	Ensure procurement and administration	Risk transfer	Cost of insurance and procurement etc.
Outsourcing	Ensure procurement and administration/supervision	Risk transfer	Cost of contract and procurement etc.

Interventions that avoid risks can involve completely removing a hazard, for instance the renovation of buildings to remove harmful substances like asbestos or PCB in building components, or changing processes to substitute dangerous chemical products with less harmful products. Such interventions are typically implemented as individual projects or as programmes of projects rolled out over the property portfolio belonging to the corporation.

Risk reduction can take place by many different types of interventions. Such interventions can be organisational like emergency and recovery planning, but they can also be mostly technical like security systems, for instance the installation of video monitoring, and the installation of back-up supply systems, for instance Uninterrupted Power Systems (UPS) and diesel generators. These types of interventions are also typically implemented as projects, but unlike pure risk avoidance projects they will need ongoing monitoring, updating and maintenance.

Interventions with risk transfer can include insurance and outsourcing. Risk is in both cases transferred to a third party, but insurance is solely related to risks, while outsourcing involves many other factors than risk. This makes it difficult to make up the specific cost of the risk transfer in outsourcing. Both of these interventions include a procurement process but also ongoing administration and supervision. A limitation of risk transfer often is that even though the company can obtain an economical compensation for the direct cost of damage and maybe even for loss of production, the wider indirect "rippling" effects, for instance loss of market share, will not be avoided or compensated.

fices of RM

	Sacrifices
nce	Cost of project, including disposal
ion/ ss	Cost of planning and training etc.
ion/ ss	Cost of planning and training etc.
tion/	Cost of installation, staff and monitoring
own- ion	Cost of installation, staff and monitoring
r	Cost of insurance and procurement etc.
r	Cost of contract and procurement etc.

ly removing a hazard, for ful substances like asbestos es to substitute dangerous interventions are typically of projects rolled out over

pes of interventions. Such nd recovery planning, but systems, for instance the of back-up supply systems, d diesel generators. These ed as projects, but unlike monitoring, updating and

nce and outsourcing. Risk nce is solely related to risks, risk. This makes it difficult outsourcing. Both of these so ongoing administration n is that even though the r the direct cost of damage lirect "rippling" effects, for compensated.

Table 12.3 Average length of business interruptions and their causes (Wiggins, 2014)

Cause of business interruption	*Average length of interruption*
Fire	28 days
Theft	26 days
Lightning	22 days
IT failure	10 days
Flooding	10 days
Power failure	1 day

Research shows, according to Wiggins (2014), that a company will experience a major disruption about once every four years. 57% of all business disasters are IT-related and 10% are due to power failures. The average lengths of business interruptions are shown for a number of different causes in Table 12.3.

How to measure and manage

Key Performance Indicators

Typical general KPIs for RM are cost related, for instance total risk expenses, insurance costs, emergency costs and the cost of RM activities. Such costs can be measured as ratios of total turnover or budget for an organisation or a project. In relation to business continuity KPIs often concern time, for instance uptime (the opposite of downtime) and recovery time.

We suggest the following top five KPIs for risks:

- Uptime of critical activities as percentage of total time
- Total risk expenses as percentage of company turnover
- Total insurance expenses as percentage of company turnover
- Total damage prevention expenses as percentage of company turnover
- Total actual damage expenses as percentage of company turnover.

How to manage risks

The main benefit of risk control is a high level of business continuity, which is best measured by uptime. The main purpose of BCM is precisely to ensure a high level of uptime. The most important interventions to ensure uptime are emergency and recovery planning and the installation of back-up supply systems, but also other interventions aimed at risk avoidance and risk reduction, like the internal control systems mentioned below, can contribute to increased uptime. Risk transfer by insurance has little effect on uptime, while risk transfer by outsourcing can have an effect, if the external party has special capabilities to ensure uptime.

The main sacrifice of risk control regards the required expenses. As a basis for the development of RM policies it can be useful to make up the total risk

expenses. They include expenses for damage prevention, insurance, and recovery and repair after actual damages. Increased expenses for damage prevention will normally lower the expenses of the other areas. The typical correlation between risk expenses and safeguard level is illustrated in Figure 12.5.

It appears the total risk expenses have a typical minimum point. In an overall evaluation other conditions than the purely financial ones must be included. For instance, considerations for person risk may imply a higher safeguard level for specific hazards. The risk level in such cases is often based on the principle of ALARP – As Low As Reasonably Practicable – which means that the cost involved in reducing the risk further would be grossly disproportionate to the benefit gained (Faber and Stewart, 2003). Comprehensive damages can also imply considerable indirect consequences such as the delay of development projects and negative publicity. In order to make up total risk expenses it is necessary to continuously record and calculate the actual damages. This concerns both the insured and the non-insured damages. Such a recording is also an important basis to be able to prioritise damage prevention.

In spite of the correlation between expenses for damage prevention and insurance, which is shown in Figure 12.5, it can be difficult to gain a premium reduction on continuous insurances from increased investments in damage prevention. From experience it is not possible to get information from an insurance company about the discount on the premium one may gain from installation of a sprinkler system in a building, for instance. The insurance companies refer to the fact that the premium is determined on the basis of an overall risk assessment (Jensen, 2008).

On the other hand, large savings can be obtained from professional procurement of insurances in which the real and possible planned level of damage prevention is included as part of the basis for procurement. It can be recommended

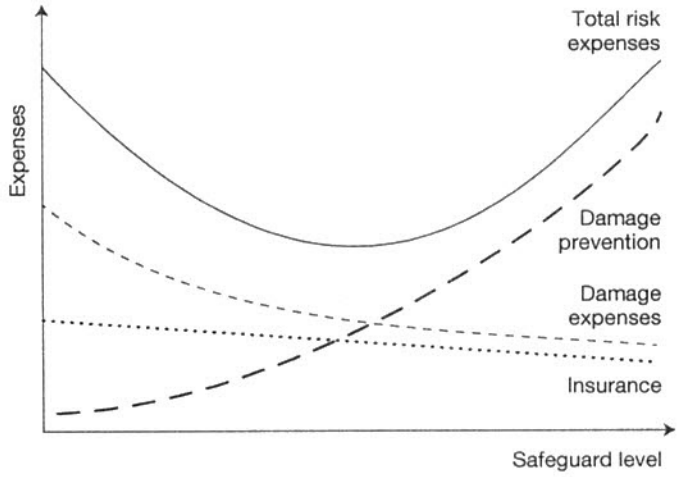


Figure 12.5 Correlation between risk expenses and safeguard level (Jensen, 2008)

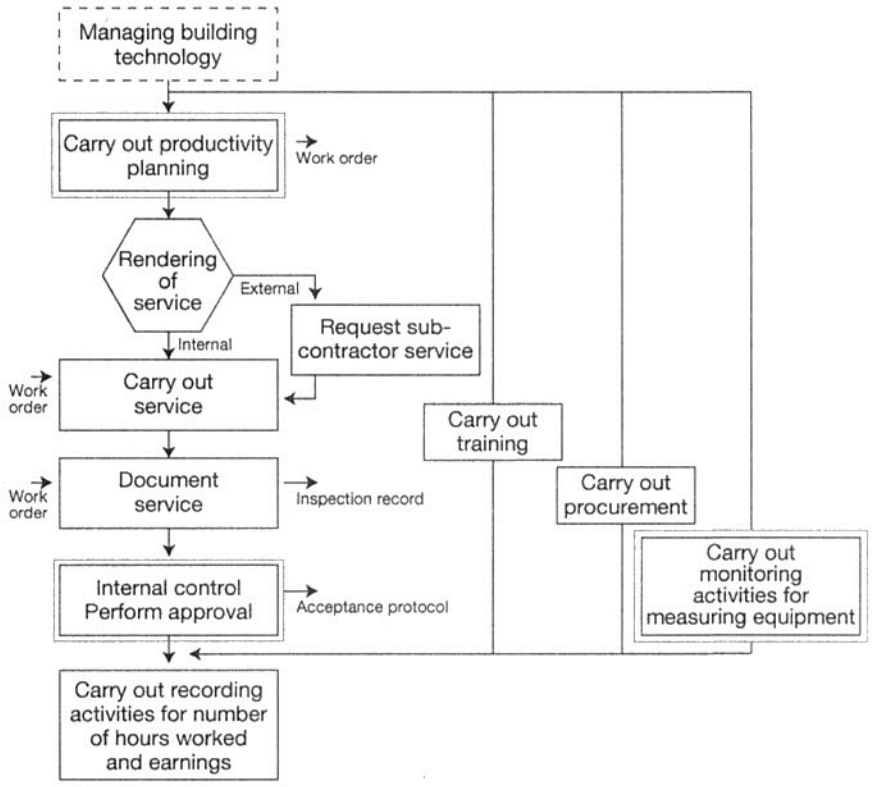


Figure 12.6 Building a technology management process with ICS activities (Redlein et al., 2014)

to engage an insurance broker to assist in preparation and implementation of insurance procurement, especially the first time it is done. Often considerable savings in the insurance expenses can be achieved by such a process (Jensen, 2008).

Internal Control System

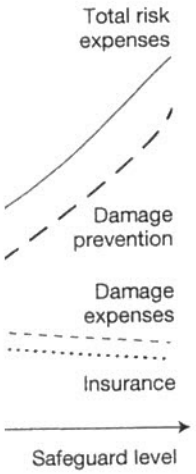
The earlier mentioned study from Austria (Redlein et al., 2014) recommends that measures to reduce risk are integrated in a company's Internal Control System (ICS). An example of how this can be carried out in relation to a process concerning managing building technology is shown in Figure 12.6.

Perspectives

There is a need for further research to collect quantitative data about the costs and benefits of typical risk reducing or risk avoiding interventions in FM/CREM, as well as exploring best practices (sound balance between costs and

ı, insurance, and recovery
r damage prevention will
pical correlation between
e 12.5.
mum point. In an overall
nes must be included. For
ıigher safeguard level for
based on the principle of
ıich means that the cost
y disproportionate to the
ıensive damages can also
he delay of development
ɔ total risk expenses it is
al damages. This concerns
ch a recording is also an
tion.
· damage prevention and
ifficult to gain a premium
ł investments in damage
get information from an
ıium one may gain from
· instance. The insurance
rmined on the basis of an

tained from professional
ɔle planned level of damage
ınt. It can be recommended



ıard level (Jensen, 2008)

benefits) and worst cases (too little intervention resulting in huge hazards, or too costly interventions to reduce small risks).

In recent years awareness of climate change has increased the focus on RM in relation to the resilience of the built environment. This is an increasingly popular new research area, and it also forces property owners and FM/CREM organisations to take a more long-term perspective. Portfolio management of property is becoming more important due to this, and methods like forecasting, back-casting and scenario planning are becoming more commonly used.

Acknowledgement

The authors want to thank senior researcher Frank Markert, DTU Management Engineering, Technical University of Denmark, for his review of and useful comments on an early version of this chapter.

References

Adedokun, O.A., Ibironke, O.T., Dairo, D.O., Aje, I.O., Awodele, O.A., Opawole, A.D., Akinradewo, O.F. and Abiola-Falemu, J.O. (2013a) 'Evaluation of qualitative risk analysis techniques in selected large construction companies in Nigeria', *Journal of Facilities Management*. 11 (2), pp. 123–135.

Adedokun, O.A., Ibironke, O.T., Dairo, D.O., Aje, I.O., Awodele, O.A., Opawole, A.D., Akinradewo, O.F. and Abiola-Falemu, J.O. (2013b) 'Evaluation of quantitative risk analysis techniques in selected large construction companies in Nigeria', *Journal of Facilities Management*. 11 (4), pp. 354–368.

Alexander, K. (1992) 'Facilities Risk Management', *Facilities*. 10 (4), pp. 14–18.

Alexander, K. (Ed.) (1995) *Facilities Management – Theory and Practice*. London: E&FN Spon.

Barrett, P. (1995) *Facilities Management: Towards Best Practice*, Oxford: Blackwell.

Barrett, P. and Finch, E. (2014) *Facilities Management: The Dynamics of Excellence*, Third Edition. Oxford: Wiley Blackwell.

CEN (2006), *Facility Management – Part 2: Guidance on how to prepare Facility Management Agreements*. European Standard EN 15221-2. European Committee for Standardization

CEN (2011) *Facility Management – Part 4: Taxonomy, Classification and Structures in Facility Management*. European Standard EN 15221-4, European Committee for Standardization.

COSO (2004) E*nterprise Risk Management – Integrated Framework. Executive Summary*. Committee of Sponsoring Organizations of the Treadway Commission, September.

Dyton, R. (1995) 'Practical Risk Management', keynote paper in Alexander, K. (Ed.) *Facilities Management – Theory and Practice*, London: E&FN Spon.

Faber, M.H. and Stewart, M.G. (2003) 'Risk assessment for civil engineering facilities: Critical overview and discussion', *Reliability Engineering and System Safety*, 80 (2), pp. 173–184.

Finch, E. (1992) 'Risk and the Facilities Manager', *Facilities*. 10 (4), pp. 10–13.

Gerritse, D., Bergsma, F., and Groen, B. (2014) 'Exploration of added value concepts in facilities management practice: Learning from financial institutes', in Alexander, K.

(Ed.) *Promoting Innovation in FM. Research Papers. Advancing knowledge in FM. International Journal of Facilities Management, EuroFM Journal.* March.

Gill, T.J. (2006) 'Workplace continuity: How risk and technology will affect facilities strategy', *Journal of Facilities Management*, 4 (2), pp. 110–125.

ISO (2012) *Societal security – Business continuity management systems – Requirements.* International Standard IS0 22310. International Organization for Standardization.

ISO/IEC (2009) *Risk management – Vocabulary.* Guide 73. International Organization for Standardization and International Electrotechnical Commission.

Jensen, P.A. (2008) *Facilities Management for Practitioners and Students*, Centre for Facilities Management – Realdania Research, DTU Management Engineering. Lyngby, Denmark.

Jensen, P.A. and Varano, M. (2011) 'Technical Due Diligence: A study of current practice in assessment of buildings', *Journal of Performance of Constructed Facilities*, 25 (3), pp. 217–222.

Kamarazaly, M.A., Mbachu, J. and Phipps, R. (2013) 'Challenges faced by facilities managers in the Australasian universities', *Journal of Facilities Management*, 11 (2), pp. 136–151.

Lavy, S. and Shohet, I.M. (2010) 'Performance-Based Facility Management – An Integrated Approach', *International Journal of Facility Management,* 1 (1), pp. 1–14.

Pathirage, C., Haigh, R., Amaratunga, D. and Baldry, D (2008) 'Knowledge management practices in facility organisations: A case study', *Journal of Facilities Management*, 6 (1), pp. 5–22.

Redlein, A. and Giller B. (2008) 'Reference Processes and Internal Control Systems within Facility Management', in *European Facility Management Conference 2008 – Conference Proceedings*, pp. 181–191

Redlein, A., Redlein, B., Søborg, A. and Poglitsch, R.O. (2014) *Managing and Mitigating Risk within Strategic Facility Management*, ISS White Paper, August.

RICS (2009) *Technical Due Diligence of Commercial & Industrial Property.* London.

Ünver, K. and Jensen, P.A. (2012) 'Risk Management from Corporate and FM Perspectives: Two case studies', *Proceedings of the 11th EuroFM Research Symposium*, 24–25 May, Copenhagen, Denmark. Centre for Facilities Management – Realdania Research, DTU Management Engineering, and Polyteknisk Forlag, Lyngby, Denmark.

Van der Voordt, T. and Jensen, P.A. (2014) 'Adding Value by FM: Exploration of management practice in the Netherlands and Denmark', in Alexander, K. (Ed.) *Promoting Innovation in FM. Research Papers. Advancing knowledge in FM. International Journal of Facilities Management, EuroFM Journal.*

Varano, M. (2009) *Technical Due Diligence – A Comparison of Best and Current Practice.* Master's thesis, Technical University of Denmark, Lyngby, Denmark.

Wiggins, J.M. (2010) *Facilities Manager's Desk Reference.* Chichester: Wiley-Blackwell.

objectives are known to the
high priority in the FM unit.
! for a more holistic evaluation

communication with your

ı reporting on projects.

ant in connection with the

is interesting to discuss. What
ıve reception staff inhouse or
or IT systems for maintenance,

13 Cost

Alexander Redlein and Per Anker Jensen

Introduction

Facility Management (FM) is a key function in managing facility services and working environments to support the core business of the organisation. A lot of companies have recognised FM as an important management strategy capable of reducing the costs of facilities (Chotipanich, 2004). A discussion is taking place about the added value of FM as a function within organisations and the services they provide. A clear expression of this is the large number of FM-related studies that have been conducted focusing on different aspects of FM and their added value for primary processes, quality, time, risk and relationship quality (Kok et al., 2011; Jensen and van der Voordt, 2015).

Since 2005 the Vienna University of Technology (TU Vienna) has analysed the demand side of FM on a yearly basis in different European countries such as Austria, Germany, Bulgaria, Italy, Romania, Spain, Turkey and the Netherlands (companies were selected randomly). The research has been based on a (standardised) questionnaire survey. One of the attempts to prove the profitability and efficiency of FM was performed by Susanne Hauk in her PhD study on "Wirtschaftlichkeit von Facility Management" (Hauk, 2007). Another research project at the TU Vienna analysed whether there are differences regarding efficiency and effectiveness according to whether a separate FM department has been established or not. The authors also defined additional parameters that influence the efficiency of FM. Examples of these parameters are: areas of cost saving, availability of cost and building data, and usage of CAFM (Computer Aided Facility Management). The study found that companies with their own FM department tend to achieve savings within more facility services areas (Redlein and Sustr, 2008).

This chapter presents further results of the actual surveys from the TU Vienna. The researchers used statistical models to find out whether there is a (significant) correlation between different variables/parameters. In the literature there are three major research paradigms for collecting the required data: quantitative research methods, qualitative research methods, and mixed method research. Quantitative and qualitative methods both have particular strengths and weaknesses. For this reason the authors used a mixed methods approach.

The chapter mainly focuses on cost savings, particularly concerning whether organisations with a FM department have more facility services with savings than organisations without a dedicated FM department, and whether outsourcing can be seen as a cost-saving approach.

State of the art

According to different publications (e.g. Scharer, 2002) it is possible to save between 10% and 30% of the costs of buildings through the (efficient) use of FM. In most cases, figures about the economic effects/benefits of FM are based on the study of a single company, or else the data presented is not specified in detail. In both cases, data cannot be used for a general proof of the economic efficiency/value added of FM (Zechel et al., 2005; Scharer, 2002). The figures are also subject to large variations. Therefore there is a need to determine the value added of the use of FM, particularly FM departments, and the parameters influencing the magnitude of this value added with the help of scientific models and methods. For this reason annual surveys have been conducted in various countries. The results were used to define the benefits and sacrifices of typical interventions.

The surveys from TU Vienna mainly focus on cost reduction and the increase of productivity of the FM organisation itself on the one side, and cost drivers on the other side (Mierl, 2012). Cost drivers require differentiated cost planning and cost control. They are measures of cost causation and resource use and output (Leidig, 2004).

The biggest cost drivers of the surveyed countries (measured by number of mentions) include areas such as energy, maintenance/repair, safety, cleaning and launching new software. The most relevant areas of cost savings (also by number of mentions) were areas such as energy, cleaning, maintenance/repair and personnel. Savings were mainly possibly through new types of contract, improved rates, technical upgrades, reorganisation and utilisation of synergies.

The most named areas in which an increase in productivity could be observed (in terms of number of answers) are administration, personnel, safety, and maintenance/repair. Reasons for an increase in productivity are: process optimisation, work utilisation, utilisation of synergies and personnel/employee workload optimisation.

Impact of an own FM department

Based on the data, several hypotheses concerning savings through the use of FM could be validated. The hypothesis is that companies with an own FM department tend to have a higher number of facility services with savings (areas of cost savings) than companies without an own FM department. An own FM department allows better management of facility services (e.g. cleaning, maintenance/repair) and guarantees the best realisation of optimal real estate management. As a result, economic optimisations in different facility

services can be performed (Hauk, 2007). In relation to the typology of interventions in Chapter 2, this will often involve changing the interface with core business.

The number of facility services with savings (areas of cost savings) was analysed in detail. The Wilcoxon Test was used for comparing the average performance of two groups to verify whether there is a difference between two populations on the basis of random samples from these populations (Dodge, 2008). The data for Romania 2013 and Austria 2012 will be considered; see Table 13.1.

The results of the test show that there is a statistically significant difference ($p < 0.05$) between the two medians, which means that there is an effect. Companies with their own FM department tend to have more areas of cost saving than companies without their own FM department. A company's own FM department manages the different facility services better. In addition, synergies between the different services can be leveraged through the central management of facility services. This statistical model found that a company's own FM department allows better management of facility services, and therefore economic optimisation and cost savings in different facility services such as cleaning or maintenance/repair can be performed.

The proportion of companies with their own FM department is at a high level all over Europe. FM is a very important tool to achieve an increase in (annual) savings and productivity. According to a statistical analysis based on the data from the studies an inhouse FM department had positive effects on annual savings such as energy and cleaning. FM also leads to an increase in productivity. The most named areas were administration, personnel and maintenance/repair. The study proved that companies in Austria and Romania with their own FM department tend to achieve savings within more facility services in comparison with companies without their own FM department. An inhouse FM department also leads to higher annual savings. In both cases the Wilcoxon Test shows a significant result. That means that there is a (statistically) significant difference between the two groups (FM department yes/no) and the tested variables (annual savings, facility services with savings).

Table 13.1 Number of facility services with savings – FM department

	Austria 2012		*Romania 2013*	
	FM department	*Without FM department*	*FM department*	*Without FM department*
N	63	8	10	1
Mean*	1.86	.88	1.70	1.00
Median*	2.00	1.00	2.00	1.00
Std. Deviation*	.998	.641	.674	–
p – value	= 0.000000025466		P = 0.011412	

Outsourcing as cost-saving approach

A commonly used method to achieve cost reductions is outsourcing. In relation to the typology of interventions in Chapter 2 this concerns changing the supply chain.

The International Facility Management Association (IFMA) conducted surveys on the practice of outsourcing in the FM field in 1993, 1999 and 2006. The results reveal that over the years the use of out-tasking (hiring individual, specialised vendors to provide one or more FM functions) has decreased from 91 per cent of the responding companies in 1993 to 77 per cent in 2006. The steepest decline was from 1999 to 2006, with a corresponding increase in the number of companies that are outsourcing (hiring full-service, single vendor organisations to provide many services bundled together). The most commonly outsourced/out-tasked services are housekeeping, architectural design, trash and waste removal and landscape maintenance. The most important criteria when deciding whether or not to outsource are financial in nature: controlling costs, freeing capital funds, improving ROI, and reducing turnover and training costs. Over half of the companies surveyed saved money through outsourcing/out-tasking, and a third saw a quality improvement. Two out of five companies brought services back inhouse after outsourcing the service. Typically the reasons for this were to regain control of the service, either in terms of costs, quality or response time. One half of the companies consolidated their vendor base to use fewer service providers (IFMA, 2006).

The fundamental argument for introducing outsourcing and market competition to management services is that such a delivery approach can save costs by reducing bureaucratic inefficiencies, allowing large organisations and governments to access economies of scale, bypassing costly labour and generating competition among service providers. Competitive tendering can, according to the literature findings, yield 10 per cent to 30 per cent in cost savings, with no adverse effect and sometimes an improvement in service quality (Lam, 2011).

Several studies on the risk factors associated with outsourcing functions have been reported. Kremic et al. (2006) carried out a survey of risk factors for outsourcing IT functions. These risk factors include: unrealised savings with a potential for increased costs; employee morale problems; over-dependence on a supplier; loss of corporate knowledge and future opportunities; and inadequate requirement definitions. Ikediashi et al. (2012) analysed the risks associated with outsourcing FM services in Nigeria. Findings from the study reveal that poor quality of services was rated the most critical, security issues was rated second, followed by the inexperience of the client.

The areas of outsourced facility services in surveys from Austria, Spain and Germany in 2014 are shown in Figure 13.1. The degrees of outsourcing of cleaning and technical maintenance are among the highest in all three countries with levels of well over 80%. Outsourcing of heating/ventilation/air conditioning is also high in all three countries, while the results for other services vary considerably between the countries or are generally much lower.

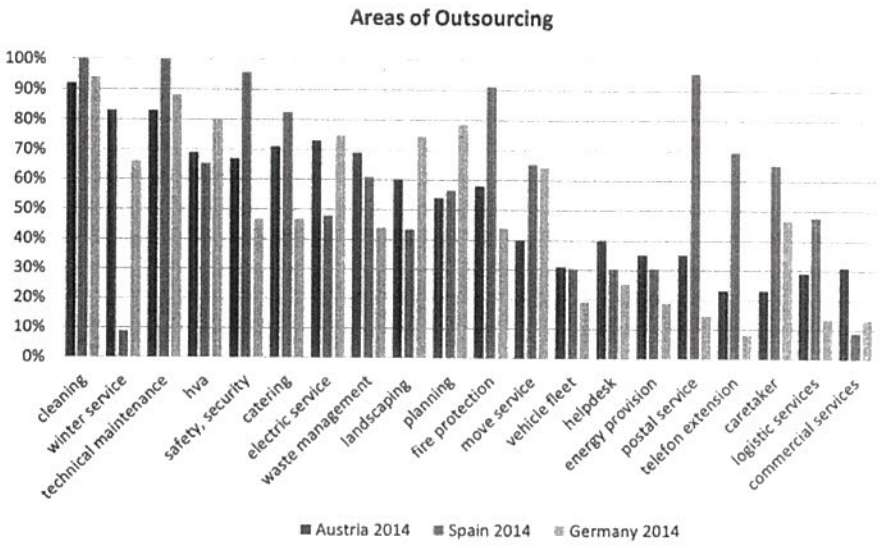


Figure 13.1 Outsourced FM Services in Austria, Spain and Germany 2014

The theoretical background underlines the assumption that organisations who outsource their facility services gain more added value than organisations that provide their facility services inhouse. That is why the researched organisations were asked how they control their FM functions and which percentage they source out (Smit, 2008). To see if the degree in outsourcing of facility services has an effect on the added value of an organisation, the degree of outsourcing is compared with the parameter "annual savings". A regression analysis was used to make quantitative estimates of the relationship between these two variables/parameters. The dependent variable was the annual savings (in %) and the independent variable was the degree of outsourcing.

The hypothesis that a larger degree of outsourcing result in more added value, i.e. a higher degree of perceived annual savings, is only partially confirmed. An increasing degree of outsourcing does indeed lead to a slight increase in annual savings, but there is no statistically significant correlation between the degree of outsourcing and the annual savings, i.e. the degree of outsourcing has only a weak effect on the annual cost savings. Only 0.9% of the variance in annual savings is explained by the outsourcing degree. It can be concluded that there is no significant relation between the degree of outsourcing in an organisation and the way respondents perceive the added value of their FM organisation.

As mentioned before, many facility services such as cleaning, safety, winter servicing and catering are outsourced (see Figure 13.1). Therefore, outsourcing is still an important strategy for companies. The number of external service providers in the years from 2010 to 2012 is shown in Table 13.2.

The results show a change from the majority having more than ten external providers in 2010 towards most of the surveyed companies having between three

Table 13.2 Number of external service providers in Austria 2010–2012 (Redlein and Zobl, 2014)

	1–2 providers	*3–10 providers*	*More than 10 providers*
2012	6%	63%	31%
2011	6%	68%	26%
2010	12%	41%	47%

and ten external service providers. This reduction in the number of commissioned service providers shows the tendency to engage external service providers with an integrative service offer. The statistical analysis of the relation between annual savings and number of external service providers shows that the annual savings for companies with three to ten external service providers are highest, and that they decrease with an increasing number of external service providers. An increasing or high number of external service providers does not automatically generate more cost savings (annual savings).

The surveys also showed that the share of companies with only one or two external service providers under contract remains at a low level. In 2010 the share of companies with only one or two external service providers under contract was 12%. This share of companies under contract decreased in 2011 and 2012 to 6%. Thus, at least in Austria and the EU countries that have been analysed, there is no trend towards only one external service provider with an integrative service offer.

It might be assumed that the less external service providers a company has to commission, the less complex is the internal administration and coordination of contracts in connection with external service providers. Indirect costs may include contract monitoring and oversight, contract generation and procurement, intangibles and transition costs. These costs may increase with an increasing number of external service providers and reduce the annual savings. Another view is that external service providers with an integrative service offer cannot provide the full range of services required of companies that outsource. They offer a range of disparate services and fail to do anything well (Drion et al., 2012). If important functions are being outsourced, an organisation is heavily dependent on the external service provider. Risks such as bankruptcy and financial loss cannot be controlled. These risks increase with a decreasing number of external service providers. This may also reduce the annual savings of the demanders. Companies have to find a trade-off between the costs of complex administration and coordination of contracts for a high number of external service providers and the dependence on the external service provider.

Benefits and sacrifices

Based on the results of the surveys, the statistical models and expert interviews, practical examples of interventions in the area of cost saving and increase of productivity are:

- *Establish own FM department:* As an own FM department manages the different facility services better and leverages through the central management synergies between the different services, as a first step companies should establish their own internal FM departments.
- *Reorganisation:* Most companies concentrate on process optimisation mainly for the core processes. Secondary processes are not the focus of optimisation projects. To use methods like business process optimisation for secondary processes as well can reduce costs and increase productivity.
- *New type of contract:* The use of results-orientated contracts instead of task-oriented ones makes it possible for the service provider to use innovative production methods. This type of contracts makes investments in new technology more reasonable.
- *Rates:* The use of benchmarking pools and the comparison and evaluation of hourly and m^2 rates offered makes it possible to save costs. However, it is also necessary to validate the offers. That means analysing whether the tasks can be carried out within the given cost framework. Collective agreements provide information about hourly wage rates and help to validate the offers.
- *Technical upgrade:* Investments in energy saving technology (LED, free cooling chillers, thermal isolation) lead to lower energy consumption, reduction of CO_2 emissions and cost reduction. Also, investment in automation (electronic entrance systems) reduces personnel costs. Due to high wages especially in Western Europe, the payback period is rather short.
- *Utilisation of synergies:* The reduction of service providers can lead not only to economies of scale but also to economies of scope. According to Redlein and Pichlmüller (2007) 80% of all routine inspection can be done by additionally trained personnel. Therefore job enlargement in the area of security etc. can be used to leverage economy of scope and thereby increase productivity. Persons carrying out security patrols can also perform routine inspections during their tours. In addition, costs can be saved due to reduced preproduction costs, for example. The time to travel to the premises of a technician carrying out the routine inspection can be saved as a person already in the facility can do the tasks.

Such interventions can result in cost savings, which can be seen as benefits, while costs and expenses can be seen as sacrifices. However, cost savings can have related sacrifices as well. For instance, cost savings that involve lower service levels might cause dissatisfaction and resistance among staff and problems with attracting and retaining the best employees.

How to measure and manage

Key Performance Indicators

Proper interventions and benchmarking as described in the EN15221-7 (CEN, 2012) can be used. Strategic benchmarking can be used for resource allocation

decisions and budget planning. Process benchmarking can be used to identify the prioritisation of process optimisation projects. Performance benchmarking supports the assessment of property performance and cost effectiveness.

Examples of benchmarks to identify relevant areas for cost savings and increase of productivity are given in Chapter 5.2 of EN15221-7. Commonly used financial ratios are:

1 FM cost per m², workstation or full time equivalent (fte)
2 Space and infrastructure cost per m², workstation or fte or more detailed
3 People and organisation cost per m², workstation or fte or more detailed
4 Space cost per fte etc.
5 Workplace cost per fte etc.

Out of the comparison of these ratios internally or with external parties, relevant areas for cost savings and/or potential increase of FM productivity can be identified. A prerequisite is to structure costs adequately. A proper structure can be found in EN15221-7 (Table C.1 in the standard). Companies can start with the top level of operational facility products shown in Table 2.3 in Chapter 2 of this book. Later on companies can use the more detailed specification to identify problems at a detailed level.

Perspectives

The significant results of the surveys show that there are several areas for cost savings, and that FM can help to leverage them. Companies with their own FM department tend to have higher annual savings than companies without their own FM department. An inhouse FM department guarantees the best realisation of optimal real estate management. The expert knowledge of optimal management makes it possible to achieve savings through the use of FM. For example, clearly arranged real estate documents, contracts and floor plans in one central place help to identify cost saving potentials (Redlein et al., 2007). The surveys identified potential areas and interventions. The benchmarking process according to EN15221-7 can help to identify the relevant areas in each company, as well as proper intervention to leverage the potential.

Even though FM does not equal outsourcing, it is an important method within FM. The most outsourced facility services in Austria, Spain and Germany are cleaning, technical maintenance and heating/ventilation/air conditioning. Most of the companies had between three and ten external service providers, and the annual savings are highest for these companies, but the correlation between the number of external service providers and the degree of outsourcing and the annual savings is weak. Although organisations may outsource for cost-related reasons, there are no guarantees that expected savings will be realised. The literature also warns that there is an initial tendency to overstate the benefits of outsourcing, and that suppliers are likely to perform better at the beginning of a contract to make good first impressions. If outsourcing is to be fully integrated

as a valid and respectable management tool, it must be pursued with a clear sense of where, when and why it leads to enhanced value and cost savings (Alexander and Young, 1996).

The effects of outsourcing on an organisation's costs are not yet fully understood and perhaps the variables and their relationships are more complex than expected. Further studies should also include an investigation of "soft factors". More detailed analyses of different industries would be useful to gather more information and expand the data within this research field, in order to get more valid and reliable cost information and a better understanding of cause-effect relationships between interventions, cost effects, additional effects including sacrifices, and the effects of intermediating variables. In addition, a comparison of these studies with similar ones from other countries would help to gather more information about this research field.

References

Alexander, M. and Young, D. (1996) 'Outsourcing: Where's the value?' *Long Range Planning*, 29 (5), pp. 728–730.

CEN (2012) *Facility Management – Part 7: Guidelines for Performance Benchmarking.* European Standard EN 15221-7, European Committee for Standardization.

Chotipanich, S. (2004) 'Positioning facility management', *Facilities*, 22 (13/14), pp. 364–372.

Dodge, Y. (2008) *The Concise Encyclopedia of Statistics*, Berlin, Heidelberg: Springer Verlag,

Drion, B., Melissen, F. and Wood, R. (2012) 'Facilities management: Lost, or regained?' *Facilities*, 30 (5/6), pp. 254–261.

Hauk, S. (2007) *Wirtschaftlichkeit von Facility Management*, PhD dissertation, TU Wien.

IFMA (2006) *An inside look at FM Outsourcing.* Summary available at: http://www.ifma.org/publications/books-reports/an-inside-look-at-fm-outsourcing (accessed 12 January 2014).

Ikediashi, D.I., Ogunlana, O., Boateng, P. and Okwuashi, O. (2012) 'Analysis of risk associated with facilities management outsourcing: A multivariate approach', *Journal of Facilities Management*, 10 (4), pp. 301–316.

Jensen, P.A. and Van der Voordt, T. (2015) *The added value of FM: How can FM create value to organisations. A critical review of papers from EuroFM Research Symposia 2013–2015.* Research Report. Baarn: EuroFM publication.

Kok, H.B., Mobach, M.P. and Omta, O.S.W.F. (2011) 'The added value of facility management in the educational environment', *Journal of Facilities Management*, 9 (4), pp. 249–265.

Kremic, T., Tukel, O.I. and Rom, W.O. (2006) 'Outsourcing decision support: A survey of benefits, risks and decision factors', *Supply Chain Management: An International Journal*, 11 (6), pp. 467–482.

Lam, T.Y.M. (2011) 'Outsourcing of housing services in Hong Kong: Optimization of transaction value', *Journal of Facilities Management*, 9 (2), pp. 114–126.

Leidig, G. (2004) *Prozesskosten-Management.* Arbeitskreis Klein- und Mittelbetriebe, Eschborn. http://www.rkwkompetenzzentrum.de/fileadmin/media/Dokumente/Publikationen/2004_FB_Prozesskosten-Management.pdf (accessed on 07.01.2014).

Mierl, M. (2012) *Trends und Status Quo 2011 im Facility Management im Vergleich mit 2010*, Master's thesis, TU Wien.

Redlein, A. and Pichlmüller, H. (2007) 'Value Engineering im Bereich Facility Services', in Burtscher, D. (Ed.) *Value Engineering, Partnering, PPP – Neuer Wein in alten Schläuchen? Beiträge aus Theorie und Praxis, Tagungsband ICC 2007.* Innsbruck University Press, 1. Auflage, Innsbruck, ISBN: 978-3-902571-27-4; S. 35 - 46.

Redlein, A. and Sustr, F. (2008) 'Economic Effective Implementation of FM: A Research Based Upon Financial Data', *Proceedings of 7th EuroFM Research Symposium*, EFMC2008, Manchester, pp. 221–229.

Redlein, A., Schauerhuber, M. and Hauk, S. (2007) 'Parameters for an economic efficient implementation of FM'. *6th EuroFM Research Symposium, Zurich, Switzerland, 26 and 27 June 2007*, Conference Papers, pp. 109–116.

Redlein, A. and Zobl, M. (2014) 'Outsourcing: A Cost-Saving Approach in FM?' in Jensen, P.A. (Ed.) *Proceedings of CIB Facilities Management Conference: Using Facilities in an Open World – Creating Value for All Stakeholders. Joint CIB W070, W111 & W118 Conference. Technical University of Denmark, Copenhagen, 21-23 May 2014.* Centre for Facilities Management – Realdania Research, DTU Management Engineering, and Polyteknisk Forlag, May.

Scharer, M. (2002) *Wirtschaftlichkeitsanalyse von CAFM Systemen*, Diplomarbeit, WU Wien.

Smit, I. (2008) *A study on the added value of Facility Management*, Thesis report, Wageningen UR.

Zechel, P., Bächle, A., Balck, H., Felix, P., Flecker, G., Friedrichs, K., Geertsma, C., Henzelmann, T., Hovestadt, L., Hovestadt, V., Janecek, M., Mende, W. and Neumann, G. (2000) *Facility Management in der Praxis: Herausforderung in Gegenwart und Zukunft*, Renningen: Expert Verlag.

Facilities Management (FM) and Corporate Real Estate Management (CREM) are two closely related and relatively new management disciplines with developing international professions and increasing academic attention. From the outset both disciplines have had a strong focus on controlling and reducing costs for real estate, facilities and related services. In recent years there has been a shift towards putting more focus on how FM and CREM can add value to the organisation. This book is driven by the need to develop a widely accepted and easily applicable conceptual framework for adding value by FM and CREM. It presents state of the art theoretical knowledge and empirical evidence about the impact of buildings and facilities on twelve value parameters, as well as how to manage and measure these values. The findings are connected to a new Value Adding Management model.

The book is research based with a focus on guidance to practice. It offers a transdisciplinary approach, integrating academic knowledge from a variety of different fields with practical experience. It also includes twelve interviews with practitioners, shedding light as to how they manage adding value in practice. This is a much needed resource for practitioners, researchers and teachers in the field of FM and CREM, as well as students at both undergraduate and postgraduate levels.

Per Anker Jensen is Professor in Facilities Management and head of the externally funded Centre for Facilities Management – Realdania Research, Technical University of Denmark (DTU), Denmark. He holds the degrees of MSc in Civil Engineering, PhD and MBA. Besides research and teaching he has twenty years of experience in practice as a consultant, a project manager and a facilities manager. He was a member of the board of EuroFM and chairman of EuroFM's Research Network Group in 2007 and 2008. He is currently project manager of the joint EuroFM research project on the Added Value of FM, which started in January 2009.

Theo van der Voordt is Associate Professor in Corporate and Public Real Estate Management at the Faculty of Architecture at the Delft University of Technology, the Netherlands. His current research focuses on workplace performance, experience and the use of new work environments, the design and management of health care real estate, and value adding management of FM and CREM. His research aims to develop and test workplace strategies, conceptual models and practical tools to support data collection and decision making processes. This work is conducted in close cooperation with the Centre for People and Buildings (CfPB) in Delft, a knowledge centre that specialises in the relationship between people, working processes and the working environment.

FACILITY MANAGEMENT

Cover images: Theo van der Voordt and Centre for Facilities Management – Realdania Research

Routledge
Taylor & Francis Group
www.routledge.com

Routledge titles are available as eBook editions in a range of digital formats

ISBN 978-1-138-90718-8

an informa business