

## Performance measurement in the context of CREM and FM

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# THE ADDED VALUE OF FACILITIES MANAGEMENT CONCEPTS, FINDINGS AND PERSPECTIVES

PER ANKER JENSEN, THEO VAN DER VOORDT AND CHRISTIAN COENEN  
(EDITORS)



**THE ADDED VALUE OF FACILITIES MANAGEMENT**  
**CONCEPTS, FINDINGS AND PERSPECTIVES**

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## 8. PERFORMANCE MEASUREMENT IN THE CONTEXT OF CREM AND FM

*Chaiwat Riratanaphong, Theo van der Voordt and Anna-Liisa Sarasoja*

### ABSTRACT

*Purpose:* To discuss trends in organisational performance measurement, to identify and discuss widely used performance criteria and key performance indicators (KPIs) in general and in the fields of Facility Management (FM) and Corporate Real Estate Management (CREM), and to identify how a more holistic measurement framework could be used in measuring the added value of FM and CREM i.e. to find out how well FM and CREM are contributing to the company's performance and strategies.

*Methodology:* A review of general management, FM and CREM literature on performance measurement and KPIs in connection to added value of FM, case studies into performance measurement as part of a PhD research in progress that is being conducted by the first author (with the second author being one of the supervisors) and interviews with CEO's in different countries as part of a finalized PhD research of the third author.

*Findings:* The research traced a number of performance measurement models and resulted in a list of useful KPIs that have been classified according to the FM Value Map impacts: social, environmental, satisfaction, cost, productivity, adaptation and culture. The present list shows a holistic approach and aligns to different impacts on relevant stakeholders and the surroundings.

*Practical implications:* The performance models and KPIs can be used as input to integrated and well balanced performance management and performance measurement, including benchmarking with competitive organisations, as part of professional Facility Management and Corporate Real Estate Management.

*Research limitations:* We did not conduct a quantitative analysis of how often a particular KPI has been mentioned in literature; besides only a few empirical tests have been conducted on operationalization and application of KPIs in current FM and CREM practice.

*Originality/value:* Combining of the findings from two Phd-studies on performance measurement and performance management has led to a new and well classified list of KPIs.

**Keywords:** FM, CREM, Performance, Measurement, KPIs.

### INTRODUCTION

Organisational performance is a broad term that covers both economic and functional aspects. Regarding the performance of real estate and building related facilities and services – being important resources of every firm - technical and aesthetic aspects are important as well.

The level of performance a business attains is a function of the efficiency and effectiveness of the actions it undertakes and the resources used to support these activities. High-performance operations that most companies aim to accomplish should be high-quality, fast, dependable, flexible and low cost (Slack et al., 2001). Tangen (2005) described performance as an umbrella term for all concepts that consider the success of a company and its activities. Performance measurement provides the basis for an organisation to assess how well it is progressing towards its predetermined objectives, to identify areas of strengths and weaknesses, and to decide on future initiatives, aiming to improving organisational performance (Amaratunga and Baldry, 2002). According to the literature, performance measurement has been developed in two phases (Tangen, 2004; Lavy et al., 2010). In the first phase - that went on until the 1980s - performance measurement primarily focused on financial criteria. Since the late 1980s, the second phase revealed that the traditional performance measures had severe limitations including encouragement of short-term thinking, lack of a strategic focus and insufficient local optimization. The introduction of new performance measures such as shareholder value, economic profit, customer satisfaction, internal operations performance, intellectual capital and intangible assets (Neely and Bourne, 2000) reflected a more holistic and integrated approach, taking into account benefits as well. Neely et al. (1995) summarised the main changes from traditional performance measurement systems towards modern innovative performance measurement systems as outlined in Table 8.1. Van Ree (2002) came to a similar conclusion in saying that performance measurement has changed from simply focusing on the effectiveness and efficiency of an organisation to a wider set of criteriasee, see Table 8.2.

The same trend comes to the fore in the fields of (adding value by) FM and CREM (Jensen et al., 2012). Organisations try to manage the performance of real estate and real estate related facilities and services to support organisational performance and to create a positive added

**Table 8.1: Trends in development of performance measurement systems (Neely et al., 1995)**

<b>Traditional performance measurement systems</b>	<b>Innovative performance measurement systems</b>
Based on cost/efficiency	Value-based
Trade-off between performances	Performance compatibility
Profit-oriented	Customer-oriented
Short-term orientation	Long-term orientation
Prevalence of individual measures	Prevalence of team measures
Prevalence of functional measures	Prevalence of transversal measures
Comparison with standard	Improvement monitoring
Aim at evaluating	Aim at evaluating and involving

**Table 8.2: Performance criteria organisations should meet  
(modified from Van Ree, 2002)**

Till 1950s	1960s	1970s	1980s	1990s	2000s
Effectiveness	Effectiveness	Effectiveness	Effectiveness	Effectiveness	Effectiveness
	Efficiency	Efficiency	Efficiency	Efficiency	Efficiency
		Productivity	Productivity	Productivity	Productivity
			Flexibility	Flexibility	Flexibility
				Creativity	Creativity
					Sustainability

value or to avoid a negative influence on their goals. Any activity undertaken in improving the performance of corporate real estate will affect the organisation's resources and needs to be assessed in terms of (potential) benefits and costs on the organisational level (Den Heijer, 2011). So there is a need to identify FM and CREM related KPIs that helps the organisation to focus on performance (benefits) in relation to the resources that are spent on real estate and other facilities (costs).

This chapter elaborates trends in performance measurement in general and gives an overview of performance criteria and KPIs to measure the performance of corporate real estate and building related facilities and services in connection to organisational performance. The KPIs found in literature and practice have been classified according to the impacts that are mentioned in the FM Value Map, and will be discussed on whether they can be applied for the interests of different stakeholders. The findings can be used as input to integrated and well balanced performance management.

## PURPOSE OF PERFORMANCE MEASUREMENT

According to Zairi (1994) the function of performance measurement is to generate a class of information that will be useful in a wide variety of problems and situations. In its various forms, performance measurement represents the yardsticks which tell people how well they have done and as such motivates them to achieve higher targets (Zairi, 1994). Performance measurement provides aspiration to achieve superior levels of effectiveness and competitiveness. It focuses on the means and results (ends) or processes and outcomes, and can be described in terms of practices and metrics (Zairi, 1994). Practices are characteristics which describe internal and external business behaviours which tend to lead to a performance gap. Practices could be related to the processes themselves, organisational structures, management systems, human factors, and strategic approaches. Performance measurement can also be described as an important aid to make judgments and to make decisions. Performance measurement can help managers to answer five strategically important questions: 1) Where have we been? 2) Where

are we now? 3) Where do we want to go? 4) How are we going to get there? and 5) How will we know that we got there? (Lebas, 1995).

Sinclair and Zairi (1995) provided a list of six dimensions to emphasize the importance and need for performance measurement. Performance measurement:

- Enhances improvement;
- Can ensure that managers adopt a long-term perspective;
- Makes communication more precise;
- Helps an organisation to allocate its resources to the most attractive improvements activities;
- Is central to the operation of an effective and efficient planning, control, or evaluation system;
- Can affect the motivation of individuals and encourage right organisation behaviour;
- Can support management initiatives and manage change.

Parker (2000) mentioned some similar and some additional reasons why companies should use performance measures, in order to:

- Identify success;
- Identify whether they are meeting customer requirements;
- Understanding their processes (to confirm what they know or reveal what they do not know);
- Identify where problems, bottlenecks and waste exists and where improvements are necessary;
- Ensuring that decisions are based on facts, not supposition, emotion or intuition;
- Show if improvements planned, actually happened.

In connection to performance measurement, Neely et al. (1995) proposed the definitions of three terms:

- Performance measure: a metric to quantify the efficiency and/or effectiveness of an action;
- Performance measurement: the process of quantifying the efficiency and effectiveness of action;
- Performance measurement system: a set of metrics to quantify the efficiency and effectiveness of an action.

Brown and Delvin (1997) define a performance measurement system as a complete set of performance measures and indicators derived in a consistent manner according to a forward set of rules or guidelines. It is a means to monitoring and maintaining organisational control, i.e. the process of ensuring that an organisation pursues strategies that lead to the achievement of

overall goals and objectives (Nanni et al., 1990). Performance measures can be used to force an organisation to focus on the right issues.

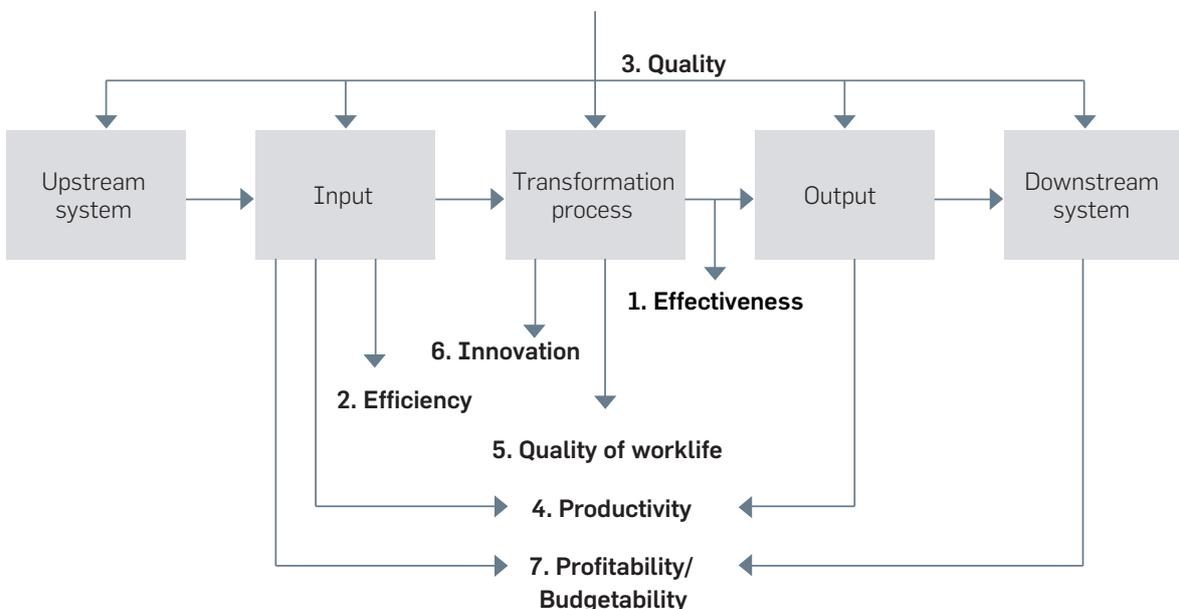
## WHAT TO MEASURE? A SHORT TOUR THROUGH HISTORY

Many authors have reflected on general performance measurement and performance criteria i.e. different aspects or areas of performance, and tried to link performance to concepts such as quality, effectiveness and efficiency. A short tour through the key features of most relevant frameworks regarding measuring organisational performance – including the performance measurement matrix, performance pyramid, Balanced Score Card, and Strategy mapping - provided a number of criteria that may improve our understanding of performance measurement.

According to Sink and Tuttle (1989), performance of an organisation is a complex interrelationship between different perspectives of performance criteria. They identified seven performance criteria that are interrelated, see Figure 8.1:

- *Effectiveness*, “doing the right things, at the right time, with the right quality”: in practice, effectiveness is expressed as a ratio of actual output to expected output;
- *Efficiency*, “doing things right”, defined as a ratio of resources expected to be consumed to resources actually consumed;

**Figure 8.1: Interrelationship between seven performance criteria (Sink and Tuttle, 1989)**

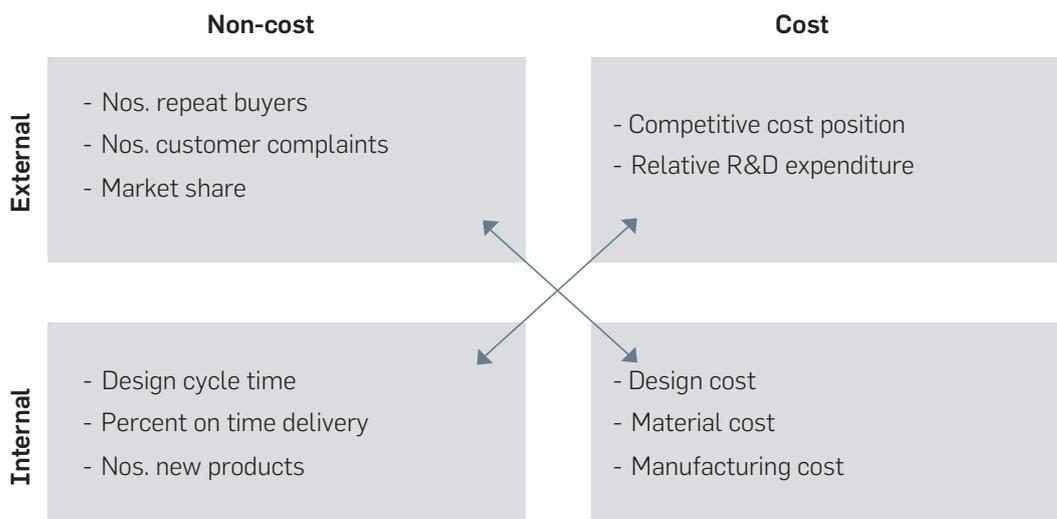


- *Quality*; whereas quality is an extremely wide concept, to make the term more tangible, quality is measured at six checkpoints: 1) upstream systems, 2) inputs, 3) transformation value adding process, 4) outputs, 5) downstream systems, 6) quality management process;
- *Productivity*, the traditional ratio of output to input;
- *Quality of work life*, an essential contribution to a system which performs well;
- *Innovation*, a key element in sustaining and improving performance; and
- *Profitability/budget ability*, representing the ultimate goal for any organisation.

Keegan et al. (1989) developed a balanced performance measurement matrix that integrates four different classes of business performance: cost and non-cost, internal and external, see Figure 8.2. This matrix is a simple and flexible framework capable of accommodating any measure of performance (Neely, 2002). According to Neely et al. (2001) the strength of the performance measurement matrix is that it seeks to integrate different classes of business performance.

Judson (1990) developed the so-called performance pyramid. This model has subsequently been improved by Lynch and Cross (1991) and was adapted later on in Cross and Lynch (1992), see Figure 8.3 The performance pyramid establishes a clear relationship between goal setting and measurement, between business strategies and implementation. It also identifies measurements at the team level; work teams focus on quality measures, whereas leadership teams focus on process or strategy (Lynch and Cross, 1991). The strength of this framework is that it distinctly ties together the hierarchical view of business performance measurement with the

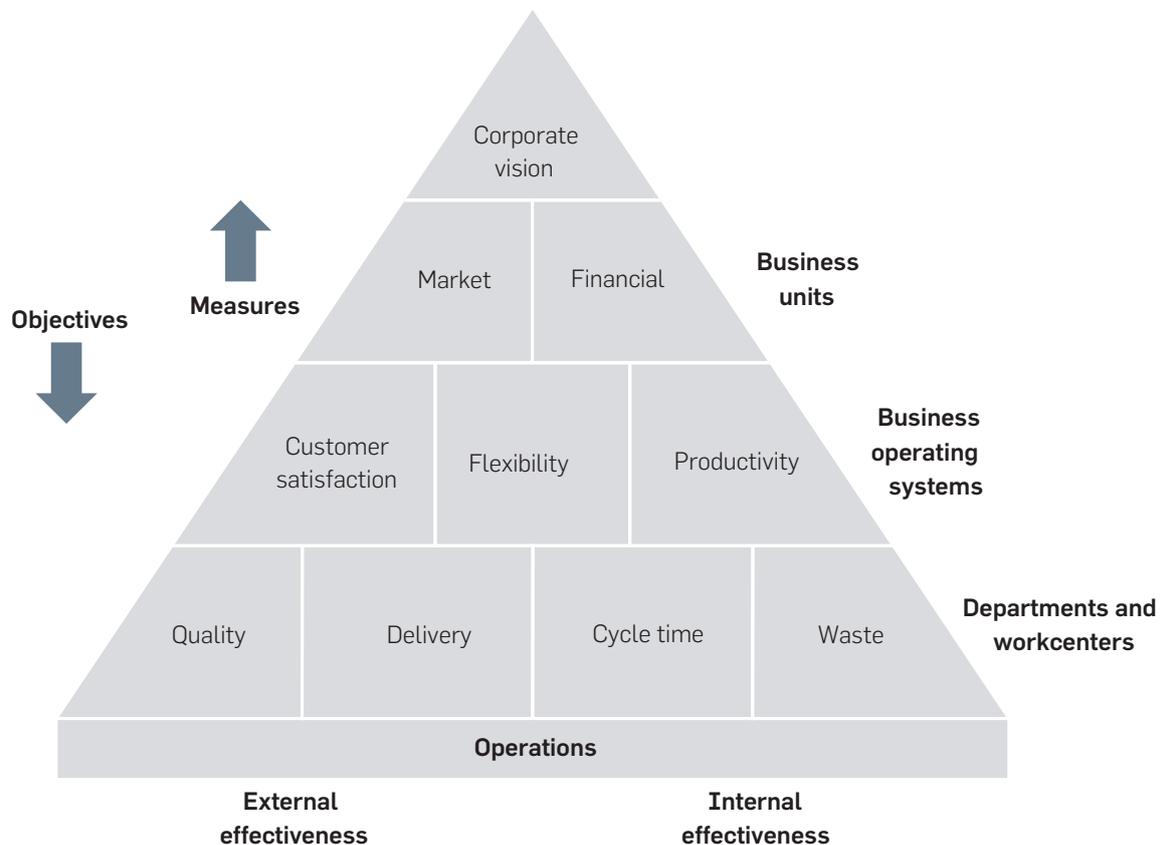
**Figure 8.2: Performance Measurement Matrix (Keegan et al., 1989)**



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**Figure 8.3: The Performance Pyramid (Cross and Lynch, 1992)**


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business process view (Neely et al., 2000). Its objectives and related measures are focusing on vision; business unit (market, financial); business operation system (customer satisfaction, flexibility, productivity); department and work center (quality, delivery, cycle time and waste); and operations.

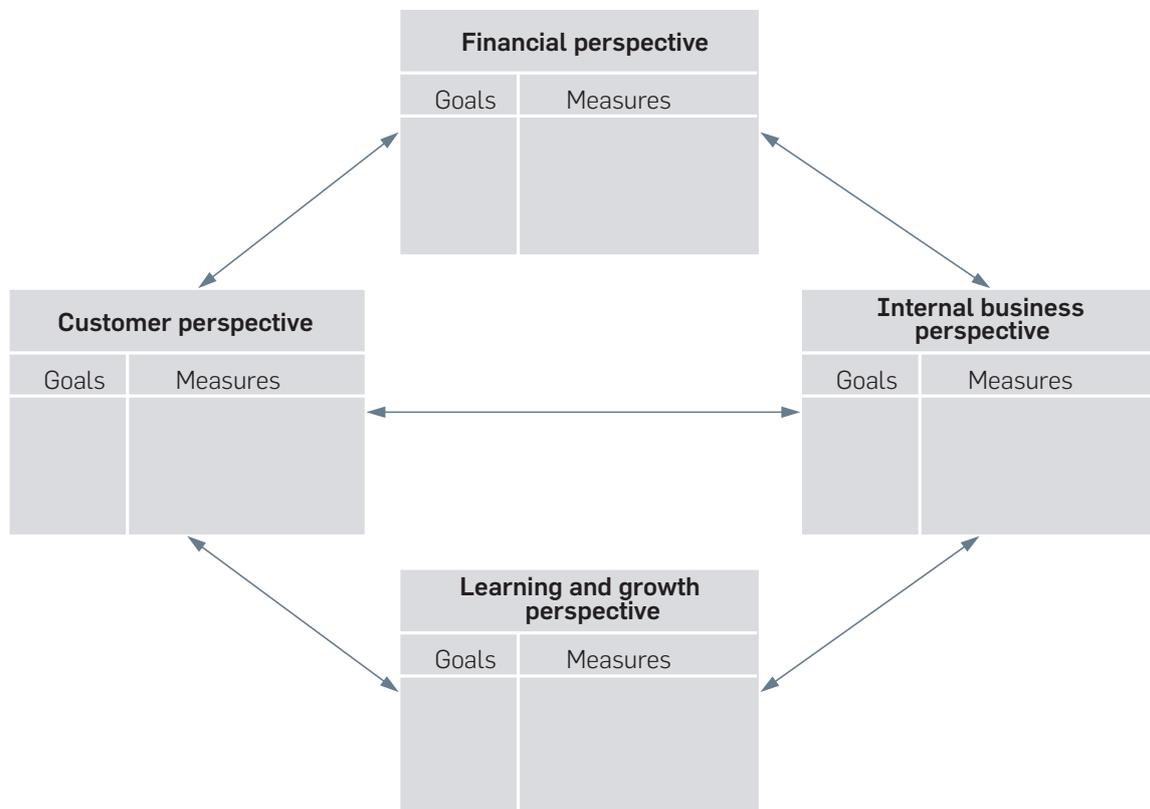
One of the most well-known performance measurement frameworks is the Balanced Scorecard (BSC) that was developed by Robert Kaplan and David Norton in 1992, see Figure 8.4. The basic notion of the BSC is that organisational performance ought to be evaluated from more than simply a financial perspective. It helps to translate the strategy into actions from four perspectives:

- *Financial*: Traditional measures of profitability, revenue, and sales growth.
- *Customer*: Customer retention, customer satisfaction and market research.
- *Internal business processes*: Processes to meet or exceed customer expectation.
- *Learning and growth*: How the organisation and its people grow and meet new challenges.

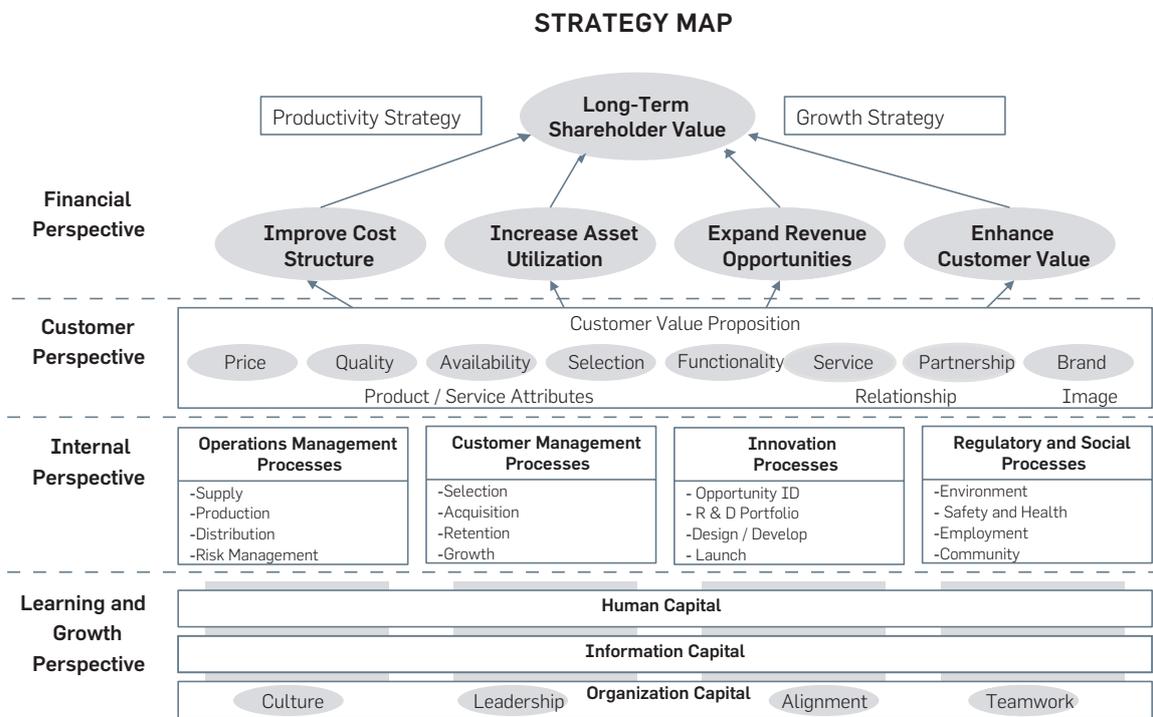
In the Balanced Scorecard (Kaplan and Norton, 1992), the balanced set of four perspectives of performance measures involves the four fundamental questions:

- How do we look to our shareholders (financial perspective)?
- How do our customers see us (customer perspective)?
- What must we excel at (internal business processes perspective)?
- How can we continue to improve and create value (learning and growth perspective)?

**Figure 8.4: The Balanced Scorecard (Kaplan and Norton, 1992)**



The 'strategy map' - a model also originated by Kaplan and Norton - is another approach used to visually represent the cause-and-effect logic of an organisation's strategy in the four BSC perspectives: financial, customer, internal processes and learning and growth (Kaplan and Norton, 2004), see Figure 8.5. By connecting various elements with one another, strategy mapping helps describing and communicating the strategy among executives and to their employees.

**Figure 8.5: Strategy Map (Kaplan and Norton, 2004)**

According to the performance prism of Neely et al. (2001), performance measurement systems should be organised around five distinct but linked perspectives of performance, see Figure 8.6:

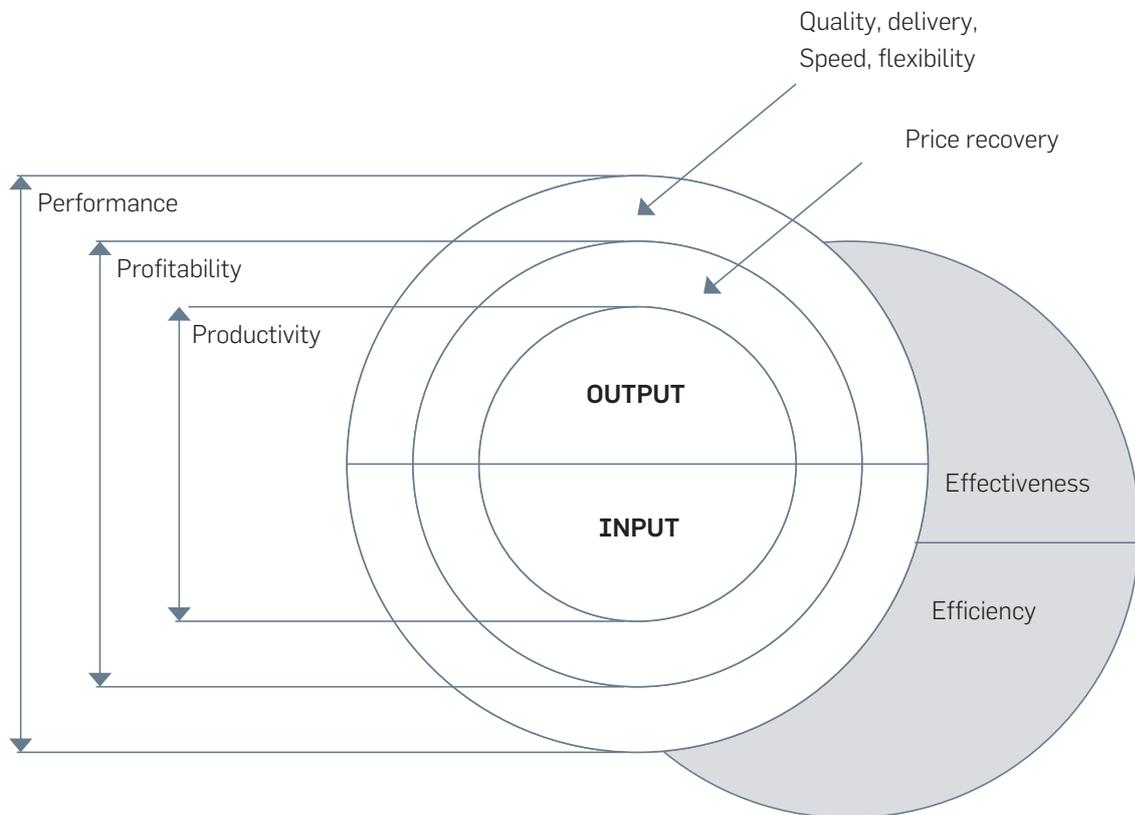
- Stakeholder satisfaction. Who are the stakeholders and what do they want and need?
- Strategies. What are the strategies we require to ensure the wants and needs of our stakeholders?
- Processes. What are the processes we have to put in place in order to allow our strategies to be delivered?
- Capabilities. The combination of people, practices, technology and infrastructure that together enable execution of the organisation's business processes (both now and in the future): what are the capabilities we require to operate our processes?
- Stakeholder contributions. What do we want and need from stakeholders to maintain and develop those capabilities?

In the triple P model, Tangen (2005) defines performance as the umbrella term of excellence and includes profitability and productivity as well as other non-cost factors such as quality, speed, delivery and flexibility, see Figure 8.7. Productivity involves the relation between output and input quantity (Tangen, 2005). Profitability is a monetary relationship in which the influenc-

**Figure 8.6: The Performance Prism (Neely et al., 2001)**



**Figure 8.7: The Triple P model (Tangen, 2005)**



es of price-factors (i.e., the difference between costs and revenues). The terms effectiveness and efficiency are cross-functional when considered to the other three terms. Effectiveness represents the degree to which desired results are achieved. Efficiency represents how well the resources of the transformation process are utilized.

## PERFORMANCE MEASUREMENT IN THE CONTEXT OF FM AND CREM

Alexander (2003, p. 274) identifies measurement of FM performance as one of “*three essential issues for the effective implementation of a facilities strategy*”. FM is assumed to be able to contribute to performance of organisations in many ways, including strategy, culture, control of resources, service delivery, supply chain management, and management of change (Amaratunga and Baldry, 2002). In this context, the application of the performance management concept could be identified as a major task of an FM organisation in attempting to introduce performance measurement systems and how to use them to influence future performance.

In the field of CREM we see that the demand of corporate real estate is changing considerably as a result of both external economic shifts and organisational change. Firms are encountered with a wider set of choices when they identify a need for new or improved accommodation. The purpose of real estate performance measurement is to comprehend the impacts of management decision-making on success and failure of the real estate portfolio and to suggest possible improvements (Cable and Davis, 2004). It is important to an organisation as it provides much-needed direction to management for decision making. The goals of performance measurement also include determining the extent to which a building is catering to its occupants and identifying major issues affecting its performance adversely (Douglas, 1996). Performance levels can be broken down into three levels of priority: 1) health, safety and security performance, 2) functional, efficiency and work flow performance and 3) psychological, social, cultural and aesthetic performance (Preiser 1983; Vischer, 1989).

Based on the Triple-P model of Tangen (2005), De Vries et al. (2008) connected real estate interventions to competitive advantage, profitability and productivity, see figure 4.2 in chapter 4. Competitive advantage has been defined as the (developments in) market share. Research from De Vries (2007) demonstrated both positive and negative effects of real estate interventions on organisational performance of Academies of Applied Sciences, caused by real estate influences on production, customer satisfaction, and cost reduction and so on. However, she also concluded that cause-effect relationships were hard to prove, due to simultaneous changes in organisational characteristics and the external context.

Den Heijer (2011) discussed the impact of university real estate on performance on two levels: 1) the impact on an organisation and society, linking to business economics theories and 2) the impact on individuals, linking to psychology theories. In her study, the hierarchy of adding value is connected to the different stakeholders and linked to four main performance criteria:

profitability, productivity, competitive advantage (same as Tangen, 2005 and De Vries, 2007) and sustainable development (see also figure 11.5). This model for adding value to performance could also be applied to other organisations, but the priority of each performance criteria might be given different rankings. However, the types of performance that a particular company strives to fulfil are very case specific.

## FM AND CREM RELATED KPIS

Cable and Davis (2004) stated that performance measurement through the establishment of KPIs helps the senior management team to make important strategic decisions. It is essential for organisations to describe their performance requirements in terms of factors that are critical to the successful operation. KPIs represent a set of measures focusing on those aspects of organisational performance that are the most critical for the current and future success of the organisation (Parmenter, 2007). KPIs are used both as indicators of individual performance and to inform business decisions. Becker (1988) mentioned six KPIs of facilities:

- No loss of business due to building services or systems failure
- Operating costs controlled and within budget
- Proactive reporting and planning carried out
- Low cost, function buildings
- Promote corporate image
- Reduced occupancy cost vs. revenue

Varcoe (1996, p. 51) stated about the basis of strategic management in sound performance measures that it is *"only from the firm basis of a clear understanding of the overall organisational performance equation that business decisions and value-based recommendations for improvement supported by measurement can be made in the proper context of true organisational need"*.

The acknowledgement that operational buildings are durable physical assets that require ongoing management has created a need for more robust decision-making tools that are capable of evaluating the respective influences of different operations, maintenance and service usage strategies throughout the extended service life of a facility (Preiser and Vischer, 2005). Bon et al. (1998) mentioned that real property performance should be measured with the objective of gradually changing the character of the entire portfolio via continual managerial action bent on improving real property performance. In the past, FM in general, and public sector FM in particular, was overtly focused on the indicator of cost per unit area as the ubiquitous comparator of building performance enshrined in various guides, codes, and benchmarking schemes (Price, 2004, 2007; Pinder and Price, 2005; Hinks et al., 2007). Nowadays a slowly growing interest comes to the fore into output indicators that measure benefits as well.

**Table 8.3: 35 indicators relating to building and facilities in four categories (Lavy et al., 2010)**

<b>Financial indicators</b>	<b>Physical indicators</b>	<b>Functional indicators</b>	<b>Survey-based indicators</b>
1. Operating costs 2. Occupancy costs 3. Utility costs 4. Capital costs 5. Building maintenance cost 6. Grounds-keeping cost 7. Custodial and janitorial cost 8. Current replacement value (CRV) 9. Deferred maintenance, and deferred maintenance backlog 10. Capital renewal 11. Maintenance efficiency indicators (MEI) 12. Facility condition index (FCI) 13. Churn rate and churn Costs	1. Building physical condition – quantitative: Building Performance Index (BPI) 2. Building physical condition – qualitative: general building maintenance in: (1) building physical condition; (2) sanitary, plumbing and storm water; (3) mechanical services; and (4) lighting and electrical 3. Property and real estate 4. Waste 5. Health and safety 6. Indoor environmental quality (IEQ) 7. Accessibility for disabled 8. Resource consumption – energy: (1) energy use: total facility energy use; or building energy use; (2) net energy consumption; (3) annual energy consumption; (4) total natural gas consumption; (5) building electrical consumption; or (6) building electrical demand, demand intensity, or peak electricity demand 9. Resource consumption – water: (1) water consumption; or (2) net water consumption 10. Resource consumption – materials: (1) material consumption, or (2) net material consumption 11. Security 12. Site and location	1. Productivity 2. Parking 3. Space utilization 4. Employee or occupant's turnover Rate 5. Mission and vision, and Mission Dependency Index (MDI) 6. Adequacy of space	1. Customer/building occupants' satisfaction with products or services 2. Community satisfaction and participation 3. Learning environment, educational suitability, and appropriateness of facility for its function 4. Appearance

Based on a literature search, Lavy et al. (2010) presented 35 major indicators relating to building and facilities, classified in four categories, see Table 8.3:

1. *Financial indicators*, which relate to costs and expenditures associated with operation and maintenance, energy, building functions, real estate, plant, etc.;
2. *Physical indicators*, which are associated with the physical shape and conditions of the facility, buildings, systems, and components;
3. *Functional indicators*, which are related to the way the facility and the buildings function and which express building appropriateness through space adequacy, parking, etc.; and
4. *Survey-based indicators*, which are based solely on respondents' opinion to surveys that are primarily qualitative in nature.

Den Heijer (2011) has in her PhD-study identified a number of KPIs to measure the performance of a university, divided in KPIs for productivity, profitability, competitive advantage and sustainable development as shown in table 11.2 in chapter 11. Except for competitive advantage all groups of KPIs includes several KPIs that are related to real estate.

In a current PhD research into performance measurement of workplace change (Riratana-phong, 2011) a huge number of KPIs has been clustered in six perspectives of business performance according to the BSC concept (Bradley, 2002):

- Stakeholder perception (e.g. customer satisfaction and loyalty, community sentiment) refers to customer perspective of the BSC.
- Financial health (e.g. economic or market value added) refers to financial perspectives of the BSC.
- Organisational development (e.g. innovation quality and quantity, cultural factors, team formation and new process introduction rate) refers to the internal business process perspective of the BSC.
- Productivity (e.g. space utilization, process speed and quality, waste levels) refers to learning and growth perspective of the BSC.
- Environmental responsibility (including transport-related sustainability effects) refers to internal business process perspective of the BSC.
- Cost efficiency (total occupancy cost related to revenue generation) refers to the financial perspective of the BSC.

In order to connect the list of KPIs to the FM Value Map of Jensen (2010), the clusters have been adapted and re-arranged in two main categories: surroundings and core business, with respectively four sub-categories (economic, social, spatial, environmental) and five sub-categories (satisfaction, cost, productivity, adaptation, culture). "Reliability" refers to continuity, security and safety, and is not included as a separate category, but incorporated in issues such as 'Quality of facilities' (e.g. physical condition of facilities, number of building quality audits). Table 8.4 shows the list of performance criteria and KPIs originated from Bradley (2002),

**Table 8.4: FM and CREM performance criteria and KPIs according to the literature – clustered in connection to FM Value Map impacts**

<b>FM Value Map Impacts</b>	<b>FM/ CRE KPIs</b>
<b>Surroundings</b>	
<b>Economical</b>	Not mentioned at all
<b>Social</b>	- Contribution to public policy and societal priorities (Modern Comptroller-ship, Workplace of the Future, Government Online, Greening of Government Operations) (RPS) (Hagarty and Wilson, 2002; RPS, 2003)
<b>Spatial</b>	Not mentioned at all
<b>Environmental</b>	<p><b>Environmental impacts</b></p> <ul style="list-style-type: none"> <li>- Contaminated sites management (BCBC, 2003)</li> <li>- Amount of garbage (Lindholm and Gibler, 2005)</li> <li>- Transport- related sustainability effects (Bradley, 2002)</li> <li>- Sustainable development objectives (Hagarty and Wilson, 2002)</li> <li>- Sustainability (GSA Real Property Performance Results, 2006)</li> <li>- Progress Against Sustainable Development Objectives (RPS, 2003)</li> </ul> <p><b>Energy performance (Hinks and McNay, 1999)</b></p> <ul style="list-style-type: none"> <li>- Energy use/square meters (Statsbygg, 2003)</li> <li>- Energy Intensity (BCBC, 2003)</li> <li>- Energy consumption (conservation) (Lindholm and Gibler, 2005)</li> <li>- Number of energy audits (Lindholm and Gibler, 2005)</li> </ul>
<b>Core business</b>	
<b>Satisfaction</b>	<p><b>Employee satisfaction with work environment</b></p> <p>(Arthur Andersen, 1993; Nourse 1994; Bdeir, 2003; Hinks and McNay, 1999; Lindholm and Gibler, 2005)</p> <ul style="list-style-type: none"> <li>- Quality of indoor environment (lightning, air conditioning, temperature) (Kincaid, 1994)</li> <li>- Noise level (Kincaid, 1994)</li> <li>- Provision of safe environment (Hinks and McNay, 1999)</li> <li>- Amount of workplace reforms and space modifications (Lindholm and Gibler, 2005)</li> <li>- Ratio of office to common areas (Lubieniecki and Desrocher, 2003)</li> <li>- Provision of amenities (Bdeir, 2003)</li> <li>- Absentee rates by buildings (Massheder and Finch, 1998)</li> </ul> <p><b>Employee satisfaction with CRE services</b></p> <p>(Duckworth, 1993; Lubieniecki and Desrocher, 2003)</p> <ul style="list-style-type: none"> <li>- Employee satisfaction with professional skills (Lindholm and Gibler, 2005)</li> <li>- Employee satisfaction with information sharing (Lindholm and Gibler, 2005)</li> </ul>

<b>Core business</b>	
<b>Satisfaction</b>	<p><b>Location success factors (proximity to required transportation modes, access to employees, amount of local amenities)</b> (Duckworth 1993; Lubieniecki and Desrocher, 2003; Lindholm and Gibler, 2005)</p> <ul style="list-style-type: none"> <li>- Proximity to required transportation (Duckworth 1993; Lubieniecki and Desrocher, 2003)</li> <li>- Distance to employees homes/ customers /others sites and business units (Lindholm and Gibler, 2005)</li> <li>- Customer satisfaction with responsiveness (Amaratunga and Baldry, 2002)</li> </ul> <p><b>Customer satisfaction with facilities</b> (Lindholm and Gibler, 2005)</p> <ul style="list-style-type: none"> <li>- Overall Tenant Satisfaction with Property Management Services (RPS, 2003)</li> <li>- Survey Rating of Extent to Which Full Service Workplace Provisioning Solutions Meet Customer Needs (BCBC, 2003)</li> <li>- Rating based on building attributes (Duckworth, 1993)</li> <li>- Number of helpdesk calls per square foot (Bon et al., 1998)</li> </ul>
<b>Cost</b>	<p><b>Occupancy Cost</b></p> <ul style="list-style-type: none"> <li>- Occupancy cost per square foot (Arthur Andersen, 1993; Nourse, 1994; Bon et al., 1998; Massheder and Finch, 1998; Bdeir, 2003)</li> <li>- Occupancy cost per employee (Arthur Andersen, 1993; Massheder and Finch, 1998; Bdeir, 2003)</li> <li>- Occupancy cost as a % of total operating expense (Arthur Andersen, 1993; Bdeir, 2003)</li> <li>- Occupancy cost as a % of operating revenue by building or business unit (Massheder and Finch, 1998; Bradley 2002)</li> <li>- Occupancy cost per dollar or per unit of revenue (Nourse, 1994)</li> <li>- Occupancy cost per seat (Bdeir, 2003)</li> <li>- Occupancy cost per customer (Bon et al., 1998)</li> <li>- Actual extra occupancy cost versus predicted cost (Massheder and Finch, 1998)</li> <li>- Occupancy cost per sales or turnover (Lindholm and Gibler, 2005)</li> <li>- Occupancy cost per business unit (Lindholm and Gibler, 2005)</li> <li>- Building Occupancy Charge (BOC) savings to customers (BCBC, 2003)</li> <li>- Lease costs per square metre (BCBC, 2003)</li> </ul>

**Core business**

<p><b>Cost</b></p>	<p><b>Building and FM Costs</b></p> <ul style="list-style-type: none"> <li>- Total Annual Building Occupancy Charges (BCBC, 2003)</li> <li>- Cost of services and resources (cleaning, catering, furnishing, office articles) (NEN 2748)</li> <li>- External facilities costs (external accommodation, layout of home workplace, transport) (NEN 2748)</li> <li>- Facility management costs (environment, working conditions, quality) (NEN 2748)</li> <li>- Cost per square foot (owned/leased) (GSA Real Property Performance Results, 2006)</li> <li>- Cost per CRE employee (Bdeir, 2003)</li> <li>- Operation cost/square meters (Statsbygg, 2003)</li> <li>- Maintenance cost/square meters (Statsbygg, 2003)</li> <li>- Different costs per square metre, such as energy consumption; operations and maintenance cost; and leasing costs (NPB, 2003)</li> <li>- Cost of leased vs. owned inventory (Hagarty and Wilson, 2002)</li> <li>- Total project cost in relation to budget, the exceeding of total property management budget and administration budget (Statsbygg, 2003)</li> <li>- Number of moves per year (Lindholm and Gibler, 2005)</li> <li>- Vacancy rates (Hagarty and Wilson, 2002; GSA Real Property Performance Results, 2006; BCBC, 2003; RPS, 2003)</li> <li>- Cost of under utilized space (Lindholm and Gibler, 2005)</li> <li>- Workplace standards in use (Lindholm and Gibler, 2005)</li> <li>- Cost of acquisitions versus returns (Massheder and Finch, 1998)</li> <li>- Holding costs per year (Massheder and Finch, 1998)</li> </ul>
<p><b>Productivity</b></p>	<p><b>Workplace</b></p> <ul style="list-style-type: none"> <li>- Working environment (Kaczmarczyk and Morris, 2002)</li> <li>- Alternative Workplace Arrangements (GSA Real Property Performance Results, 2006)</li> <li>- Distance employees commute (Duckworth, 1993)</li> </ul> <p><b>Strategic Involvement</b></p> <ul style="list-style-type: none"> <li>- CRE involved in corporate strategic planning (Lubieniecki and Desrocher, 2003)</li> <li>- CRE integrated with HR strategies (Lubieniecki and Desrocher, 2003)</li> <li>- CRE actively involved in firm-wide initiatives such as special asset use, consolidations, or shared services opportunities (Lubieniecki and Desrocher, 2003)</li> </ul> <p><b>Human Resource</b></p> <ul style="list-style-type: none"> <li>- Productivity percent (Carder, 1995; van der Voordt, 2004)</li> <li>- Absentee rates by buildings (Massheder and Finch, 1998)</li> <li>- Employees' opinion on how well the workplace supports their productivity (Lindholm and Gibler, 2005)</li> </ul>

**Core business****Adaptation****Accommodation usage**

(Hagarty and Wilson, 2002; Kaczmarczyk and Morris, 2002; RPS, 2003)

- Area leased as percentage of total area (m<sup>2</sup>) (Statsbygg; Lindholm and Gibler, 2005)
- Percent of space occupied (Nourse, 1994; Bdeir, 2003)
- Gross floor area per usable floor area (Massheder and Finch, 1998)
- Space Supply and Demand Ratios (RPS, 2003)
- Percentage of surplus assets sold (Lindholm and Gibler, 2005)
- Length of lease terms (Lindholm and Gibler, 2005)
- Effective utilisation of space (Hinks and McNay, 1999)
- Amount of teamwork space (information workers) (Lindholm and Gibler, 2005)
- Number of workstations per employee (information workers) (Lindholm and Gibler, 2005)
- Vacancy rates (Hagarty and Wilson, 2002; GSA Real Property Performance Results, 2006; BCBC, 2003; RPS, 2003; Lindholm and Gibler, 2005)

**Employees housed** (GSA Real Property Performance Results, 2006)

- Square feet per employee (Arthur Andersen, 1993; Nourse, 1994; Massheder and Finch, 1998; Bdeir, 2003; Lindholm and Gibler, 2005)
- Total square feet Employees housed (GSA Real Property Performance Results, 2006)
- Area managed/employee (BCBC, 2003)

**Quality of facilities** (Lindholm and Gibler, 2005)

- Physical condition of facilities (Lindholm and Gibler, 2005)
- Amount of distance work settings in use (Lindholm and Gibler, 2005)
- Number of building quality audits (Lindholm and Gibler, 2005)
- Suitability of premises and functional environment (Hinks and McNay, 1999)
- Equipment provided meets business needs (Hinks and McNay, 1999)
- Number of development projects (obsolete properties) (Lindholm and Gibler, 2005)
- Development of unique system to measure the quality of internal and external facility services (NPB, 2003)
- Standards of cleaning (Hinks and McNay, 1999)
- All work on properties done in accordance with approved maintenance plan (Statsbygg, 2003)
- Time wasted with interruptions (due to open space layout) (Lindholm and Gibler, 2005)
- Ratio of Area Managed per Operations and Maintenance Employee (BCBC, 2003)

Core business	
<b>Adaptation</b>	<b>CRE unit quality</b> (Lindholm and Gibler, 2005) <ul style="list-style-type: none"> <li>- Time used in project versus time budgeted for the project</li> <li>- Money spent on project versus money budgeted on the project</li> <li>- Amount of advice given to other business units</li> </ul>
<b>Culture</b>	<ul style="list-style-type: none"> <li>- Use of company logos and colour in workplace design (Lindholm and Gibler, 2005)</li> </ul>

NPB	=	National Property Board of Sweden
BCBC	=	British Columbia Buildings Corporation
RPS	=	Real Property Services (RPS) Branch of Public Works and Government Services Canada
Statsbygg	=	Norwegian Directorate of Public Construction and Property
NEN	=	The Netherlands Standardisation Institute
GSA	=	U.S. General Services Administration

Carder (1995), General Services Administration (2006), Kaczmarczyk and Murtough (2002), Kaczmarczyk and Morris (2002) and Wilson et al. (2003), and subsequently compared with Hinks and McNay (1999) and Lindholm and Gibler (2005). Testing which ones were applied to measure the effects of a move to another accommodation, it turned out that only a very limited number of these KPIs were used in practice as shown in chapter 16.

## DISCUSSION AND CONCLUDING REMARKS

According to Amaratunga and Baldry (2002), in order to make effective use of its performance measurement outcomes, an organisation must be able to make the transition from measurement to management. Performance management is defined as *“the use of performance measurement information to effect positive change in organisational culture, systems and processes, by helping to set agreed-upon performance goals, allocating and prioritizing resources, informing managers to either confirm or change current policy or program directions to meet those goals, and sharing results of performance in pursuing those goals”* (Procurement Executives' Association, 1999). The development of performance measurement in management has followed a path that has been influenced by the general push to improve quality and service, in addition to meeting cost parameters (Amaratunga and Baldry, 2002). Performance management programmes provide feedback based on specifics rather than generalizations and are based on specific objectives derived from the desired outcome of performance measurement results (Amaratunga and Baldry, 2002).

The literature review traced a number of models that link both organisational performance and performance of real estate and building related facilities to general concepts such as quality, effectiveness and efficiency (Van Ree, 2002; Sink and Tuttle, 1989; Lynch and Cross, 1991) and adding value (De Vries et al., 2008; Den Heijer, 2011). Furthermore a huge number of performance criteria and KPIs have been mapped and clustered in connection to its impact on organi-

sational performance and adding value by FM and CREM. This improved understanding may as such help to find benefits for different stakeholders, inside and outside the organisation. Many authors mention the significance of a wide set of performance criteria, including sustainability (Van Ree, 2002; Den Heijer, 2011), creativity (Van Ree, 2002) and stakeholder satisfaction (Kaplan and Norton, 1992; Neely et al., 2001). In order to reduce the complexity of performance measurement, a wide range of KPIs needs to be arranged in a more practicable way. In this chapter the principles of the Kaplan and Norton's strategy map (2004) – representing cause-and-effect relationship of an organisation's strategy in four BSC perspectives and the FM Value Map (Jensen, 2010) showed to be helpful to clearly clustering a huge number of KPIs in connection to core business and the surroundings.

The overview of KPIs can be useful to organisations in different contexts and on different levels: operational, tactical and strategical. The present list goes beyond cost efficiency and connects organisations' strategic objectives to performance management and as such links FM and CREM to the core business. The KPI list can provide performance measurement information that effects positive change in organisational culture, systems and process. The shift from performance measurement to performance management is by helping to set the agreed-upon performance goals, allocating and prioritizing organisation's resources.

A next research step could be to test which KPIs are being preferred in practice, why and by whom, and how the selection and priorities are linked to organisational characteristics and the external context.

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