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Measuring the Added Value of Workplace Change: Performance Measurement in Theory and Practice

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ABSTRACT

Purpose: – The purpose of this paper is to compare performance measurement systems from the literature with current performance measurement approaches in practice to get a better understanding of the complex relationships between workplace change, added value and organisational performance.To be able to measure the added value of workplace change, a valid and reliable performance measurement system is needed to measure the impact of the work environment on organisational performance before and after the change. This paper compares performance measurement systems from the literature with current performance measurement approaches in practice in order to get a better understanding of the complex relationships between workplace change, added value and organisational performance. A second aim is to have a closer look at the appraisal of workplace change by the end users.

Methodology: A review of the literature traced various performance measurement systems with different performance areas and Key Performance Indicators. Three case studies were conducted, two in Thailand and one in the Netherlands, to explore if and how these theoretical insights are applied in current practice. Due to the worldwide introduction of New Ways of Working, special attention is paid to employee satisfaction and perceived productivity support.

Findings: Many performance criteria and KPIs from literature are used in practice. However, apart from the Balanced Scorecard no performance measurement system from literature is literally applied. Regarding most issues, none of the organisations conducted a comparison of the impact of their real estate on organisational performance before and after the change. In one case only both ex ante and ex post data were collected about the appraisal of change by the end users.

Practical implications: The performance measurement systems that were found in theory and practice can be used as input to value adding management of facilities. Based on the findings a step-by-step procedure is presented to facilitate the selection of prioritised key performance indicators.

Research limitations: The number of cases is limited. Additional case studies in depth are needed to get a wider picture of practice. Besides, still much work has to be done to operationalise the performance criteria.

Originality/value: This research connects the concepts of performance measurement and adding value by workplace change with data from two different continents.

Keywords: Workplace change, Performance measurement, Added value, , Stakeholders, Key performance indicators, Benchmarking

1. INTRODUCTION

The past decades show an increasing interest in the added value of facilities by its potential to contribute to organisational performance (Lindholm and Gibler, 2005; Lindholm, 2008; De Vries et al., 2008; Jensen et al., 2012, 2013, 2014; Van der Zwart and Van der Voordt, 2013; Van der Voordt and Jensen, 2014; Appel-Meulenbroek, 2014). In this same period, all over the world companies have implemented New Ways of Working supported by innovative workplace design (Becker, 1993; Aronoff and Kaplan, 1995; Worthington, 1997; Duffy and Powell, 1997; Van der Voordt, 2003; Becker, 2004). Drivers to change include an expected lower need of floor space and cost reduction (focus on efficiency), better collaboration, increased autonomy in how, where and when to work, improved productivity, and creating an environment that attracts and retains talented knowledge workers (focus on effectiveness) (Van der Voordt et al., 2012). In order to be able to measure the actual added value of workplace change it has to be clear what added value means, which values are or should be involved, and how to measure the impact of workplace change on organisational performance. This paper starts with current definitions of added value and various types of value (section 2). Then it explores which performance criteria and indicators come to the fore in the literature (section 3) and which ones are being used in three workplace change practices (section 4). The comparison of possible and applied performance indicators provides a reference frame for measuring the added value of workplace change. The paper ends with reflections on the findings (section 5) and conclusions, recommendations for further research and suggestions how to select the most important value parameters and KPIs.

2. DEFINITIONS AND TYPES OF ADDED VALUE

Jensen et al. (2012) defined the added value of Facilities Management (FM) and Corporate Real Estate Management (CREM) as the trade-off between the benefits of FM and CREM interventions and the costs and risks to achieve these benefits. De Vries et al. (2008) defined the added value of corporate real estate as its contribution to organisational performance and the attainment of organisational goals from the perspective of various stakeholders. This definition links added value explicitly to better performance. Based on a review of the contributions by authors from different countries, different disciplines and different sectors (offices, universities, health care and industry), Jensen et al. (2012) detected six different types of added value:

1) Use value: quality in relation to the needs and preferences of the end users;
2) Customer value: trade-off between benefits and costs for the customers or consumers;
3) Economic, financial or exchange value: the economic trade-off between costs and benefits;
4) Social value: connecting people by supporting social interaction, identity and civic pride;
5) Environmental value: environmental impact of FM, Green FM;
6) Relationship value e.g. getting high-quality services or experiencing a special treatment.

Other researchers discuss different types of value as well, such as productivity, profitability and competitive advantage (De Vries et al., 2008) and sustainability (Den Heijer, 2011). Values are often interrelated. For instance, competitive advantage might benefit from stimulating creativity and innovation and physical expressions of brand values (Khanna et al., 2013). Interviews with practitioners showed that the values that are included in Facility Management or Corporate Real Estate Management practice depend of the vision, mission and life cycle of the company and contextual factors such as the labour market and economics (Van der Voordt & Jensen, 2014).

The interviews also showed that the concept of added value is widely used in practice. However, a widely agreed holistic framework of relevant Key Performance Indicators is not yet available (Bititci et al., 2012). The next section presents various performance measurement systems and Key Performance Indicators that might help to bridge the gap between added value thinking and smart ways to measure added value.

3. PERFORMANCE MEASUREMENT ACCORDING TO THE LITERATURE

3.1 Purpose of performance measurement

In order to be able to respond to the challenges of a global competitive market, managers need up-to-date and accurate performance information on its business. This performance information needs to be integrated, dynamic, accessible and visible to support fast and pro-active decision-making (Nudurupati et al., 2011). Performance measurement represents the yardsticks to assess how well people or facilities perform. The outcomes can provide the inspiration to achieve higher levels of effectiveness and competitiveness. As such, performance measurement is an important aid for making judgments and 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 seven topics to emphasize the importance and need for performance measurements. Performance measurement:

- enhances improvement
- can ensure that managers adopt a long-term perspective
- makes communication more precise ('say it in numbers')
- helps an organisation to allocate scarce resources to most attractive improvement activities
- is central to the operation of an effective and efficient planning, control, or evaluation system
- can affect the motivation of individuals by challenging but achievable targets and encourage right organisation behaviour
- can support management initiatives including Total Quality Management and managing change

Parker (2000) mentioned both similar and additional reasons such as:

- identify success
- identify whether the organisation meets customer requirements
- understand their processes (to confirm what they know or to reveal what they do not know)
- identify where problems, bottlenecks and waste exists and where improvements are necessary
- ensure that decisions are based on facts, not supposition, emotion or intuition
- show if the improvements planned, actually happened

3.2 Performance measurement frameworks and performance indicators

Nowadays a huge number of conceptual frameworks and measurement systems is available (Folan and Brownce, 2005; Riratanaphong, 2014), such as the performance measurement matrix of Keegan et al. (1989), the Balanced Scorecard (BSC) developed by Kaplan & Norton (1992), the Strategy Map developed by the same authors (Kaplan & Norton, 2004), the Performance

Pyramid of Cross & Lynch (1992), the Performance Prism of Neely et al. (2001) and the Triple-P model developed by Tangen (2005). According to the Balanced Scorecard organisational performance should be evaluated from four perspectives: 1) Financial: profitability, revenue, sales growth; 2) Customer: customer retention, customer satisfaction, market research; 3) Internal business processes: processes to meet or exceed customer expectation; and 4) Learning and growth: how to grow and meet new challenges. Bradley (2002) classified various performance criteria into six perspectives of business performance according to the BSC concept:

1. Stakeholder perception (customer perspective);
2. Financial health (financial perspective);
3. Organisational development (internal business process perspective);
4. Productivity (learning and growth perspective);
5. Environmental responsibility (internal business process perspective); and
6. Cost efficiency (financial perspective).

His six perspectives can be linked to the various types of added value that have been presented by different authors, see Table 1. As such the performance criteria can be used to operationalise the different value dimensions. For instance performance indicators related to employee satisfaction and productivity can be used to measure the use value. Performance indicators of environmental responsibility can be used to measure the environmental value.

Table 1: Comparison of performance criteria according to Bradley (2002) with various lists of added values

Bradley (2002)	Nourse and Roulac (1993)	De Jonge (1996)	Lindholm & Gibler (2005); Lindholm (2008)	Van Meel et al. (2010)	Den Heijer (2011)	Van der Zwart and Van der Voordt (2013)	Jensen et al. (2012)
1.Stakeholder perception (employee satisfaction)	Promoting HRM objectives	-	Increasing employee satisfaction	Attracting and retaining talented staff	Supporting user activities Increasing user satisfaction Improving quality of place	Increasing user satisfaction	Satisfaction
2.Financial health	Capturing real estate value creation of business	Increasing of value	Increasing the value of assets	-	Increasing real restate value	Improving finance position	-
3.Organisational development	Flexibility	Increasing of flexibility	Increasing flexibility	Increasing flexibility	Increasing flexibility	Improving flexibility	Adaptation
	Facilitating managerial process and knowledge work	Changing culture	-	Encouraging interaction Supporting cultural change	Supporting culture Stimulating collaboration	Improving culture	Culture
	Promoting marketing message Promoting sales & selling process	PR and marketing	Promoting marketing and sales	Expressing the brand	Supporting image	Supporting image	-
	Facilitating and controlling production, operation and, service delivery	Risk control	-	-	Controlling risk	Controlling risk	Reliability
	-	-	Increasing innovation	Stimulating creativity	Stimulating innovation	Increasing innovation	-
4.Productivity	-	Increasing productivity	Increasing productivity	Enhancing productivity	Supporting user activities	Improving productivity	Productivity
5.Environmental responsibility	-	-	-	Reducing environmental impact	Reducing the footprint	-	Environmental
6.Cost efficiency	Occupancy cost minimization	Cost reduction	Reducing costs	Reducing costs	Decreasing costs	Reducing costs	Cost

- = not mentioned

Another interesting overview of performance criteria is the one by Sink and Tuttle (1989), who identified seven performance criteria that are interrelated:

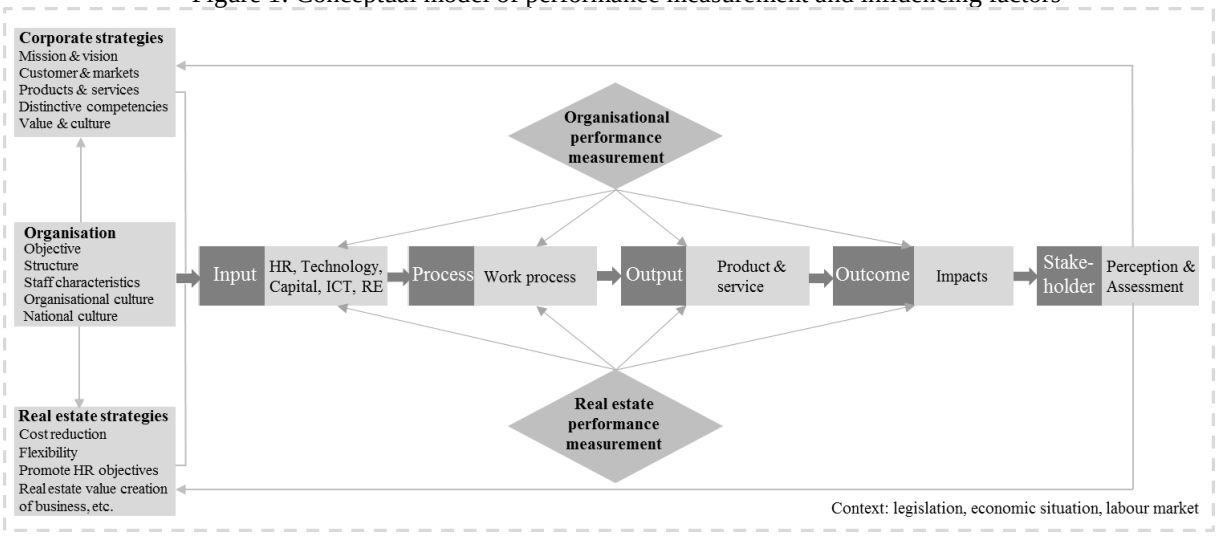
1. *Effectiveness*: the degree to which an organization accomplishes what it set out to accomplish, usually expressed as a ratio of actual output to expected output;
2. *Efficiency*: a ratio of resources expected to be consumed to resources actually consumed;
3. *Quality*: the assurance of quality at five checkpoints: 1) upstream systems, 2) inputs, 3) transformation value adding process, 4) outputs, 5) downstream systems;
4. *Productivity*: relationships between outputs and resources consumed;
5. *Quality of work life*: feelings of workforces on key factors such as safety, compensation, pay;
6. *Innovation*, a key element in sustaining and improving performance; and
7. *Profitability*, representing the relationships between revenue and cost.

This system seems rather complete and for this reason it is also used to compare current practice with available theory.

3.3 Cause-effect relationships

Apart from being clear about the value dimensions and performance indicators, performance measurement also requires 1) to be more precise about the performance of WHAT e.g. people, facilities, or services, 2) to be able to explain the causes of high or low performance, and 3) to understand which changes are needed to improve what kind of performance. In the PhD thesis on performance measurement of workplace change (Riratanaphong, 2014) a clear distinction was made between organisational performance and real estate performance. De Vries et al. (2008) concluded that cause-effect relationships are difficult to prove, due to the impact of many interrelated input factors, and the way interventions are implemented. A recent study by Goh et al. (2015) showed that contextual factors such as size and geographic dispersion of a public sector organisation and the complexity of their operating environment can mitigate the success of an imposed rigid one size fits all performance measurement framework. Figure 1 shows a conceptual model that visualizes the possible impact of organisational characteristics and corporate and real estate strategies on organisations' resources, the processes between input and output, the outcomes i.e. the impacts on organisational and corporate real estate performance, and feedback loops from performance measures to strategic choices (Riratanaphong, 2014).

Figure 1: Conceptual model of performance measurement and influencing factors



It is assumed that:
- organisational characteristics such as its staff, structure and culture define both the corporate strategy and the corporate real estate strategy and as such affects the choices and conditions regarding the resources of a firm;
- the resources including facilities define how well the work processes are supported and what comes out of it i.e. the number and quality of provided products and services;
- the assessment of the performance of the organisation and its facilities as perceived by various stakeholders is used to adapt and improve the current corporate and corporate real estate strategy;
- contextual factors such as legislation, economy and market conditions have an impact as well.

4. PERFORMANCE MEASUREMENT IN PRACTICE

4.1 Research methods

To improve our understanding of the added value of workplace change and to explore how this is measured in practice, three case studies were conducted, two in Thailand - Dhanarak Asset Development (DAD) and Philips Electronics Thailand (PTH) - and one in the Netherlands: Waterschap Rivierenland (WSRL). The two Thai cases were selected by the first author, who lives and works in Thailand. The Dutch case was selected by the second author who lives and works in the Netherlands and was involved in the WSR case as part of a series of case studies by the Center for People and Buildings in Delft. Criteria for case selection were actual implementation of workplace change, heterogeneity regarding business types (public and private sector) and cultural contexts, willingness-to-cooperate and availability of data.

DAD and WSRL represent two public organisations whereas PTH is a private organisation. Data on performance measurement were collected from company reports and interviews with the case organisation's representatives, focusing on performance measurement frameworks and criteria and performance measures/KPIs. The empirical data have been compared with the criteria from the six perspectives mentioned by Bradley (2002) and the seven performance criteria that were identified by Sink and Tuttle (1989). These perspectives cover many aspects of organizational performance and most areas on the added value of CREM/FM. The impact of workplace change on employees' appraisal was examined using the work environment diagnosis instrument (WODI). This questionnaire records employee satisfaction, perceived productivity support by the work environment, and prioritised aspects i.e. which aspects are perceived as most important by the employees (Maarleveld, et al., 2009). The findings of the WODI questionnaire were compared with the average percentages of satisfied employees on a number of issues in 96 cases in the Netherlands that were conducted by the Center for People and Buildings (CfPB) (Brunia, 2013), the so-called CfPB satisfaction indicator.

4.2 Research findings

a. Real estate performance measurement

The case studies showed that apart from the Balanced Scorecard no other performance measurement system from literature is literally applied here. Regarding most issues, none of the organisations conducted a sound comparison of the impact of their real estate on organisational performance before and after the change. In only one case both ex ante and ex post data were

collected about the appraisal of change by the end users. The three case studies also showed that performance measurement of an organisation is multi-dimensional and includes several performance criteria and performance measures beyond cost efficiency. All six perspectives presented by Bradley (2002) and all seven performance criteria indicated by Sink and Tuttle (1989) showed to be applied in all three cases but with different interpretations and in different ways, see Table 2 and Table 3.

Table 2: CRE performance measures according to Bradley (2002) (left) and measures found in the case studies

1. Stakeholder perception	**Bradley (2002)**	**DAD-case**	**PTH-case**	**WSRL-case**
Employee satisfaction with work environment	Quality of indoor environment: lightning, air conditioning, temperature, noise level. Provision of safe environment Location success factors (access to employees, amount of local amenities) Ratio of office space to common areas Provision of amenities Amount of workplace reforms and space modifications	Employee satisfaction with regard to lighting, temperature, noise disturbance, odour or dust disturbance, safe environment, availability of self-protection equipment in case of accident.	Employee satisfaction with regard to diversity of the spaces, opportunities to work outside the office, energized atmosphere, interaction and knowledge exchange, and IT	Employee satisfaction with regard to air (dust, odours, and amount of air), temperature, adequate space, lighting, noise level, appearance of the workplace.
Employee satisfaction with CRE services	Employee satisfaction with professional skills Employee satisfaction with information sharing	Employee satisfaction with regard to ICT related support services and the management of facilities (survey by the first author using the WODI tool)	Employee satisfaction with regard to ICT related support services and the management of facilities (survey by the first author using the WODI tool))	Employee satisfaction with regard to ICT related support services and the management of facilities (survey by the first author using the WODI tool)
Customer satisfaction with facilities	Survey rating (e.g. customer/tenant survey of the facilities, building, property management and CRE services) Number of complaints Average call frequency and cost per square foot help desk Location success factors (proximity to transportation, access to customers, distance to other sites and businesses)	Satisfaction of the government complex building users	Rank in customer survey* Number of Complaints*	Customer satisfaction survey*
2. Financial health	**Bradley (2002)**	**DAD**	**PTH**	**WSRL**
Value of property, plant and equipment	Business return on real estate assets Real estate return on investment Real estate return on equity Sales or revenue per square foot (metre) Space (square feet or metres) per unit of revenue Return on property management	Income from commercially rented area Return on asset	NA	NA
3. Organisational development	**Bradley (2002)**	**DAD**	**PTH**	**WSRL**
Quality of facilities	Physical condition of facilities Suitability of premises and functional environment Number of building quality audits	Work done according to the development of building management and ICT standard	Risk management and business control (strategic, operational, compliance and financial risks)*	Risk Inventory and Evaluation (RI&E) including the physical condition of facilities

Accommodation usage	Square feet per employee Effective utilisation of space e.g. amount of teamwork space, vacancy rates, time wasted with interruptions due to open space layout	NA	NA	Square metre per desk (according to labour law)
CRE unit quality	Time used in project versus time budgeted for the project Money spent on project versus money budgeted on the project Amount of advice given to other business units	Delivering rentable area to other government agencies Percentage of allocating commercial area	% reduction in process cycle time* Number of engineering changes* Capacity utilization* Order response time* Process capability*	Design process descriptions and optimizing business processes*
4. Productivity	**Bradley (2002)**	**DAD**	**PTH**	**WSRL**
Employee productivity	Productivity (% of perceived productivity support from working environment) Absentee rates by buildings	Health & wellbeing in the workplace Productivity survey (WODI)	Health & wellbeing in the workplace through workplace innovation (WPI) Productivity survey (WODI)	Health &wellbeing through workplace design Productivity survey (WODI)
Strategic Involvement	CRE involved in corporate strategic planning CRE integrated with HR strategies CRE actively involved in firm-wide initiatives such as special asset use, consolidations, shared services	Master plan of the IT system Management of the information system IT solution in HRM	The implementation of the WPI Smart IT solutions for the Introduction of WPI	The implementation of the flex workplace
5. Environmental responsibility	**Bradley (2002)**	**DAD**	**PTH**	**WSRL**
Resource use	Energy consumption, Number of energy audits	Introduction of green building Construction materials and equipment meet local content	Green products* Energy efficiency improvement Collection and recycling of company's products* Amount of recycled materials in company's products*	Introduction of sustainable approach to the new building EU Energy label
Waste	Contaminated sites management, Amount of garbage	NA	NA	NA
6. Cost efficiency	**Bradley (2002)**	**DAD**	**PTH**	**WSRL**
Occupancy costs	Total occupancy cost per employee Occupancy cost as a % of total operating expense Occupancy cost as a % of operating revenue by building or business unit	Taxes (property and land)	Office rent (Baht/sq. m./ month)**	Depreciation expense
Operating costs (building and FM)	Total operating expenditures versus budget including: general administration; capital expenditures; moves, adds, rearrangements; facility/properties services; other business services (mail, and copy centres, risk, and/or security) Facility management costs (environment, working conditions, quality)	Operating costs - Facility costs (buildings & equipment) - Overhead costs (employees and committee)* - Fees and services*	Utility (electricity & water) cost/unit Parking cost/month Overhead cost*	Operating costs - Salary costs* - Social charges* - Personnel costs of third party*

* does not directly relate to real estate; NA = not applied i.e. not measured or no data available, **40 Baht = 1 euro

Table 3: Performance criteria according to Sunk and Tuttle (1989), left, and performance measures from the case studies

Performance criteria (Sink and Tuttle, 1989)	**Performance measures from case studies**		
	DAD	**PTH**	**WSRL**
Effectiveness *Degree to which an organization accomplishes what it set out to accomplish*	Work done according to assigned plan from government	Market introduction in time Market introduction realized sales	Data for benchmarking the company's output
Efficiency *Ratio of resources expected to be consumed to resources actually consumed*	Investment plan	Operational cash flow	Budget comparison
Quality *The assurance of quality at the organisational system (i.e. input, process, output)*	Quality assurance - Internal audit as a part of organisational system	Quality improvement team participation	Quality management, i.e. the evaluation of physical condition of facilities as a part of organisation's performance measurement system
Productivity *Relationships between outputs and resources consumed*	Work done according to assigned plan from the government - Percent of work done Human Resource Management - IT solution in HRM	Output: Sales growth Input: Number of positions filled	Product based on the number of hours work
Quality of work life *Feelings of workforces on key factors in an organisation such as safety, compensation, pay, etc.*	Human Resource Management - Employee satisfaction with regard to safety, health and environment	Employee attitude survey (perceptions and attitudes related to employee satisfaction)	Employee satisfaction with regard to: air, temperature, adequate space, lighting, noise level, appearance of the workplace
Innovation *A key factor in sustaining and improving performance*	Master plan of the IT system Management of the information system IT solution in HRM	The implementation of the workplace innovation concept Smart IT solutions for workplace innovation	The implementation of the flex workplace
Profitability *Relationships between revenue and cost*	Earnings before interest, taxes, depreciation and amortization (EBITDA)	Economic profit realized Income from operations Working capital Inventory turns	Available cash to be deposited at the current value of the assets

b. Employees' appraisal of workplace change

Table 4 presents the percentages of satisfied respondents in the three case studies and the average percentage of satisfied respondents in 96 Dutch cases (Brunia, 2013). The findings showed that all three cases have rather low satisfaction percentages on archive and storage facilities and privacy. The DAD employees are much less satisfied with most of the aspects compared with the Dutch employees. Several aspects of the PTH workplace have a much lower satisfaction percentage than the average of 96 Dutch cases, such as content and complexity of work (59% versus 80% in the average Dutch cases) and opportunities to communicate (48% versus 71%). However, the satisfaction percentage of indoor climate is much higher in the PTH case (59%) in comparison to the Dutch cases (33%).

Table 4: % satisfied respondents in three cases and average % in 96 Dutch cases (Brunia, 2013)

	DAD	**PTH before change**	**PTH after change**	**WSRL**	**CfPB (2013)**
Organisation	25	60	66	72	67
Content and complexity of work	32	64	59	83	80
Sharing own ideas about working environment	24	31	41	45	44
Accessibility of the building	37	55	62	72	78
Architecture and appearance of the building	59	45	45	91	55
Subdivision of the whole building	33	48	38	80	46
Number, diversity, and functionality of spaces	30	19	55	65	44
Adjacency and locality of the spaces	33	38	55	76	53
Openness and transparency of environment	27	57	55	61	53
Functionality and comfort workspaces	37	52	62	70	56
Interior design appearance and ambiance	29	43	62	60	50
Privacy	28	14	41	29	37
Opportunities to concentrate	23	7	52	33	39
Opportunities to communicate	51	43	48	75	71
Archive and storage facilities	25	24	34	42	36
ICT and ICT support facilities	21	52	48	47	53
Facilities and facilities management	23	52	55	67	53
Indoor climate	23	57	59	48	33
Lighting	40	64	69	48	58
Acoustics	21	48	52	48	44
Facilities for remote working	14	67	62	65	48
Perceived support of individual productivity	30	43	55	45	40
Perceived support of team productivity	35	45	34	46	38
Perceived support of organisational productivity	17	43	31	38	31

The WSRL case shows a much higher satisfaction percentage regarding architecture and the appearance of the building (91% versus 55% on average in 96 Dutch cases), subdivision of the whole building (80% versus 46%), number, diversity, and functionality of spaces (65% versus 44%), and adjacency and locality of the spaces (76% versus 53%).

Regarding perceived productivity support by the work environment, the percentage of satisfied respondents with perceived support of individual productivity in the DAD case (30%) is slightly lower than in on average in 96 Dutch cases (40%), whereas more PTH and WSRL employees are satisfied on this topic (55% and 45%). Regarding prioritised aspects, striking differences came to

the fore as well, e.g. 39% of the DAD employees ranked adjacency and locality of the spaces in their top 3 of most prioritised aspects versus 17% in the PTH case and 5% in the WSRL case.

The PTH case offered the opportunity to compare the employees' appraisal before and after workplace change. In the new situation, 15 of the 21 aspects show a higher percentage of satisfied respondents, and for most aspects the percentage of dissatisfied respondents has decreased. The satisfaction about the perceived support of individual productivity increased as well. However, the perceived support of team and organisation productivity has dropped after the workplace change.

5. DISCUSSION

Remarkably, apart from the Balanced Scorecard no performance measurement framework that is presented in the literature is being applied in practice in its original form. Probably these frameworks are not well-known by practitioners or perceived as too complex and not practically applicable. However, all performance criteria that were mentioned by Bradley (2002) and by Sink and Tuttle (1989) showed up to be included in all three cases, be it with different interpretations and in different ways. The different applications might be due to different organisational contexts (i.e. business type, objectives, structure) and different external contexts. In addition to cost efficiency, in all three cases other dimensions of performance measurement are included in the performance measurement systems as well. Most performance criteria found in the case studies are measured by using various performance measures such as operational cash flow (efficiency), quality management (quality) and economic profits/earnings (profitability).

The performance criteria of Sink and Tuttle (1989) and Bradley (2002) show that performance is multi-dimensional concept. The various types of value that are mentioned by different authors show that added value is a multidimensional construct as well. In table 1 we tried to connect various performance criteria with various added value parameters. In all three cases performance measurement was not clearly related to value adding management. Performance measurement was mainly used as a tool to monitor the performance of the facilities and less or less explicitly as a means to assess its contribution to the overall performance of the organisation and as such to assess the added value of change from the perspective of different stakeholders. As a follow-up to the book of Jensen et al. (2012) on the Added Value of Facilities Management, a second book is being prepared that elaborates the possibility of defining short lists of Key Performance Indicators for each of the value parameters that were mentioned in table 1 (Jensen and Van der Voordt, forthcoming).

The findings from performance measurements in different cases can be used for benchmarking purposes by comparing ones' own data with data from other cases or an overall benchmark. For instance organisations may compare their own percentages of satisfied employees with an absolute standard (e.g. the aim to attain at least 80% satisfaction) or a relative standard (e.g. to perform better on satisfaction than the average of satisfied employees per aspect in other cases). However, a better or worse performance after change or in comparison with other organisations is often difficult to explain, due to the impact of many influencing factors that might have changed simultaneously and due to differences between organisations and their context, regarding for instance the structure and culture of the organisation, employee characteristics, workplace characteristics, work processes, implementation processes and internal and external

conditions (Riratanaphong, 2014). Knowledge from inside the organization is needed to interpret the findings in a valid and reliable way.

With regard to the conceptual model of performance measurement (figure 1), the findings show that real estate performance measuring in the three cases reflect their different organisational contexts, operations, resources, impacts and stakeholders. For example, the DAD and the WSRL cases are both public organisations and show to be concerned with both internal and external stakeholders, whereas the PTH case focuses more on internal stakeholders. The DAD and WSRL cases appear to be concerned with the external stakeholders by being aware of public opinion regarding environmental impact and by providing company information to citizens.

In all cases we observed that the choice of the workplace concept depends on staff characteristics and work processes. The typical layout and the standard work settings of the DAD fits with the routine office work. The objective of stimulating collaborative work in the PTH and the WSRL case has resulted in an innovative workplace concept with a modern interior design and flexible and rather open work settings. The flexible workplace concept provides the PTH and WSRL employees with more choices to perform tasks where they prefer. Both cases showed a higher satisfaction percentage in comparison to the DAD case for inter alia the number, diversity and functionality of spaces, openness and transparency of the environment, functionality and comfort of workspaces, and facilities for remote working.

Remarkably, the PTH case is the only case with data about employee appraisal before and after workplace change. The perceived support of team and organisation productivity dropped, whereas the perceived support of individual productivity increased after the change. The decreased team productivity may be explained by the new workplace layout. Although various groups of employees in the lighting department operate as a team, no team spaces have been provided to support group work. As a consequence these groups are not enabled to effectively communicate with one another. It can be concluded that due to the miscalculation of the team space requirements during the implementation process, a lower satisfaction percentage of team productivity was obtained compared to the previous situation.

Various questions within the Work Environment Diagnosis Instrument (WODI) refer to opportunities to communicate and to concentrate and to sharing own ideas about the working environment. As such an assessment of employee satisfaction before and after workplace change can be useful to evaluate support of knowledge sharing, which is of utmost importance in the current knowledge age. Data from WODI analyses could be compared with data from social network analysis or space syntax analysis (Kastelein, 2014) and lay-out metrics (Appel-Meulenbroek, 2014) to get a more complete picture.

Regarding social values, some public agencies decided not to move into the DAD-complex as previously agreed because of a psychological reason: they preferred to be accommodated in a single tenant building. Some of these public agencies' current accommodations were renovated old palaces that provide a higher cultural value (McMillan, 2006) to the occupied organisations than the Government Complex. According to Coenen et al., 2012, cultural value is a component of the social value dimension and should be incorporated in value adding management.

6. CONCLUSIONS AND PRACTICAL IMPLICATIONS

Efficient and effective management of corporate real estate and other facilities requires well considered decisions to align the facilities and services to the needs of the core business in order to add value to the organisation and to contribute to organisational performance. Evidence based decision making is only possible with valid and reliable data about the impact of real estate on organisational performance. The huge variety in performance measurement systems in the literature and the lack of data on the performance of facilities and organisational performance before and after workplace change shows that there is still a long way to go to define a widely agreed, well operationalised, , holistic and practically applicable performance measurement system that enables decision-makers to make the right choices. Additional in-depth research is needed to explore cause-effect relationships between facilities and organisational performance before and after change and between different organisations.

In order to support organisations in how to select prioritised performance measures and KPIs out of a long list of possible KPIs, a step-by-step plan might be useful (Riratanaphong, 2014), including six steps:

1) Inventory of KPIs that the organisation currently applies;
2) Clustering of all KPIs in organisational performance and corporate real estate performance.
3) Classification of all measures e.g. into well-defined categories, e.g. the six categories of Bradley (2002).
4) Comparison of possible and currently applied measures and KPIs.
5) Reflection on similarities and dissimilarities in connection to the vision and mission of the organisation and its main objectives.
6) Prioritisation of KPIs in connection to the main objectives and contextual variables such as economy and competitive advantage.

Questions that might be helpful to apply these steps are for instance: Which CRE characteristics align best to the mission and vision of the organisation and organisational objectives? Which CRE characteristics support the work processes optimally and which KPIs could be applied to measure these connections? Which CRE characteristics might influence productivity, profitability, competitive advantage and sustainability? Which areas are key? Similar questions can be raised regarding other facilities and services.

The step-by-step plan has been developed inductively based on the three case studies (Riratanaphong, 2014) but has not yet been empirically tested in other cases. A next step could be to discuss the proposed procedure in expert meetings and to conduct additional case studies in search for a better understanding of the complex relationships between organisational performance and real estate performance.

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