Performance measurement of workplace change

in two different cultural contexts

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A+B Architecture and the Built environment

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Contents (concise)

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Preface

This research project has taken five years to complete, and the journey began with an ambitious goal. However, the road was not an easy road to travel. The tremendous tasks of studying and revising my research could not have been done without the support of all those involved. I would first like to begin by thanking my supervisory team. I would like to thank my supervisor, Professor Hans de Jonge for accepting me as his PhD candidate, for the support and guidance he has offered me along the way and for never giving up on me when I sometimes struggled. It was a privilege to have you as my supervisor. I would like to thank my daily supervisor, Theo van der Voordt, for the enormous support he gave me and for not only having encouraged me academically, but also for helping me find my way through all the official procedures so that I could live and work in The Netherlands. Thank you for creating the opportunity for me to conduct a research project here at TU Delft. I am grateful for your support. I am also thankful to Per Anker Jensen who has given me several opportunities to participate in various academic activities during the past few years. My acknowledgements go to my PhD defence commission members, whose detailed and constructive comments proved to be very helpful for improving this book. I would also like to thank John Hinks for his support.

During the undertaking of this research project, many people have supported me. I would like to thank my colleagues: Alexandra, Erwin, Esra, Flavia, Hilde, Leentje, Philip, Tom, Peter and all of the other colleagues in our group for their support and feedback. A special thank you goes to Monique, who lifted my spirits when I was going through a rough period. I would like to thank Wim Pullen, Iris de Been, Marion Beijer, Sandra Brunia and colleagues at the Center for People and Buildings who have provided a substantial amount of data for my case study. I would like to thank Eric Kuindersma for his willingness to participate in my research. I thank for the feedback from Juriaan van Meel, John Suyker, Brenda Groen and Jackie de Vries. I would also like to thank Véro Crickx and Michelle Mellion for their assistance in the editing process.

Naturally, there were also my other colleagues, friends and family in Thailand who I would like to thank. I would like to thank Kampon Ruethaivanich and Pattaree Jantarakongkul for allowing me to conduct research in their organisations. I would like to express my gratitude to Professor Vimolsiddhi Horayangkura who gave me the opportunity to pursue my academic career at the Faculty of Architecture and Planning at Thammasat University in Thailand. I would like to thank Ann Tipsuda for the support she offered with the statistical analysis and Pak Damrongsak, Kob Kongkoon, Sukulpat and the team for taking on the huge load of administrative and teaching tasks at our real estate development group. I would also like to thank Tanapon Panthasen for his support. I thank for the support of photos between chapters from Ek Buranakul.

Finally, there are very important people in my life who have also accompanied me on this long journey. They are my parents, Prawit and Laddawan, and my brothers, Opas and Narong, who have supported me during the ups and downs. The most important person I would like to thank, however, is my wife, Jittapat, who always believes in me and who helps by taking care of our beautiful baby, Pim Jinnipa. I would like to express my great love and deep appreciation to you for all that you have done.

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1   Introduction

The saying 'what gets measured, gets done', was a source of inspiration when choosing this research topic concerning performance measurement. Several management principles have been used by senior management to guide organisations towards improved performance. These principles include guidelines for using a measurement framework to improve process and quality management. Due to the fact that several stakeholders involved in this measurement process usually have different perspectives on performance, organisations with different context characteristics require a clear and understandable conceptual framework and tools for performance measurement. One of the organisation's resources, real estate, can contribute to organisational performance (Nourse and Roulac, 1993, De Vries et al., 2008, Lindholm, 2008, Den Heijer, 2011, Jensen et al., 2012a). This research focuses on performance measurement involving workplace change which can be applied in order to align workplaces so that organisational objectives can be achieved and a contribution can be made to organisational performance.

§ 1.1   Performance measurement

The changing business environment impacts the production of goods or services. For instance, advanced technologies enable companies in India and China to become integral parts of complex global supply chains (Friedman, 2005). The organisations strive to do business in quite a new way to increase the performance of available resources in order to stay in business. Competitive pressures force the organisations to focus on cost reduction and efficiency. However, drivers to improve social interaction and an employee's contribution to an organisation lead to the concern of other performance criteria such as effectiveness, flexibility and creativity. Traditional measurement tools that focus on cost minimisation are not sufficient in the changing context of the business environment (Varcoe, 1996, Kaplan and Norton, 2001, Bradley, 2002). There is an increasing need for performance measurement tools that not only focus on the efficiency of the day-to-day operation, but also on the strategic effectiveness of business resources that align with the mission and vision of the company (Nourse and Roulac, 1993, Tangen, 2003, De Vries et al., 2008, Jordan et al., 2009, Den Heijer, 2011, Riratanaphong et al., 2012). The introduction of new performance measures such as shareholder value, economic profit, customer satisfaction, internal operation performance, intellectual capital and intangible assets (Neely and Bourne, 2000) reflect a more holistic and integrated approach, taking the benefits into account as well. Due to a rapidly changing context, organisations

are looking for performance measurement approaches that not only cover all of the aspects regarding the organisation, but which can also be applied to various situations. It is essential to use performance measurement methods which have an integrated perspective of performance.

§ 1.2 Workplace change

Performance of an organisation can be improved by monitoring and controlling the use of an organisation's resources which includes both the personnel and their work environment. It has been realised that one of the major objectives of workplace change is cost reduction (Van Meel et al., 2010). However, knowledge work and human capital drive the focus to other components such as IT, human resources and the interdependence of facilities. Today's modern office is more likely to depend on these human relations and the quality of the interactions undertaken in the office environment (Haynes and Price, 2004). In addition, the changing nature of work has resulted in an increasing demand for workplaces that respond to the new types of employees' needs (Duffy, 1997). The new workplace is not only concerned with using space efficiently, but it also involves employee satisfaction and productivity.

Research into organisational behaviour suggests that physical settings can influence employee satisfaction, productivity, and motivation (Bitner, 1992). Increasing workplace understanding is built on the recognition that space has different characteristics: it performs different functions and it allows people to work in different ways. The output of the modern office relates not only to the physical characteristics, but also to social networks and interactions undertaken in the office environment. In addition to cost reduction, employee satisfaction and perceived productivity support of the work environment are areas that could contribute to increased performance and serve as drivers to change the workplace. Performance from an employee's perspective, with regard to the workplace change, is the second focus of this research.

§ 1.3 Cultural context

As a person who lives and works in Thailand, my interest is in the development of performance measurement approaches that can be applied to workplace situations in my home country. While working on my PhD dissertation at the Delft University of Technology, I spent most of the past four years in The Netherlands. The perception of workplace change at the Faculty of Architecture in Delft is quite different from what

I had experienced before. This brought a third issue into my search for applicable performance measurement methods and conceptual frameworks in connection to workplace change; are there cultural differences between Thailand and The Netherlands that play a vital role when appraising workplace environments? This cultural issue is used as a contextual background that could contribute to obtaining a better understanding of the performance measurement of workplace change within different contexts.

§ 1.4   Research objectives and research questions

The aim of this research is to provide a conceptual framework that visualises the impact of workplace change on employees' responses to the new work environment and to present guidelines on performance measurement of workplace change in different contexts. The following research questions focus on these main research themes: performance measurement and workplace change.

1   Performance measurement
- How can the performance of workplace change be measured according to the literature?
- How is performance of workplace change being measured in practice?
- What recommendations can be given to improve performance measurement of workplace change?

2   Workplace change
- What are the main drivers and objectives of workplace change?
- Which stakeholders are involved in the implementation process and what are their roles?
- What is the impact of organisational structure, staff characteristics and work processes on workplace change?
- How satisfied or dissatisfied are employees with the various aspects of their work environment and the perceived support of productivity, and which aspects do they perceive as being the most important?
- What recommendations can be given to improve employee satisfaction and productivity?

In addition, a background issue will be explored: which similarities and dissimilarities can be found in performance measurement and appraisal of workplace change in two different cultural contexts, i.e. Thailand and The Netherlands?

§ 1.5 Research methodology

§ 1.5.1 Research approach

This thesis involves two main research themes, performance measurement and workplace change, in connection to a contextual background of organisational and national culture. Each theme and background data were incorporated in developing an overall conceptual model and three related conceptual models: 1) on performance measurement, 2) on employees' responses to workplace change and 3) on cultural context. These conceptual models have been used to formulate research questions, conduct empirical studies and analyse data. Table 1 describes the research matrix which has been classified under three separate headings

	Theme 1 Performance measurement	Theme 2 Employees' responses to workplace change	Contextual background Organisational and national culture
Part I Theoretical framework	· Performance measurement theories and frameworks · Performance measurement in the context of FM[1] and CREM[2] · Added value of CREM · Performance measures and KPIs · Conceptual model	· Driving forces · Workplace typology · Current trends in workplace design and management · Impact of workplace change on employees: 1. employee satisfaction 2. perceived productivity support 3. prioritised aspects · Conceptual model	· Organisational culture theories · Four major culture types · Competing values framework · National culture theories · Five dimensions of national culture · Comparison between Thai and Dutch cultural settings · Conceptual model
Part II Empirical research	· Performance measurement system · Performance criteria · Performance measures and KPIs	· Findings from WODI questionnaire:[3] 1. Employee satisfaction 2. Perceived productivity support 3. Prioritised aspects	· Findings from OCAI questionnaire:[4] - Organisational culture · Findings from VSM94 questionnaire:[5] - National culture
	Connection between conceptual models and findings from case studies		
Part III Conclusions & recommendations	· Conclusions and recommendations to improve performance measurement and workplace change processes		

Table 1
Research matrix: two main research themes and a contextual background

§ 1.5.2   Research perspective

The naturalistic approach (Lincoln and Guba, 1985) was chosen as a system of inquiry in this research. The ontological premise of naturalistic research is that there are multiple, socially-constructed realities. Naturalistic research is intended to understand phenomena in their naturally occurring states. It is a discovery-oriented approach in the natural environment. The naturalistic inquiry is also known as the interpretive paradigm. In this perspective even though a study may have been conducted objectively, it is still value bound. The researcher's background knowledge will influence the social construction of reality (Miles and Huberman, 1994, Groat and Wang, 2002). This also applies to the analyses made concerning several parts of this research, including the stakeholder perception of workplace change and the impact of culture that might be influenced by the researcher's background knowledge. In addition, part of the research has been conducted by using questionnaires which enable a quantitative data analysis to be conducted.

§ 1.5.3   Research strategy

In this research, two methods of scientific reasoning are applied: inductive and deductive reasoning. Inductive reasoning focuses on acquiring a general insight through the generalisation of having observed specific facts. The inductive process serves to relate the specific topic to a broader context and seeks clarification of multiple critical factors affecting the phenomenon (Groat and Wang, 2002). Deductive reasoning focuses on extracting statements from general theories in order to test these statements on the basis of facts. The deductive process of inquiry seeks cause-and-effect explanations. In this study, the researcher uses deductive reasoning to derive

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1   Facilities Management (FM)

2   Corporate Real Estate Management (CREM)

3   The Work Environment Diagnosis Instrument (WODI), a tool for collecting data on employees' responses to the
            work environment (employee satisfaction, perceived productivity support and prioritised aspects) (Center for
            People and Buildings, 2010).

4   The Organisational Culture Assessment Instrument (OCAI) a tool for assessing organisational culture (Cameron
            and Quinn, 2006)

5   The Values Survey Module 94 (VSM94) a tool for assessing national culture (Hofstede, 1997)

specific research questions from the larger context of theory and inductive reasoning by exploring insights based on three different case studies. This cyclical process of inductive and deductive reasoning allows the theoretical frameworks to be explored and tested in the empirical research.

§ 1.5.4 Research methods

This section describes the applied data collection methods regarding the two main research topics (performance measurement and workplace change).

Literature review
Performance measurement
Workplace change
Organisational and national culture

Multiple case study

Case studies

THAILAND: 2 case studies	NETHERLANDS: 1 case study
Private organisation	Public organisation
Philips	Dhanarak Asset Development	Waterschap Rivierenland

Performance Measurement: performance measurement frameworks and criteria, performance measures/KPIs

Employees' responses to the work environment: employee satisfaction, perceived productivity support, prioritised aspects

Context of organisational and national culture

Cross case comparison and feedback to theory

Conclusions and recommendations

Figure 1
Research steps concerning two main research themes and a contextual background

The research steps as presented in Figure 1 describe the process from literature review, multiple case studies to conclusions and recommendations (indicated by an arrow connecting each step).

1 *Literature study*
In Part 1 concerning the literature reviews of performance measurement, workplace change and organisational and national culture are used to explore and link the findings from existing studies and to develop conceptual models. An overall theoretical framework is formulated in this part as well.

2 *Multiple case study*
To answer the research questions within real-life contexts, a multiple case study has been chosen for the research approach. This research is a qualitative and interpretative work using a comparative analysis of two cases and one reference case in order to understand how organisations implement performance measurement, and to find out how performance measurement from the literature can be applied in organisations with different contexts. Understanding the performance measurement practices, exploring the secondary information of workplace change and culture, describing the implementation process of workplace change and analysing the appraisal of change are crucial in this study.

Through case studies, empirical data helps to explain a contemporary phenomenon. In this procedure, the inductive approach reasons through moving from a specific case or collection of observations to general law (Taylor et al., 2002). However, the deductive approach is also applied in order to seek cause-and-effect explanations regarding a factual basis. Three case studies of organisations situated in different countries, two in Thailand and one in The Netherlands, have been conducted to explore performance measurement of workplace change in connection to cultural issues as a contextual background.

2a. Document analysis
The empirical study includes a collection and analysis made of reports on the case study organisations such as the type of business, organisational objectives, organisational structure and the work process. Reports concerning performance measurement indicate an organisation's performance measurement frameworks, criteria and performance measures/KPIs. Performance measurement methods in practice have been compared with suggested measurement methods in literature. In regard to workplace change, the analysis focuses on: 1) workplace change characteristics including location, building grade, architectural design, workplace concept and supporting facilities, 2) implementation process such as drivers to change and organisation of change, and 3) appraisal of change; i.e. employee satisfaction, perceived productivity support and prioritised aspects of the work environment.

2b. Interviews

Face-to-face interviews were applied in the Thai cases. The purpose was to gain qualitative data concerning the main variables including organisation, performance measurement and workplace change. In the Dutch case, the international affairs manager was asked several questions. Most findings in this case are based on an analysis made from the reports and documents that were available.

2c. Surveys

In each case, a series of questionnaires is applied by using existing instruments:

- The Work Environment Diagnosis Instrument (WODI), a tool for an indicative evaluation with a focus on overall employee satisfaction and perceived support of labour productivity through the working environment and prioritised aspects (Maarleveld et al., 2009)
- The Organisational Culture Assessment Instrument (OCAI) for assessing organisational culture (Cameron and Quinn, 2006)
- The Values Survey Module 94 (VSM94) for assessing national culture (Hofstede, 1997)

The questionnaires in English were translated into Thai. The translated version and the original version were carefully compared and examined to assure that there were no significant differences between them. The purpose of the three questionnaires (WODI, OCAI, VSM94) was to explore the relationships between variables, for example, regarding the satisfaction of employees with their physical working environment and the actual characteristics of their work environment. The questionnaires can be found in Appendices VII and VIII. Due to copyright restrictions, the VSM94 has not been included in the appendix.

Case selection

To improve our understanding of performance measurement regarding workplace change in different countries, two case studies were chosen in Thailand and one in The Netherlands. To explore these phenomena, cases must have features that they share in common, and they should also differ in some features as well.

Four criteria have been added to the case selection

1 Workplace change practice. In order to explore the employees' responses to the changed environment, it is important to select cases which implemented workplace change and in which the contextual factors of the change process could be examined.
2 Public and private organisation. Because the type of business can affect workplace change, the case studies have been chosen from both the public and private sector.
3 Cultural context. The organisational and national culture of three case studies are explored and used as a contextual background which has been added to the findings from performance measurement and workplace change.

4   Cooperation and availability of data. To gain insight into the case studies, it is necessary that a willingness to cooperate be displayed by the organisations selected in order to obtain in-depth information.

Based on these criteria, two organisations in Thailand and one organisation in The Netherlands were selected to serve as case studies:
1   Dhanarak Asset Development (DAD), Thailand
2   Philips Electronics Thailand (PTH), Thailand
3   Waterschap Rivierenland (WSRL), The Netherlands

These three cases are examples of two public (DAD, WSRL) and one private organisation (PTH), which were selected based on the workplace change characteristics as well as the willingness to participate in the research. The DAD case presents a standardised performance measurement system of a public organisation. The PTH, a private organisation, offered the opportunity to conduct the surveys both before and after the change. The extra data obtained from ex-ante evaluation has been used in order to compare it with the findings from ex-post evaluation of the PTH case. The WSRL case provides information on the Dutch workplace and the responses of employees regarding the work environment after the change was implemented. Except for the culture assessment which was made, the data collection on employees' appraisals had already been carried out earlier by the Center for People and Buildings (CfPB) in The Netherlands (Brunia, 2013).

The findings from the ex-post evaluation were used to compare the findings from the three case studies with the CfPB indicator (Brunia, 2013). This indicator shows the average percentage of satisfied employees on a number of issues, based on over 96 cases in The Netherlands. Figure 2 shows the procedure of a cross-case comparison of the three case studies regarding two research themes and a contextual background.

Case studies

Thailand   Netherlands

DAD   Philips TH   WSRL

2 Themes &
a contextual background

Performance measurement

Employees' responses to work environment

Cultural context
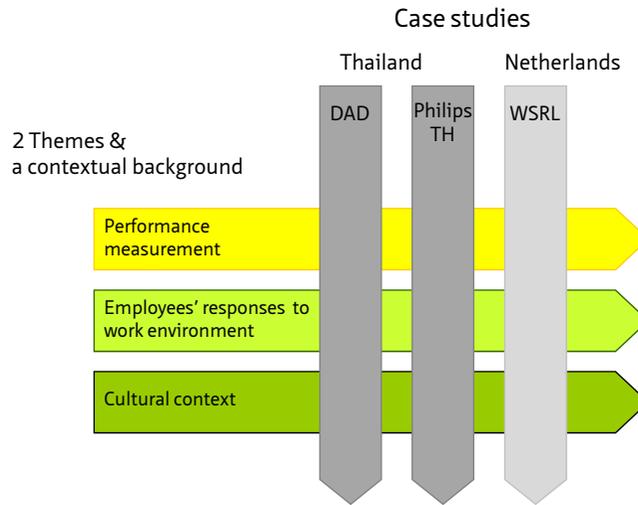
Figure 2
Cross case comparison in two research themes and a contextual background.

Table 2 describes data collected corresponding to the two research themes (i.e. performance measurement, employees' responses to workplace change).

Performance measurement	Employees' responses to workplace change		
	Workplace change	Implementation process	Appraisal of change
· Performance criteria	· Location	· Workplace change objectives	· Employee satisfaction
· Performance measurement frameworks	· Building grade		· Perceived productivity support
· Performance measures/KPIs	· Architectural design		· Prioritised aspects
	· Workplace concept		
	· Supporting facilities		

Table 2
Main variables found within this research

Summary of data collection in three cases

Table 3 summarises data collected on various topics according to the main research themes and the contextual background of the three cases. When possible, data on workplace change has been gathered from three situations: the workplace before the change, the change process, and the workplace after the change. However, the availability of data for each topic is different from case to case and can be described as: 1) fully available, 2) sufficiently available, 3) to some degree available, and 4) not available.

Scheme	Dhanarak Asset Development Thailand	Philips Thailand	Waterschap Rivierenland
Performance measurement			
Performance criteria	+ +	+ +	+ +
Performance measurement frameworks	+ +	+	+
Performance measures/KPIs	+ +	+	±
Workplace before change			
Place before change			
Location	+ +	+ +	+
Architectural design	+ +	+ +	–
Workplace concept	+ +	+ +	–
Supporting facilities	+ +	+ +	–
Process			
Daily activities	+ +	+ +	±
Appraisal of workplace before change			
employee satisfaction	–	+ +	–
perceived productivity	–	+ +	–
prioritised aspects	–	+ +	–
most positive and negative aspects	–	–	–
Implementation process			
Workplace change objectives	+ +	+ +	+ +
Drivers to change	+ +	+ +	+ +
Organisation of change	+	+ +	+
Workplace after change			
Place after change			
Location	+ +	+ +	+ +
Architectural design	+ +	+ +	+ +
Workplace concept	+ +	+ +	+ +
Supporting facilities	+ +	+ +	+ +
Process			
Daily activities	+ +	+ +	+ +
Appraisal of workplace after change			
employee satisfaction	+ +	+ +	+ +
perceived productivity	+ +	+ +	+ +
prioritised aspects	+ +	+ +	+ +
most positive and negative aspects	–	–	+ +
Cultural context			
National culture	+ +	+ +	+ +
Organisational culture	+ +	+ +	+ +
availability of data: + + fully available, + sufficiently available, ± to some degree available, – not available			

Table 3

Data collected according to research themes and a contextual background of three case studies

Outline of the thesis

The thesis presents a theoretical and an empirical part. The theoretical part consists of literature reviews in the field of performance management, workplace change (i.e. driving forces and impact on employees), and organisational and national culture. Relevant theories and concepts connected with the research problem are presented and discussed, as well as their applicability in answering the research questions. The synthesis of the literature review has been used to guide the empirical field study i.e. to formulate research questions and to develop the research design and data-collection methods. The empirical part presents three case studies and a cross-case analysis.

This first chapter provides an introduction to the different research areas. This chapter describes the reasons for conducting a research study on performance measurement of workplace change in different contexts, i.e. Thailand and The Netherlands. In this chapter, the research objectives, the research questions, the research methodology and the thesis outline are described.

Part one (Chapters 2 to 5) introduces the theoretical foundation of this thesis that includes the definitions of the terms used. The collection, analysis and reflection on existing tools and key performance indicators from the literature are presented in Chapter 2. The added value of corporate real estate is discussed in this chapter as well, followed by a conceptual model that shows the relationships between the variables in connection with corporate and real estate performance measurement.

Chapter 3 provides the understanding of drivers and objectives of workplace change and how employees respond to their changed work environment. The work environment diagnosis instrument (WODI) questionnaire that is used for collecting data on employees' responses to the work environment (employee satisfaction, perceived productivity support and prioritised aspects of the work environment) is presented in this chapter. Furthermore, a conceptual model that illustrates the impact of variables on the appraisal of workplace change is described in this chapter.

Chapter 4 and Chapter 5 describe the contextual backgrounds of organisational and national culture that are used as supporting data to the findings from performance measurement and workplace change. Chapter 4 describes the theory of organisational culture and four cultural types together with an assessment tool, namely the organisational culture assessment instrument (OCAI). Five cultural dimensions are explained in the context of national culture. The Values Survey Module 1994 (VSM94), an instrument used for collecting data on five dimensions of national culture, is described in this chapter followed by a conceptual model that describes the links between the organisational and national culture and other variables including performance measurement, employees' responses to the work environment and workplace change.

Chapter 5 discusses the Thai and Dutch cultural settings. Historical contexts and the national characteristics of both cultures provide background data on the similarities and differences found regarding the five cultural dimensions between these two countries.

Part two (Chapters 6 to 9) presents the empirical studies conducted in Thailand and The Netherlands. This part shows the findings concerning the variables found in the conceptual models regarding performance measurement and employees' responses to the work environment, in connection with a contextual background of organisational and national culture. The comparison of the findings between Thai and Dutch case studies is discussed in Chapter 9. An analysis of empirical data is compared with the existing theories in order to explain the connections between the variables and to explore the existing gaps in our understanding.

Part three, Chapter 10 presents the conclusions and recommendations. This chapter provides the overall conclusions, recommendations and practical implications. Figure 3 explains the structure of the PhD dissertation.

Background

1. **Introduction**

Why is it important to research the performance measurement of workplace change in two different cultural contexts, i.e. Thailand and The Netherlands?

PART I
Theoretical
Framework

| 2.Performance Measurement | 3.Workplace Change |
| 4.Organisational and National Culture | 5.Comparison between Thai and Dutch Cultural Settings |

How can the performance of workplace change be measured according to the literature?
What are the main drivers and objectives of workplace change?
Which stakeholders are involved in the implementation process and what are their roles?
What is the impact of organisational structure, staff characteristics and work processes on workplace change?
Background question: what are the main differences between the Thai and Dutch culture?

PART II
Empirical
research

| 6. Dhanarak Asset Development | 8.Waterschap Rivierenland |
| 7. Philips Thailand | 9. Cross case analysis: findings & reflections |

How is performance of workplace change being measured in practice?
How satisfied or dissatisfied are employees with the various aspects of their work environment and the perceived support of productivity, and which aspects do they perceive as being the most important?
Background question: what influences of national culture can be explored?

PART III
Conclusions &
recommendations

10. **Conclusions & Recommendations**

What recommendations can be given to improve performance measurement of workplace change?
What recommendations can be given to improve employee satisfaction and productivity support?
What recommendations can be given for further research?

Figure 3
Structure of the PhD dissertation

§ 1.7 Conceptual model

Figure 4 presents the integrated conceptual model that links the four main variables: 1) organisation, 2) workplace change, 3) performance measurement (frameworks, criteria and measures/KPIs), and 4) employees' responses to the work environment (employee satisfaction, perceived productivity support, prioritised aspects). The organisation and workplace change affect workplace performance both objectively (performance measurement frameworks and criteria, performance measures/KPIs) and subjectively (employees' responses to the work environment). Performance measurement is linked to the proposed measures in six categories according to the literature including: 1) stakeholder perception, 2) financial health, 3) organisational development, 4) productivity, 5) environmental responsibility and 6) cost efficiency.
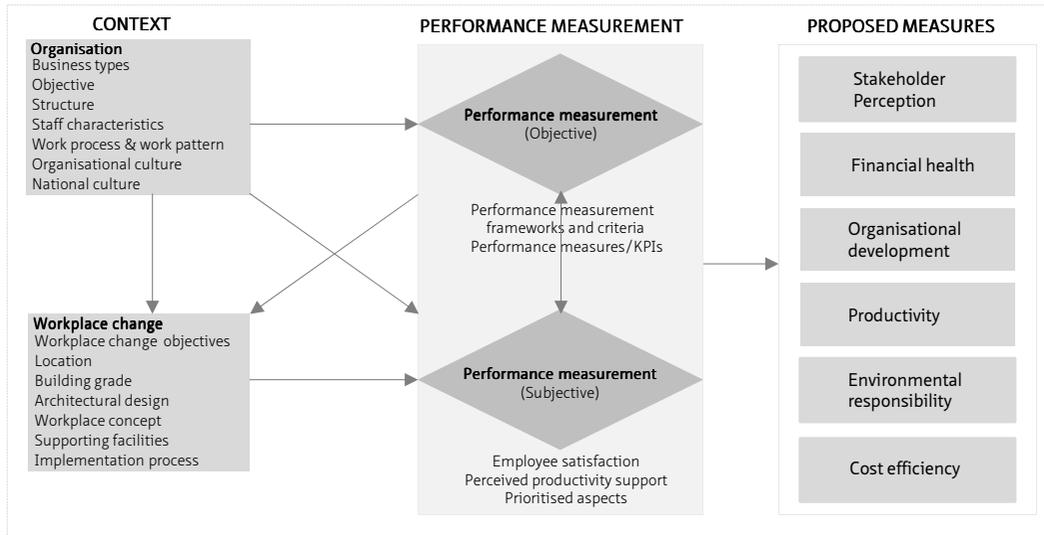
Figure 4
Integrated conceptual model

The organisational context consists of two main variables: organisation and workplace change. Organisation variables include types of business, objectives, structure, staff characteristics, work processes, and organisational and national culture. Workplace change variables include workplace change objectives, location, building grade , architectural design, workplace concept, supporting facilities and the implementation process. These four groups of variables are interrelated with each other, and a change in one or more variables can affect the others. This conceptual model is used to explore the relationship between variables, both theoretically and empirically.

PART 1 **Theoretical framework**

2 Performance measurement

Introduction

This chapter elaborates on the current trends in performance measurement and gives an overview of performance criteria. It also refers to the Key Performance Indicators (KPIs) used to measure the performance of corporate real estate and building-related facilities and services in connection to organisational performance. The KPIs found in literature have been classified according to the six perspectives of performance measures from Bradley (2002), and a discussion will follow regarding whether they can be applied in practice. The added value of corporate real estate management will be discussed as well. A conceptual model has been included which displays the relationships between the variables that are linked to corporate and real estate performance measurement. The findings of this chapter 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 information that will be useful for solving a wide variety of problems and which can be applied to certain situations. In its various forms, performance measurement represents the yardsticks which gauge how well people have done and in turn, which motivate them to achieve even higher targets (Zairi, 1994). Performance measurement provides the inspiration 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 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 dimensions 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
- 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 several similar and 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 to 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 the 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.

§ 2.3 **Trends in performance measurement**

Organisational performance is a broad term that covers both economic and functional aspects. In regard to the performance of real estate and building-related facilities and services – which are important resources to all firms – both the 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 improve 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, which continued 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 the fact that it encouraged short-term thinking, lacked strategic focus and had 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 by taking into account the benefits as well. Neely et al. (1995, in Anderson and McAdam, 2004) summarised the main changes from traditional performance measurement systems towards modern innovative performance measurement systems as outlined in Table 4. 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 establish a wider set of criteria (Table 5).

Traditional performance measurement systems	Innovative performance measurement systems
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 4

History in development of performance measurement systems (Neely et al., 1995)

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

Table 5

Performance criteria organisations should meet (modified from Van Ree, 2002)

The same trend comes to the fore in the fields of (adding value by) FM and CREM (Jensen et al., 2012a). 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 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). That is why there is a need to identify FM and CREM related KPIs that help the organisation to focus on performance (benefits) in relation to the resources that are spent on real estate and other facilities (costs).

§ 2.4   Performance measurement frameworks and criteria

Many authors have reflected on general performance measurement and performance criteria, i.e. different aspects or areas of performance, and they have tried to link performance to concepts such as quality, effectiveness and efficiency. A short tour through the key features of the 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 (Figure 5):

- *effectiveness*, defined as degree to which an organization accomplishes what it set out to accomplish. In practice, effectiveness is expressed as a ratio of actual output to expected output
- *efficiency*, defined as a ratio of resources expected to be consumed to resources actually consumed
- *quality*, the assurance of quality at five checkpoints: 1) upstream systems, 2) inputs, 3) transformation value adding process, 4) outputs, 5) downstream systems
- *productivity*, relationships between outputs and resources consumed
- *quality of work life*, feelings of workforces on key factors in an organisation such as safety, compensation, pay, etc.
- *innovation*, a key element in sustaining and improving performance
- *profitability/budgetability*, representing the relationships between revenue and cost
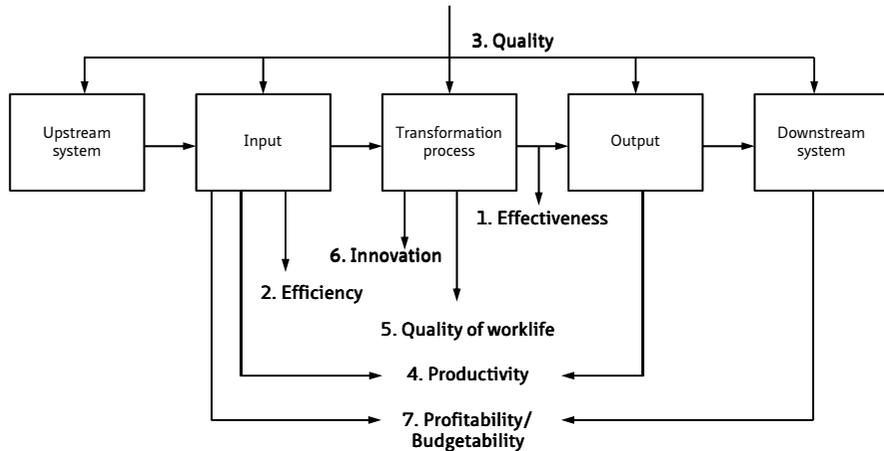
Figure 5
Interrelationship between seven performance criteria (Sink and Tuttle, 1989).

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 (Figure 6). 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.
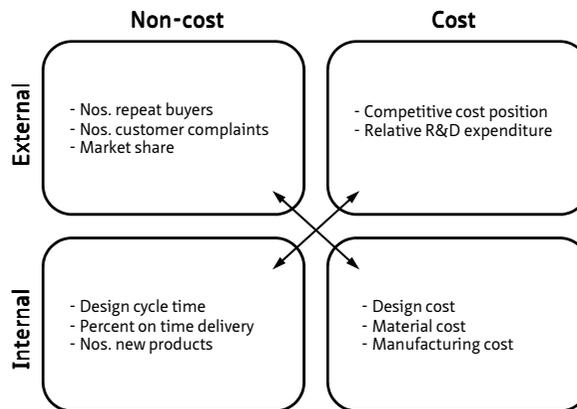
Figure 6
Performance measurement matrix (Keegan et al., 1989).

Judson (1990) developed the so-called performance pyramid. This framework has subsequently been improved by Lynch and Cross (1991) and was adapted later on in Cross and Lynch (1992), (see Figure 7). 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 strengths of this framework are such that it distinctly ties together the hierarchical view of business performance measurement with the business process view (Neely and Bourne, 2000). Its objectives and related measures are focusing on vision; business unit (market, financial); business operating system (customer satisfaction, flexibility, productivity); department and work centre (quality, delivery, cycle time and waste); and operations.

Figure 7
The Performance Pyramid (Cross and Lynch, 1992)

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). 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)?
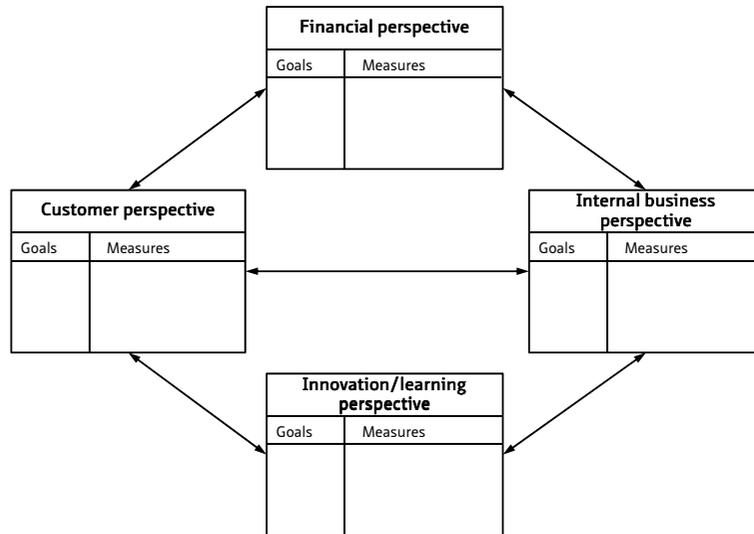
The 'strategy map' - a model also originated by Kaplan and Norton - is another framework used to visually represent the cause-and-effect logic of an organisation's strategy in the four BSC perspectives: financial, customer, internal processes and learning and growth (Kaplan and Norton, 2004), (see Figure 9). By connecting various elements with one another, strategy mapping helps describe and communicate the strategy used among executives and with their employees.
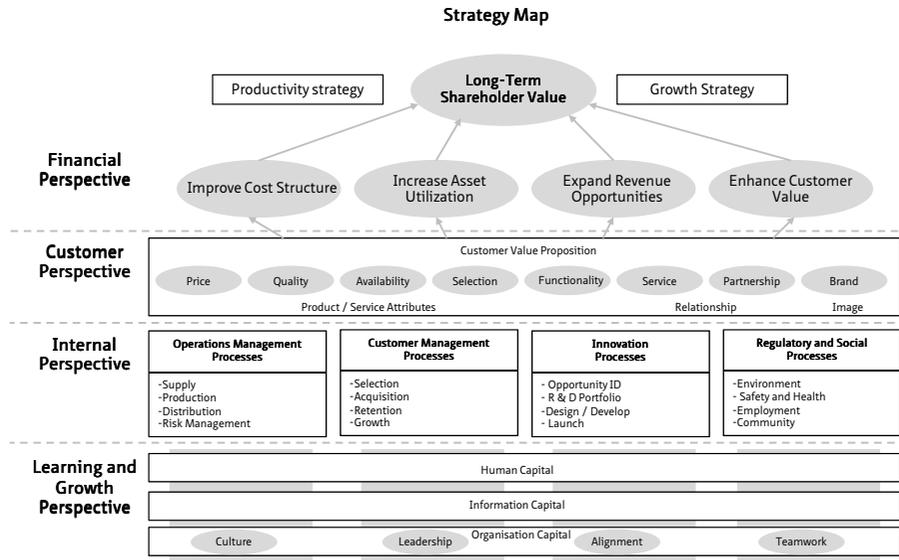
Strategy Map

Figure 9
Strategy Map (Kaplan and Norton, 2004)

According to the performance prism of Neely et al. (2001), performance measurement systems should be organized around five distinct but linked perspectives of performance (see Figure 10):

- 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 enable the 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 these capabilities?
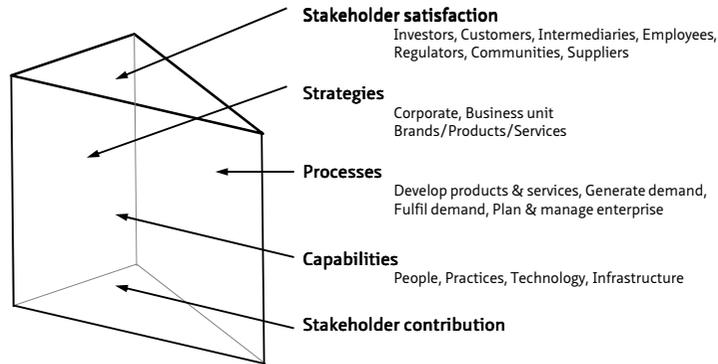
Figure 10
The Performance Prism (Neely et al., 2001).

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 11). Productivity involves the relation between output and input quantity (Tangen, 2005). Profitability is a monetary relationship which influences price-factors (i.e., the difference between costs and revenues). The terms effectiveness and efficiency are cross-functional when considered in regard 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 utilised.
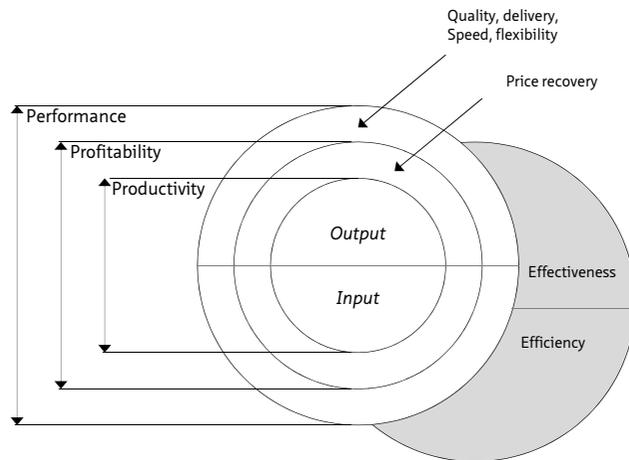
Figure 11
The Triple-P model (Tangen, 2005)

§ 2.5 Performance measurement in the context of CREM and FM

Alexander (2003, p.274) identifies the 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 facing an FM organisation when attempting to introduce performance measurement systems and discovering how to use them to influence future performance.

In the field of CREM we can notice how the demand for corporate real estate has changed considerably as a result of both external economic shifts and organisational change. Today, firms are confronted with a wider range of choices when they identify a need for new or improved accommodation. The purpose of real estate performance measurement is to comprehend the impact of management decision-making on the 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 caters to its occupants and identifies 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 12). Competitive advantage has been defined as the (developments in) market share. Research from De Vries (2007) has demonstrated both the positive and negative effects of real estate interventions on the organisational performance of the Academies of Applied Sciences, caused by real estate influences on production, customer satisfaction, cost reduction and so on. However, she also concluded that cause-effect relationships were hard to prove, due to the simultaneous changes in organisational characteristics and the external context.
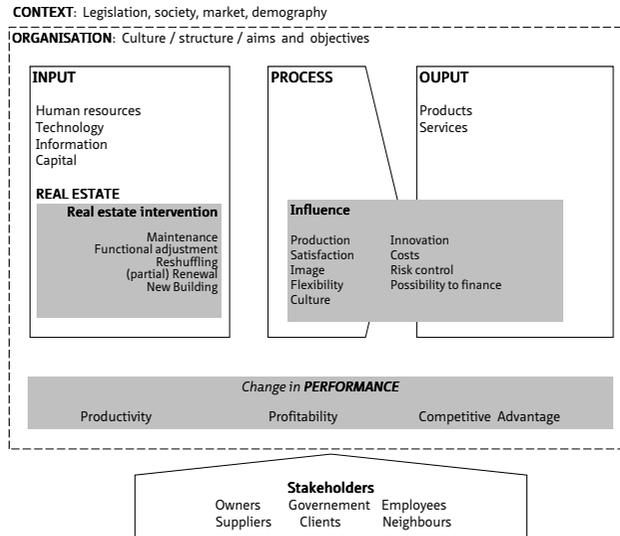
Figure 12
Conceptual framework used to study effects of real estate intervention on organisational performance (De Vries, et al., 2008).

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§ 2.6 The added value of corporate real estate management

CREM is usually defined as the management of a real estate portfolio of a corporation or public authority by aligning the portfolio and services to the needs of the core business in order to "obtain maximum added value" for the business and to contribute optimally to the overall performance of the organisation (adapted from Dewulf et al., 2000)). Nourse and Roulac (1993) linked real estate decisions to corporate strategy by discussing how alternative real estate strategies can contribute to business objectives. According to Nourse and Roulac, eight different types of real property strategies can be linked to several goals that a firm might have which are described as follows:

1 Occupancy cost minimisation
   • Explicit lowest-cost provider strategy
   • Signal to critical constituencies of cost-consciousness
2 Flexibility
   • Accommodate changing organizational space requirements
   • Manage variability/risk associated with dramatic escalation/compression space needs
   • Favour facilities that can readily be adapted to multiple uses by corporation and others

3 Promote Human Resources objectives
  - Provide efficient environment to enhance productivity
  - Recognize that environments are important elements of job satisfaction and therefore compensation
  - Seek locations convenient to employees with preferred amenities
4 Promote marketing message
  - Symbolic statement of substance or other value
  - Form of physical institutional advertising
  - Control environment of interaction with company's product/service offering
5 Promote sales and selling process
  - High traffic location to attract customers
  - Attractive environment to support/enhance sale
6 Facilitate and control production, operations, service delivery
  - Seek/design facilities that facilitate making company products/delivering company services
  - Favour locations and arrangements that are convenient to customers
  - Select locations and layouts that are convenient to suppliers
7 Facilitate managerial process and knowledge work
  - Emphasize knowledge work setting over traditional industrial paradigm
  - Recognize changing character, tools used, and location of work
8 Capture the real estate value creation of business
  - Real estate impacts resulting from demand created by customers
  - Real estate impacts resulting from demand created by employees
  - Real estate impacts resulting from demand created by suppliers

De Jonge (1996) describes seven elements of added value of real estate that include various aspects of workplace change:
1 Increasing productivity
  - Offering adequate accommodation
  - Site selection
  - Introducing alternative workplaces
  - Reducing absence of leave
2 Cost reduction
  - Creating insight into cost structure
  - More efficient use of workplaces
  - Controlling costs of financing
3 Risk control
  - Retaining a flexible real estate portfolio
  - Selecting suitable locations
  - Controlling the value development of the real estate portfolio
  - Controlling the process risk during (re)construction
  - Controlling environmental aspects and labour conditions

4	Increase of value
- Timely purchase and sale of real estate
- Redevelopment of obsolete properties
- Knowledge and insight into the real estate market
5	Increase of flexibility
- Organisational measures (working hours, occupancy rates)
- Legal/financial measures (mix own/rent/lease)
6	Changing the culture
- Introducing workplace innovations
7	PR and marketing
- Selection of branch locations
- Image of buildings
- Governing corporate identity

Similarly, eight different types of real estate strategies (Nourse and Roulac, 1993) and seven elements of added value of real estate (De Jonge, 1996) have provided several links to workplace change such as increased flexibility, cost reduction, promote marketing and sales.

Previous studies on the added value of CREM relate workplace performance and productivity. In the study of the value-adding attributes of real estate, Lindholm and Leväinen (2006) stated that the demand for more efficient utilization of space and higher workplace productivity has led to businesses adopting a range of strategies for managing their facilities. In their study, real estate strategies are organized to support core business strategies into the seven alternatives (see Figure 13):

1	increasing the value of assets
2	promoting marketing and sales
3	increasing innovation
4	increasing employee satisfaction
5	increasing productivity
6	increasing flexibility
7	reducing costs
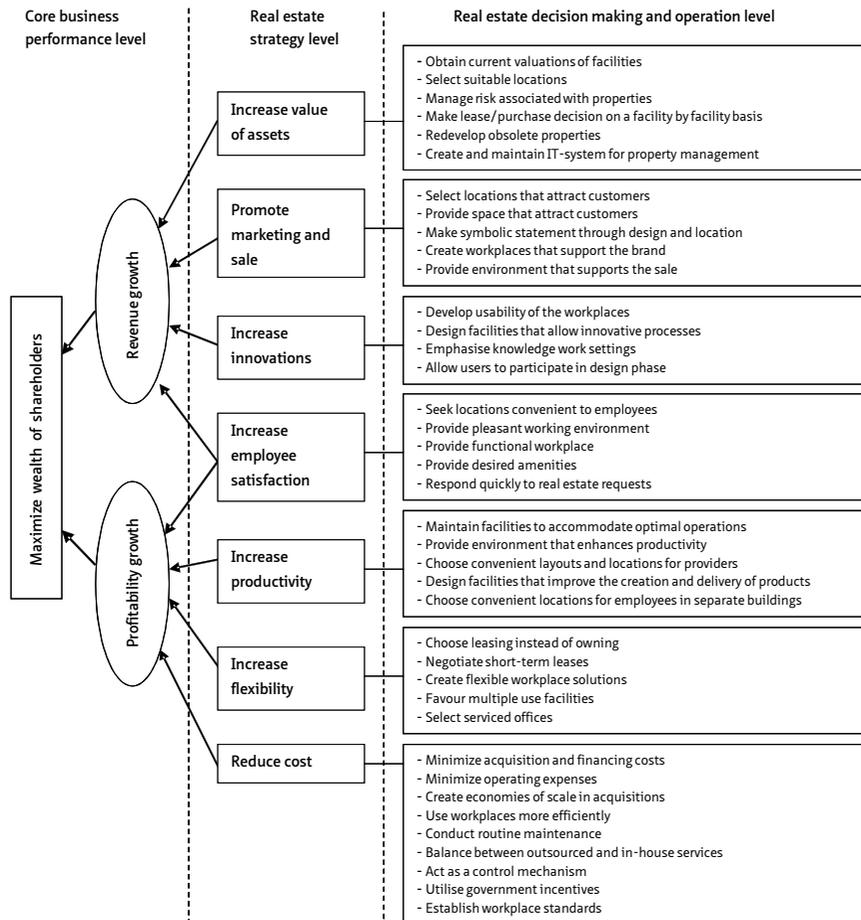
Figure 13
The model for identifying the added value of CREM (Lindholm, 2008)

The FM Value map developed by Jensen (2010) is a framework that can be used to provide a better understanding of the value and contributions of FM. The value map has been developed based on inductive reasoning from an analysis that has been made of a large number of cases in the Nordic countries of Europe. The FM value map focuses on value creation as part of FM and how FM can add value to a core business as well as the surroundings - for the benefit of all the relevant stakeholders (see Figure 14).
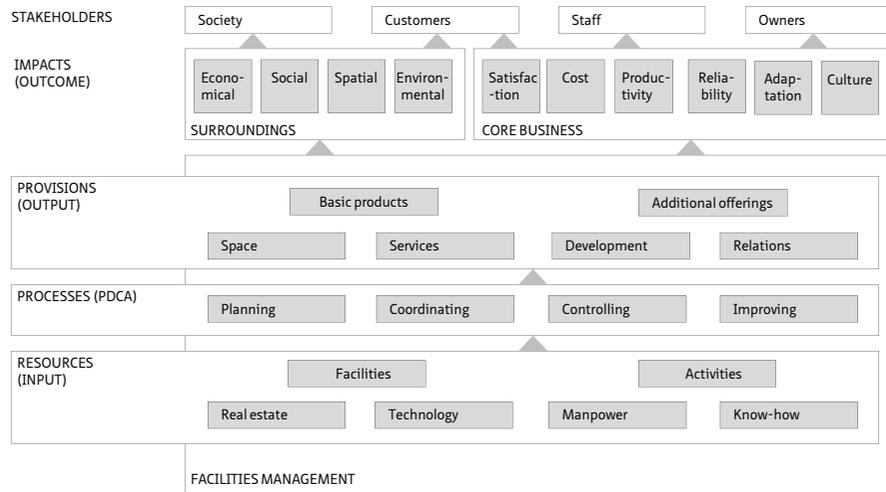
Figure 14
FM Value Map (Jensen, 2010)

The value map entails that FM use certain resources that work as input to some processes, leading to a number of provisions as outputs. These provisions can have various impacts on both a core business and the surroundings, which can be of benefit to the various stakeholders. The resources of FM are subdivided into facilities and activities with facilities consisting of real estate and technology, whereas activities consist of manpower and know-how. The processes in FM are subdivided according to the PDCA (Plan-Do-Check-Act) in planning, coordination, controlling and improving. The provisions of FM are subdivided in basic products and additional offerings. The basic products consist of space and services, whereas additional offerings consist of development and relationships. The impacts to the core business are divided into satisfaction, cost, productivity, reliability, adaptability, and culture. For the surroundings, the impacts are divided into economical, social, spatial, and environmental. The stakeholders are divided into owners, staff, customers, and society. The FM Value Map not only provides the understanding of the interface between FM provisions and the impact to the core business in different stakeholders' perspectives, but it also includes the impacts on the surroundings that are linked to sustainability and corporate social responsibility.

Den Heijer (2011) discussed the impact of university real estate on performance on two levels: 1) the impact on an organisation and society, linking it to business economics theories and 2) the impact on individuals, linking it 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 (the same as Tangen, 2005, and De Vries, 2007) and sustainable

development, (see Figure 15). This model for adding value to performance could also be applied to other organisations, but the priority of each performance criteria might be assigned different rankings. However, the types of performance that a particular company strives to fulfil are very case specific.
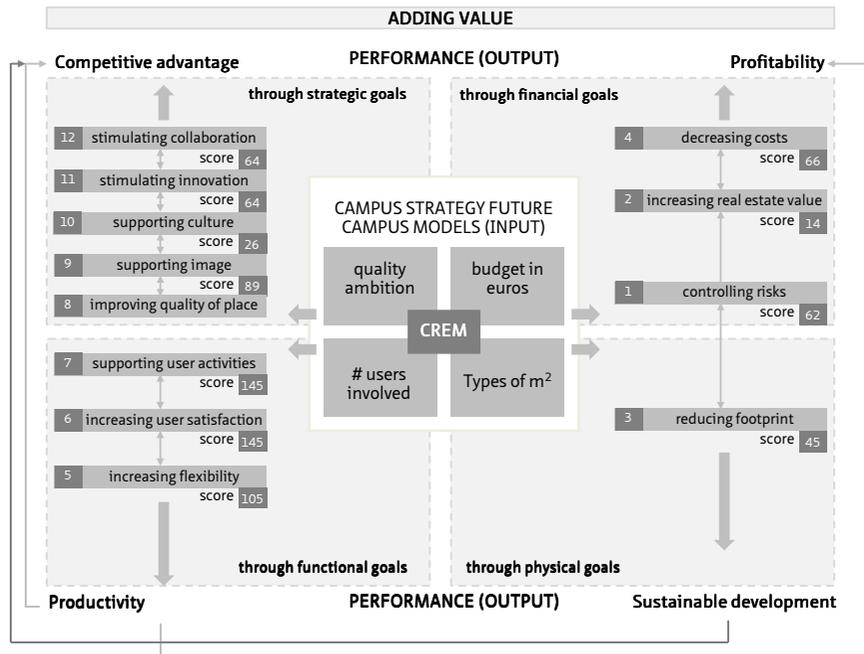
Figure 15
Hierarchy of adding value - model to assess real estate decisions – from project (input) to performance (output) – ex post and ex ante (Den Heijer, 2011)

In terms of adding value to the university's performance, Den Heijer developed a list of goals that focus on efficiency and effectiveness. This list of goals has been based on campus goals that were found in the research (De Jonge et al., 2000, Den Heijer, 2002) and related to various ways of adding value to the university's performance. The following list was prioritised by the Dutch campus managers (see Figure 16).
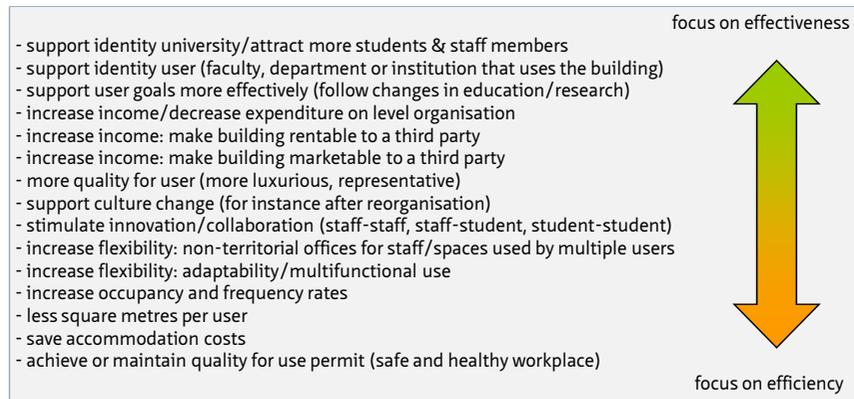
Figure 16
List of goals that can be supported by the campus.

§ 2.7 Comparison of different studies concerning the added value of real estate

Different terms are used to identify the added value of CREM including real estate strategies (Nourse and Roulac, 1993, Lindholm, 2008), performance measurement (Bradley, 2002), objectives (Van Meel et al., 2010) and added value (De Jonge, 1996, Den Heijer, 2011, Van der Zwart and van der Voordt, 2012, Jensen et al., 2012a). These terms are interrelated and in some cases they are interchangeable. Table 6 compares the areas of the added value of CREM from several different authors.

Bradley (2002)	Nourse and Roulac (1993)	De Jonge (1996)	Lindholm (2008)	Van Meel et al. (2010)	Den Heijer (2011)	Van der Zwart and Van der Voordt (2012)	Jensen et al. (2012)
1.Stakeholder perception (employee satisfaction)	Promote Human Resources objectives	not mentioned	Increasing employee satisfaction	Attract and retain staff	Supporting user activities / Increase user satisfaction / Improving quality of place	Increase user satisfaction	Satisfaction
2.Financial health	Capture the real estate value creation of business	Increase of value	Increasing the value of assets	not mentioned	Increase real restate value	Improve finance position	not mentioned
3.Organisational development	Flexibility	Increase of flexibility	Increasing flexibility	Increase flexibility	Increase flexibility	Improve flexibility	Adaptation
	Facilitate managerial process and knowledge work	Changing the culture	not mentioned	Encourage interaction	Supporting culture	Improve culture	Culture
				Support cultural change	Stimulating collaboration		
	Promote marketing message Promote sales & selling process	PR and marketing	Promoting marketing and sales	Express the brand	Supporting image	Support image	not mentioned
	Facilitate and control production, operations, service delivery	Risk control	not mentioned	not mentioned	Controlling risk	Controlling risk	Reliability
	not mentioned	not mentioned	Increasing innovation	Stimulate creativity	Stimulating innovation	Increase innovation	not mentioned
4.Productivity	not mentioned	Increasing productivity	Increasing productivity	Enhance productivity	Supporting user activities	Improve productivity	Productivity
5.Environmental responsibility	not mentioned	not mentioned	not mentioned	Reduce environmental impact	Reducing the footprint	not mentioned	Environmental
6.Cost efficiency	Occupancy cost minimisation	Cost reduction	Reducing costs	Reduce costs	Decreasing costs	Reduce costs	Cost

Table 6

Comparison of different lists of added value of CRE

The added values have been classified according to the six perspectives of performance measures derived from Bradley (2002) (see Section 2.8.1). These six perspectives of performance measures have been aligned with most of the areas of the added value of CREM in the literature. The performance measures in six categories include: 1) stakeholder perception, 2) financial health, 3) organisational development, 4) productivity, 5) environmental responsibility and 6) cost efficiency.

All of the authors express their concern about cost reduction and flexibility as the approach to add value followed by productivity, changing the culture, user satisfaction and promoting marketing and sales. The other areas have been mentioned less often including risk control, increased real estate value and stimulating innovation. The least-mentioned area is environmental responsibility. The comparison table shows that one of the most recent studies, the one by Den Heijer (2011) on the added value of CREM in connection to university performance, can be compared to all of the six perspectives of business performance measures applied in this PhD study (Bradley, 2002).

§ 2.8   CREM and FM related performance measures, indicators and 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 that focus 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 business performance as a whole.

There are frequently used terms relating to KPIs including performance measures, performance indicators and metrics. Although these terms are often interchangeably used, they are different and should be mentioned here. Hitchcock (2002) and O'Sullivan et al. (2004) state that performance metrics can define the performance objectives in a clear and quantifiable manner. Performance metrics relate to the objectives of the performance evaluation of a building and can be helpful in determining the progress made in achieving the performance goals of a building (Deru and Torcellini, 2005).

According to Neely et al. (1995), performance measure is defined as a metric to quantify the efficiency and/or effectiveness of an action. Performance measurements are directly measurable items such as the total expenses or facilities particulars, such

as occupancy costs, gross floor area, etc. (Ho et al., 2000). Performance indicators are data obtained by measuring expenses or facilities particulars against certain metrics, such as occupancy costs per employee, occupancy costs per square meter, ratio of gross floor area to usable floor area, proportion of gross floor area serviced with energy, etc. (Ho et al., 2000). Douglas (1996) emphasises the importance of indicators that portray the space in terms of amount (area and volume), quality (appropriateness, visual and environmental qualities) and shape (plan and layout).

A simple explanation to distinguish performance indicators from performance measures is that a "performance indicator" indicates (not measures) performance, and a "results indicator" indicates results. A "key performance indicator" is a "performance indicator" that is more important (key) than others (Jones, 2012).

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, functional buildings
- Promote corporate image
- Reduced occupancy cost vs. revenue

Varcoe (1996, p.51) stated that the basis of strategic management in sound performance measures means that '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 the 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, Pinder and Price, 2005, Hinks et al., 2007 in Price and Clark, 2009, p.6). Nowadays, a slowly growing interest comes to the fore into output indicators that measure benefits as well.

Based on literature search, Lavy et al. (2010) presented 35 major indicators relating to building and facilities in four categories (Table 7):

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.

4 survey-based indicators, which are based solely on respondents' opinion to surveys that are primarily qualitative in nature

Financial indicators	Physical indicators	Functional indicators	Survey-based indicators
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

Table 7

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

Den Heijer (2011) 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 8. Except for competitive advantage, all of the groups include KPIs that are related to real estate.

Key performance indicators (KPIs) to measure a university's performance			
Productivity	Profitability	Competitive advantage	Sustainable development
· publication per academic fte · *output per m²* · *student per m²* · *employee per m²* · *energy costs per m²* · total costs of ownership as % of total costs (or turnover) · etc.	· revenue minus costs · solvency · liquidity · *environmental goals* · position on innovation index · citation score · (economic) value of alumni · *increased real estate value*	· international rankings · market share of students · quality of alumni · student satisfaction · alumni satisfaction · employee satisfaction	· *energy use per m²* · energy use per user · *CO_2 emission per m²* · CO_2 emission per user · *energy labels of buildings* · *footprint in m² per user*
Italics = real estate related KPIs			

Table 8
Key performance indicators to measure a university's performance (Den Heijer, 2011)

§ 2.8.1   Corporate real estate performance measures from six perspectives

The Balanced Scorecard (BSC) concept in connection to corporate real estate and the workplace has been applied to several added value approaches such as real estate strategies (Lindholm, 2008), FM value map (Jensen, 2010) and performance measurement frameworks in the Worldwide Workplace Web (W4) network (Wilson et al., 2003). The use of the BSC is equally applicable to not-for-profit and governmental organisations as well as to commercial organisations (Bradley, 2002). However, the scorecard is always organisation-specific in its detail. Bradley classified performance measures in six perspectives of business performance according to the BSC concept (Bradley, 2002):

1 stakeholder perception (customer perspective)
2 financial health (financial perspectives)
3 organisational development (internal business process perspective)
4 productivity (learning and growth perspective)
5 environmental responsibility (internal business process perspective)
6 cost efficiency (financial perspective)

As a result of the literature review regarding performance measures, a long list was drawn up of performance measures and indicators (see Appendix V). The list of performance measures was first gathered from public institutions including the National Property Board of Sweden (NPB), the British Columbia Buildings Corporation (BCBC), the Real Property Services (RPS), the Branch of Public Works and Government Services Canada, the Norwegian Directorate of Public Construction and Property (Statsbygg), The Netherlands Standardisation Institute (NEN) and U.S. General Services Administration (GSA). Subsequently, the list was supplemented with literature from Carder (1995), Hinks and McNay (1999), Bradley (2002), Kaczmarczyk and Murtough (2002), Kaczmarczyk and Morris (2002), Wilson et al. (2003), Van der Voordt (2004) and Lindholm and Gibler (2005). The purpose of the list is to gather performance measures from various perspectives with a particular focus on real estate and workplace connection. To improve the applicability, the list was clustered to correspond with the six perspectives mentioned above.

Instead of suffering from a lack of adequate performance measures, an organisation will usually find it has too many. The performance measures from six perspectives according to the literature were formulated (see Appendix V). However, the long list of performance measures is not very practical. Therefore, a shorter list of performance measures with regard to real estate and workplace has been formulated in this chapter.

1 **Stakeholder perception**
In the literature, employee satisfaction with the work environment and customer satisfaction with facilities are two performance measures that are frequently mentioned in connection with real estate and workplace. Sometimes community and well-being are mentioned as well.

Employee satisfaction with the work environment
Several authors discuss employee satisfaction with work environment (Sundstrøm, 1986, Arthur Andersen et al., 1993, Nourse, 1994, Vollebregt, 1996, Hinks and McNay, 1999, Bdeir, 2003, Van der Voordt, 2003, Lindholm and Gibler, 2005, Cleements-Croome, 2006). Employee satisfaction with the work environment refers to the degree to which the work environment meets the wishes and needs of the working individual (Van der Voordt, 2003). Employee satisfaction with the work environment can be measured by the following factors:
- Quality of indoor environment: lightning, air conditioning, temperature, noise level (Kincaid, 1994)
- Provision of safe environment (Hinks and McNay, 1999)
- Provision of amenities (Bdeir, 2003)
- Ratio of office space to common areas (Lubieniecki and Desrocher, 2003)
- Amount of workplace reforms and space modifications (Lindholm and Gibler, 2005)

According to Maslow's hierarchy of needs, the quality of the indoor environment refers to the physiological needs. The provision of a safe environment refers to both physiological and safety needs, which are concerned with personal security, health and well-being. The provision of amenities, the ratio of office space to common areas and the amount of workplace reforms and space modifications relate to the work environment that fits with daily activities and functionality, stimulates communication, provides concentration and supports personalisation and expression of status.

Employee satisfaction with corporate real estate services
The other measures including employee satisfaction with CRE services (Duckworth, 1993, Lubieniecki and Desrocher, 2003, Lindholm and Gibler, 2005) and location success factors (access to employees, amount of local amenities) (Duckworth, 1993, Lubieniecki and Desrocher, 2003) are classified as innovative performance measures (Lindholm and Gibler, 2005) that are necessary for the management of corporate real estate and facilities. These measures are included in the Work Environment Diagnosis Instrument (WODI) for an indicative evaluation of employee satisfaction through the working environment. Employee satisfaction with professional skills and information sharing are especially important during the preparation and implementation process of workplace change.

Customer satisfaction with facilities
It is widely accepted that the customer (client) plays an important role in many industries, particularly in the service business (Hui and Zheng, 2010). Customer satisfaction has been linked to higher profit margins and greater employee satisfaction, customer retention, and repeat purchases (Berry and Parasuraman, 1992, Jones and Sasser, 1995, Schneider and Bowen, 1995, Conrad et al., 1997, Appiah-Adu and Singh, 1999). In addition to the traditional financial performance, the Balanced Scorecard concept covers the other perspectives that reflect an organisation's goals, including placing a focus on the customer.

Mobach (2009) mentioned that facility services have different effects on organisational performance with regard to the impact of spatial characteristics on health, mood and behaviour of people in and around organisations. Tranfield and Akhlaghi (1995) suggest that performance measures for facilities should relate to the main business indicators of the primary task. Performance measurement systems used in the primary task may reflect the power of the various stakeholders in the organisation, and reflect the balance of the various goals being pursued by the senior management. If customer satisfaction with facilities is a key indicator in the primary task, it may be useful to use a similar indicator in property performance measurement.

Measures of performance for customers could include customer satisfaction surveys and a recording the number of complaints (Walters, 1999). According to Wilson et al. (2003) and Lindholm and Gibler (2005), customer satisfaction with facilities is the

most commonly used CRE measure. This measure was mentioned in Carder (1995), Kaczmarczyk and Morris (2002), Hagarty and Wilson (2002), Wilson et al. (2003) and GSA (2006). Carder (1995) mentioned performance measures, such as the average call frequency and the cost per square foot the Help Desk that can provide a useful proxy for customer satisfaction.

On the other hand, the public organisations concern about the overall tenant satisfaction with property management services (RPS, 2003) and survey rating (i.e. extent to which full service workplace provisioning solutions meet customer needs; BCBC, 2003). In terms of marketing and sales as an area in the added value of real estate, the innovative performance measures relating to customer satisfaction include location success factors such as access to customers, the distance to other sites and businesses (Duckworth, 1993, Lubieniecki and Desrocher, 2003) and the ratings based on building attributes (Duckworth, 1993).

Customer satisfaction with facilities can be measured by:
- 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 the help desk
- location success factors (e.g. access to customers, distance to other sites and businesses)

Community and well-being
From the external stakeholder perspective, the measures relating to community and well-being are mostly mentioned in the public sector and include the contribution to public policy and societal priorities (Kaczmarczyk and Morris, 2002, Wilson et al., 2003). To sum up, Table 9 shows the most frequently-mentioned performance measures on stakeholder perception that have been obtained from several authors in the field.

Stakeholder perception	Performance measures
Employee satisfaction with work environment	· Quality of indoor environment: lightning, air conditioning, temperature, noise level, etc. (Kincaid, 1994, Van der Voordt, 2003) · Provision of safe environment (Hinks and McNay, 1999) · Amount of workplace reforms and space modifications (Lindholm and Gibler, 2005) · Ratio of office space to common areas (Lubieniecki and Desrocher, 2003) · Provision of amenities (Bdeir, 2003) · Location success factors (access to employees, amount of local amenities) (Duckworth, 1993, Lubieniecki and Desrocher, 2003, Lindholm and Gibler, 2005)
Employee satisfaction with CRE services	· Employee satisfaction with professional skills · Employee satisfaction with information sharing
Customer satisfaction with facilities	· Survey rating (e.g. customer/tenant survey of the facilities, building, property management and CRE services) (Walters, 1999) · Number of complaints (Walters, 1999) · Average call frequency and cost per square foot for the help desk (Carder, 1995) · Location success factors (proximity to required transportation, access to customers, distance to other sites and businesses) (Duckworth, 1993, Lubieniecki and Desrocher, 2003, Lindholm and Gibler, 2005)
Community and well-being	· The contribution to public policy and societal priorities (Hagarty and Wilson, 2002)

Table 9
Performance measures of stakeholder perception

2 **Financial health**

Financial health (also referred to as financial well-being) is most often defined as a way in which the overall financial aspect of organisations can be measured by including the amount of assets that are owned as well as how much income must be spent to cover regular and other expenses (Business.com, 2012). For example, the most common measures in this area include net income, return of equity, return on investment, business volumes, ratio of expenses to revenue and capital expenditures.

Financial resources determine the company's ability to invest in new facilities and to upgrade existing facilities. This perspective relates to both internal and external contexts such as investment capital, real estate market conditions, corporate context and financial considerations. Capital expenses include the purchase and development or ownership of facilities, and the purchase of long-lived items such as furniture and fixtures. O'Mara (1999) suggested asking a few general questions including "What source of investment capital is available for real estate and facilities? Should the company lease or own properties? What impact will a major real estate commitment have on the company capital market position?"

Companies can find many other uses for the money appropriated for real estate and facilities. However, if not enough attention is paid to facility investment, this could have adverse competitive consequences. The way in which both operating and capital expenses are accounted for and charged back varies from company to company. Some companies track facility costs directly from the business units that benefit from them, but the others pool together all of the real estate costs, and then allocate costs evenly across the company (O'Mara, 1999).

Real estate and facilities are significant consumers of both operating and investment capital. From a corporate perspective, real estate is the fifth resource, in addition to human resources, technology, information technology, information and capital (Joroff et al., 1993), which is a necessary input in a production process. The problem of real estate is that, economically, it is viewed as an indivisible asset, hard to consume in small quantities, and also long-lived. In addition, real estate is an illiquid asset. The ownership usually brings a number of legal and financial liability issues, which have implications for the business far beyond the value of the real estate (Louargand, 2000).

In terms of the economic value added, this concept generally implies measuring all the wealth that has been put into the company over a given period, as compared to the amount of wealth that is ensured at the end of the process. If the business processes are being managed correctly, then wealth will be created (Louargand, 2000, p.67).

Capturing the real estate value creation of business is one of the alternative real estate strategies. (Nourse and Roulac, 1993). Similar terms are used by different authors including an increase of value (De Jonge, 1996), financial health (Bradley, 2002), increasing the value of assets (Lindholm, 2008), increasing real estate value (Den Heijer, 2011), and improving the financial position (Van der Zwart and Van der Voordt, 2012).

Value of property, plant and equipment
Value of property, plant and equipment (for balance sheet) (Lubieniecki and Desrocher, 2003) is related to the area of the added value of CREM and can be measured by:
- Real estate cost of acquisitions versus returns/IRR
- Lease vs. construction or ownership cost comparisons
- Real estate return on investment
- Real estate return on equity
- Business return on real estate assets
- Sales or revenue per square foot (metre)
- Space (square feet or metres) per unit (dollar) of revenue

From the public sector perspective, the economic or market value added with regard to corporate real estate includes the following measures:
- Return on Investment for Owned Market-Comparable Office Buildings (BCBC, 2003)
- Return on property management. Result before finance cost as percentage of invested capital per year (Statsbygg, 2003)
- Total income from consulting and planning, construction project management and property management (Statsbygg, 2003)
- Total Proceeds on Properties Sold (BCBC, 2003)

There are a number of performance measures that address the significance of financial performance. However, the pure business performance measure terms used for the entire business operation are difficult to identify in connection to real estate. This is because real estate is a fairly small item on the balance sheet (Louargand, 2000). In this PhD research, the focus is on the value of property, plant and equipment as the economic or market value added of corporate real estate. In most cases, real estate's impact on the income statement is the most critical and relevant measurement (Lubieniecki and Desrocher, 2003). Table 10 shows the most frequently-mentioned performance measures by several authors that focus on financial performance.

Financial health	Performance measures
Value of property, plant and equipment (Lubieniecki and Desrocher, 2003)	· Business return on real estate assets (Lindholm, 2008) · Real estate return on investment (Lindholm, 2008) · Real estate return on equity (Lindholm, 2008) · Sales or revenue per square foot (metre) (Lindholm, 2008) · Space (square feet or metres) per unit (dollar) of revenue (Lindholm, 2008) · Return on property management (Statsbygg, 2003)

Table 10
Performance measures of financial health

3   **Organisational development**
This area can be compared with the Balanced Scorecard's internal business process perspective. This perspective emphasizes the way in which the organisation must excel in order to improve performance such as those processes that are meant to meet or exceed customer expectation (Kaplan and Norton, 1992). In terms of corporate real estate, an organisation's business processes can be improved in three main areas: 1) quality of facilities, 2) accommodation usage and 3) CRE unit quality (Kaczmarczyk and Morris, 2002, Wilson et al., 2003).

Quality of facilities
The organisational development not only includes the quantitative, tangible aspect, but it also focuses on the qualitative aspect or effectiveness of the business processes. Performance measures relating to the quality of real estate and facilities include:
- Physical condition of facilities (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)
- Standards of cleaning (Hinks and McNay, 1999)
- All work on properties done in accordance with approved maintenance plan (Statsbygg, 2003)
- Ratio of area managed per operations and maintenance employee (BCBC, 2003)

Accommodation usage

This measure focuses on the measurement of an organisation's real property assets and working spaces such as lease terms, square metre areas or number of workstations. This area can be measured by:

- Area leased as percentage of total area (m²) (Statsbygg, 2003, Lindholm and Gibler, 2005)
- Percentage 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)
- Number of workstations per employee (information workers) (Lindholm and Gibler, 2005)
- Effective utilisation of space (e.g. amount of teamwork space, vacancy rates, time wasted with interruptions due to open space layout)
- 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, 2006)
- Area managed/employee (BCBC, 2003)

CRE unit quality

Lindholm and Gibler (2005) mentioned the CRE unit quality as innovative performance measure that includes:

- 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

The suitability of premises and functional environment also relates to other performance measures such as whether the equipment provided meets the business needs and standards of cleaning (Hinks and McNay, 1999). In accommodation usage, the square feet per employee is more appropriate than the number of workstations per employee, given that the differing space and type of workstations are required by different groups of employees throughout the company. The effective utilisation of space (Hinks and McNay, 1999) is suitable for describing how the accommodation is used and measured such as the amount of teamwork space, vacancy rates, percentage of space occupied, gross floor area per usable floor area and space supply and demand ratios. To sum up, Table 11 shows the most frequently-mentioned performance measures on organisational development.

Organisational development	Performance measures
Quality of facilities	· Physical condition of facilities (Lindholm and Gibler, 2005) · Suitability of premises and functional environment (Hinks and McNay, 1999) · Number of building quality audits (Lindholm and Gibler, 2005)
Accommodation usage	· Square feet per employee (Arthur Andersen, 1993, Nourse, 1994, Massheder and Finch, 1998, Bdeir, 2003, Lindholm & Gibler, 2005) · Effective utilisation of space (e.g. amount of teamwork space, vacancy rates, time wasted with interruptions due to open space layout)
CRE unit quality	· Time used in project versus time budgeted for the project (Lindholm and Gibler, 2005) · Money spent on a project versus the money budgeted for the project (Lindholm and Gibler, 2005) · Amount of advice given to other business units (Lindholm and Gibler, 2005)

Table 11
Performance measures of organisational development

4   **Productivity**

Productivity is a frequently-mentioned area regarding the added value of CREM (De Jonge, 1996, Bradley, 2002, Lindholm, 2008, Van Meel et al., 2010, Den Heijer, 2011, Jensen et al., 2012a, Van der Zwart and Van der Voordt, 2012). In fact, improving productivity and decreasing costs turned out to be the areas most discussed concerning adding value by CREM (Jensen, et al., 2012). Regarding the workplace, the term productivity refers to the fine balance between the total occupancy costs of a workplace and its contribution to employee performance (Van Meel et al., 2010).

Productivity concerns improving staff output at less of a cost (Van Meel et al., 2010). Therefore, the work environment is an area closely related to perceived productivity support such as the move to the new workplace or an alternative workplace arrangement (Kaczmarczyk and Morris, 2002, GSA, 2006, Jensen, et al., 2012a).

Employee productivity
Van Meel et al. (2010) state that the relationship between the work environment and productivity is elusive and complex. It is a rather indistinct construct that is difficult to define in most office-based organisations. However, Van der Voordt (2003) mentioned that the difference in productivity among the different work environments can be measured by:
- Actual labour productivity
- Perceived productivity
- Amount of time spent on different activities
- Absenteeism due to illness
- Indirect indicators (see also Table 17)

Absentee rates by building is a measure which relates to workplace performance and which reflects the quality of the building, for instance, whether it should be improved or developed further. While many authors mentioned absenteeism as a measure

of productivity (Hagarty and Wilson, 2002, Kaczmarczyk and Morris, 2002, BCBC, 2003, RPS, 2003, van der Voordt, 2004), self-assessment of productivity has been used most frequently to assess productivity (Oseland, 1999). Despite the many ways to measure productivity, some research shows that self-assessment is the most appropriate measure of office productivity (Oseland, 1999, Van der Voordt, 2003). Perceived productivity in the workplace can be measured by the percentage of people who perceive the working environment as having a positive influence on productivity, in team or individually (Van der Voordt, 2003, Lindholm and Gibler, 2005).

There are other factors which influence the perceived labour productivity such as the distance that employees must commute (Duckworth, 1993). In their study, Lindholm and Gibler (2005) classified employees' opinions on how well the workplace supports their productivity as an innovative performance measure. Another indirect measurement of employee productivity includes (Office of Real Property, 1999):
- Turnover – retention of employees, cost of retaining.
- Time-tracking devices – log books, overtime, project hours.
- Customer demand for products or services.
- Observed downtime for modifications, complaints, interruptions.
- Churn costs – employee downtime, space move costs, time to execute a move and get a person back up-and-running (phone, computer, etc.).

Strategic involvement of corporate real estate
Haynes (2007, p.460) mentioned two contrasting approaches of office productivity. The first approach adopts a 'control paradigm' that aims to achieve greater efficiency. This approach focuses on reductions in either cost or space provision. The second approach adopts 'an enabling paradigm' that aims to achieve greater effectiveness. This approach centres on occupiers being provided with an office environment that enables them to increase their productivity. The enabling paradigm proposes a link between work processes, the work environment and increased office productivity. The latter approach requires the understanding of work environment that integrates human resource management, work psychology and facilities management.

Lubieniecki and Desrocher (2003) mentioned the strategic involvement of corporate real estate that can be considered as indirect measures relating to productivity. These measures are:
- CRE involved in corporate strategic planning (Lubieniecki and Desrocher, 2003)
- CRE integrated with HR strategies (Lubieniecki and Desrocher, 2003)
- CRE actively involved in firm-wide initiatives such as special asset use, consolidations, or shared services opportunities (Lubieniecki and Desrocher, 2003)

Table 12 shows the most frequently-mentioned performance measures on productivity from several authors.

Productivity	Performance measures
Employee productivity	· Productivity (% of perceived productivity support from working environment) (Carder, 1995, van der Voordt, 2004, Lindholm & Gibler, 2005) · Absentee rates by buildings (Massheder and Finch, 1998)
Strategic Involvement	· CRE involved in corporate strategic planning (Lubieniecki and Desrocher, 2003) · CRE integrated with HR strategies (Lubieniecki and Desrocher, 2003) · CRE actively involved in firm-wide initiatives such as special asset use, consolidations, or shared services opportunities (Lubieniecki and Desrocher, 2003)

Table 12
Performance measures of productivity

5 Environmental responsibility

Pressure for improved environmental performance is likely to increase from several sectors including the government, public and business (Katsikakis, 2006). Government influences on property are becoming more evident such as the environmental impact assessment (EIA) that is now in force in many countries. The EIA is an assessment of the possible positive or negative impact that a proposed project may have on the environment, consisting of a combination of the environmental, social and economic aspects. EIA was implemented in Dutch legislation on 1 September 1987. The categories of projects that require an EIA are summarised in Dutch legislation, the Environmental Act (Wikipedia, 2013d).

The SANE study (Sustainable Accommodation for the New Economy), a major European Commission initiative, focuses on the creation of sustainable, collaborative workplaces for knowledge workers across Europe that results in making less energy footprints from building blocks. Influenced by the government, policy frameworks aimed at sustainable development are likely to influence everything from construction materials, to energy use, to travelling to and from work (Harris, 2006). Pre-fabrication and sustainable construction will become more commonplace and the design of buildings could well be turning inwards. (Katsikakis, 2006).

The environmental efficiency of buildings can be measured by using an existing green building indicator system such as Leadership in Energy and Environmental Design (LEED) and Building Research Establishment Environmental Assessment Method (BREEAM). LEED provides building owners and operators with a concise framework for identifying and implementing practical and measurable green building design, construction, operations and maintenance solutions (Wikipedia, 2013a). BREEAM sets the standard for best practice in sustainable building design, construction and operation which is aimed at minimising the environmental impact by ensuring that sustainability best practices are in place, while at the same time, also lowering an organisation's costs through energy efficiency (BREEAM, 2012).

Duffy (1997) gave his view on the differences of office building design between the North American tradition and the northern European countries that have different focuses. While the North American office buildings express commercial success and achieve higher density, the northern European offices are more concerned with the needs of the employees with a focus on having access to daylight and natural ventilation, which also produces less environmental impacts.

Drivers in the changing pattern of work, organisational structure, technology, sustainability, flexibility and personal well-being are creating a demand to which organisations need to respond. To meet the planning demands for more sustainable environments, the multifunctional use and adaptability of the space and mixed-use environment provide greater flexibility in regard to the office space. Having a flexible way of working, whether from home or other locations, contributes to sustainability by reducing energy consumption from transportation. The re-use of buildings also helps to achieve a sustainability objective by avoiding new construction that in turn might consume a large amount of non-renewable resources.

Resource use
In terms of resource use, the energy consumption of a building is a direct way to evaluate energy performance. Related terms are energy use/square meters, energy intensity and number of energy audits. To achieve the sustainability objective, the organisation may have to concern itself with several issues including the transport-related sustainability effects, environmental impacts on land and water, etc.

Environmental impact
The concern about environmental impacts is considered as an area in the added value of CREM (Bradley, 2002, Van Meel, et al., 2010, Den Heijer, 2011, Jensen, et al., 2012a). Office buildings have a large impact on the environment as they require a great deal of raw materials to build and even more natural resources to run (Van Meel, et al., 2010). The approach to reduce environmental impacts helps to stabilize an organisation's resources and to cope with the interests and needs of the different stakeholders.

There is an increasing awareness and active participation by business professionals in the development of Corporate Social Responsibility (CSR). Organisations are increasingly becoming more involved in green initiatives by developing sustainable approaches and practices, adapting products and services to the low-carbon economy and innovating in all areas of their business (Garrett, 2012). Key benefits from sustainability include increased energy efficiency and property values (Reed and Wilkinson, 2005). Smith and Pitt (2009) also identified the added value of sustainable workplaces to improving employee health and well-being and increasing productivity. CSR is another area, where FM has a great potential to add value (Jensen, et al., 2012). In fact, facilities managers can expect to be asked to provide information for CSR, by

drawing up reports which include environmental performance. A typical list of aspect regarding environmental performance covers six areas (Arny, 2012):

1 Emissions (greenhouse gas, emissions that affect health)
2 Environmental impacts on land
3 Environmental impacts on water
4 Resource use
5 Waste (waste management, environmental impacts of waste)
6 Supply chain (purchasing, resource use in the supply chain, environmental impacts in the supply chain)

In terms of the corporate real estate management, contaminated sites management and the amount of garbage are performance measures that the organisation should be concerned about and which support the sustainable development objectives. To sum up, Table 13 shows the most frequently-mentioned performance measures on environmental responsibility from several authors.

Environmental responsibility	Performance measures
Resource use	· Energy consumption of building (Hinks and McNay, 1999, Lindholm and Gibler, 2005) · Number of energy audits (Lindholm and Gibler, 2005)
Waste	· Contaminated sites management (BCBC, 2003) · Amount of garbage (Lindholm and Gibler, 2005)

Table 13
Performance measures of environmental responsibility

6 **Cost efficiency**

Firms are confronted with a number of choices once they have recognized that there is a need for workplace change. The organisations can build or purchase accommodation, lease space for long or short periods with or without the inclusion of services, or they can use 'instant office' solutions provided by service office operators (Gibson, 2000). The costs of real estate are the second or third largest cost factor in most companies (Stoy and Kytzia, 2006). Brill et al. (2001) identified the total costs of the workplace which consist of three main areas: building, technology and operations. Gibson (2000) mentioned that the costs of an office portfolio for an occupier is a combination of real estate plus workplace infrastructure supported by services (FM and business support).

Whereas the financial health perspective focuses on the overall financial aspect of organisations, cost efficiency focuses on cost reduction from real estate. Financial health, with regard to real estate, is more important to those organisations which are involved in real estate-related business or organisations with a large portfolio. On the other hand, cost efficiency affects most organisations at all levels (i.e. small and large corporations).

The occupancy costs play an imminent role in assessing the total workplace cost. The occupation costs (rent, rates) account for about half of the total occupancy costs. Other elements required to create a working environment are likely to be controlled by a number of departments or groups within a large corporation (Gibson, 2000). The estimated breakdown of average total occupancy costs consist of (Gibson, 2000):

- Occupation (rent, rates) (49%)
- Support (18%)
- Adaptation (15%)
- Operation (15%)
- Management (3%)

The cost classification from the standards of The Netherlands Standardisation Institute (NEN) consists of:

- NEN 2631, investment costs (land costs, construction costs, fitting-out costs and additional costs)
- NEN 2632, operating costs (fixed costs, energy costs, maintenance costs, administrative costs and specific operating costs)

The costs of office space can be classified to include occupancy costs and other operation-specific, production-related personnel and material costs (Stoy and Kytzia, 2006). Two important items that include the cost of the workplace are: 1) occupancy costs and 2) operating costs (building and FM).

Occupancy costs:
- Occupancy Cost per square foot (Arthur Andersen, 1993, Nourse 1994, Bon et al. 1994, Massheder and Finch, 1998, Bdeir 2003)
- Occupancy cost per employee (Arthur Andersen, 1993, Massheder and Finch, 1998, Bdeir, 2003)
- Occupancy cost as a percentage of the total operating expense (Arthur Andersen, 1993, Bdeir, 2003)
- Occupancy cost as a percentage of operating revenue by building or business unit (Massheder and Finch, 1998)
- Occupancy cost per dollar or per unit of revenue (Nourse, 1994)
- Occupancy cost per seat (Bdeir, 2003)
- Occupancy cost per customer (Bon et al ., 1994)
- Actual extra occupancy cost versus predicted cost (Massheder and Finch, 1998)
- Occupancy cost per sales or turnover (Lindholm and Gibler, 2005)
- Occupancy cost per business unit (Lindholm and Gibler, 2005)
- Building Occupancy Charge (BOC) savings to customers (BCBC, 2003)

Operating costs (building and FM):
- Total Annual Building Occupancy Charges (BCBC, 2003)
- Cost of services and resources (cleaning, catering, furnishing, office articles) (NEN 2748)
- External facilities costs (external accommodation, layout of home workplace, transport) (NEN 2748)
- Facility management costs (environment, working conditions, quality) (NEN 2748)
- Operation cost/square meters (Statsbygg, 2003)
- Maintenance cost/square meters (Statsbygg, 2003)
- Different costs per square metre, such as energy consumption; operations and maintenance cost; and leasing costs (NPB, 2003)
- Cost of leased vs. owned inventory (Hagarty and Wilson, 2002)
- Total project cost in relation to budget, the exceeding of total property management budget and administration budget (Statsbygg, 2003)
- Number of moves per year
- Cost of underutilised space (Lindholm and Gibler, 2005)
- Workplace standards in use (Lindholm and Gibler, 2005)
- Cost of acquisitions versus returns (Massheder and Finch, 1998)

Despite the numerous measures regarding occupancy costs, the total occupancy costs per employee provides the most accurate picture of overall portfolio performance (Lubieniecki and Desrocher, 2003). In addition, the organisation should take the ratio of expenses to revenue into consideration. A lower ratio of cost to revenue reflects the real estate's greater contribution to the company's profit margin. On the other hand, the corporate real estate personnel are accountable for the management of the building costs to budget. This is done in the same manner as a revenue centre which is responsible for revenue against budget as the CRE unit may be required to examine the total operating expenditures versus the budget. To sum up, Table 14 shows the most frequently-mentioned performance measures on cost efficiency from several authors.

Cost efficiency	Performance measures
Occupancy costs	• Total occupancy cost per employee (Arthur Andersen, 1993; Massheder and Finch, 1998; Bdeir, 2003) • Occupancy cost as a % of total operating expense (Arthur Andersen, 1993; Bdeir, 2003) • Occupancy cost as a % of operating revenue by building or business unit (Massheder and Finch, 1998)
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) (Hinks and Mcnay, 1999; Lubieniecki and Desrocher, 2003) • Facility management costs (environment, working conditions, quality) (NEN 2748)

Table 14
Performance measures of cost efficiency

§ 2.8.2 The proposed list of performance measures according to the literature

Table 15 includes the most frequently-mentioned corporate real estate performance measures taken from the six categories in the literature that were previously described in Section 2.8.1. This shorter list of performance measures with regard to real estate and workplace change will be used as the proposed list of corporate real estate performance measures in order to compare them with the performance measurement data from the case studies. Similarities and dissimilarities from the comparison could lead to the selection of corporate real estate performance measures that are aligned with the organisational objectives.

Stakeholder perception	Performance measures
Employee satisfaction with work environment	· Quality of indoor environment: lightning, air conditioning, temperature, noise level, etc. · 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 CRE services	· Employee satisfaction with professional skills · Employee satisfaction with information sharing
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 required transportation, access to customers, distance to other sites and businesses)
Community and well-being	· The contribution to public policy and societal priorities
Financial health	
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 (dollar) of revenue · Return on property management

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Organisational development	Performance measures
Quality of facilities	· Physical condition of facilities · Suitability of premises and functional environment · Number of building quality audits
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)
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
Productivity	
Employee productivity	· Productivity (percentage of perceived productivity support from working environment) · Absentee rates by buildings
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, or shared services opportunities
Environmental responsibility	
Resource use	· Energy consumption · Number of energy audits and amount of garbage
Waste	· Contaminated sites management · Amount of garbage
Cost efficiency	
Occupancy costs	· Total occupancy cost per employee · Occupancy cost as a percentage of total operating expense · Occupancy cost as a percentage of operating revenue by building or business unit
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)

Table 15
Corporate real estate performance measures according to the literature

§ 2.9 Conceptual model

A number of performance measurement frameworks from the literature have been introduced in order to understand the general concept of performance measurement. These frameworks include several variables such as organisational goals and objectives, corporate and real estate strategies, an organisation's input, process, output and outcome and stakeholder perception. The literature review of performance measurement and the related variables provide a better understanding of performance measurement in different perspectives. There is a need to have a conceptual model

that can be used to understand the relationship between the variables of organisation and corporate real estate performance measurement, and which can also be used to select and prioritise corporate real estate performance measures and KPIs.

The development of a conceptual model to depict performance measurement (Figure 17) was influenced by the particular elements of conceptual frameworks from the various authors that have been introduced in this chapter. Among these frameworks, the conceptual framework for studying the effects of real estate interventions on organisational performance from De Vries (2007) and the FM value map from Jensen (2010) came to the fore. These frameworks can explain the impact of real estate on core business (organisational performance) and surroundings. The positive and negative effects of real estate can be traced from the impacts of the organisation's input, process, output and outcome on organisational performance (i.e. changes in productivity, profitability, costs). The conceptual model of performance measurement was developed from the basis above.

The conceptual model is aimed to provide the understanding of performance measurement in different perspectives (i.e. organisation and corporate real estate performance) and in the different processes of an organisational system (i.e. input, process, output, outcome). The conceptual model shows how an organisation and real estate performance measurement can be applied to align with corporate and real estate strategies. According to the model, performance measurement can be applied to monitor actions and resources which have been used to support these actions in order to achieve the set targets. Performance measurement can be discussed in connection to the organisational context, operations, resources, impacts and stakeholders.

The second purpose is to use the conceptual model for the prioritisation of corporate real estate performance measures and KPIs that will be further discussed in Chapter 10. The third purpose would be to use the conceptual model in order to develop an integrated model that can be used to explain the connections between performance measurement, workplace change, the appraisal of change and cultural background.
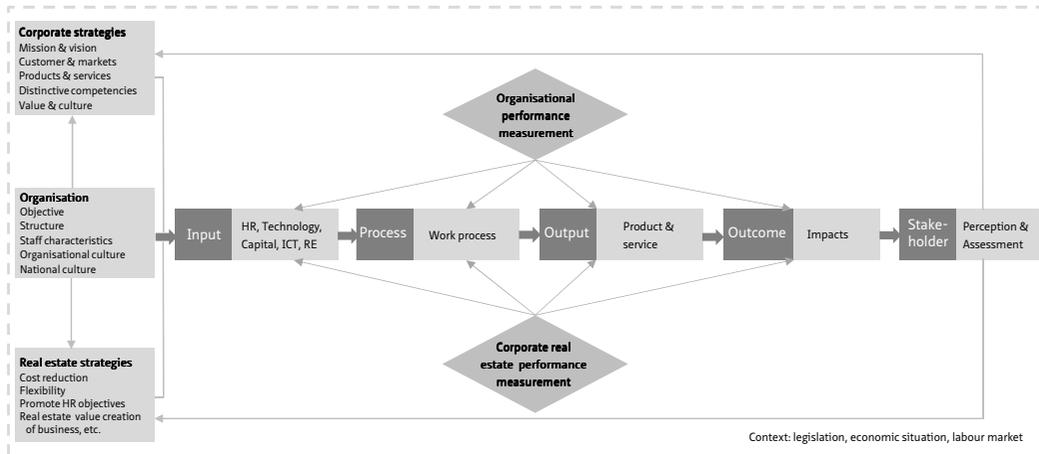
Figure 17
Conceptual model of performance measurement

Description of variables

The conceptual model describes the variables regarding the input, process, output and outcome in connection to corporate and real estate performance measurement. Performance measurement is an important aid to make judgments and to make decisions. The level of performance a business can attain is reflected in the efficiency and effectiveness of the actions it undertakes and the resources it uses to support these activities. Performance measurement focuses on the means and results (ends) or processes and outcomes.

Corporate real estate performance measurement aims to comprehend the impact of management decision-making on the success and failure that is seen in the real estate portfolio and suggest possible improvements. This PhD research applies six perspectives of business performance from Bradley (2002) in order to connect real estate performance to organisational performance. These six perspectives of business performance include: stakeholder perception, financial health, organisational development, productivity, environmental responsibility and cost efficiency.

Corporate strategies are described as the total pattern of the decisions and actions that position the organisation in its environment and that are intended to achieve its long-term goals (Slack et al., 2001). Organisations describe the key elements of their business along the dimensions of corporate strategies which include mission & vision, customer & markets, products & services, distinctive competencies and values & culture (Osgood Jr, 2004). Real estate strategies refer to the strategies that encompass how real estate decisions can be guided, for example, cost reduction, flexibility, promote marketing message, promote human resource objectives, etc.

An organisation includes the variables in objective, structure, staff characteristics, and organisational and national culture that impact on input variables including human resource, technology, capital, ICT and real estate. In terms of the workplace, a process is described as work processes that are carried out in an office. The output is defined as products, services or financial results that can have various impacts on different stakeholders' perspectives. Context includes variables in legislation, economic situation and labour market. These variables can influence the way organisations operate their resources.

§ 2.9.1 Conclusions

This chapter traced a number of frameworks that link both organisational performance and the 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). 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, the wide range of KPIs needs to be arranged in a more practicable way. In this PhD dissertation, the principles of the Kaplan and Norton's strategy map (2004) representing cause-and-effect relationship of an organisation's strategy in four balanced scorecard perspectives proved to be helpful in clearly clustering KPIs in connection to the organisational objectives. In addition, a huge number of corporate real estate performance measures and KPIs have been clustered in the six perspectives of business performance according to Bradley (2002). These corporate real estate performance measures that compose the six perspectives can be used as a reference to compare them with performance measures and KPIs from literature and what has been found in practice. The overview of KPIs can be useful to organisations in different contexts and on different levels: operational, tactical and strategic. The current list goes beyond cost efficiency and connects organisations' strategic objectives to performance management and as such it also links FM and CREM to the core business. The KPI list can provide performance measurement information that affects a positive change in organisational culture, systems and process. The shift from performance measurement to performance management can be achieved by helping to set the agreed-upon performance goals, and by allocating and prioritising an organisation's resources. This can be done by giving priority to the performance measures that can help the organisation to focus on particular actions and resources. The results obtained from this process can be used to improve the organisation's performance measurement system.

3 Workplace change: driving forces, types of changes and the impact on organisations and employees

§ 3.1 Introduction

An organisation's goals and diverse drivers can influence workplace change, which in turn, affects the productivity of its employees and their job satisfaction. Changes in organisational structure, work patterns, technological developments and the need for a culture change provide the main reasons for why the organisations decide to change their workplaces (Riratanaphong, 2006). If the workplace is classified by taking different perspectives, a better understanding of its characteristics can be obtained. How an environment is built expresses the brand, reduces environmental impact, stimulates creativity and supports culture change. These are all important aspects to take into consideration when employing real estate strategy. The impact of workplace change on employees (i.e. employee satisfaction, perceived productivity support and prioritised aspects of the work environment) are described in this chapter.

§ 3.2 Driving forces

Generally speaking, when an organisation decides to change its workplace, the most common reason for this is the need to reduce costs, to promote efficiency and to improve performance. In addition, drivers to change the workplace such as a changing work pattern and organisational structure can influence workplace change and affect how this change is received.

Cost reduction
One of the most important factors driving change in the workplace is cost reduction (Becker, 2004, Van Meel et al., 2010). Cost reduction is a sound economic reason for changing ways of working (e.g. desk sharing or hoteling). Whereas organisations are forced to reduce the costs of property and occupancy due to fierce business

competition, half of the office is often unoccupied (Van Meel et al., 2010). Nowadays, work processes are more flexible, so that work activities can be carried out in different spaces and times. To achieve efficiency, organisations need to arrange their workplaces with greater flexibility in order to support their work processes.

Changing work pattern
McGregor (2000) mentioned that in the future unpredictable work patterns will be the norm rather than the exception. Online working will become more and more commonplace, and the pattern of a working day will vary depending on the work processes of the individual. Office space will be used more intensively, with less focus being placed on the long-term ownership of individual workplaces. There will be more flexible and shorter-term ownership of office space for various groups of users (Duffy, 1997). These statements are in keeping with the current situation, in which organisations are confronting time-based competition and they have to eliminate the time wasted in the office as well as reduce wasted space. Knowledge workers are being offered the freedom to alter their work patterns by choosing work environment options regarding how, when and where to work. Permanent employees are engaging with external partners and a contingent workforce as much as they do with their colleagues (Miciunas, 2013).

Organisational structure
Various trends in organisational structure that affect office work include the increase of cross functional team working, fewer hierarchical units and more focus on customers' needs (Riratanaphong, 2006). The organisation is emerging with a flatter structure, responsibility is being decentralised and a greater autonomy is being awarded to operating units (Alexander, 1994). Flat management organisations are empowering employees to manage their work with greater autonomy and to choose how their time may best be spent (PSFK, 2013). Many firms prefer to use the management term 'empowerment' in their business process. This term can be defined as high-performance involvement in which companies break down into smaller units, and which provides their employees with the satisfaction of ownership and responsibility. The implication is that office design and office location will be prompted by highly opinionated, intelligent, dispersed, and diverse users, leading to an increasing demand for smaller and less centralised offices (Duffy, 1997, p.51). Accordingly, an organisational structure which includes several geographically dispersed locations can also provide a workforce that is more closely connected to its customers.

In addition, this organisational flattening is placing increased demands on knowledge workers' time and it is challenging the notions of work-life balance (Miciunas, 2013). What is particularly worth noting is that senior management must provide conditions in which facilities can be effectively managed and that they have the ultimate responsibility for generating resources that meet the organisation's needs so as to support its business objectives (Alexander, 1994, p.7).

Technology
The innovation of information and communication technology is responding to the demands made by the competitive world of business and the globalisation of trade. Such technological developments have helped the international commodity trade and money markets to improve the speed and efficiency of the services they offer to the international trading community, which also helps to facilitate the growth of world trade (Cole, 1997). Digital technology has made it possible to create and maintain relationships and to accomplish tasks from a distance that were previously only possible to realize face-to-face in traditional locations (Joroff, 2002). It is estimated that by 2020 there will be over 50 billion devices connected to the internet (Cisco, 2011). Trends in technology that integrate voice, data, and images and which engage in networks and the web, are becoming increasingly important to organisations. Organisations are currently experimenting with new workplace strategies which exploit the new information technologies to meet the goals of reducing overhead costs and to better serve their customers' needs (Riratanaphong, 2006).

Organisational culture
It is difficult to understand the impact a workplace has on an organisation without examining the role of an organisational culture in the design and use of the workplace. Becker and Steele (1995) link organisational culture to a number of aspects, for example, the expectations and assumptions of how good members should behave, the common language and understanding about the meaning of words and events, major policies, symbolic meanings, basic assumptions about the way the world works, and commonly held values about what is worth doing and how it should be done. The corporate culture embodies the organisation's assumptions regarding how space is structured and what the relations between staff and management are like. Generally, the amount of space is allocated to individuals or groups according to the existing hierarchical structure. However, recent research has shown that there is a shift in employees' attitudes towards expectations for high flexibility of where, when, and how to work (Intel labs, 2012). In the flexible workplace, the working spaces are arranged from work processes rather than positions or status. Various culture types and dimensions and their impact on workplace will be described in more detail in Chapter 4.

§ 3.3 Workplace typology

Various terms refer to workplace change such as workplace redesign, re-engineering, revitalization, renovation and innovation of the physical working environment. There is a choice which can be made regarding which kind of workplace change relies on which variables within an organisational context. Different types of workplace reflect different work processes. The following office taxonomy describes a workplace from various perspectives. Duffy (1997) categorised work processes by using two variables: interaction and autonomy, and proposed the terms as:

• Group processes – Den (high interaction, low autonomy)
• Individual processes – Hive (low interaction, low autonomy)
• Concentrated study – Cell (low interaction, high autonomy)
• Transactional knowledge – Club (high interaction, high autonomy)

Figure 18
Figure 18a (left image) Typology of office work based on two organisation variables (Duffy, 1997).
Figure 18b (right image) Four types of office work (Duffy, 1997) .

This classification by Duffy (1997) describes four organisational types, patterns of work, space occupancy, office layout and the use of information technology. According to Duffy, no one organisation can be categorised as being completely a hive, cell, den or club, but most are actually combinations. He further stated that the sum of all offices at any one time must consist of a proportion of all four types.

The integrated workplace is the result of a collaborative, multidisciplinary approach to developing and providing workspace, uniting the organization's real property plan with the organisation's strategic business goals. It responds to the people and work practices of each individual and group, and provides them with the physical space and tools needed for their success (GSA, 1999). Apart from the definition of the integrated

workplace by the GSA, Becker and Joroff (2000) introduced the four perspectives of "Integrated Workplace Strategy" as follows:

1. The nature of physical settings (where the work is conducted)
2. The information technologies used in the performance of work (how data, opinions, and ideas are accessed, processed, and communicated)
3. The nature of work patterns and processes (when and how tasks must be performed to achieve business objectives)
4. Organisational culture and management (the formal and informal values, expectations, policies, and behaviours that influence all the other factors)

Another taxonomy of office types has been developed at the Delft University of Technology (Vos et al., 1999). This framework has taken three dimensions into account: place, space and use.

- Place (location) refers to the central office or telework (satellite office, business centre, guest office, home office and instant office)
- Space refers to the cellular office, group office, open plan office and 'combi' office
- Use is categorised as personal office, shared office or non-territorial office.
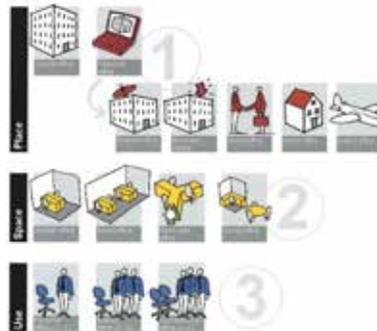
Figure 19
Office typologies (Vos et al., 1999)

Nutt (2000) classified the way in which work and work communication can be organised in space and time:

- Same place - Same time refers to a face-to-face workplace or a traditional office
- Same place - Different time refers to touch down or drop-in office
- Different place - Same time refers to a satellite office or video conferencing support
- Different place - Different time refers to the virtual office

	Different Place	Different Place
Non Coincident Working	Same Time	Different Time
Coincident Working	Same Place	Same Place
	Same Time	Different Time
	Coincident Working	**Non Coincident Working**

Space (left axis) *Time* (bottom axis)

Figure 20
Work organisation in space and time (Nutt, 2000)

Nutt further stated that there are three key dilemmas associated with these four domains of work. The first concerns an organisation's choice of finding an appropriate mix of the four working domains to support the organisation's objectives and the employee's needs. The second is the choice of management structure, procedure and culture. The third dilemma relates to the quantification of the demand and supply of facilities, space and support services (Nutt, 2000, p.75).

According to Frankema (2003), the workplace can be categorised by three relational characteristics (Frankema, 2003):
• The workplace related to accommodation and facilities
• The workplace related to a work process and an organisation and
• The workplace as a function in the objectives of an organisation

The problem addressing workplace issues may be caused by the different definitions of a workplace. The approach needed to tackle these issues would be to have a holistic view of the workplace and workplace-related issues. When considering the workplace design, it should not be limited to the physical aspects of the workplace, but it should extend to include the business objectives and the organisation's characteristics. For example, the implementation of a workplace concept should be in alignment with organisational characteristics such as objectives, drivers, work processes, staff characteristics, management styles and culture.

Current trends in workplace design and management

In terms of workplace design, alongside with the functional purpose of supporting occupants' performance, the workplace has an important role to stimulate creativity. An environment which encourages a team to build trust and to play freely is an essential ingredient for innovation (Grove et al., 2010). Workplaces that are appealing to our sensory aesthetics inspire feelings of passion for those who work there. To establish an effective office concept, the underlying objectives should be clear. The following objectives are often associated with new office concepts.

Express the brand
Branding is about creating a particular image or perception of the organisation and its products or services among customers or other strategic stakeholders. The study conducted by Lievens et al. (2007) shows the importance for organisations (employers) to maintain a generally consistent image among relevant stakeholder groups, i.e. employees and applicants. Physical presence conveys and reinforces organisational messages continually, without requiring any effort (Becker, 2004). The physical working environment can be used to convey a particular message or identity with the incorporation of 'brand visuals' (logos, slogans and company colours) as seen in the cases of Nike, LEGO, Google, Philips design and Virgin (Grove et al., 2010). The case of Digital Equipment Corporation, a major American company in the computer industry, which has been mentioned by Becker (2004), is another example of the interior design approach that transforms the conventional offices using by lazy-boy chairs, wall murals, decorative fountains, and swing sets and patio furniture and brings brand recognition to the public.

Reduces environmental impact
Existing buildings require over 40% of the world's total final energy consumption, and account for 24% of the world's CO_2 emissions. The building sector is one of the most cost-effective sectors for reducing energy consumption (International Energy Agency, 2006). In addition, by reducing the overall energy demand, and by improving energy efficiency in buildings, the carbon dioxide (CO_2) emissions from the building sector can be significantly reduced. Environmental issues are becoming more and more a concern in the building and construction industries. The energy efficient design concept such as the use of special reflective or thermal insulation materials in building envelope (i.e. roof, walls, floor or windows) can reduce heating or cooling load. The special technique of the tightly sealed building envelope provides the control of ventilation and infiltration and helps to build thermal storage and the control of solar heat gain. The choice of office concept – in particular the footprint of workstations and whether or not they are to be shared – has a considerable influence on the environmental impact of an office building. Small footprints by flexible offices not only lead to space reduction, but it also requires fewer materials and less maintenance, less HVAC and less demolition work at the end of the life cycle (Van Meel et al., 2010).

Stimulate creativity and interaction

Modern organisations are increasingly perceived as ecosystems: systems in which tacit knowledge is developed and exchanged through conversations, formal and informal. Space that encourages effective conversations might speed up organisational learning (Haynes and Price, 2004). Company performance is becoming more dependent on an organisation's ability to be creative (Martens, 2008). Grove et al. (2010) have explored 38 case studies in various themes common to the unique creative environments ranging from communal areas, such as kitchens and living room-like places that serve as informal gathering spaces that encourage open and unbiased interaction between co-workers to the flexible floor plans and adaptable furniture that encourages imaginative thinking. Literature suggests that the physical work environment can have a positive effect on the creativity of an organization (Worthington, 2001, Becker, 2007). Martens (2008) has proposed a model which can be used to position relations, elements and forces that determine the match of a creative workplace and its occupiers. Creativity can emerge from complex, dynamic interaction processes including contextual aspects such as organisational structure, culture as well as spatial environments (Boden, 2004, Meusburger, 2009). Sailer (2011) studied two criteria for creativity in workplaces: spaces to stimulate encounters with people from different teams; and a balance of spaces for communication and concentration. However, in his research, only the first criterion was successfully met.

Support Culture change

Making changes in culture is one of the most difficult managerial tasks. Office design, however, can be a powerful tool or even a 'change agent' in this process. O'Mara (1999) mentioned that the work environment can be used to influence cultural change by facilitating certain behaviours and impeding others. For example, the provision of coffee bars, open stairwells and recreation areas can all promote interaction. Another strategy that can be used to reduce the emphasis on hierarchy is to reduce the number of space standards and put more managers in open offices. O'Mara further stated that the important questions to be asked are: What are behaviours the organisations want to encourage and what do they want to change? Are the changes in the office design consistent with other behavioural changes the organisations are championing throughout the company? However, changes in the physical settings that are intended to support culture change should go hand in hand with changes in management style and working practices (Van Marrewijk, 2009, Van Meel et al., 2010).

Workplace assessment

Regarding workplace management, Becker (2004) mentioned that the problem with a great deal of performance measurement is its failure to effectively define just what the purpose of the measurement is, and who the real audience is in regard to the findings. The following three key questions that can be used to test assumptions concerning what the management is looking for in connection to performance assessment:

1   What, exactly, is meant by organisational performance in the context of workspace strategies and office design?
2   What's the best way to assess the value of workspace intervention?
3   Who would like to know about organisational performance, and why?

Becker further stated that workspace performance assessment is differentiating among three kinds of organisational performance: facility performance (efficiency measures involving costs, speed, utilisation), human performance (behaviours and attitudes believed or demonstrated to contribute to key organisational goals such as speed of delivery or quality of service), and corporate performance (outcomes such as number of media mentions in the national press and potential clients who visit which enhances the firm's brand and strengthens its relationships with clients).

The previous study of innovative workplace design that was produced by the department of Real Estate & Housing of the Faculty of Architecture at Delft University of Technology revealed the potential costs (such as negative effects, investment in labour or risks) and benefits (such as profits, positive effects or reduced costs) of workplace innovation (Van der Voordt, 2003, Riratanaphong, 2009). Identifying the costs and benefits of workplace change is essential to the management of workplace change. The Delft knowledge center, Center for People and Buildings is continuously requested to conduct an ex post evaluation of working environments after change and also to conduct ex ante research to explore employee satisfaction (www.cfpb.nl).

Implementation process
Becker et al. (1994) mention that the success of alternative offices is determined by the underlying strategy and the method of implementation. The organisation with a process-oriented approach is far more likely to accomplish than the cost-driven and solution-oriented organisation. The first approach involves the desire to work in a new way, which is more dynamic, efficient and effective than the latter that focuses on cost reduction.

Each group of stakeholders has different priorities. In particular, employees at different levels and with different functions respond differently to the idea of workplace change (Vischer, 2012). A well organised implementation process helps reduce the resistance to change by engaging, informing and involving end-users and by making a careful analysis of the actual needs of the organisation. By setting clear and explicit objectives, all of the stakeholders involved will have similar expectations concerning the new office concept (Van Meel et al., 2010). Feedback from employees is a required protocol for supporting the implementation of workplace practices that can be applied to improving the facilities conditions.

§ 3.5 Impact of workplace change on employees

The study of a workplace and its impact on organisational performance can be discussed from a viewpoint that the working environment has on core business. In this research, the impact of workplace change on employees focuses on three areas: employee satisfaction, perceived productivity support and prioritised aspects of the work environment. Employee perception of the changed environment that aligns with real estate goals can contribute to organisational objectives, which in turn can influence organisational performance.

§ 3.5.1 Employee satisfaction

User satisfaction is recognised as an important factor in the success of an organisation and is regarded as a key performance indicator (Fleming, 2005, Lee, 2006). This is based on the reason that higher satisfaction levels improve morale and reduce voluntary turnover (Dole and Schroeder, 2001). There are a range of areas related to employee satisfaction in regard to the work environment.

Employee satisfaction with work environment
In the primary process of the office-based organisations, the actual transformation is established through the coordinated interaction between the production factors: people and means (Van Ree, 2002). These factors can be discussed in terms of efficiency and effectiveness. While reducing the occupancy costs is the approach to achieve efficiency, providing a comfortable and satisfying working environment is the way to achieve effectiveness (Van Ree, 2002).

Accommodation can have a positive impact on all five performance criteria that the organisation should meet (effective, efficient, productive, flexible and creative), especially by influencing the production factor 'people' (Tapscott, 1982). Employee satisfaction with work environment is directly related to their job satisfaction and indirectly related to organisational commitment and turnover intention (Carlopio and Gardner, 1992). Employee satisfaction about the working environment is defined as the degree to which the working environment meets the wishes and needs of the working individual (Van der Voordt, 2003). The term can relate to the work itself (content, complexity, required knowledge and skills, degree of autonomy); the social working environment (colleagues, management style, conditions of employment such as salary, leave of absence arrangements, and career prospects); the physical working environment (workplace, lighting, daylight, view); and other interactions that take place regarding these aspects.

Influential factors

The assessment of employee satisfaction should take into account the possible influence of various factors. Relevant issues include (Van der Voordt, 2004):

- the extent to which the working environment as a whole fits with daily activities
- the functionality and appeal of various types of workplace
- the extent to which the environment stimulates communication
- the extent to which personnel can concentrate in their working environment
- the extent to which the environment fits with psychological needs such as privacy, territoriality, identity, personalisation and expression of status
- accessibility of people (physically, by phone, digitally)
- flexibility and adaptability of the environment
- services such as reception, repro, catering, mail delivery, helpdesk
- indoor climate (temperature, light, sound, view, daylight)
- ICT facilities
- furniture
- filing (filing method, amount of filing space, accessibility)

Figure 21 illustrates various factors that influence employee satisfaction including the physical working environment, conditions of employment, the work itself and the interaction that take places regarding these aspects.
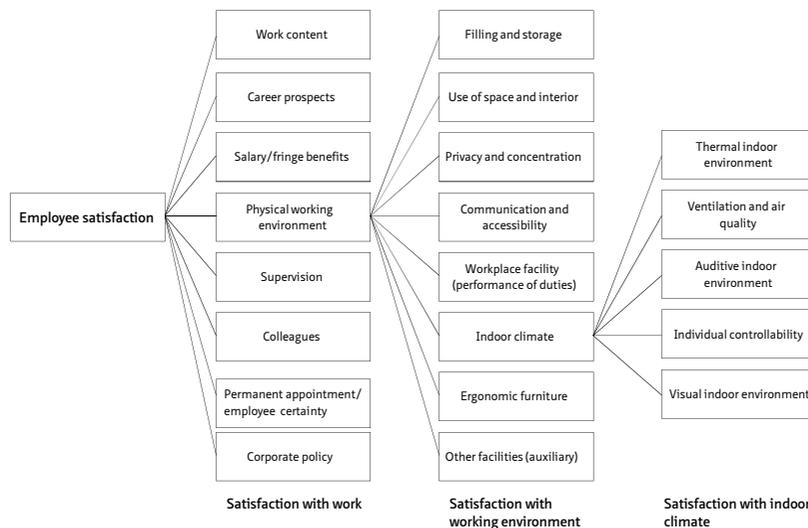
Figure 21

Factors that influence employee satisfaction (Sundstrøm, 1986, Vollebregt, 1996, Cleements-Croome, 2006 in Van der Voordt, 2003)

According to Herzberg, employee satisfaction is determined by two factors:

- Motivators or 'satisfiers': factors that act as a source of satisfaction and as a motivation to perform, such as pleasant and interesting work, assuming personal responsibility, recognition and success.
- Hygiene factors or 'dissatisfiers': factors that do not necessarily encourage satisfaction, but which cause dissatisfaction if they are absent (i.e. poor physical conditions, low pay and incompetent management) (Herzberg et al., 1959, Herzberg, 1966)

Because the wide scope of satisfaction involves many factors, it is important to determine beforehand what the parties concerned would like to know and what they want to do with the acquired knowledge. It is also important to ensure that the demands and wishes of employees match those of the organisation as a whole (Van Meel et al., 2010). In terms of workplace change, involving end users directly within the design and briefing stages would enhance their overall perceptions of the workplace as it will influence and determine (Becker, 1990):

- the amount and quality of information collected
- the nature and quality of solutions proposed and accepted
- help determine employees' satisfaction with the process
- colour their view of the final outcome

Performance measures of employee satisfaction
Becker (1990) emphasises that FM performance integrates not only the building performance as a physical product, but it also recognized, in terms of outcomes, from cost to human satisfaction and performance, that the building influences in some way the organisation values. From the literature, performance measures of employee satisfaction include:

- employee satisfaction with work environment (Arthur Andersen, 1993, Nourse 1994, Bdeir, 2003, Hinks and McNay, 1999, Lindholm and Gibler, 2005)
- employee satisfaction with CRE services (Duckworth, 1993, Lubieniecki and Desrocher, 2003)

Employee satisfaction with the working environment is related to real estate and the physical work environment (i.e. quality of indoor environment, provision of safe environment, location success factors, ratio of office space to common areas, provision of amenities, amount of workplace reforms and space modifications). On the other hand, employee satisfaction with CRE services (i.e. professional skills, information sharing) displays the satisfaction of the social working environment because it relates to the management of the facilities, rather than the work or physical working environment.

Assessment techniques to measure employee satisfaction
Van der Voordt (2004) mentioned five ways of measuring satisfaction with workplace innovation including:

- satisfaction with specific aspects; often on a five-point scale. For example, 'How do you value the following aspects (privacy of conversation, desk sharing, the size of your workplace, etc.): (very) unsatisfied - (very) satisfied; (very) bad - (very) good?'
- the extent to which users view these aspects as being important: likewise, mostly on a five-point scale, ranging from very unimportant to very important.
- general assessment: for example, 'What is your overall assessment of your physical working environment, expressed on a graded scale?' or 'What is your general impression of the new work environment: positive, neutral or negative?'
- assessing the most positive and the most negative characteristics of the work environment, for example, 'Which three characteristics of your environment have had the greatest positive/negative influence on your work?'
- making a comparison with the original situation: for example, 'Would you rather return to the original situation?'

The Center for People and Buildings in Delft, a knowledge centre that specializes in the relationship between people, working processes and the working environment has developed the WODI Light questionnaire, a tool to assess employee satisfaction and perceived support of productivity through the working environment (Maarleveld et al., 2009). WODI Light includes a short questionnaire with a focus on issues that have turned out to be of utmost importance to overall employee satisfaction and labour productivity. In addition, a more detailed questionnaire is available to investigate employee satisfaction more in depth (Volker and Van der Voordt, 2005).

This WODI Light questionnaire includes different types of questions that have been structured into themes, completed with questions on personal characteristics and overall questions. The themes include organisation and work, the building, the direct work environment, privacy, the workplace, concentration, communication, archive, IT, indoor climate, external services and perceived work productivity. The thirty-nine item questionnaire makes use of a five-point scale that can take about 10 minutes per respondent to complete. In addition, the actual use of the workplace is questioned, as well as the activities which are performed by the employees during the day (the percentage of their working time) (Maarleveld et al., 2009).

In this PhD research, the WODI Light tool is used to explore the impact of workplace change on employee satisfaction. The results regarding employee satisfaction, perceived productivity support and prioritised aspects in various components of working environment can be linked to real estate objectives and the added value of CREM/FM.
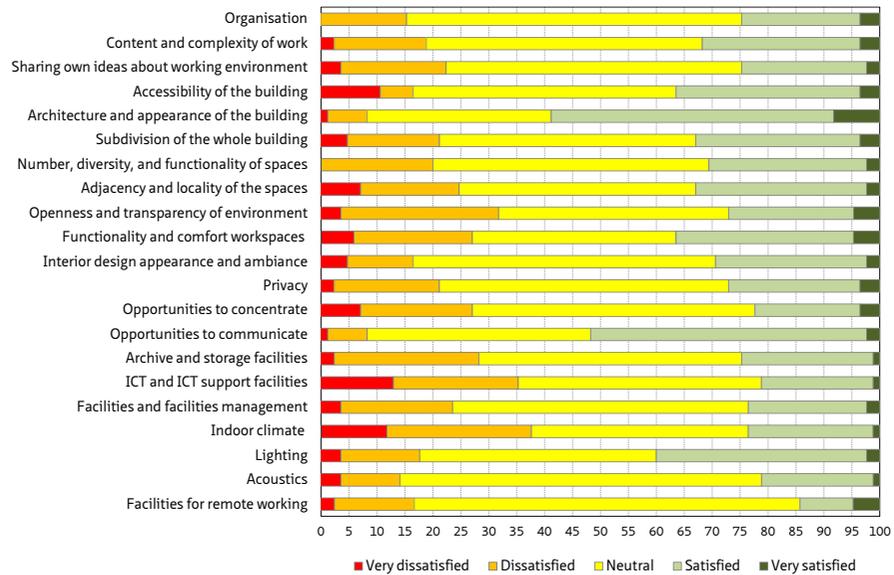
Example of findings using the WODI Light questionnaire: employee satisfaction with the work environment (A case study of Dhanarak Asset Development, N = 85)

There is also another user satisfaction survey instrument which has been developed by Public Works Canada (Dillon and Vischer, 1987). It is an instrument that can be used to measure worker comfort and satisfaction based on occupant surveys and it consists of a standardised questionnaire. The questionnaire is made up of twenty-two questions on a five-point scale which are related to nine environmental dimensions. Worker responses to the questions are grouped to generate mean ratings for each dimension.

Dimension	Measures	Questions no.
Thermal comfort	Temperature comfort	1-3
Air quality	Temperature and ventilation	4-6
Office noise	Intrusive or disturbing noise levels	7-9
Spatial comfort	Furniture arrangement	10-13
Privacy	Voice privacy and telephone privacy (acoustic comfort); Visual privacy as part of workstation layout	14-16
Lighting	Amount of lighting in the workspace (electrical lighting)	17-19
Building noise control	Noise generated by the building itself rather than by its occupants (e.g. noise from air system, noise from outside the building)	20-22

Table 16

Dimensions and measures obtained from the user satisfaction survey (Dillon and Vischer, 1987)

The survey yields comparative information about environmental conditions in different areas of a building. The survey results are used to generate a profile of the tested building which can then be compared to a normative profile (developed by Public Works Canada), or ratings from a previously occupied building. This can provide insight into the functioning of the building and help guide decisions to be made regarding further investigation, building planning, and improvement (Kroner et al., 1992).

Employee satisfaction as an added value of CREM
Several authors have mentioned employee satisfaction as an added value of CREM. Nourse and Roulac (1993) mention employee satisfaction under the term "promote human resource objectives". The attractive workplace design that responds to the wishes of employees can have a strong real estate strategy impact. One of the main purposes of an office is to attract and retain staff (Van Meel et al., 2010). Lindholm (2008) described employee satisfaction as one of the seven corporate real estate strategies that can be achieved by seeking locations convenient to employees, responding quickly to real estate requests and providing a pleasant working environment, functional workplace and desired amenities.

Den Heijer (2011) links campus strategies to the quality of place, to satisfy the users and to attract and retain students, professors and other employees. Van der Zwart and Van der Voordt (2012) propose to improve user satisfaction by steering on a functional, comfortable and pleasant working environment, taking into account user needs and preferences. In addition, the FM value map, which focuses on the value creation as a part of FM, incorporates the staff satisfaction as one of the impacts that can add value to a core business and surroundings and for the benefit of all stakeholders (Jensen et al., 2012b).

§ 3.5.2   **Perceived productivity support**

In order to attain viability and continuity of organisations it is important to maximise productivity (Van der Voordt, 2003, Vink, 2009 in Bakker et al., 2013, p.72). There is a growing body of evidence that links the physical workplace with employee satisfaction and productivity (De Croon et al., 2005). Several authors study the relationship between employee satisfaction to perceived productivity support of the work environment (Kroner et al., 1992, Leifer, 1998). However, different measurement approaches are required for different aspects of productivity.

Perceived productivity support of work environment
The West Bend mutual study revealed a statistically significant positive association between the change in productivity and the change in overall satisfaction with the workspace (Kroner et al., 1992). The building survey approach by Leifer (1998) is described by the ability that target building maintenance and refurbishment are related to occupant satisfaction and productivity. His study aimed to relate users' satisfaction to their productivity as indicated by their perceived ability to carry out their work. Haynes found that workers' perception of the environment has an impact on their productivity. He further concludes there is sufficient evidence to support the claim that office comfort can affect productivity (Haynes, 2008a in Rothe et al., 2012).

The concept of productivity is a multidimensional term, the meaning of which can vary, depending on the context within which it is used (Tangen, 2005). In scientific literature, productivity is defined as the relationship between output and input, between results or proceeds and sacrifices (Brinkerhoff and Dressler, 1990, Aronoff and Kaplan, 1995). Productivity is defined as the relation between output quantity (i.e. correctly produced products which fulfil their specifications) and input quantity (i.e. all resources that are consumed in the transformation process) (Tangen, 2005). Leaman and Bordass (2006) assigned the meaning of productivity as the ability of people to enhance their work output by increasing the quantity and/or quality of the product or service they deliver. Although better or more output is the intention of productivity improvement, it is also possible to focus on the same output with fewer resources.

Various perspectives of productivity
There are various ways to define productivity and they can be divided into three main categories (Ghobadian and Husband, 1990):
- The technological concept: the relationship between ratios of outputs to the inputs used in its production
- The engineering concept: the relationship between the actual and the potential output of a process
- The economist concept: the efficiency of resource allocation

The improvements in productivity can basically be caused by five different relationships (Misterek et al., 1992):
- Output increases faster than input; the increase in input is proportionately less than the increase in output (managed growth)
- More output from the same input (working smarter)
- More output with a reduction in input (the ideal)
- Same output with fewer inputs (greater efficiency)
- Output decreases, but input decreases more; the decrease in input is proportionately greater than the decrease in input (managed decline)

Performance measures of productivity

Hadi (1999) proposes a holistic view to the measurement of office productivity. She proposes that productivity measures should be discussed and split into three areas:

1 quantifiable and tangible measures
2 indirect measures, i.e. staff turnover, etc.
3 organisational measures such as teamwork and creativity

Realising that the measuring of productivity is of complex nature, the Office of Real Property (1999), proposed examples of indirect measurement of employee productivity as follows:

- Turnover – retention of employees, cost of retaining
- Absenteeism – sick leave, annual leave
- Self-assessment of workplace effects on one's own productivity
- Time-tracking devices – log books, overtime, project hours
- Customer demand for products or services
- Observed downtime for modifications, complaints, interruptions
- Anecdotal evidence on workplace suitability – people's perceptions of workplaces suitability are still a viable measurement
- Churn costs – employee downtime, space move costs, time to execute a move and have a person back up-and-running (phone, computer, etc.)

According to Clements-Croome (2006), productivity depends on four clusters of variables:

1 Personal characteristics, such as the phase in someone's career, the technology at someone's disposal that allows him or her to work at home and the relationship between work and private life
2 Social factors, such as relationships with colleagues
3 Organisational characteristics, such as the organisational structure or management style
4 Characteristics of the physical environment, such as the indoor climate (temperature, lighting and acoustics), air quality (humidity, draughts and pollution) and the workplace layout

However, Leaman and Bordass (2006) argue that human productivity in workplaces is fraught with difficulty, for example, studies of individual occupants often miss out the wider context of physical and locational differences between buildings, and how they are managed and operated. The study conducted by Leaman and Bordass (2006) lists five variables that affect perceived productivity:

1 comfort, including personal control
2 responsiveness to need, including comfort, but a host of other ways in which needs should be met effectively
3 ventilation type, which also encompasses attributes such as size, building depth and other allometric properties (i.e. how size affects shape, volume, services etc.)
4 workgroups and their layout in the space plan
5 design intent and how this is communicated to users and occupants

Another difficulty of productivity is that in many places it is invisible. There are measures that can be quite easy to employ for repetitive office work. However, the basic qualities such as speed and accuracy are much more difficult to assess because they introduce a high degree of subjective assessment (Cleements-Croome, 2006). Indicators of increased productivity include (NEMA, 1989):

- Performing tasks more accurately
- Performing faster without loss of accuracy
- Capability to perform longer without tiring
- Learning more effectively
- Being more creative
- Sustaining stress more effectively
- Working together more harmoniously
- Being more able to cope with unforeseen circumstances
- Feeling healthier and so spending more time at work
- Accepting more responsibility
- Responding more positively to requests

From the literature, performance measures of perceived productivity support include:

- employee productivity (Carder, 1995, Van der Voordt, 2004, Lindholm and Gibler, 2005, Massheder and Finch, 1998)
- CRE integrated with HR strategies (Lubieniecki and Desrocher, 2003)

Employee productivity is incorporated with measures in 1) the percentage of productivity support from working environment and 2) absentee rates by building. The corporate real estate integrated with HR strategies (i.e. the use of the workplace to attract and retain employees) is considered as the strategic involvement of corporate real estate.

Assessment techniques to measure perceived productivity support
Kroner et al. (1992) and Leifer (1998) used the instrument developed by Public Works Canada (Dillon and Vischer, 1987) to relate to users' satisfaction with productivity. Kroner et al. (1992) applied the productivity assessment, which is a work-flow form, to test the hypothesis that more positive changes in productivity would have more positive changes in the overall satisfaction with the workspace. The study conducted by Leifer (1998) was intended to relate users' satisfaction to their "productivity" as indicated by their perceived ability to carry out their work. On the other hand, Van der Voordt (2003) describes five ways of measuring productivity and the difference in productivity among working environments.

Productivity	Description
1. Actual labour productivity	For example, the number of translated words per each employee and per unit of time (translation agency), the number of phone calls that have been made (call centre), concluded policies (insurance company) per division, or the number of manufactured cars per FTE (automobile industry)
2. Perceived productivity	For example, by asking people to assign a report mark to the environment indicating the extent to which it supports their productivity, or by asking them to rate their appreciation using a three or five-point scale. Variants include: · What percentage of your time is spent working productively? · What percentage of your time is spent working unproductively due to much distraction? · What percentage of your time is spent searching for a suitable workplace? · By what percentage would your productivity increase if working conditions were to change?
3. Amount of time spent	The amount of time gained because filling is carried out more efficiently, staff turnover can be dealt with more easily, or the amount of time that is lost by having to log on more frequently and clearing desks on a regular basis.
4. Absenteeism due to illness	A form of non-productivity
5. Indirect indicators	To what extent are people able to concentrate properly or are they actually distracted: how quickly can employees solve a problem or supplement a lack of knowledge through interaction with colleagues?

Table 17

Productivity of the working environment (Van der Voordt, 2003)

Self-assessment of productivity has been used in the field for some time and has provided useful results (Oseland, 1999). This statement is also true for office innovation that usually measures perceived productivity (Van der Voordt, 2003). Oseland (1999) confirmed that self-assessment is the most appropriate measure of office productivity, and requested that further research be done with a larger sample size to reinforce confidence in the self-assessment measure.

The following is an example of a measurement tool of perceived productivity from Building Use Studies questionnaires. Although the questionnaire is a subject of much comment from those who prefer objective measures, the subjectively perceived productivity scales outweigh the disadvantages (Leaman and Bordass, 2006).

	+40% or more	+30%	+20%	+10% or more	0	-10%	-20%	-30%	-40% or more	
Productivity increased by..	1	2	3	4	5	6	7	8	9	Productivity decreased by..
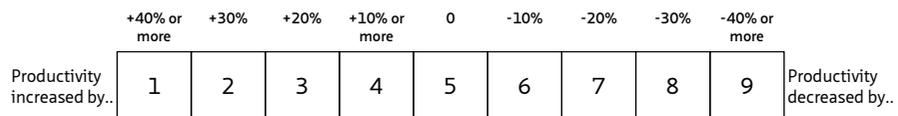
Figure 23

Perceived productivity question used in Building Use Studies surveys (Building Use Studies, 2005)

Another example taken from the Delft University of Technology aims to evaluate perceived productivity of workplace innovation.

| a | How would you rate your productivity? | □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 □ 8 □ 9 □ 10 |

Explanation (if any)

| b | In your opinion, what is the effect of the current working environment on your productivity (output)? | □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 □ 8 □ 9 □ 10 |

Explanation (if any)

Figure 24
Example of how perceived productivity is measured (Van der Voordt, 1999)

The WODI Light tool that was previously mentioned is also used for assessing the perceived productivity support of the work environment in three aspects: 1) individual productivity, 2) team productivity, and 3) organisation productivity.
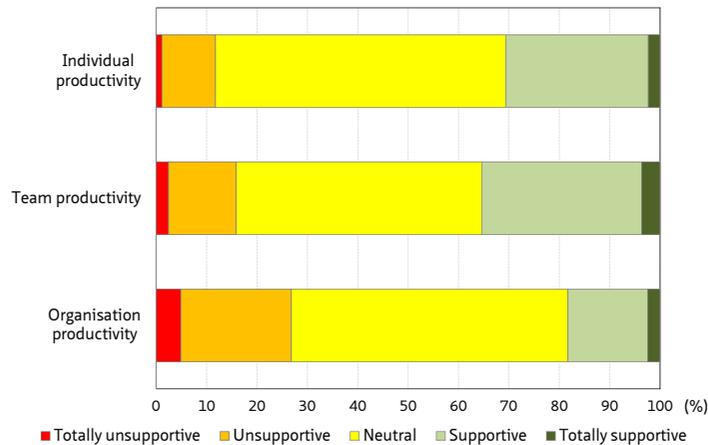
Figure 25
Example of findings using the WODI Light questionnaire: perceived productivity support (A case study of Dhanarak Asset Development, N = 85)

Prioritised aspects

Individuals prefer different working environments to perform tasks depending on their personal factors. Previous studies concerning user perception of working environments emphasise the significance of office design with regards to user requirements (Haynes, 2008b, Tucker and Smith, 2008, Vischer, 2008, Rothe et al., 2011).

User perception
Tucker and Smith (2008) studied the importance of user perceptions within an organisational context, and how perceptions are positively applied within facilities management. The findings show how differences in user perceptions and expectations can be effectively applied to a strategic management context within FM, and they explain that perceptions in the organisational context are two-fold – first, via the workplace environment and productivity, and second, via strategic FM delivery. They conclude that user perceptions need to be viewed as a holistic process within FM business planning. Their study focuses on several key issues and elements revolving around the perceptions of the workplace such as:

• personal control
• privacy
• interior planting
• personalisation
• colour
• windows and lighting

User preference
Preference is defined as priority in the right to demand and receive satisfaction of an obligation (Merriam-Webster, 2013). It is the thing that is preferred over another. The prioritised aspects of the work environment, therefore, are the items preferred over the others. User preferences are issues that cause happiness and satisfaction, but which are not necessary for performing a task (Rothe et al., 2012). For example, workspaces next to windows may be preferred although this may cause no difference in terms of the output produced from the occupiers located in other areas.

Types of preferences
The creation of workplaces that result in satisfied end users requires more information about user preferences towards their work environments. Rothe et al. (2011) assess preferred work environment attributes that office users see as important and present different user profiles that are determined based on user choices and preferences regarding their work environments. Types of preferences concerning the work environment can be described as follows (Rothe et al., 2012):

- service preferences (e.g. lobby, posting and meeting room services)
- virtual and mobility preferences - virtual environment and the possibility to choose the type of workplace according to the current task)
- collaboration preferences - work environments that support teamwork
- image preferences - a workspace that supports the image
- impact preferences - an individual's possibility to have an impact on his or her work environment
- sustainability - the sustainability characteristics of the building and its management such as energy efficiency, recycling, green cleaning, and possible green building certificates
- commuting preference - issues that support commuting by car and bicycling to work

In order to reach end-user satisfaction, both needs and preferences should be taken into consideration: "Employee satisfaction refers to the degree to which the working environment meets the wishes and the needs of the employees" (Van der Voordt, 2004). Rothe et al. (2012) mention the difference between needs and preferences that needs have the properties of hygiene factors: dissatisfaction increases if the needs are not met, while the preferences are motivators: in order to increase satisfaction also preferences have to be fulfilled.

User needs and preferences model
Rothe et al.(2012) demonstrate the relationship between the concepts need, preference and requirement and implementation (Figure 26).

a. Compromise: Is needed and preferred but not implemented, causes dissatisfaction
b. Bliss: Preferred and implemented, increases satisfaction
c. Must have: Is needed, preferred and implemented, increases satisfaction
d. Necessity: Is needed and implemented, does not increase satisfaction
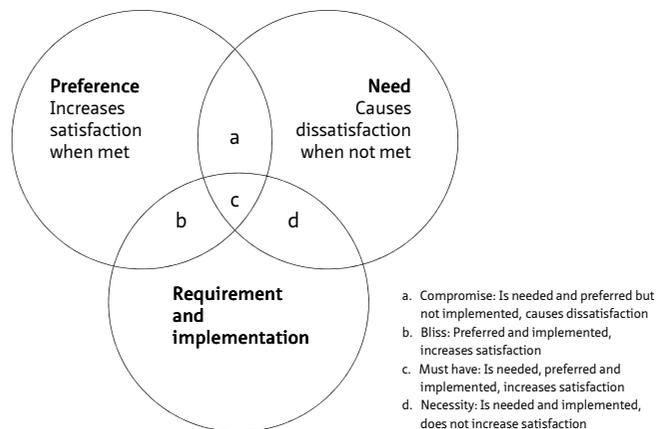
Figure 26
Relationship between needs, preferences, and requirements and implementation (Rothe et al., 2012)

Based on environment-behaviour research, the needs and preferences model proposed by Vischer (1985) addresses the users' demands and incorporates them primary assumptions:

1   users' needs and preferences can be identified through questioning the users, or key informants who are spokesmen for the users
2   appropriate design and manipulation of physical aspects of the environment do result in the users' needs being met
3   meeting users' needs is a primary, if not the primary, objective of environmental design

Vischer (2008) further states that measuring the occupants' experience provides information both about the product – how spaces affect behaviour in different situations, the effects of building systems on comfort – and about psychological processes – how people feel about and respond to the spaces they occupy, as well as about process.

Feedback from users can and sometimes informs the design, construction, management and disposition of buildings. In Vischer's study, a framework based on three levels of environmental comfort that influences productivity including physical, psychological and functional comfort has been developed.

- Physical comfort: health and safety, responsible design, respecting construction standards, comfort standards
- Psychological comfort: territoriality and privacy, satisfaction, environmental empowerment through information dissemination and choice
- Functional comfort: Workspace designed to support task performance, improved task performance, environmental competence, measurable dimensions
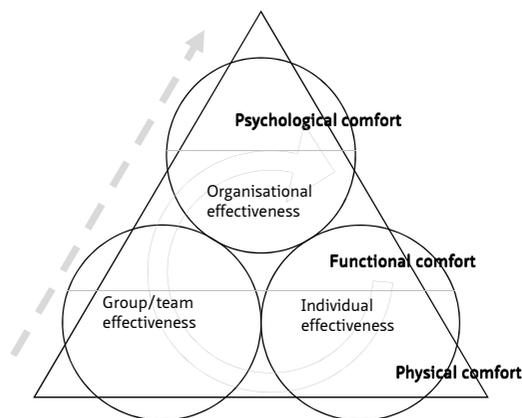
Figure 27
Analytic framework for assessing the user's experience (Vischer, 2008)

In the building, the user is at the centre of this approach to a theory of the built environment. Users are defined according to their use of the built environment, and thus the users' experience becomes a measure of its effectiveness. Units for users in an office building are the individual worker, the team or workgroup, and the organization. Each interacts with the built environment at a different level and thus the measure of environmental effectiveness varies for each unit. The focus on different dimensions of working environment aspects can provide the solution that is most suitable to the wishes of the employees.

Assessment techniques to measure prioritised aspects
Prioritised aspects of the work environment can be measured using the WODI Light tool. The findings present the ranking of the % of respondents marking a particular aspect as one of three most important aspects of the workplace environment from 19 aspects (Figure 28).
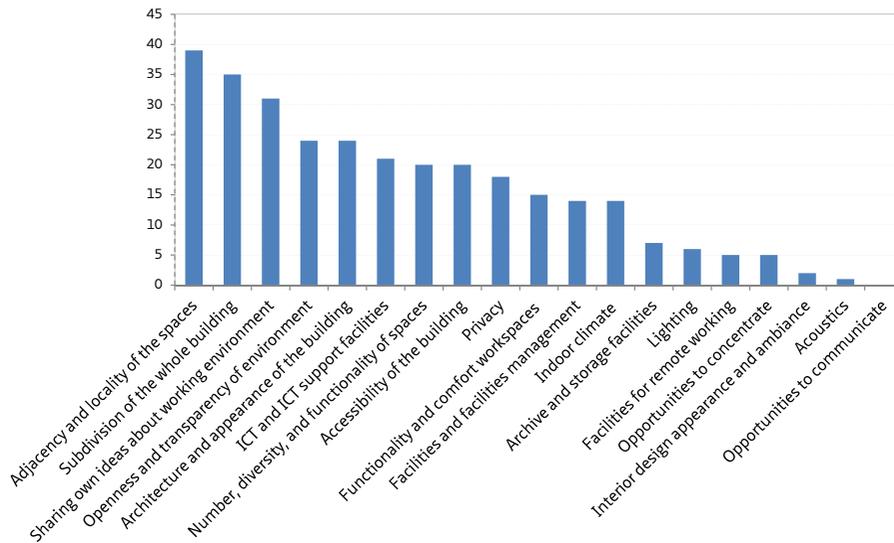
Figure 28
Example of findings using the WODI Light questionnaire: prioritised aspects of the work environment (A case study of Dhanarak Asset Development, N = 85)

Rothe et al. (2012) used the survey questions in which respondents can mark the importance of particular work environment attributes on a five-step scale: not important, less important, neutral, important to some extent, and very important. The study focused on different age groups and their preferences towards various work environment aspects. The questionnaire comprised questions of four different

categories: locational attributes, service attributes, office building attributes, and workspace attributes. These attributes were finally classified to seven preference areas: service, virtual and mobility, collaboration, image, impact, sustainability, and commuting.

Average factor scores of respondents in different age groups
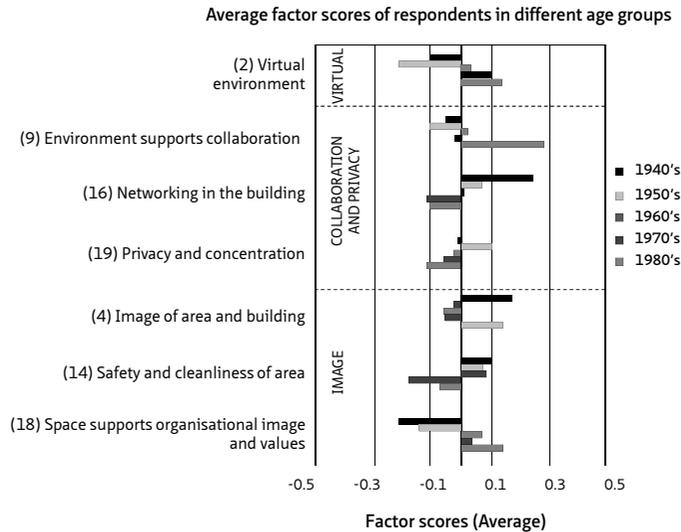
Figure 29
Average factor scores, preferences concerning the virtual environment, privacy and collaboration, and image (Rothe et al., 2012)
Notes: Factor relevant based on Discriminant Analysis. The higher the factor score, the more important is the factor for the respective group, compared to other groups.

§ 3.6   Conceptual model

Inventory of approaches in this chapter were used to develop a conceptual model of workplace change appraisal. Among these approaches, the integrated workplace strategy from Becker and Joroff (2000) came to the fore. The four components of the integrated workplace strategy (physical settings, IT, work patterns and processes, organisational culture and management) can explain the factors that influence workplace change appraisal. These four components were used to develop variables of the workplace change appraisal, i.e. organisation, work process, workplace change, implementation process, and the appraisal of change. The preconditions and external context were subsequently added to the model (Figure 30).

The conceptual model has been developed in order to explore the impact of influential factors on workplace change appraisal and the extent these factors can interplay when they are compared in the three case studies. The thematic comparison of the within case analysis in Chapters 6-8 is based on the variables in the conceptual model. The second purpose of the conceptual model is that it can be used to develop the integrated conceptual model which can explain the links between workplace change, the appraisal of change, performance measurement and cultural background.
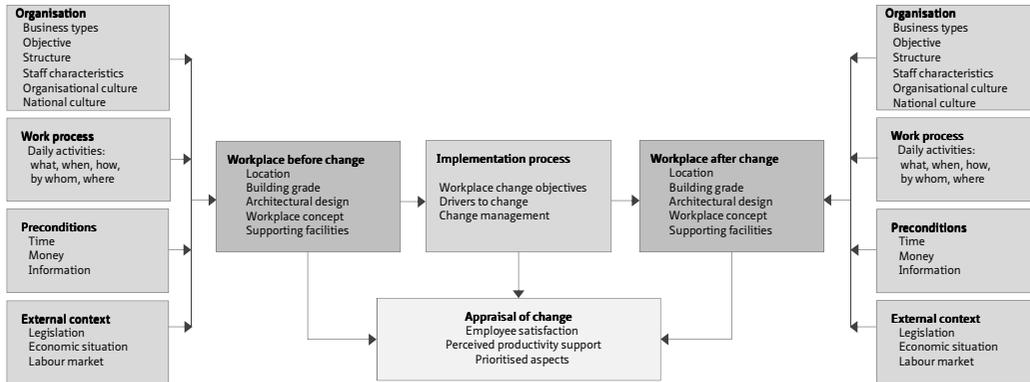
Figure 30
Complex relationships between the variables impacting on an appraisal of workplace change (Riratanaphong and Van der Voordt, 2012)

Description of variables
Organisation-related variables include business types, objective, structure, staff characteristics, organisational and national culture. Business types, objectives and the structure of the company all describe the organisational characteristics that can have an impact on how an organisation's resources are managed. Staff characteristics describe how staff deals with certain situations. Work process refers to daily activities (what happens, when, where, how and by whom) that are carried out in a workplace. The culture variable aims to identify certain types of behaviours, attitudes, beliefs values and norms of individuals working in organisations. This part can be associated with the findings received from cultural surveys. Organisational culture assessment identifies how employees perceive their current and preferred culture in four major types: clan, adhocracy, hierarchy, market (Cameron & Quinn, 2006). A national culture survey assesses five cultural dimensions according to Hofstede (1997): power distance, individualism, masculinity, uncertainty avoidance and long-term orientation. The cultural context will be described in more details in Chapter 4.

Preconditions are considered in terms of time, money and information. Time refers to the moment of implementing the workplace change that impacts the organisation and its operation. Money is the financial situation of the organisation at the time of implementing the workplace change. Information is regarded as the facts provided or learned about the preparation and implementation of the workplace change practice. External context concerns the impact of legislation, the economic situation and the labour market at that time.

The workplace, as seen before and after the change, includes variables of location, building grade, architectural design, workplace concept and supporting facilities. Building grade refers to the classifications of office properties such as age, location, interior design quality, standard of maintenance, length of leases, etc. The implementation process involves factors that cause workplace change and how the organisation copes with change. Appraisal of change is the assessment of employee satisfaction, perceived productivity support and prioritised aspects in the various components of the working environment.

§ 3.7 Conclusions

This chapter describes the theories of workplace change and its impact on employees. Theories on workplace change provide an understanding of several factors which have an impact on the design and management of a workplace. The findings from literature emphasise the importance of drivers and objectives to bring about change, such as cost reduction, the changing work pattern and the organisational structure that can all have an impact on workplace change and how this is appraised. A typology of office work that is based on different variables (e.g. interaction and autonomy, space and time) helps to understand the relationships between different work processes and various workplace concepts (Duffy, 1997, Vos et al., 1999, Nutt, 2000). Trends in workplace design and management provide information to discuss workplace strategies in connection to real estate and organisational objectives. This improved understanding of the workplace can be used to analyse the various components of workplace change and the appraisal of change.

Several theories were introduced in this chapter to elaborate on the employees' responses to the changed work environment in three ways: employee satisfaction, perceived productivity support and prioritised aspects. A holistic view of factors which influence employee satisfaction (i.e. physical working environment, conditions of employment, the work itself) appear to be helpful in understanding the impact that can have on employees (Sundstrøm, 1986, Vollebregt, 1996, Cleements-Croome, 2006

in Van der Voordt, 2003). The five ways of measuring productivity (Van der Voordt, 2003) enable to understand the various approaches used to measure productivity. User needs and preference model (Rothe et al., 2012) and the analytic framework for assessing a user's experience (Vischer, 2008) have appeared to be useful in explaining the findings from the prioritised aspects of the work environment.

Similar assessment techniques on employee satisfaction and productivity were found in the literature including Public Works Canada (Dillon & Vischer, 1987) and Work Environment Diagnosis Instrument (WODI; Center for People and Buildings, 2010). Because of the applicability of the tool, the WODI Light has been selected to evaluate employees' responses to the workplace change depicted in the case studies in this PhD research. Moreover, the Center for People and Buildings indicator (CfPB indicator, 2013), provides the average percentage of satisfied respondents in 96 Dutch cases, and offers the opportunity to compare the findings of the case studies with similar data taken from a number of Dutch cases.

4 Organisational and national culture

Introduction

One of the obstacles to define culture is that it has been mentioned by many authors in different perspectives and on many occasions. On the one hand, culture refers to the customs and rituals that societies develop. On the other hand, it can be referred to as the climate and practices that organisations develop, or as the espoused values of an organisation (Schein, 2004). Furthermore, different ideas about culture are the subject of an ongoing academic debate. Despite the assumption that there are better or worse cultures and stronger or weaker cultures (Schein, 2004), there is no scientific evidence to affirm that one group is intrinsically superior or inferior to another, and one culture has no absolute criteria for judging the activities of another culture as being low or noble (Hofstede, 1997). Schein (2004: 17) defines culture as 'a pattern of shared basic assumptions that the group learned as it solved its problems of external adaptation and internal integration, that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way you perceive, think, and feel in relation to those problems'. He further mentions that the concept of culture points to phenomena that are powerful in impact but invisible and, to a considerable degree, unconscious. According to Hofstede (1997), different groups and categories of people can be classified in several layers including a national, regional, gender, generation, social class and organisational level. In addition, Hofstede (1997) classified manifestations of culture into four categories: symbols, heroes, rituals and values, as shown in Figure 31.
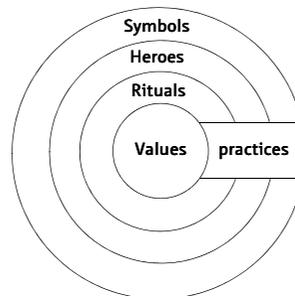
Figure 31
Manifestations of culture: from shallow to deep (Hofstede, 1997)

- *Symbols* are words, gestures or pictures that have particular meaning that is recognised by group members that share the culture.
- *Heroes* are people who have characteristics that are highly valued in a culture.
- *Rituals* are collective activities that are socially important within a culture such as ways of greeting.
- *Values* are broad tendencies to prefer certain states of affairs over others, for example, rational and irrational feelings.

Symbols, heroes, and rituals can be subsumed under the term 'practices' because they are visible to an observer, although their cultural meaning lies in the way they are perceived by insiders. The core of culture is formed by 'values' (Hofstede, 1997).

This chapter describes various aspects of culture and introduces different types and dimensions of organisational and national culture. Theoretical findings from this chapter will be used as background data to explore the role of culture on performance measurement of workplace change between organisations in Thailand and The Netherlands.

§ 4.2 Organisational culture

Hofstede (1997) describes 'culture one' as the civilisation or refinement of the mind and the results of such refinement such as education, art and literature. Another aspect of 'culture as mental software' is a much broader use, called 'culture two'. Commonly used terms relating to culture emphasise the idea that certain things in groups are shared or held in common, for example: group norms, espoused values, formal philosophy, climate, shared meanings and formal rituals and celebrations. The word 'culture' adds other critical aspects to the concept of sharing, which include structural stability, depth, breadth, and patterning or integration (Schein, 2004).

Cameron and Quinn (2006:145) refer to culture as being implicit, indiscernible aspects of organisations. It is an enduring, slow-changing core attribute of organisations that includes core values and consensual interpretations about how things are. In addition, culture is a potential predictor of other organisational outcomes such as effectiveness (Cameron and Quinn, 2006). Organisational culture is defined as the beliefs and expectations that bring about norms that powerfully shape the behaviour of individuals and groups within the organisation (Schwartz and Davis, 1981, Schein, 1990, O' Reilly et al., 1991). Schein (1999) states that organisational culture is developed over time as people in the organisation learn to deal successfully with problems of external adaptation and internal integration; it becomes the common language and the

common background. In this way culture can arise from what has proven successful for the organisation.

Cameron and Quinn (2006) argue that the concept of organisational culture emerged from two different disciplinary roots: an anthropological foundation (the fact that organisations are cultures) and a sociological foundation (the fact that organisations have cultures). Consequently, two different approaches to culture were developed within each of these disciplines: a functional approach (culture emerges from collective behaviour) and a semiotic approach (culture resides in individual interpretations and cognitions). The former approach assumes that researchers and managers can identify differences among organisational cultures, can change cultures, and can empirically measure cultures. They further mention that the use of the term 'organisational culture' helps to differentiate the culture of the general organisation from the values, preferences, and inclinations of individuals (personal culture), and from the language, norms, and philosophies of a nation or civilisation (societal culture).

The application of the concept of culture to organisation has received increasing attention (Schein, 1990, O'Reilly et al., 1991). As mentioned by Schwartz and Davis (1981), organisations cannot function without some degree of regularised, formal information flow, policies, procedures, and meetings through which the essential tasks of the business are carried out. Organisations are built upon the skills, experience and requirements of the employees that compose them. The organisational culture is also associated with the shared behaviour of employees with regard to the job and organisation (Rambersad, 2003). Moreover, it can be explained by the management in terms of management style (Schwartz and Davis, 1981) and organisational structure (Smith, 1998). The organisational culture can affect the organisation's capability of attaining objectives and plans. Thus, the success of the organisation is determined by the integration of organisational culture, the management system, the structure and the people (Schwartz and Davis, 1981 in Chongruksut, 2009).

Measurement
Organisations have many unique subcultures associated with different subunits, and each of these subcultures holds common attributes that formulate an overarching culture which is typical for the entire organisation. Three strategies are used to measure culture at the organisational level of analysis (Cameron and Quinn, 2006):

1. a *holistic approach* in which the investigator becomes immersed in the culture and engages in in-depth participant observation
2. *metaphorical or language approaches* in which the investigator uses language patterns in documents, reports, stories, and conversations to uncover cultural patterns
3. *quantitative approaches* in which the investigator uses questionnaires or interviews to assess particular dimensions of culture

With regard to the three strategies, a quantitative approach allows multiple viewpoints to be considered when assessing the attributes of an organisation's culture. In a qualitative approach, the investigation of multiple organisational cultures becomes impossible when immersion in each one is mandatory. Therefore, to conduct comparisons among multiple cultures, quantitative approaches must be used (Cameron and Quinn, 2006).

§ 4.2.1   The competing values framework

Cameron and Quinn (2006) developed an organisational culture model based on the Competing Values Framework (CVF) (Quinn and Rohrbaugh, 1983). In the CVF, the organisations are identified in three value dimensions: flexibility - control, internal – external, and means - ends, and positioned in four models of effectiveness: human relations, open systems, internal processes, and rational goals. The CVF adopts an anthropological approach that aims to assess 'how things are' in the organisation rather than how individuals feel about them'. The CVF was developed initially from research conducted at the University of Michigan on the major indicators of effective organisational performance. This model provides an understanding of the CVF in two dimensions: flexibility-control and internal-external, with the integration of means-ends to each dimension, which can account for the individual characteristics and behaviours of the organisation (Quinn and Rohrbaugh, 1983).
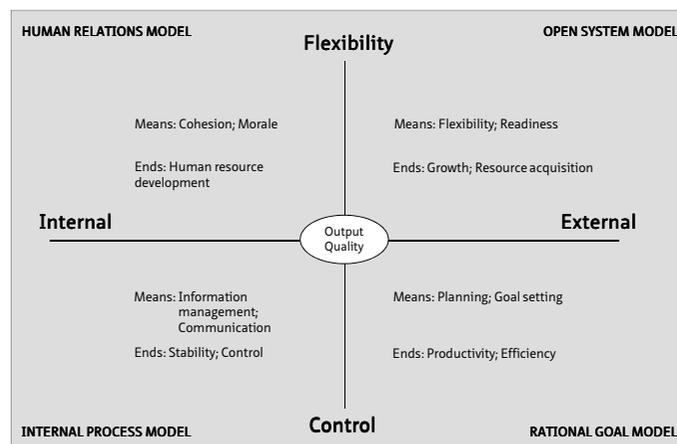
Figure 32
Model of the CVF in three dimensions: flexibility-control, internal-external, means-ends (Quinn and Rohrbaugh, 1983)

The first dimension makes a distinction between an emphasis being placed on flexibility, discretion, and dynamism and an emphasis placed on stability, order, and control. For example, some organisations and managers are viewed as effective if they are flexible, adaptable, and transformational. Other organisations and managers are viewed as effective if they are stable, predictable, and consistent. This continuum ranges from versatility and pliability at one end, to steadiness and durability at the other (Cameron, 2009).

The second dimension makes a distinction between an internal orientation which focuses on integration, collaboration, and unity from an external orientation which focuses on differentiation, competition, and rivalry. For example, some organisations and managers are viewed as effective if they have harmonious internal relationships and processes. Others are judged to be effective if they successfully compete against others and establish a market niche. This continuum ranges from cohesion and consonance at one end to separation and independence at the other.

The third dimension is considered by the means-ends continuum that is interpreted as the objectives of organisations (ends) and the means or processes through which they sustain themselves and attain their objectives (Quinn & Rohrbaugh, 1983).

These dimensions form four quadrants, each representing a distinct set of organisational and individual factors. These four core values represent opposite or competing assumptions. Each dimension highlights a core value that is opposite to the value at the other end of the continuum - i.e., flexibility versus stability, internal versus external. The four major quadrants defined by these two axes have been labelled as the Human Relations Model, the Open System Model, the Internal Process Model, and the Rational Goal Model (Quinn & Rohrbaugh, 1983).

- *The human relations model* emphasises flexibility and internal focus, and stresses criteria such as cohesion and morale (as means) and human resource development (as an end).
- *The open system model* emphasises flexibility and external focus, and stresses criteria like flexibility and readiness (as means) and growth, resource acquisition, and external support (as ends).
- *The rational goal model* emphasises control and external focus, and stresses the effectiveness criteria in planning and goal setting (as means) and productivity and efficiency (as ends).
- *The internal process model* emphasises control and internal focus, and stresses the role of information management and communication (as means) and stability and control (as ends).

Four major culture types

Cameron and Quinn (2006) developed an organisational culture model, based on the CVF (Quinn and Rohrbaugh, 1983). The link of the CVF to organisational cultures can be described in terms of key values; leadership types, value drivers, approaches to change; and the theories of effectiveness in culture type residing in each of the four quadrants of the framework. The four culture types are aligned with the four quadrants of the CVF: human relations, open systems, internal processes and rational goals (see Figure 33). These quadrants are alternatively referred to as clan, adhocracy, hierarchy, and market cultures, respectively (Cameron and Quinn, 2006).

Flexibility and Discretion

CLAN	**ADHOCRACY**
HIERARCHY	**MARKET**

Internal focus and Integration

External focus and Differentiation

Stability and Control
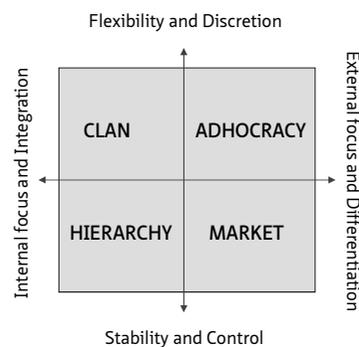
Figure 33
Four types of organisational culture (Cameron and Quinn, 2006)

1   *The clan culture*
The clan culture is similar to a family-type organisation. A clan-type organisation emphasises teamwork, employee involvement, corporate commitment to employees and the long-term benefit of individual development. Customers are considered partners in this organisational type. The organisation promotes a humane work environment in which the internal climate and concern for people define success. Leaders are viewed as mentors who have the managerial task of empowering employees and facilitating their participation, commitment and loyalty. The relationship in an organisation is maintained by loyalty and tradition.

2   *The hierarchy culture*
The hierarchy culture can be described as an organisation that focuses on an environment that is relatively stable, in which tasks and functions can be integrated and coordinated, uniformity in products and services can be maintained, and workers and jobs are under control. This type of culture is characterised by a formalised and structured workplace that is held together by formal rules and policies. In this culture,

success is defined by clear lines of authority, standardised rules and procedures, and control and accountability mechanisms. Leaders have roles as coordinators and organisers. Maintaining a smooth-running organisation with the long-term concerns of stability, predictability and efficiency is important.

3   *The adhocracy culture*
Adhocracy is derived from the term 'ad hoc', which implies something temporary, specialised and dynamic. This culture does not have centralised power or authority relationships. Instead, power is authorised to individuals or task teams depending on the problem being addressed. An organisation characterising the adhocracy culture can be seen as adaptable, flexible and creative where uncertainty, ambiguity and information overload are typical. Leaders are visionary, innovative and risk-oriented.

4   *The market culture*
The market culture refers to a type of organisation that functions as a market itself. This culture type emphasises transactions with external parties such as suppliers, customers, contractors, licensees, unions and regulators. This culture type operates through economic market mechanisms, mainly monetary exchange, in which competitiveness and productivity are core values. Leaders are hard-driving producers and competitors. Because the long-term concern is on competitive actions, it is essential to outpace the competition and to have market leadership.

§ 4.2.3   Six content dimensions of organisational culture

Quinn and Rohrbaugh (1983) developed an assessment tool employing the CVF as a means for determining the relative importance of cultural traits within an organisation, establishing the organisation's dominant culture type characteristics and an overall culture profile in terms of the four cultural forms mentioned above, and by adding the following six key dimensions of organisational culture.

1   *The dominant characteristics*. This dimension characterises what the general organisation is like.
2   *The organisational leadership*. This dimension emphasises the leadership style and approach that permeate the particular organisation.
3   *The management of employees*. This dimension refers to the style that characterises how employees are treated and what the working environment is like.
4   *The organisational glue*. This dimension refers to the bonding mechanisms that hold the organisation together.
5   *The strategic emphasis*. This dimension defines which areas of emphasis drive the organisation's strategy.
6   *The criteria of success*. This dimension determines how victory is defined and what is rewarded and celebrated.

In combination, these dimensions characterise how organisations function in terms that reflect fundamental cultural values and implicit assumptions of the organisations. In other words, these dimensions reflect 'how things are' in the organisation (Cameron and Quinn, 2006). In an organisation, the six content dimensions of organisational culture can be explained in relation to the four culture types.

§ 4.2.4 The Organisational Culture Assessment Instrument (OCAI)

The OCAI questionnaire uses a scenario analysis procedure in which respondents report the extent to which written scenarios are indicative of their own organisation's culture. These scenarios serve as cues - both emotional and cognitive - that bring core cultural attributes to the surface (Cameron and Quinn, 2006). Many well-known studies of organisational culture have used this approach, including Ouchi and Johnson (1978), O'Reilly (1983), and Denison (1990), and it is represented by the competing values approach to culture assessment.

The OCAI questionnaire asks questions on six items: 1) dominant characteristics, 2) organisational leadership, 3) management of employees, 4) organisational glue, 5) strategic emphasis and 6) criteria of success. Each item has four options: A = Clan, B = Adhocracy, C = Market and D = Hierarchy. Respondents are asked to divide 100 points among the four options, depending on the extent to which each option represents the respondent's organisation. A higher number of points is given to the option that is most similar to the organisation. The column for the instrument labelled 'Current' corresponds with how the organisation that is being rated currently operates. The respondents are then asked to rate how they think the organisation should be in five years' time in the 'Preferred' column (see Appendix VIII). The respondents thus produce two independent ratings of the organisational culture - one as it currently exists and the other as they would like it to be in five years' time (Cameron and Quinn, 2006).

In this study, I apply OCAI to assess the organisational culture of the three case studies as it can be used to assess the common attributes of subcultures (i.e. culture of units/departments) thus making up an overall culture of the organisation. Assessing organisational culture means that the overarching elements are the focus of measurement, and the organisation level of analysis is the intended target of assessment when using the instrument. The analysis of organisational culture types in four quadrants of the competing values framework is helpful when discussing cultural characteristics in connection to other variables of the study such as performance measurement and workplace change characteristics.

§ 4.3 National culture

Like all culture, national culture is a learned characteristic that is not genetic. Although national cultural traits are learned and therefore could have been learned differently from one country to another, the differences in national patterns of mental programming tend to be very stable over time (Hofstede, 1982). There are strong forces towards integration within nations such as one dominant national language, common mass media, a national education system, a national army, a national political system, a national market for certain skills, and national products and services (Hofstede, 1997).

There is a tendency for ethnic, linguistic and religious groups to seek recognition of their own identity. For example, national culture in European countries is derived from a different country cluster: the UK comes from the Anglo cluster, Italy from the Latin cluster, Germany from the Germanic cluster and Sweden and The Netherlands from the Nordic cluster (Ronen and Shenkar, 1985). Hofstede (1997) reported that the following issues qualify as common fundamental problems that all societies encounter worldwide, with consequences for the functioning of these societies, of the groups within these societies, and of individuals within these groups:

1 Relation to authority
2 Conception of self, in particular:
   • the relationship between individual and society, and
   • the individual's concept of masculinity and femininity
3 Ways of dealing with conflicts, including the control of aggression and the expression of feelings.

Hofstede (1997) investigated cultural differences of IBM employees in 50 countries around the world. Differences in values among matched populations of employees of national subsidiaries of a multinational allow a conservative estimate of differences among the national populations at large, as respondents are supposed to share the same worldwide corporate culture.

§ 4.3.1 Five dimensions of national culture

A dimension is an aspect of a culture that can be measured in regard to other cultures. The basic differences between national cultures correspond to dimensions which Hofstede (1997) termed as follows: power distance (from small to large), collectivism versus individualism, femininity versus masculinity, uncertainty avoidance (from weak to strong) and long and short term orientation.

1   *Power Distance Index (PDI)*
    Power distance is the extent to which the less powerful members of institutions and organisations within a society expect and accept that power is distributed unequally.

2   *Individualism Index (IDV)*
    Individualism is the opposite of Collectivism. Individualism stands for a society in which the ties between individuals are loose: a person is expected to look after himself or herself and his or her immediate family only. Collectivism stands for a society in which people from birth onwards are integrated into strong, cohesive in-groups, which continue to protect them throughout their lifetimes in exchange for unquestioning loyalty.

3   *Masculinity Index (MAS)*
    Masculinity is the opposite of Femininity. Masculinity stands for a society in which emotional gender roles are clearly distinct: men are supposed to be assertive, tough, and focused on material success; women are supposed to be more modest, tender, and concerned with the quality of life. A masculine score on this dimension indicates that the society will be driven by competition, achievement and success, with success being defined by the winner or whoever is best in the field. A feminine score on the dimension means that the dominant values in society are caring for others and quality of life. A feminine society is one in which the quality of life is a sign of success and standing out from the crowd is not viewed as being admirable.

4   *Uncertainty Avoidance Index (UAI)*
    Uncertainty avoidance is defined as the extent to which the members of institutions and organisations within a society feel threatened by uncertain, unknown, ambiguous, or unstructured situations.

5   *Long-term Orientation Index (LTO)*
    Long-term orientation is the opposite of short-term orientation. The long-term orientation dimension is closely related to the teachings of Confucius, an influential Chinese philosopher. Confucius's principles had a foundation in common Chinese tradition and belief. This orientation can be interpreted as dealing with society's search for virtue, the extent to which a society shows a pragmatic future-oriented perspective, in particular perseverance and thrift, rather than a conventional historical short-term point of view. Short-term orientation stands for a society that fosters virtues related to the past and present, in particular respect for tradition, preservation of "face", and fulfilling social obligations.

In addition, the sixth dimension 'Indulgence versus Restraint' was established later in 2010 (Hofstede et al., 2010). Indulgence stands for a society that allows relatively free gratification of basic and natural human desires related to enjoying life and having fun. Restraint stands for a society that controls gratification of needs and regulates it by

means of strict social norms (Hofstede, 2011). This dimension has not been included in this PhD research because it was not originated from the same sample (IBM employees) of the former five dimensions. The country indexes applied in this research is based on the data obtained from the IBM database (Hofstede, 2001).

In each dimension, differences between countries manifest themselves at different levels: child/family - school - workplace - citizen/state - ideas/philosophy. Tables 18 – 22 summarise the key differences of these five cultural dimensions with regard to the workplace.

Small Power Distance	Large Power Distance
Hierarchy in organisations means an inequality of roles, established for convenience.	Hierarchy in organisations reflects existential inequality between higher and lower levels.
Decentralization is popular.	Centralization is popular.
There are fewer supervisory personnel.	There are more supervisory personnel.
There is a narrow salary range between the top and bottom of the organisation.	There is a wide salary range between the top and bottom of the organisation.
Managers rely on their own experience and on subordinates.	Managers rely on superiors and on formal rules.
Subordinates expect to be consulted.	Subordinates expect to be told what to do.
The ideal boss is a resourceful democrat.	The ideal boss is a benevolent autocrat, or "good father."
Subordinate-superior relations are pragmatic.	Subordinate-superior relations are emotional.
Privileges and status symbols are frowned upon.	Privileges and status symbols are normal and popular.
Manual work has the same status as office work.	White-collar jobs are valued more than blue-collar jobs.

Table 18
Key differences between small and large power distance societies in connection to the workplace (Hofstede, 1997)

Collectivist	Individualist
Occupational mobility is lower.	Occupational mobility is higher.
Employees are members of in groups who will pursue their in group's interest.	Employees are "economic people" who will pursue the employer's interest if it coincides with their self-interests.
Hiring and promotion decisions take an employee's in group into account.	Hiring and promotion decisions are supposed to be based on skills and rules only.
The employer-employee relationship is basically moral, like a family link.	The employer-employee relationship is a contract between parties on a labour market.
Management is management of groups.	Management is management of individuals.
Direct appraisal of subordinates spoils harmony.	Management training teaches the honest sharing of feelings.
In-group customers receive better treatment (particularism).	Ever customer should receive the same treatment (universalism).
Relationship prevails over task.	Task prevails over relationship.

Table 19
Key differences between collectivist and individualist societies in connection to the workplace (Hofstede, 1997)

Feminine	Masculine
Management as ménage: intuition and consensus.	Management as ménage: decisive and aggressive.
Resolution of conflicts by compromise and negotiation.	Resolution of conflicts by letting the strongest win.
Rewards are based on equality.	Rewards are based on equity.
Preference for smaller organisations.	Preference for larger organisations.
People work in order to live.	People live in order to work.
More leisure time is preferred over more money.	More money is preferred over more leisure time.
Careers are optional for both genders.	Careers are compulsory for men, optional for women.
Higher share of working women in professional jobs.	Lower share of working women in professional jobs.
Humanization of work by contact and cooperation.	Humanization of work by job content enrichment.
Competitive agriculture and service industries.	Competitive manufacturing and bulk chemistry.

Table 20

Key differences between feminine and masculine societies in connection to the workplace (Hofstede, 1997)

Weak Uncertainty Avoidance	Strong Uncertainty Avoidance
More changes of employer, shorter service.	Fewer change of employer, longer service.
No more rules than strictly necessary.	Emotional need for rules, even if these will not work.
Hard-work only when needed.	There is an emotional need to be busy and an inner urge to work hard.
Time is a framework for orientation.	Time is money.
Tolerance for ambiguity and chaos.	Need for precision and formalization.
Belief in generalists and common sense.	Belief in experts and technical solutions.
Top managers are concerned with strategy.	Top managers are concerned with daily operations.
More new trademarks.	Fewer new trademarks.
Focus on decision process.	Focus on decision content.
Intrapreneurs relatively free from rules.	Intrapreneurs constrained by existing rules.
Fewer self-employed people.	More self-employed people.
Better at invention, worse at implementation.	Worse at invention, better at implementation.
Motivation by achievement and esteem or belonging.	Motivation by security and esteem or belonging.

Table 21

Key differences between weak and strong uncertainty avoidance societies in connection to the workplace, organisation and motivation (Hofstede, 1997)

Short-Term Orientation	Long-Term Orientation
Efforts should produce quick results.	Perseverance, sustained efforts toward slow results.
Social pressure toward spending.	Thrift, being sparing with resources.
Respect for traditions.	Respect for circumstances.
Concern with personal stability.	Concern with personal adaptiveness.
Concern with social and status obligations.	Willingness to subordinate oneself for a purpose.
Concern with "face."	Having a sense of shame.

Table 22
Key differences between short-and long-term orientation societies: general norm (Hofstede, 1997)

The key differences of five cultural dimensions with regard to the workplace level are used to understand the complex relationship between national culture and workplace change. However, most issues are related to organisation and management (social work environment), and less regarding the physical characteristics of the work environment.

§ 4.3.2 The Values Survey Module (VSM)

Hofstede conducted research in one multinational business corporation in 40 countries (Hofstede, 1980) and it has currently been extended his research to include 93 countries. Surveys of large data sets of similar respondents in different countries enabled formulate indexes (on a continuum between 0 and 100) based on the similarities and differences between the respondents.

Subsequently, the Values Survey Module (VSM) was developed in order to compare culturally determined values of people from two or more countries or regions. The 20 content questions allow index scores to be calculated on five dimensions: power distance, individualism, masculinity, uncertainty avoidance, and long-term orientation. These dimensions are extensively validated against other aspects of national societies as well as tests of their cross-time stability (Hofstede, 2001).

These generalised dimensions do not aim to stereotype the cultural groups, or to suggest that culture in the particular groups is the same or cannot be changed. This cultural framework allows an opportunity to discuss and exchange dialogues of the particular situations based on five dimensions of national culture.

The 20 questions were selected for the national culture survey because, in statistical terms, the country mean scores are strongly correlated. When matched samples from different countries are compared, the mean scores for the countries belonging to the same dimension usually vary. Although it is likely that the answers to the 20 content

questions vary between nationalities, it cannot be said that each respondent of a specific nationality gives one answer and those of another nationality give a different answer.

According to Hofstede, the questions and dimensions in this questionnaire were chosen to be able to compare countries, and the questionnaire was developed for use at the country level. The minimum number of respondents per country or region to be used in comparisons is 20. Below that number, the influence of single individuals becomes too strong. The ideal number is 50. All content questions are scored on five-point scales. Index scores are derived from the mean scores of the response. The value of each index is usually between 0 and 100, but values below 0 and above 100 are technically possible.

In this study, the VSM is applied to the three case studies in order to calculate the scores on five dimensions of national culture. VSM (1994 version) was selected for this research as it has been widely used in many countries. Results from the surveys in the case studies can be used to compare country indexes from Hofstede (i.e. Thailand and The Netherlands) as well as the national characteristics of each country. However, findings from the national culture survey in five dimensions should not be considered as being representative of national culture, but are aimed at providing a framework for developing our understanding of particular situations, anticipating cultural conflicts and addressing them through personal dialogue.

§ 4.4   Conceptual model

The model in Figure 34 has been developed from the conceptual model of workplace change appraisal previously mentioned in Chapter 3. To focus on organisational and national culture, the other variables such as objective, structure, preconditions and external context have been removed from this model. In addition, performance measurement has been added to the model to explain the role of culture on corporate and real estate performance. Figure 34 presents the conceptual model of organisational and national culture that links four main variables: 1) organisational and national culture, 2) workplace change, 3) performance measurement and 4) employees' responses to the work environment.

The conceptual model is developed to explore the possible relationships between organisational and national culture and other research variables, i.e. performance measurement, workplace change and employees' responses to the work environment. In order to explore the cultural context, data on different types and dimensions of organisational and national culture in the case studies will be discussed in connection

to: 1) different characteristics of workplace change, 2) performance measurement frameworks, criteria and performance measures/KPIs, 3) employee satisfaction, perceived productivity support and prioritised aspects.
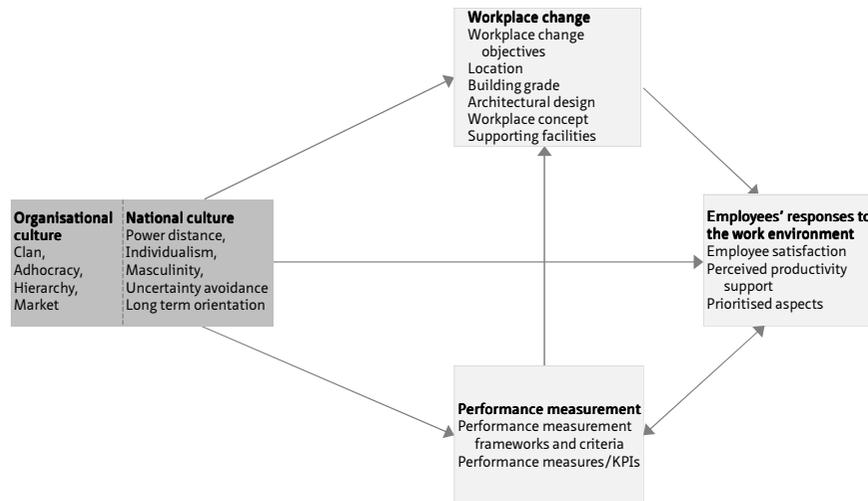
Conceptual model of organisational and national culture

Description of variables
The conceptual model shows the impact of organisational and national culture on performance measurement, workplace change and employees' responses to the work environment. Organisational culture is incorporated with four organisational types: clan, adhocracy, hierarchy and market. Organisations are characterised in five dimensions of national culture including power distance, individualism, masculinity, uncertainty avoidance and long term orientation.

Employees' responses to the work environment are described as the perception of employees to the changed work environment, i.e. employee satisfaction, perceived productivity support and prioritised aspects. Workplace change includes variables of workplace change objectives, location, building grade, architectural design, workplace concept, supporting facilities and implementation process. Performance measurement information is gathered from performance measurement frameworks, criteria and performance measures/KPIs being used in the case studies. These variables will be discussed in connection to the findings from organisational and national culture of the three case studies in Chapter 6 - 8.

§ 4.5   Conclusions

In this chapter, I describe the theories of organisational and national culture from the perspective of culture as introduced by several authors. The manifestations of culture classified into practices and values by Hofstede (1997) provide an understanding of the various layers of culture. Different strategies (i.e. holistic, metaphorical and quantitative approaches) were mentioned to measure organisational culture. Among these strategies, a quantitative approach proposed by Cameron and Quinn (2006) is required to conduct comparisons among multiple cultures (common attributes of subcultures) in the organisation. The competing values framework (Cameron and Quinn, 2006) helps us to better understand the different types of organisational culture; their four quadrant framework has been applied as a fundamental concept for discussing the role of organisational culture.

A general concept of national culture has enabled us to understand fundamental aspects that all societies encounter. Literature on five dimensions of national culture has described these aspects in connection to the workplace and can be used to discuss findings from the national culture survey in connection to workplace change characteristics and the appraisal of change in the three case studies. The understanding of organisational and national culture and findings from cultural surveys (OCAI and VSM94) can be used as background data to support the analysis of the main findings of this study: performance measurement of workplace change in two different cultural contexts.

5 Comparison between Thai and Dutch cultural settings

Introduction

This chapter concerns the Thai and Dutch national cultures and characterise them according to Hofstede's (1997) five dimensions of national culture. In Section 5.2, the history of Thailand is described through the origin of a nation state and ethnic backgrounds, together with the influences of Buddhism, the economy and the political systems. These influences are intertwined and integrated, forming the 'typical' Thai national characteristics described in Section 5.3. In Section 5.4, the impact of western culture and globalisation on the Thai national identity are discussed in terms of influences, controversies, conflicts and interests. According to Hofstede (1997), the five cultural dimensions have been drawn from the different perspectives which view the particular culture of the Thai people.

Section 5.5 describes the historical context of The Netherlands in terms of historic background, Calvinistic philosophies, political and social influences. Dutch national character traits are discussed in Section 5.6. These Dutch characteristics are used to delineate the five dimensions of Dutch culture in Section 5.7. In Section 5.8, I identify the similarities and differences between the Thai and Dutch culture in five dimensions. This enables us to discuss the impact of culture on workplace characteristics, performance measurement frameworks and criteria and performance measures/KPIs, and on employees' responses to the work environment.

Thai historical context

Historical background
There have been many theories suggesting that the Thai people are a subgroup of the Tai, people who originally lived in the Southern China. However, some propose an indigenous states theory, as indigenous states were able to absorb foreign political and cultural influences, and shape their own distinct cultural identity (Wolters, 1982). Although more than 85% speak Thai and share a common culture, there is a strong sense of regional identity and pride in many parts of Thailand.

Thailand has a multi-ethnic society. Approximately one-third of the population lives in central Thailand, including Bangkok; one-third lives in the northeast, with significant Lao and Khmer ethnicities; 20% in the north; and 15% in the south. Ethnic Malay Muslims comprise a majority in the three southernmost provinces. Up to 12% of Thai are of Chinese heritage (IBP, 2011). Central Thai is the language taught in schools and used in government. Despite the linguistic and cultural diversity of central, northern, northeastern and southern Thailand, the official rhetoric has been that they are all 'Thai' (Vasu, 2005). In 1939, the Thai military government under Field Marshal Phibun Songkram changed the country's name from Siam to Thailand, representing the national identity, an action that was popular with the people (Chachavalpongpun, 2009).

Buddhism
As they developed, the initial Thai states gradually inherited a Buddhist culture. Combining the various lifestyles and beliefs found in this region, Buddhism became the core faith of early Thai society and the Buddhist faith was recognised by both the state and the people. Buddhism played a role in determining the political system and the affairs of the ruling classes that was accepted in early Thai society (Sarkisyanz, 1965). The influence of Buddhism during the early Thai state period formed the foundation for the development of the kingdom of Thailand.

Economics
The Thai government aims to achieve a balanced economic sustainability, and it is currently attempting to reduce the income gap. The large income gap in Thai society has led to an unjust distribution of social services, especially for the lower middle class. In Thailand, in 2009 the richest 20% generated almost 60% of the income, the highest of all countries in the region including Indonesia, Laos, Malaysia, the Philippines and Vietnam while the poorest 20% garnered only 4% of the income; also the lowest among the group (Fernquest, 2011). The current focus on social and economic trends in urbanisation has led to the expansion of industrial activities, which have now surpassed the country's fundamental development in agriculture and service industries. These trends have raised several issues in relation to modernisation, for example in creating a demand for more consumer products at the expense of locally made goods, services, and recreational activities (Lepoer, 1987). In addition, the problem of urbanisation is reflected in the abandonment of land and rural home communities as people move to the city seeking employment.

Politics
Since the founding of the Kingdom of Sukhothai in 1238, the Thai kingdoms and the Kingdom of Siam were under the absolute rule of a monarchy. The state was transformed into a constitutional form after the democratic revolution in 1932 that led to the issue of the first written constitution. Thailand's political system is conducted within the form of a constitutional monarchy. The king is head of state and the Prime

Minister is the head of government. The judiciary is independent of the executive and the legislative branches (Wikipedia, 2012). However, Thais are still politically divided with entrenched opinions (Bangkok Post, 2013). Political stability has been threatened by ongoing conflicts between the current government, the opposition and supporters of both groups. In 2006, these conflicts led to a coup and a year-long political crisis.

§ 5.3 Thai national characteristics

The country's designation 'Thai' means 'free man'. The country's name, 'the land of the free', is a feature of its history. Despite the European colonial rule in Southeast Asia and Western Indonesia, Thailand was the only country never to be colonized (Malhotra, 2006). Therefore, for centuries the Thai culture was not influenced by Western cultures. This long and independent history resulted in specific forms of behaviour which are seen as being 'proper' with regards to the country's fundamental beliefs. This behaviour is intertwined into certain patterns that are manifested in several aspects of life, such as the way foreign nations, economic matters, religious practices or family life are dealt with. These aspects are equally relevant and are linked with one another (Benedict, 1943).

The enjoyment of life
The Thai enjoy life. They are friendly and cheerful as can be seen in the way they greet each other in daily life. They seem to have no worries, and may be seen as carelessness (Campbell, 1902). Their festivals are occasions of lively celebration and of sensory enjoyment. Whether the occasion is the king's birthday or the traditional Thai New Year or religious holidays, these events will be celebrated with an orchestra, theatrical performances and displays of fireworks. The Thai are peace-loving, as is described in the Thai national anthem. Private disputes also characteristically pass off without violence. However, political conflicts may cause increasing confrontation with opponents, together with increasing levels of hostility.

Merit making
Merit is a concept in Buddhism/Hinduism; it is the result of having performed good deeds, acts or thoughts and merit is accumulated throughout one's life or in subsequent incarnations (Wikipedia, 2013b). Merit-making is an ethical precept of a good life in Thai Buddhism. Merit can be gained in a number of ways, for example special acts such as getting on well with your neighbours. The interpretation of merit-making for the Thai is that if a person exercises sufficient care in following the rules, he/she need not be anxious (Benedict, 1943).

Buddhism places a great emphasis on the mind. Anguish in the form of remorse, anxiety or guilt has to be avoided in order to cultivate a calm and peaceful mind. A lay Buddhist should cultivate good conduct by training in what are known as the 'Five Precepts'; these are training rules that should not be broken. The practice of precepts helps to cultivate compassion, generosity, contentment, truthfulness and mindfulness. All Buddhists should try to observe at least five precepts in order to elevate themselves morally and spiritually. The five precepts are (BuddhaNet, 1996):

1. to avoid taking the life of beings. This precept applies to all living beings not just humans. All beings have a right to their lives and that right should be respected.
2. to avoid taking things not given. This precept goes further than mere stealing; people should avoid taking anything unless they can be sure that is intended for them.
3. to avoid sensual misconduct. This precept is often mistranslated or misinterpreted as relating only to sexual misconduct, but it covers any overindulgence in any sensual pleasure such as gluttony as well as misconduct of a sexual nature.
4. to refrain from false speech. As well as avoiding lying and deceiving, this precept covers slander and speech which is not beneficial to the welfare of others.
5. to abstain from substances which cause intoxication and heedlessness. This precept is in a special category, as it does not infer any intrinsic evil in alcohol itself, but indulgence in substance like these could be the cause of breaking the other four precepts.

The Concept of Thainess
Like all countries in Asia and the Pacific region, Thailand has inevitably been caught up in the changes occasioned by the expansion of Western interests and the influence of Western ideas. When Thailand had to confront Western culture, Thailand's ruling class chose to comply with Western-style material progress and to maintain most parts of "Thainess" in culture by assigning new definitions to various constituent parts of "Thainess" to prevent it from being seen as barbaric (Sattayanurak, 2005).

In 1913, King Rama VI defined the "Thai nation" as a nation that comprises people whose livelihood was intricately linked with Thai culture and who were loyal to the heart of "Thainess," which consists of the royal institution and Buddhism. He emphasised that this "Thainess" is as universal as the European civilisations because it is based on Buddhism that is superior both in terms of rational dogma and Buddha's royal lineage. This is one of several definitions of Thainess that stresses the core value of Buddhism in Thai custom. In this way, no matter how much the society develops, the Thai way of life will still remain because the society has been rooted in kindness, generosity and harmony under the unifying spiritual centres of kingship and Buddhism. It is not only these values that help direct the Thais toward virtue, but the Thai society has a whole will then have the efficient mechanisms for governing the nation at the same time (Sattayanurak, 2005).

§ 5.4 The five dimensions of Thai culture

Hofstede (1997) stated that culture is a catchword for all those patterns of thinking, feeling, and acting that not only refine the mind, but also the ordinary things in life such as greeting, eating, showing or not showing feeling, keeping a certain physical distance from others, sexual activity, or maintaining body hygiene. The influence of the Thai historical context and national characteristics such as Buddhism, merit making and enjoyment of life can be used to delineate five dimensions of national culture. Thai national culture can be described in five dimensions: power distance, individualism, masculinity-femininity, uncertainty avoidance and long term orientation (Figure 35).
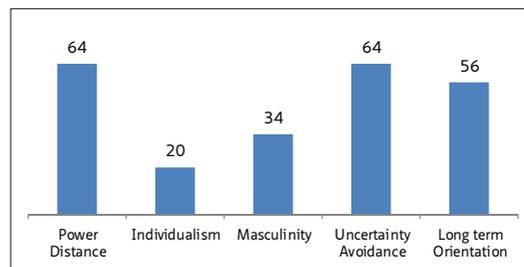
Figure 35
Cultural index scores of Thailand (Hofstede, 2001)

1   *Power distance*
Although Thailand scores 64 on the Power Distance Index, which is slightly lower than the average for Asian countries, the high score indicates a high power distance society (Hofstede, 1997). Hofstede describes power distance as the degree of centralisation of authority and the degree of autocratic leadership. Power distance society accepts inequalities. Each rank in this type of society has its privileges. Employees offer loyalty and respect for their superiors in return for protection and guidance. This can lead to paternalistic management in Thai business culture; a patronage system is the pre-eminent characteristic of Thai business culture (Cooper, 1994, Teeraparppun, 1998, Unger, 1998). Paternalism demonstrates a more complex relationship between the involved parties than what an organisation needs. There are two parties in such a relationship: one is a patron who protects, helps, cares and guides the other party, who is a subordinate loyal. Paternalistic relationships may develop within and also among organisations; this enables the parties involved to exchange certain monetary, social and other types of resources (Mead, 1994).

Thais accept wide differences in power in their organisations (Komin, 1990) and subordinates will not influence their superior's ideas or decisions (Holmes and Tangtongtav, 1995). The Thai management style is based on the maintenance of formal organisational relations through a hierarchical structure. The relationships are also based on 'goodness' and the norm in that the younger has to respect the older (Kanchananga, 1979, Hofstede, 1984, Vivanichakul and Udomsri, 1990). Thus, the attitude towards managers is more formal, the information flow is hierarchical and controlled. In addition, a high power distance society is also reflected in the bureaucracies of Thai organisations (Serbshon, 1994).

2   *Individualism*

With a score of 20 on the Individualism Index of Hofstede, Thailand is a highly collectivist country (Brown, 1995, Hofstede, 1983). In collective societies, people are integrated into strong cohesive in-groups which protect them in exchange for unquestioning loyalty. This is also manifest in a close long-term commitment to the member 'group' (a family, extended family, or extended relationships). Subordinates are required to accept a superior's views and to conform (Hofstede, 1984). As a result, a superior is assumed to be an initiator and a decision-maker, while a subordinate is assumed to be an obedient person (Vivanichakul and Udomsri, 1990). The society fosters strong relationships where everyone takes responsibility for fellow members of their group.

Personal and family connections play an integral role in Thai business. Views and opinions have a greater impact on business management when expressed by members of family or in-group members (Jirachiefpattana, 1996). In the collective society, the Thai workers expect an organisation to take care of them like a family and to protect their benefits. They perceive that the organisation influences their well-being (Hofstede, 1984). The Thai are very sensitive to not shaming others in front of their group. Personal relationships are key to conducting business and it takes time to build relations, thus patience is necessary as well as avoiding an open business discussion on first occasions (Hofstede, 2001).

3   *Masculinity-Femininity*

Thailand is considered to be a feminine society. The score of 34 on the Masculinity index is the lowest score among the Asian countries (53) and the world in average (50). Femininity represents a society in which emotional gender roles overlap: both men and women are supposed to be modest, tender, and concerned with the quality of life. A feminine society is one where quality of life is a sign of success, and standing out from the crowd is not admirable. It is a society that is less assertive and competitive, compared to one in which these values are considered to be more important and significant. Moreover, this can be delineated in quite a negative connotation by the term "coolness" of Thai behaviour; it is a kind of *sangfroid* and implies coolness of attitude toward work, responsibility, or trouble (Landon, 1939).

4   *Uncertainty avoidance*

Hofstede (2001) defines uncertainty avoidance as the extent to which the members of a culture feel threatened by uncertain or unknown situations. The uncertainty avoidance dimension has to do with the way that a society confronts an uncertain future: should the future be controlled, or should it just happen? Societies in different cultures deal with this anxiety in different ways. Countries that have high uncertainty avoidance tend to avoid uncertain situations. This uncertainty is not just for individuals, but it can be shared within the community or across society as a whole. Thailand scores 64 on this dimension, representing a preference for avoiding uncertainty. Strict rules, policies and regulations can be applied to minimise this high level of uncertainty. The goal of the population in this culture is to control the environment in order to eliminate the unexpected.

From a survey in Thailand, it was found that superiors in Thai organisations accept that they have to make decisions in an authoritarian way (Holmes and Tangtongtav, 1995). The authoritarian manager is entitled to make decisions about what he/she thinks is correct, and to guide subordinates. Uncertainty avoidance in Thailand is usually associated with avoidance of decision-making. Decisions made may lead to unwanted tasks and responsibilities that subordinates do not want to take. Furthermore, undesirable results from the decision may cause uncertainty of job security and blame on the subordinate. As a result, subordinates tend to avoid taking on more responsibilities in order to avoid mistakes that might happen. Thus decision-making in Thailand is delegated upwards. A myriad of major and minor decisions can be found on the desks of those at the top of the hierarchy (Holmes and Tangtongtav, 1995).

5   *Long-term orientation*

The long-term orientation dimension can be interpreted as being able to deal with society's search for virtue; the extent to which a society shows a pragmatic future-oriented perspective rather than a conventional historical short-term point of view (Hofstede, 2001). Long-term orientation is reflected by respect for tradition and inequality between people. Working hard and having a sense of moderation are dominant in this type of culture. Maintaining personal relationships and having a network is important. Thailand has a score of 56 on this dimension, and can therefore be considered as a long-term oriented culture, although this is quite moderate compared with other Asian countries.

Not 'losing face' is key and a protocol in the non-confrontational behaviour of Thai business culture. Komin (1990, p.135) mentions that the "face" is identical with "ego" and is very sensitive. Since the Thai place tremendous emphasis on face and ego, preserving one another's ego is the basic rule of all Thai interactions, both on the continuum of familiarity-unfamiliarity, and the continuum of superior-inferior, with difference only in degree. The Thai try to avoid conflict and criticism at all times due to this aspect of face saving (Thanasankit and Corbitt, 2002). In particular, their

emphasis on long term orientation cause the Thai not to look for one truth, which helps them be fluid in deadlines and timescales, and pragmatic in negotiations (Hofstede, 2001).

§ 5.5 **Dutch historical context**

Historical background
In the second half of the sixteenth century, the King of Spain inherited all of the provinces that were included in the territory of The Netherlands. Philip II was a ruler who believed in a powerful central authority and based his decisions on the ethical and ideological principles of the one sole religion, that of the Roman Catholic Church. Instead, this central role was played by William of Orange, the patriarch of the Dutch royal family. William of Orange was a representative of the king in one of the province, Holland. In The Netherlands at that time, there was much sympathy for Protestantism, especially that of John Calvin (Lemieux, 2007).

The revolt against Philip II brought about the formation of the Republic of the Seven United Netherlands, a formation that is similar to the European Union today. In this republic, no one could assemble sufficient power to take on a position of dominance, and enemies were only invoked when too much wealth and power was expressed. A politically high-ranking position could only be based on influence and not on power. Nowadays, The Netherlands is no longer a union of states, but instead it is a democratic state whose unity is symbolised by the Monarch (Lemieux, 2007).

Calvinistic philosophies
Although Dutch society has become strongly secularised, it is still greatly influenced by Calvinistic philosophies (Lemieux, 2007). Calvinism has been both the religious and ideological foundation of the Dutch society since the fight against the Catholic Spanish court in the Eighty-Year War (1568-1648). There were central conditions to being successful in Calvinistic philosophies: thrift, sobriety, tolerance and reality, while refraining from glamour and splendour. Nowadays, it is still the core of Dutch culture and has great influence on Dutch everyday life (Hofstede, 1983a, d'Iribarne, 1989, Lawrence, 1991, Van Iterson and Olie, 1992, Olie, 1996, Pot, 1998). Calvinism was embraced in a liberal way by a majority of the elite. Even though Calvinism emerged as the dominant religion after the revolt, it never had the status of state religion. The strong protestant work ethic with suggestions of moderation in all aspects of life, decision-making by consensus, and the stymieing of individualism, is still evident today (Lemieux, 2007).

Trade
As a historic point of commerce, the sea has characterised The Netherlands as a trading nation. Overseas trade brought the nation its prosperity, which led to the Golden Age in the seventeenth century. The western part of the country, where many Dutch ports have long been situated, is still the current economic hub (Meekanon, 2002). As a result of the industrial revolution in 1880, The Netherlands was able to close the industrial gap with other European countries by 1914 (Lawrence, 1991, Van Iterson and Olie, 1992). Before 1880, only banking, insurance and finance had prospered in The Netherlands (Van Iterson and Olie, 1992, Goey, 1999). Nevertheless, it was not until 1914 that the nation had regained its original strengths in logistic business, trade, finance and agriculture (Lawrence, 1991, Van Iterson and Olie, 1992).

Pillars
Many Dutch social institutions such as newspapers, schools, universities, hospitals, sports clubs, trade unions, banks, broadcasting organisations, professional associations and political parties were organised according to formal religious (Roman Catholic, several Protestant denominations, humanistic) and ideological (liberal, socialist, communist) loyalties. This phenomenon is called Verzuiling (pillarisation) (Meekanon, 2002). Pillarisation is the religious, social, political and cultural segregation of Dutch and Belgian society. These societies were divided into several segments or pillars according to different religions or ideologies (Wikipedia, 2013c). Pillarization has had a strong influence on both the institutions and on aspects of Dutch social life. During the last decade, when some pillars merged in order to gain more bargaining power, for example the merger between Catholic and Protestant political parties to form the CDA (Christian Democratic Appeal) in 1977, the Dutch do not tend to adhere to a single standpoint (Lawrence, 1991, Van Iterson and Olie, 1992, King, 1993, Hampden-Tumer and Trompenaars, 1994, Olie, 1996).

§ 5.6   Dutch national characteristics

In the 1930s and 1940s, a number of academic publications were written that focused on the Dutch national character (Van Heerikhuizen, 1980). These books gave insights into the specificity of Dutch culture, by answering the question 'what is typically Dutch? How does the world view and the behaviour of the Dutch differ from that found in other nations and why?' (Van Ginkel, 1992). The prominent American Anthropologist, Ruth Benedict (1974), portrayed 'the typical Dutchman' as a moralising, individualistic, liberty and peace-loving, tolerant, self-assured, proud, ironic, puritan, tidy, prudent, thrifty, conservative, domestic, serious and somewhat melancholy person, who is very conscious of class and social distinctions.

Moralistic, individualistic, fond of freedom and peace-loving and tolerant
In her observations about the Dutch national character, Benedict noted that the Dutch were convinced of being in the right, 'No country in Europe is so jealous of its moral rightness as The Netherlands' (Benedict, 1944b). The typical Dutchman stands up for his rights and does not submit to dictation. However, the Dutch do not resist authority itself as long as the rules apply to everyone. They accept 'innumerable dictations from above provided that they apply equally to all citizens' (Benedict, 1944a). According to Benedict (1974), the individualistic attitude, the particularism and the moralism of the Netherlanders are inextricably intertwined.

Self-assured and proud
The Dutch are self-assured, with an extreme conviction of having right on their side. They are proud and sometimes this leads to feelings of superiority. These feelings can be traced back to the seventeenth-century history (the war of liberation against Spain) and to the Dutch colonial empire. The feeling of superiority over other small European nations derives from the notion that The Netherlands controlled an extensive overseas region. In addition, the Dutch are also proud of their achievements in the field of water management and control. The Dutch boast that in other countries, God made the land, but the Dutch made Holland (Benedict, 1944a).

Prudent, thrifty and conservative
The Dutch are characterised by wariness and circumspection instead of foolhardiness. The Dutch are prudent, as is seen in their proverb, *Een stuivertje gespaard is een stuivertje gewonnen* (a penny saved is a penny earned). Dutch conservatism can be described by their character traits. The Dutch are conservative primarily because they have something they value to conserve. Their liberties are not threatened either by the Crown, the nobility, or the Church (Benedict, 1944b).

Home and family-oriented
Domesticity is a prominent feature of Dutch social life, 'Holland is pre-eminently a country of dependable and hospitable homes'(Benedict, 1944a). Benedict (1974), pointed to another proverb which she considers typical, zoals het klokje thuis tikt, tikt het nergens (the clock ticks at home like nowhere else). Moreover, Dutch women are devoted homemakers and are valued for their domestic virtues. They are careful, bountiful and responsible mothers.

Serious
The Dutch are serious. Benedict (1974) mentioned that the Dutch seriousness is rooted in their upbringing: education is an obligation, not a pleasure. Education is taken very seriously, and turns the 'unformed' child into a 'formed' person. She further commented that the only form of 'lightweight' behaviour on the part of Dutch men was flower-growing and painting.

Emphasis on equality

Because merchant traditions have long been dominant in The Netherlands, the Dutch tend to emphasise egalitarianism and respect for differences between people. To reach an agreement, the Dutch usually convince each other using facts and figures in the process of bargaining, and exchanging information among several parties. In addition, these traditions lead to lack of personal authority and loyalty. The emphasis on equality causes informality to be as important as formality (Meekanon, 2002).

Conformity

The Dutch consider individuality in terms of their individual accountability and contribution to society regardless of the self-importance and self-interest relating to their well-defined positions in society. Thanks to the influence of Calvinism, conformity is even more important than the individual excellence in The Netherlands. Personal ambition is normally expressed through charity (Hofstede, 1985a, Lawrence, 1991, Van Iterson and Olie, 1992, King, 1993, Hampden-Tumer and Trompenaars, 1994).

§ 5.7 The five dimensions of Dutch culture

The Dutch cultural survey conducted by Hofstede (2001) revealed five dimensions of national cultures: power distance, individualism, masculinity-femininity, uncertainty avoidance and long term orientation (Figure 36). An overview of these five dimensions of Dutch culture is given below.
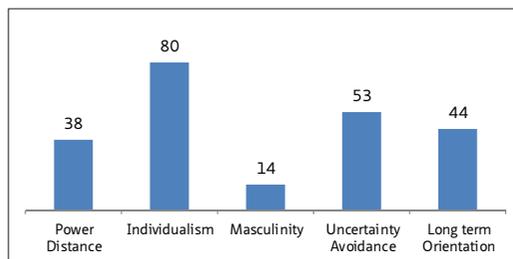
Figure 36
Cultural index scores of The Netherlands (Hofstede, 2001)

1 *Power distance*
With a score of 38, The Netherlands scores low on this dimension; this can be described as the Dutch style: being independent, hierarchy for convenience only, equal rights, accessible superiors, coaching leadership, management facilitates and empowers. Small power distance societies treat inequality as undesirable and try to reduce it where it arises (Hofstede, 1982). In the workplace, power is decentralised and managers count on the experience of their team members, and employees expect to be consulted. In particular control is disliked, and attitudes towards managers are informal and on a first-name basis. Communication is direct and participative (Hofstede, 2001).

2 *Individualism*
Individualism deals with the degree of interdependence a society maintains among its members. It has to do with whether people's self-image is defined in terms of "I" or "We". People in individualist societies are supposed to look after themselves and their direct family only. On the other hand, people in collectivist societies belong to 'in-groups' that take care of them in exchange for loyalty (Hofstede, 2001). Like many other Western countries, The Netherlands leans towards individualism. The Netherlands, with a score of 80 is an individualistic society. There is a strong preference for a loosely-knit social framework. Meekanon (2002) mentions that the Dutch tend to evaluate a person on the ground of individual accountability, and value people for their work and contribution to society as individuals; they tend to respect differences between people.

Despite pillarization in The Netherlands, the Dutch do not have a great affiliation with their confessional lines (Hofstede, 1983a, d'Iribarne, 1989, Keizer et al., 2000). Dutch business culture separates work from private life. In the workplace, the relationship between employees and employers is business-like and it does not presuppose friendship. Loyalty to a company comes from perquisites or fringe benefits, career ladder, job security, but not from emotional relationships with the company (Hofstede, 1983a, d'Iribarne, 1989, Van Iterson and Olie, 1992, Hampden-Tumer and Trompenaars, 1994, Keizer et al., 2000). Decision-making and responsibility are clear in most Dutch companies (Hofstede, 1983a, d'Iribarne, 1989, Keizer et al., 2000). In individualistic societies, offence causes guilt and a loss of self-esteem: the employer/employee relationship is a contract based on mutual advantage, hiring and promotion decisions are supposed to be based on merit only, and management is the management of individuals (Hofstede, 2001).

3 *Masculinity-Femininity*
The Netherlands scores 14 on this dimension and as such can be considered a feminine society. This means that the dominant values in society are caring for others and quality of life. It is a society where quality of life is a sign of success, however, standing out from the crowd is not admirable. In feminine countries, it is also important to maintain a good work-life balance (Hofstede, 2001).

Dutch society tends to be modest as there is sympathy for the weak, and concern for living and environmental quality. The Netherlands is a moderately competitive society, however, strong ambition, assertiveness and the idea that the winner takes absolutely everything are undesirable in Dutch society. Thanks to the weak sex segregation, aggression, represents manliness and is found to be offensive. The Dutch always restrain their emotional expression, both in terms of condemnation and swearing in social places (Meekanon, 2002). Due to the Dutch norm of sympathy for the weak, most Dutch companies do not lay off their employees in times of difficulty, but instead they try to reorganise. Dutch managers are supposed to sympathise with their subordinates. They prefer to use persuasion to motivate their subordinates (Hofstede, 1983a, Hofstede, 1985a, Lawrence, 1991, King, 1993, Hampden-Tumer and Trompenaars, 1994). The Dutch work to live, and hardy express their ambition. They tend to overlook their career planning, management development and demand for improving remuneration. If they have nothing to do at the office, they go home (Hofstede, 1983a, d'Iribarne, 1989, Lawrence, 1991, King, 1993, Hampden-Tumer and Trompenaars, 1994, Keizer et al., 2000).

4   *Uncertainty avoidance*
Hofstede (1982) describes the state where societies have to deal with the unknown future, whether they control it or let it happen, as uncertainty avoidance. This ambiguity leads to anxiety, and different cultures have learnt to deal with this anxiety in different ways. Uncertainty avoidance is defined as the extent to which the members of a culture feel threatened by ambiguous or unknown situations and have created beliefs and institutions that try to avoid (Hofstede, 2001). The Dutch score of 53 is lower than in Latin countries, for instance both Latin-European and Latin-American cultures. This is in contrast to Asian and African countries, and several European countries (Germany, Austria and Switzerland) which score fairly high. The need for order is weak in The Netherlands where the coexistence of different doctrinal allegiances is a fact of life. The Dutch admit that several truths can exist side by side. They are likely to be open to different thoughts in society and accept the concept of unity through diversity. Moreover, they can accept that the new system and the former one can co-exist. Unconventional ideas are acceptable in most Dutch companies when they formulate corporate strategy and develop new markets and products (Hofstede, 1983a, d'Iribarne, 1989, Lawrence, 1991, Keizer et al., 2000).

5   *Long-term orientation*
Long-term orientation can be defined as the extent to which a society is focused on the future as opposed to the past and present. Societies in long-term orientation dimension promote virtue and persistence and focus on future rewards. Short-term orientation societies emphasise the past and present and foster a respect for tradition (Hofstede, 2001). With a score of 44, Dutch culture tends to be a short term orientation culture. The Dutch preference for short-term orientation may reflect in their inclination towards 'return on investment' rather than 'return on favours'.

Most Dutch top executives tend to expect an immediate result from the strategy implementation that reflects the influence of this dimension. According to Weimer (1995), most Dutch firms tend to set goals on the basis of a past-oriented projection. In addition, their performance measures emphasise past-oriented goals such as profit and financial goals.

§ 5.8   Comparison between Thai and Dutch cultures on the five dimensions

This section concerns Thai and Dutch cultural settings based on the five dimensions that have been described for each country. As is to be expected from their different ethnics and cultural roots, Thailand and The Netherlands are different in many aspects. Comparatively large differences can be seen in the dimensions of power distance, individualism and masculinity. The other two dimensions of uncertainty avoidance and long-term orientation show less difference. Table 23 presents the cultural dimensions of Thailand, The Netherlands and other Asian and European countries.

Country	Power Distance Index	Individualism Index	Masculinity Index	Uncertainty Avoidance Index	Long-term Orientation Index
Hong Kong	68	25	57	29	96
Indonesia	78	14	46	48	-
Philippines	94	32	64	44	19
Malaysia	104	26	50	36	-
Singapore	74	20	48	8	48
Thailand	**64**	**20**	**34**	**64**	**56**
The Netherlands	**38**	**80**	**14**	**53**	**44**
Great Britain	35	89	66	35	25
Germany FR	35	67	66	65	31
Austria	11	55	79	70	31
Italy	50	76	70	75	34
Belgium	65	75	54	94	38
France	68	71	43	86	39
Spain	57	51	42	86	19

Table 23
Cultural index scores of Thailand, the Netherland and other countries (Hofstede, 2001)

Power distance
The assertion of equality is strong through many aspects of Dutch culture, whereas hierarchy is preeminent in many dimensions of Thai societal structure. The

Netherlands is the only country in Western Europe that has long been free of feudalism. Dutch society is not considered as having a hierarchical structure due to the influence of pillarization. In contrast, Thailand has been under the absolute rule of the kings for centuries, and until recently under a constitutional monarchy. The hierarchical structure of society is reflected in the differences of power and status in its societal members. A patronage system is deeply-rooted in Thai society. Inequality and respect for authority is easily accepted in Thai culture.

Most Dutch organisations tend to decentralise their decision-making and operation. Managers count on the experience of the team members whereas the majority of Thai firms are centralised. Most Dutch managers and their subordinates can discuss on equal terms, but most Thai managers and their subordinates have to respect the corporate hierarchy (Lawrence, 1991, Keizer et al., 2000). Respect for the elderly also has a role in Thai business culture. Most Dutch chief executives tend to start a discussion in order to try and convince their subordinates about the need to mobilise and take corrective action, whereas in Thailand, senior executives tend to either make use of their direct positions or personal authority to mobilise their workers.

Individualism
Dutch culture is clearly individualistic and the affirmation of individuals can be strongly seen in many aspects of Dutch life. Under the influence of Calvinism, the Dutch usually value people for the work they do and their contributions to society as an individual (Meekanon, 2002). In contrast, in the Thai collectivist society, there is a patronage system and personal connections play a major role in Thai organisations. The Dutch prefer to have decision-making based on exchanging information and a consensus that has been reached among several parties (Meekanon, 2002). In Thai culture, the group leader is assumed to be an absolute decision-maker. According to Hofstede (1983a), the Dutch do not have a great emotional bond or affiliation with groups. In contrast, the views and opinions of one's family or in-group members have a strong influence on the Thai business culture. Personal relationships are an advantage when conducting business in Thailand.

Masculinity-Femininity
Although both the Thai and Dutch culture are considered feminine, The Netherlands has a much lower score on the Masculinity index (14) compared to Thailand (34). In this dimension, the Dutch norm of sympathy for the weak is visible in the workplace in the relationship between superiors and subordinates. In Dutch business culture, persuasion is used to motivate workers. Feminism in Thai society has a different and more negative connotation, that reflects a lack of assertiveness or ambition towards work and responsibility.

§ 5.9   Conclusions

Literature concerning the ethnic backgrounds, geographical locations and historical contexts of Thailand and The Netherlands can provide a better understanding of the differences between the Thai and Dutch culture. It is valuable to have information on the religious, political and social influences that impact Thai and Dutch culture so as to compare the differences in the social norms or core values of both countries.

An understanding of Thai and Dutch cultural settings will provide background data regarding certain behaviours and beliefs that can be used to support an analysis of the empirical findings relating to national culture. However, culture is not static, but tends to change over the period of time. For example, pillarisation has almost vanished or less strict than the previous decade. Scores on national culture indexes from Hofstede (2001) are average and only show an overall 'simplified' picture from a much more complex reality. Culture can be different in subgroups and people differ individually from national culture. This chapter includes the literature from the past 40 years (Benedict, 1974). However, according to Hofstede (2011) culture change will need a much longer period around 50 - 100 years.

The comparisons between Thai and Dutch national characteristics in Hofstede's five dimensions (i.e. power distance, individualism, masculinity-femininity, uncertainty avoidance and long term orientation) will be used to compare the findings from the national culture surveys of the three case studies. These two countries share some similar aspects of cultural dimensions although they also differ in many facets of everyday life. Analyses of historical contexts, national characteristics and cultural dimensions are important when trying to account for the similarities and dissimilarities between organisations in two different cultural contexts.

PART 2   **Empirical research**

6 Case 1: Dhanarak Asset Development, Bangkok ,Thailand

Introduction

This chapter presents a case study conducted in Thailand for Dhanarak Asset Development company limited (DAD) on the impact of workplace change, five months after the organisation had moved to new office buildings. The study aims to identify performance measurement frameworks, criteria and performance measures/KPIs of the case organisation, and to collect new data about employees' responses to the changed work environment. Another purpose is to explore the contextual backgrounds of organisational and national culture that may have an impact on workplace performance. Findings from this case study will be used for a cross-case comparison with another Thai and Dutch case study in Chapter 9.

§ 6.2 **Research methods**

Data were collected using interviews, document analysis, observations and three separate questionnaires. Data on performance measurement were collected from company reports and information from the case organisation human resource manager. The impact of workplace change was examined using the work environment diagnosis instrument (WODI) questionnaire which evaluates employee responses to the changed work environment in three areas: employee satisfaction, perceived productivity support and prioritised aspects (Maarleveld et al., 2009). This tool has been described in detail in Chapter 3. The Organisational Culture Assessment Instrument (OCAI; Cameron and Quinn, 2006) was used to assess organisational culture. National culture was measured using the Value Surveys Module 94 (VSM94) (Hofstede, 1997). Both the OCAI and VSM94 questionnaires have been described in Chapter 4.

Documents used for the analysis include the company's annual report, roles and responsibilities handbook, code of conduct handbook, and employee satisfaction and attitude survey. A semi-structured interview was developed to be used for ten staff interviews with the chief marketing officer, senior specialist, public relations manager,

human resource manager, procurement and property manager, four senior officers and one general officer. The interviewees were asked about performance measurement and their perception of working environment and culture. Observations were conducted by a walk-through the workplace and by recording where and when certain behaviour occurred. The research was conducted from September to October 2010.

§ 6.3   Case description

DAD is a state-owned enterprise which was established in 2004 as a part of the Thai Ministry of Finance. It was set up to initiate, construct and operate the new Bangkok government building-complex. The DAD vision is to manage the government buildings and other government assets according to government policy. The company's mission covers two main areas: 1) to manage government assets according to government policies, and 2) to develop the government building-complex as a new dimension of government housing. The main organisational objectives are: 1) to achieve economies of scale from the asset management of the government building-complex, and 2) to provide value for money to the client.

Figure 37
Exterior of the government complex, new situation. Source: www.picasaweb.google.com

Organisation structure
Figure 38 shows the DAD organisation structure with five departments: 1) policy, 2) administration, 3) business development and marketing, 4) finance and 5) operations. The members of the organisation's committee are appointed by the government and perform an administrative role. This committee then assigns resources to the risk management and audit committees.
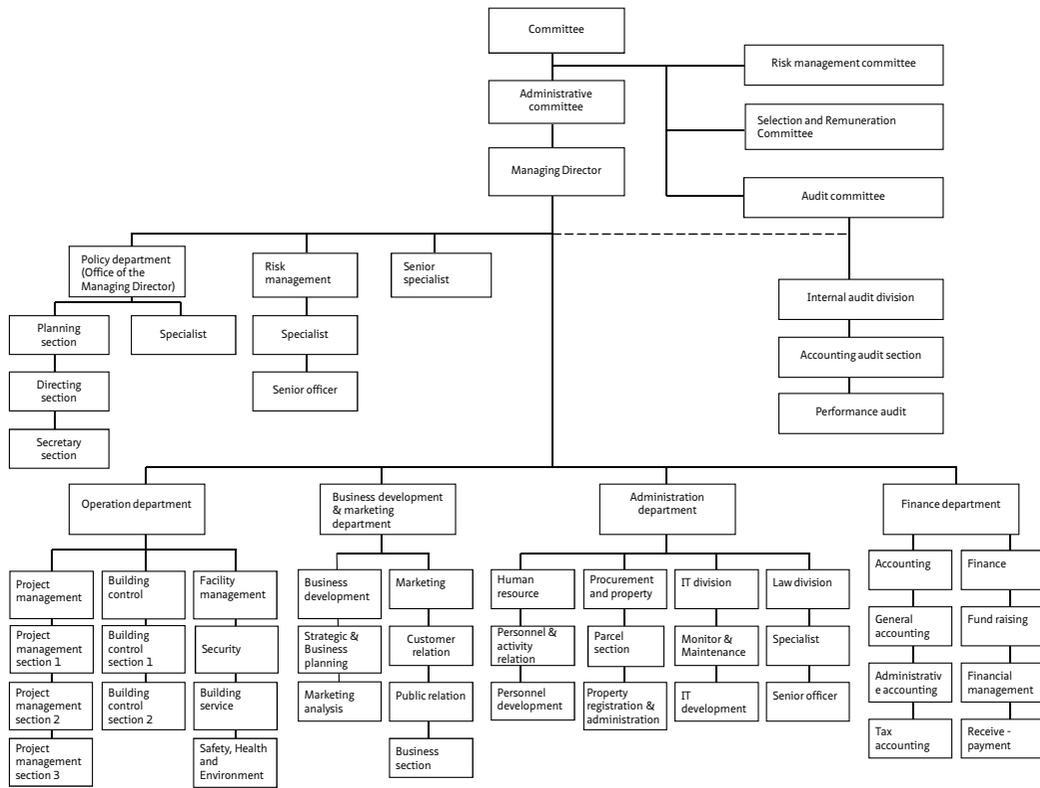
Organisational structure

Work process

DAD employs 139 staff working in five departments. Work processes can be described as routine office work, working hours from 9 to 5, with full-time occupancy. The general office work has standard workspaces in an open plan layout. An exception is the operations department, where the employees sometimes work outside the office, for example at client offices or at the construction site. The operations department's responsibilities are to operate and maintain the building service engineering of the government complex. Work patterns can be described as project or group work, requiring the use of PCs and group equipment (e.g. white board, projector) with regard to the different tasks of each department.

Workplace change

Workplace before the change
DAD was located in a twenty-year-old, multi-tenant building on the Rama 6th Road in the city centre of Bangkok. This building was constructed in 1992 to accommodate the Treasury department of the Ministry of Finance. DAD, a subsidiary of the Treasury department, was located in this building. Nearby amenities include shops, restaurants, banks, newsstands, convenience stores and hospitals. The building location can be accessed directly by public transportation (bus and sky train). The area is surrounded by other government offices, for example the office of the Minister of Finance, the Comptroller General's department, the State Enterprise policy office, the Public Debt management office, and the Fiscal Policy office. This area suffers from traffic congestion at peak hours.

The DAD workplace was a conventional office building with a simple concrete structure; a feature of government building design. The different departments shared the space in a cellular office layout on the 7th floor (see Figure 39). The cellular offices varied from private offices for senior managers to offices for a group of five employees. The limited floor area with a large number of employees working in several departments resulted in a high density workplace. Space for storage and archives was limited. Photocopiers and fax machines were located in front of the office as shared facilities and a pantry was located in the workplace. The office area was equipped with a split type air-conditioning system, however, the high density workplace resulted in a poor indoor air quality. Car parking space was limited and only available to higher level personnel.

Several factors affected the decision to change the workplace, including the unfavourable building location, office space congestion, car parking, and the requirement for having one's 'own' workplace. The main reason for the move was to cope with the increasing demand for office space resulting from the growing number of employees.

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Figure 39a (1-2) Floor plan and exterior of the DAD workplace before the change
Figure 39b (3-4) Typical workstation and meeting room, old situation

Preparation and implementation process

The preparation for moving to a new office started with a meeting of members of DAD from each department. The meeting was attended by directors, managers, senior officers and general officers with the head of the department serving as chairperson. The process started with notifications, and instructions were given to all attendees regarding a clear understanding of their roles and responsibilities. The main tasks and responsibilities of the relocation included:

- Personnel from project management and building control division to oversee architectural and M&E works of the new offices
- Facilities management division personnel to oversee the cleanliness of the location
- IT division personnel to be in charge of ICT services, such as telephone and PCs
- A division secretary was appointed coordinator for contacts with a removal company

In the new building, personal workstations were arranged with regards to the work processes of each working group in a departmental unit. During the meeting, employees were able to discuss and choose the location of the appropriate workstations in their working groups. Before the move, an inspection team examined the new offices and reported any corrections where necessary. The facility management team was responsible for cleaning the location two days before the

move. The employees packed their materials and documents in boxes provided by the removal company. A division secretary contacted the removal company and requested permission to enter the new office location. Subsequently, boxes and office furnishings were moved to the specified departmental unit. During the move, the inspection team checked to see if everything was in place, the cleanliness, the M&E, and the IT and security systems. The project management personnel were in charge if changes needed to be made. The organisation had reserved spaces for future storage requirements and new employees, which were calculated in advance based on the organisation structure. After the move, employees were not able to change their workstations from the plans that had been agreed upon before in the meeting.

Workplace after the change
The relocation to offices in the government building complex facilitated the management and operation of the complex, as set out in the company's mission. Another, more psychological reason, was the desire to be accommodated in a single tenant building; there was no longer a need to share the workplace with other organisations as had been the case in the former situation. In addition, support facilities (i.e. computers, IT system) and amenities (e.g. banks, post office, hospitals, shops, restaurants, food outlets, open meeting spaces) are all available in the new location. The new location accommodates the five departments in three separate zones in two buildings.

Although there were fewer employees (50) in the former office than the new location (139), the office was crowded due to the limited floor space. When the Bangkok government complex was completed in 2009, DAD moved to two of the buildings. The offices were arranged depending on job titles and functions; employees occupy workplaces in an open-office with high partitions, while higher level personnel occupy cellular type offices. Large and small meeting rooms are located at several locations throughout the building.

In the DAD case, office space is arranged according to work processes; departments with similar work processes are located in the same area. A more homely atmosphere was generated by allowing employees to decorate their own workstation. Partitions are used to separate different departments and department sections. Workspaces are arranged according to status, whereby a higher level member of staff has more space and a higher quality workstation. Officers, senior officers and heads of department occupy workstations with partitions, while higher levels work in private offices. Workplace density varies from 4 sq.m./person (officers), 6 sq.m./person (managers), 16 sq.m./person (directors) and 28 sq.m./person (executive officers). The main building (Figure 40, 1-4) is occupied by the policy, administration, business development & marketing and finance departments. The secondary building is occupied by the operation department (Figures 40, 5-8).
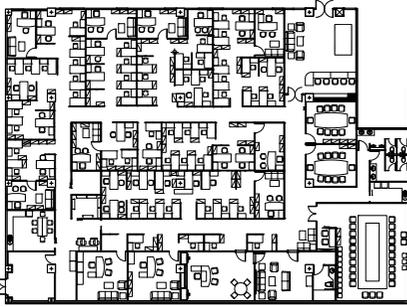
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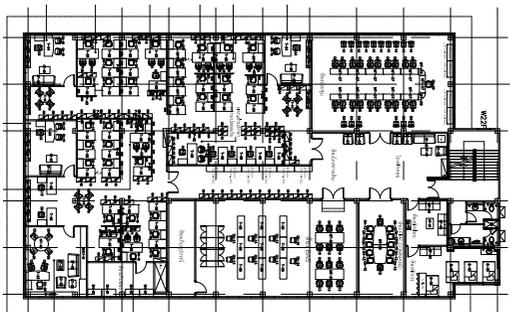
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Figure 40

Figure 40 (1-4) Floor plan, exterior of the main building, and typical workspaces, new situation
Figure 40 (5-8) Floor plan, exterior of the secondary building, and typical workspaces, new situation

Face-to-face communication is a feature of the open plan office. However, a lack of privacy during telephone calls was observed. Findings from the interview with employees show that communication between the departments of the separate buildings is time consuming, and therefore inefficient. Informal communication takes place in common areas where employees can meet with other colleagues. There is a requirement for archive and storage facilities.

§ 6.5 Performance measurement

In general, performance measurement of all state enterprises in Thailand is directed by the State Enterprise Policy Office (SEPO), which plays an important role in regulating and supporting state enterprises' good corporate governance and competitiveness. The development of the performance agreement between a state enterprise and SEPO comprises three key steps.

Step 1: Identifying the Performance Criteria
The current performance measurement system specifies performance criteria used for assessing state enterprises' operational efficiency in three key areas:
1. Adherence to policy
2. Operating performance of the state enterprise
   - Financial
   - Non-financial
3. Organisational management
   - Management roles of board of directors
   - Risk management
   - Internal control
   - Internal audit
   - IT management
   - Human resource management

Step 2: Defining Criterion Weight
The weighting of performance criteria is related to operational performance. DAD is a state enterprise that aims to provide public facilities that consider operational aspects, especially service quality. Details of the weights per criterion are:
- Adherence to policy 20% (±10)
- Operating performance of the state enterprise 50% (± 10)
- Organisational management 30%

Step 3: Defining Performance Targets for Each Criterion Value
For each criterion, performance targets are classified into five levels. Level 5 exceeds the set target in the annual enterprise plan (Level 3). Only state enterprises with outstanding management can achieve a Level 5 target. Level 1 is considerably lower than the set target in the annual enterprise plan (Level 3).

When determining annual performance targets, government representatives use past performance as the basis for benchmarking with the private sector (see Table 24, 25). This is to encourage state enterprises to improve their operational performance and to be on a par with the private sector. Even though improvement of state enterprise standards may not be achieved in one year, by setting the targets higher each year, the personnel can be encouraged to operate more efficiently.

Organisation	Benchmarking (office space for rent)			
	Available floor space to let (square metre)	Rent/month (Baht*/ square metre)	Occupancy rate	Return On Asset (ROA)
DAD	484,000	360	100%	0.31%
Central Pattana	144,280	500 – 700	94%	1.32%

Notes – information at the end of 2013, *43 baht = 1 euro

Table 24
Benchmarking with a competitor in an office market

Organisation	Benchmarking (commercial space for rent)						
	Lettable floor space (sq.m.)	Rental rate (Baht*/sq.m./ month)	Electricity (Baht/unit)	Water (Baht/unit)	Contract (Months)	Deposit (months)	Occupancy rate
DAD	26,055	360 – 1,300	4.5	25	1 - 60	3	25 – 50 %
The Avenue	21,173	700-2,000	4	18	36	6	98%
Major Hollywood	N/A	670 - 900	5	-	3	1	98%
IT Square	120,000	650 – 1,200	N/A	N/A	24	3	70%
Central Changwattana	300,000	1,100 – 2,500	N/A	N/A	36	6	80%
Central Rattanatibet	105,000	800 – 1,000	N/A	N/A	12	4	95%
The Mall Ngamwongwan	45,000	1,000 – 2,000	N/A	N/A	N/A	N/A	95%
Siam macro	60	1,500	N/A	N/A	N/A	N/A	100%
Big C Changwattana	20,000	600 – 1,200	N/A	N/A	N/A	N/A	98%
Tesco Changwatana	20,000	1,000 – 1,500	Included	Included	1	2,000 (Baht)	100%
Carrefour Changwattana	20,000	1,200 – 1,500	Included	Included	1	1	100%

Notes – information at the end of 2013, *43 baht = 1 euro

Table 25
Benchmarking with competitors in a commercial space rent market

Performance Appraisal System Procedures

1. A state enterprise submits its business/strategic/enterprise plan to SEPO after receiving approval from the board of directors' and the line ministry.

2. The subcommittee, SEPO, the State Enterprise Efficiency Improvement committee and related agencies jointly review the business/strategic/ enterprise plan in order to define performance indicators, criterion weights and targets.

3. SEPO informs the state enterprise of the agreed key performance indicators, criterion weights and targets so that the performance agreement can be written.

4. The state enterprise presents quarterly and annual reports to SEPO and the State Enterprise Efficiency Improvement committee.

5. The State Enterprise Performance Appraisal committee acknowledges the state enterprise's operating performance at the first half of the year.

6. The annual report of the state enterprise's operating performance is submitted to the cabinet.
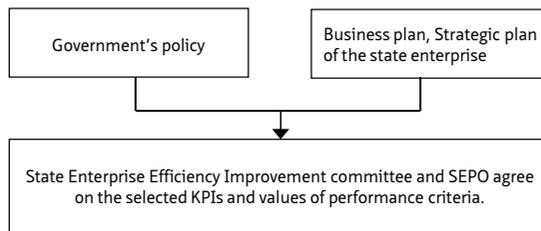
Figure 41
Performance appraisal system procedures

Performance criteria	Criterion weights (percent)		Results (points)	Weighted score (points)
1. Adherence to policy	**21**			
1.1 Work done according to assigned plan from government	16			
· Percentage of work done: Dhanarak Nontaburi housing as plan		4	3.92	0.16
· Percentage of Dhanarak housing units handed over in Phuket, Chiang Mai and Suphanburi		5	1.00	0.05
· Success level of Zone C building construction project		7	5.00	0.35
1.2 Ability in managing investment plan	5		3.42	0.17
2. Operating performance of the state enterprise	**44**			
Financial	19			
2.1 Income from commercially rented area		6	3.65	0.22
2.2 Earnings before interest, taxes, depreciation and amortization (EBITDA)		10	4.97	0.50
2.3 Return On Asset (ROA)		3	5.00	0.15
Non-financial	25			
2.4 Work done on delivering rentable area to other government agencies		6	3.48	0.21
2.5 Percentage of allocating commercial area		5	1.00	0.05
2.6 Satisfaction of the government complex building users		5	3.61	0.18
2.7 Work done on the development of building management standard		4	5.00	0.20
2.8 Work done according to the development of ICT		5	3.50	0.18
3. Organisational management	**35**			
3.1 Management roles of board of directors		6	2.98	0.18
3.2 Risk management		7	1.80	0.13
3.3 Internal control		4	2.94	0.12
3.4 Internal audit		6	2.62	0.16
3.5 IT management		6	1.92	0.12
3.6 Human resource management		6	2.66	0.16
	100			**3.26**

Table 26
Results from performance measurement in 2009

§ 6.6   Employees' responses to the work environment

Participants
The work environment diagnosis instrument (WODI) questionnaires were filled out by 87 of the 139 employees, 32 males and 55 females (1:1.7 ratio). The majority (48%) of participants was aged under 31, with 44% aged between 31-40 years old.

Most of the participants are well-educated, with 57% holding a Bachelor's degree and 36% holding a higher degree level. Employees responded to questions regarding the time spent on different activities and in different types of workplaces, preferred places, satisfaction and dissatisfaction with different aspects, most important aspects, organisational culture, and key dimensions of national culture.

§ 6.6.1   Employee satisfaction

Figure 42 shows employee satisfaction on a range of items. Respondents most appreciated the architecture and appearance of the building (59.2% satisfied and very satisfied respondents), opportunities to communicate (51.4%), lighting (40.4%), functionality and comfort of workplaces (36.7%) and accessibility of the building (36.5%). Many employees were dissatisfied with the indoor climate (38% dissatisfied and very dissatisfied respondents), ICT and ICT support facilities (35%), openness and transparency (31.5%), archive and storage facilities (28.4%) and opportunities to concentrate (27.1%).
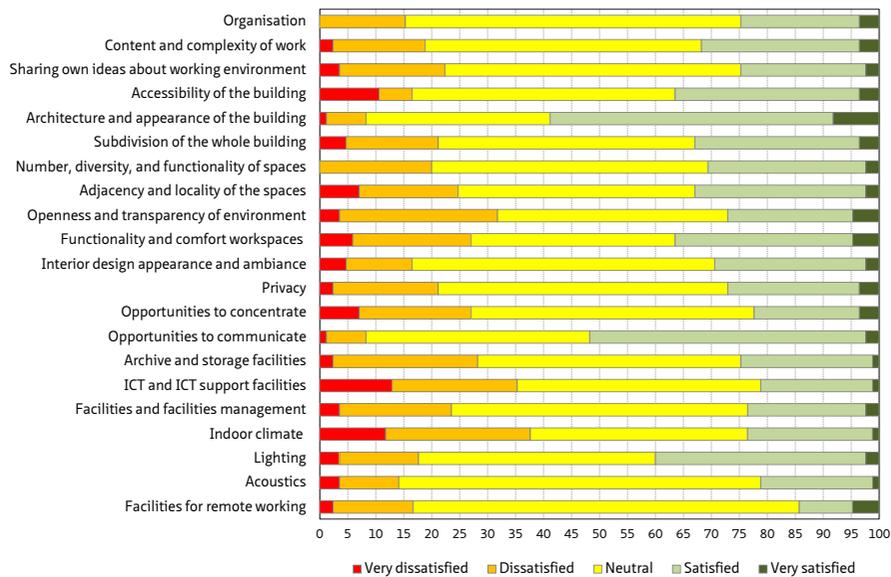
Figure 42
Percentage of satisfied and dissatisfied participants with regard to different aspects (N=85)

§ 6.6.2   Perceived productivity support

Although the employees had just moved to the new buildings with new workstation furnishings and sufficient building amenities, the extent to which the environment supported individual productivity and team productivity was perceived as being low: 30.4% and 34.5% respectively. During the interviews, participants explained that the separate building locations made communication between the departments difficult; this has resulted in the low scores.
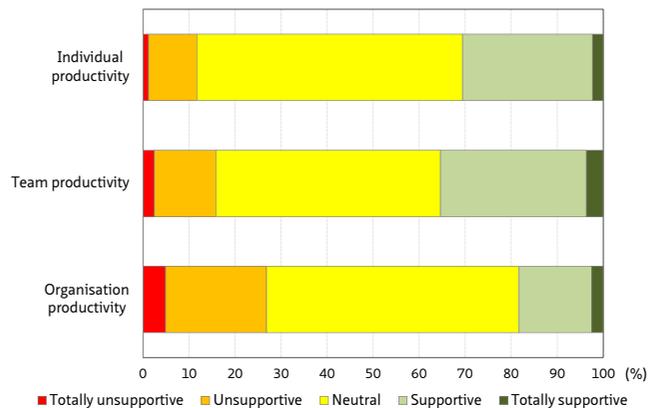
Figure 43
Percentage of participants that perceive the working environment as being supportive to different types of perceived productivity (N=85)

§ 6.6.3   Prioritised aspects

Figure 44 shows how employees rank the 3 most important aspects of the workplace environment. Adjacency and locality of the spaces were mentioned by 39%, subdivision of the whole building (35%), sharing own ideas about the work environment (31%), openness and transparency of environment (24%), and architecture and appearance of the building (24%). The least prioritised aspects include opportunities to communicate (not mentioned by any respondent), acoustics (1%), interior design appearance and ambiance (2%), opportunities to concentrate (5%), facilities for remote working (5%) and lighting (6%).
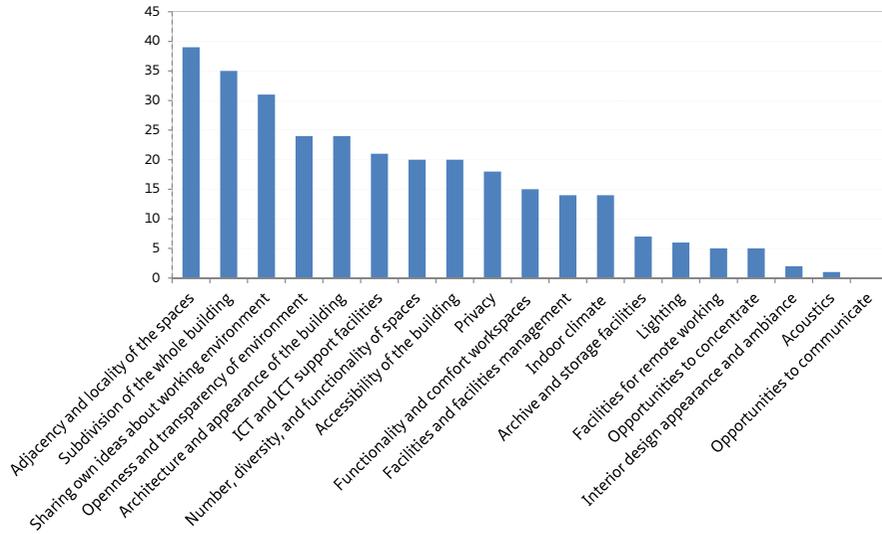
Figure 44

Ranking of % respondents marking a particular aspect as one of three most important aspects of the workplace environment (19 aspects) (N=85)

§ 6.7   Cultural context

The organisational culture survey was conducted using the Organisational Culture Assessment Instrument (OCAI; Cameron and Quinn, 2006). Results from this survey were characterised in four organisational culture types: clan, adhocracy, hierarchy, and club. The Value Surveys Module (VSM94; Hofstede, 1997) was used to identify the five dimensions of national culture: power distance, individualism, masculinity, uncertainty avoidance, and long-term orientation.

§ 6.7.1   Organisational culture

Table 27 presents the results of the case study OCAI analysis. The organisational culture was perceived as a hierarchy culture (29.3 points), whereas the clan culture type (30.9 points) was the most preferred. All other culture types also applied although these were less convincing. A hierarchical culture scores high on organisational leadership (Cameron and Quinn, 2006). The leaders are considered to be both coordinators and organisers and efficiency-minded. The management of employees is most connected to an adhocracy

culture type, but the characteristics of other culture types also apply. The organisation emphasises permanence and stability; efficiency, control and smooth operations are important. The dominant characteristics are formalized and structured with procedures governing what people do, which matches the hierarchical culture. Formal rules and policies are in place to structure connection between organisation members. Maintaining a smooth-running organisation is important.

	CLAN			ADHOCRACY			MARKET			HIERARCHY		
	Current	Prefer	Dif.	Current	Prefer	Dif.	Current	Prefer	Dif.	Current	Prefer	Dif.
Average	21.8	30.9	-9.1	23.8	22.5	1.3	25.2	21.5	3.7	29.3	25.1	4.2
Dominant characteristics	18.7	32.9	-14.2	24.6	20.4	4.2	24.5	26.1	-1.6	32.1	20.6	11.5
Organisational leadership	22.1	28.1	-6	23.8	24.7	-0.9	25.4	22.5	2.9	28.8	24.7	4.1
Management of employees	22.8	31.8	-9	26.9	19.4	7.5	25.9	19.1	6.8	24.6	29.8	-5.2
Organisational glue	19.6	29.5	-9.9	21.4	24.6	-3.2	25.3	23.2	2.1	33.8	22.8	11
Strategic emphasis	21.5	29.7	-8.2	22.8	23.4	-0.6	26.1	19.9	6.2	29.7	26.8	2.9
Criteria of Success	26.3	33.5	-7.2	23.1	22.5	0.6	24.1	18.3	5.8	26.6	25.7	0.9

Notes. Respondents are asked to divide 100 points among the four culture types. A higher number of points is given to the option that is most similar to the organisation.

Table 27
Organisational culture index according to the case study (N=80)

§ 6.7.2 National culture

The VSM94 survey results show that the DAD-company scores much lower on power distance, masculinity and long-term orientation than Thailand as a whole, and much higher scores were obtained for individualism and uncertainty avoidance (Table 28). The high uncertainty avoidance suggests that top managers are concerned with daily operations and focus on decision content. The organisation is better at implementation, and less strong in invention. There is an emotional need for rules, even if these do not work. According to Hofstede (1997), the low masculinity scores indicate that management is done by intuition and through consensus. The high individualistic culture and low power distance indicate that subordinates expect to be consulted and to not be told what to do. The low long-term orientation index means that efforts should produce quick results.

Index	DAD	Thailand*
1. Power Distance Index (PDI)	25	64
2. Individualism Index (IDV)	83	20
3. Masculinity Index (MAS)	6	34
4. Uncertainty Avoidance Index (UAI)	100	64
5. Long-term Orientation Index (LTO)	38	56

* Thailand data according to Hofstede (1997). Notes. Values of each index is usually between 0 (small/weak in particular dimension) and 100 (large/strong in particular dimension), but values below 0 and above 100 are technically possible.

Table 28
Five key dimensions of national culture

§ 6.8 Reflections

§ 6.8.1 Performance measurement

Performance measurement of the case study covers three main areas (adherence to policy, operating performance, organisational management) that are aligned with the four perspectives of the balanced scorecard (financial, customer, internal business processes, learning and growth). The DAD focuses on efficiency by its choice of a location near to client offices. The choices for a regular square shape of office layout and typical work settings were aimed to achieve cost reductions of both construction and workstation furnishings. Being a public organisation, DAD needs to show commitment to both internal (employees and customers) and external stakeholders (neighbouring community).

CRE performance measures in literature and what has been found in the DAD case
Based on the balanced scorecard, corporate real estate performance measures in the literature have been divided into six categories: 1) stakeholder perception, 2) financial health, 3) organisational development, 4) productivity, 5) environmental responsibility and 6) cost efficiency. Table 29 presents the proposed list of corporate real estate performance measures, classified according to Bradley's (2002) six categories, and the performance measures applied in the DAD case. The comparison between the proposed performance measures from the literature, and what was found in practice, shows both striking similarities and differences.

1. Stakeholder perception	Proposed performance measures according to the literature	DAD
Employee satisfaction with work environment	· Quality of indoor environment: lightning, air conditioning, temperature, noise level, etc. · Provision of safe environment · Location success factors (access to employees, amount of local amenities) · Ratio of office to common areas · Provision of amenities · Amount of workplace reforms and space modifications	· Employee satisfaction
Employee satisfaction with CRE services	· Employee satisfaction with professional skills · Employee satisfaction with information sharing	· Employee satisfaction survey conducted by the author (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 required transportation, access to customers, distance to other sites and businesses)	· Satisfaction of the government complex building users
Community and well-being	· The contribution to public policy and societal priorities	· Percentage of complaints from public regarding to environmental impact
2. Financial health		
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
3. Organisational development		
Quality of facilities	· Physical condition of facilities · Suitability of premises and functional environment · Number of building quality audits	· Work done on the development of building management standard · Work done on the development of ICT
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
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

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161   *Case 1: Dhanarak Asset Development, Bangkok ,Thailand*

4. Productivity	Proposed performance measures according to the literature	DAD
Employee productivity	· Productivity (% of perceived productivity support from working environment) · Absentee rates by buildings	· Health & wellbeing in the workplace · 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, or shared services opportunities	· Master plan of the IT system · Management of the information system · IT solution in HRM
5. Environmental responsibility		
Resource use	· Energy consumption · Number of energy audits	· Introduction of green building construction materials and equipment meet local content
Waste	· Contaminated sites management · Amount of garbage	NA
6. Cost efficiency		
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)
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*

* does not directly relate to real estate, NA not applied i.e. not measured or no data available

Table 29

CRE performance measures from the literature (left) compared to case study findings (right)

1   *Stakeholder perception*
Performance measures in this perspective involve multiple levels (individual, organisation, community). Workplace change objectives such as increasing floor space and improving environmental quality show a concern about employee satisfaction with work environment. An employee satisfaction survey is conducted annually, and includes areas related to the work environment. Customer focus is demonstrated by measuring the satisfaction of the government complex building users (i.e. tenants of rental offices, renters of commercial spaces). The DAD monitors the perception of the neighbouring community using the percentage of complaints received from the public regarding the environmental impact.

2   *Financial health*
The DAD, an asset management company, applies income from office and commercial space rental as a financial performance measure that reflects the organisation's business type.

3   *Organisational development*
    The DAD monitors work done according to the development of a building management standard, work done according to the development of ICT, delivering rentable area to other government agencies, and the percentage of commercial area allocation, in order to support the objective of providing client value for money.

4   *Productivity*
    Findings show that the DAD case applied the corporate real estate performance measures related to human resource strategies. In order to create an optimal workplace setting and contribute to employee productivity, the DAD case measures HR factors such as employee health, safety and well-being, HR IT information systems and general IT systems. Haynes (2007) noted that an emphasis on 'human contribution' rather than cost cutting will lead to an increased productivity. In the DAD case, the provision of a better office environment (workplaces, IT support) and better HR support (employee health, safety and well-being), would lead to increased employee productivity.

5   *Environmental responsibility*
    The introduction of green building by using highly efficient building materials such as special building envelope to reduce heat transfer and double isolated window frame to minimise infiltration contributes to the improvement of energy performance that has been considered as an approach to develop a sustainable objective in the DAD case. The use of local construction materials and equipment, and the recording of complaints received from the public regarding environmental impact are performance measures related to environmental responsibility.

6   *Cost efficiency*
    The DAD implements performance measures related to building and facilities (i.e. facility costs) that can be explained by the asset management business of the company. Occupancy costs are an important factor of the total workplace costs and include land and property taxes. Because the organisation owns the property, other occupancy costs such as office rent or parking costs have not been calculated.

§ 6.8.2   Employees' responses to the work environment

Employee satisfaction
Findings show that in the DAD case, staff characteristics, work processes and work patterns influence the typical workplace design: a large open plan layout with high partitions and standard work settings. This has led to the result that only a modest percentage of respondents were satisfied regarding several aspects of the DAD

workplace. The DAD building is located quite a large distance from the city centre and public transport is limited. This explains the low satisfaction regarding the accessibility of the building. The percentage of satisfied respondents regarding architecture and building appearance is high due to the fact that the organisation has moved to new buildings. It is difficult to recognize that the building accommodates a public institution, so the use of building appearance to promote corporate culture has been minimised. In addition, the separate locations of the DAD case make face-to-face communication more difficult.

The average satisfaction rating of the workplace environment as friendly and enjoyable is higher than other aspects partly because the organisation allows employees to personalise their workspaces. The typical office layout and interior design are less appreciated by the employees. The semi-open plan layout of the DAD buildings allows social contact between colleagues; this has resulted in the high percentage of satisfied employees with regard to opportunities to communicate. However, the high partitions have resulted in the high dissatisfaction score in openness and transparency. DAD employees are dissatisfied most with the indoor climate, which could be due to the tightly sealed building envelope, which was designed for energy conservation.

A lack of support spaces and the typical layout of the DAD workplace that affect the practical usability of the building are considered as the cause of the low percentage of satisfied employees in the subdivision of the whole building. Even though some employees work at client offices, the facilities for remote working are inadequate which explains the low satisfaction score regarding this aspect. Because of the hierarchical structure, DAD employees were not involved in the design process of the workplace change which has been seen as a disadvantage in regard to the changed work environment. The separate locations, the lack of privacy and insufficient storage facilities of the DAD's workplace after the change are considered as the cause of the negative responses received from employees with regard to their satisfaction with adjacency and locality of the spaces, privacy and archive and storage facilities.

Perceived productivity support
The DAD case shows a low percentage of satisfied respondents with regard to the extent to which the working environment supports individual and organisation productivity (30% and 17% respectively). The quite typical layout and standard work settings may have resulted in the low individual and team productivity. The lack of support spaces also has had an impact on team productivity. From the interviews conducted with the DAD employees, it was concluded that the separation of workplaces to two separate building locations in the DAD case caused difficulties for collaboration and team working which has resulted in the low perceived productivity percentage in the DAD case. Findings from the interview also show that employees require extra space for socialising because they believe it can help improve productivity.

Prioritised aspects of the work environment
Regarding environmental comfort, the DAD respondents are more concern with physical comfort as indicated by the emphasis on adjacency and locality of the spaces and subdivision of the whole building. Physical comfort is related to good building design and operations, as well as related to setting and meeting the standards of health and safety (Vischer, 2008).

Conceptual model of workplace change appraisal
The conceptual model is used to explore the relationship between variables impacting on an appraisal of workplace change (Figure 45). In Table 30, the variables have been explained in three groups: start, mediating and outcome.
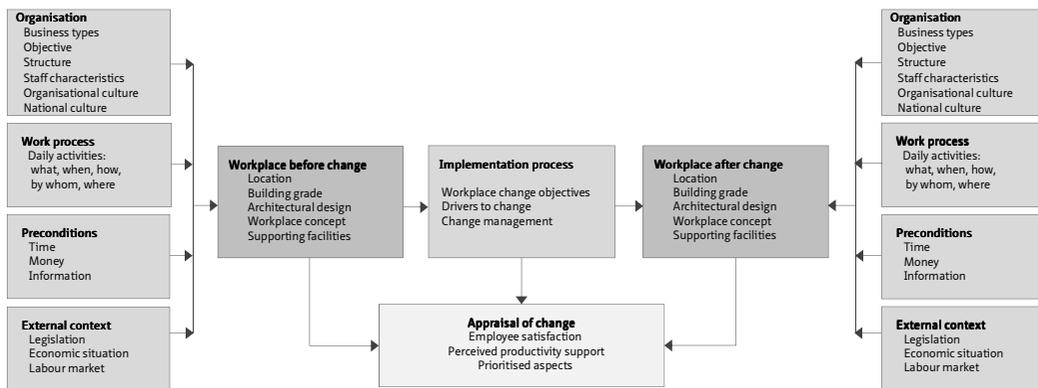
Relationships between variables of the conceptual model
Table 30 shows the assumed causal relationships between the characteristics of the organisation, work processes, preconditions, external context and the implementation process as start variables with mediating variables of workplace change such as location, architectural design and workplace concept, and the appraisal of change as an outcome.

Start variables	Mediating variables	Outcome
Organisation	**Workplace change**	**Appraisal of change**
Objectives Supports positive attitudes among public officials	*Workplace concept* Ability to personalise workspaces	*Employee satisfaction* High average satisfaction rating of workplace environment as friendly and enjoyable
Structure Hierarchy	*Change management* Employees do not get involved during the design process	*Employee satisfaction* Low satisfaction percentage in sharing own ideas about working environment, number diversity and functionality of spaces
Staff characteristics Employees put high importance on basic human needs	*Workplace concept* Typical layout with standard work settings	*Prioritised aspects* On top of most important aspects, the DAD employees indicate adjacency and locality of the spaces and subdivision of the whole building
Organisational culture The emphasis on efficiency in a hierarchical culture type	*Workplace concept* The near location of the operation department to the other departments and client's premises supports efficient communication.	*Prioritised aspects* High ranking of adjacency and locality of workplaces as one of three most important aspects of the work environment.
National culture Individualistic culture	*Workplace concept* The provision of private rooms and high partitions	*Employee satisfaction* The high dissatisfaction percentage in openness and transparency due to high partitions
Work process *Daily activities* Routine office works with regular timetable 9 to 5	*Workplace concept* Typical workplace design in large open plan layout with high partitions	*Employee satisfaction* Modest percentage of satisfied respondents in several aspects of the work environment; e.g. number, diversity, and functionality of spaces, functionality and comfort workspaces
Preconditions Money Investment budget	*Location* New workplace is located in suburban. Workplace is arranged with standard work settings*	*Employee satisfaction* Low satisfaction percentage in accessibility of the building
Implementation process *Workplace change objective* To promote sustainable objectives through the energy efficient design concept	*Architectural design* Tightly sealed building envelope in order to control ventilation and infiltration and to build thermal storage	*Employee satisfaction* High dissatisfaction of indoor climate
Drivers to change To increase office space	*Workplace concept* Move to a new building	*Employee satisfaction* High satisfaction percentage in architecture and building appearance
Change management Communication with employees	*Supporting facilities* Facilities and facilities management, ICT and ICT support facilities, archive and storage facilities	*Employee satisfaction* Low satisfaction percentage in the extent to which the working environment supports individual and organisation productivity

Bold = main variables, *characterised by general work settings and interior design quality based on the office rent market (CBRE, 2012)

Table 30

Relationships between variables of the conceptual model applied to the DAD case

Most of the public organisations in Thailand are developing the personnel administration system that supports positive attitudes and working methods among public officials in order to deliver more efficient public services. This objective has led to the agreement that allows the DAD employees to personalise their workspaces which results in the high average satisfaction rating of workplace environment as friendly and enjoyable.

Staff characteristics and *work process* of the DAD case influence the typical workplace design (i.e. a regular square office layout and standard work settings), which resulted in modest satisfaction percentages in relation to several aspects of the work environment (number, diversity, and functionality of spaces, functionality and comfort workspaces). *Staff characteristics* can be considered in terms of the need for physical comfort (Vischer, 2008), which results in the high priority given to adjacency and locality of the spaces and the subdivision of the whole building.

The emphasis on efficiency in a *hierarchical culture* type is demonstrated by the fact that the DAD offices are located close to the client's premises. This results in the emphasis on adjacency and locality of workplaces as being one of three most important aspects of the work environment. The provision of private rooms and high partitions is related to the emphasis on privacy in the *individualistic culture*, and is the cause of a high percentage of dissatisfied employees with regards to openness and transparency.

Because of the need for a large land area and in order to reduce *investment costs*, the *choice of location* was made to go to the suburbs, far from the city centre. This has resulted in a low satisfaction percentage regarding accessibility of the building.

Workplace change objective in energy conservation influences the design of a tightly sealed building envelope. The lack of natural ventilation is the cause of high dissatisfaction with the indoor office climate. *Driver to change* the workplace and the move to a new building resulted in high satisfaction with the architecture and building appearance.

The support facilities (i.e. facilities and facilities management, ICT and ICT support facilities, archive and storage facilities) are not appreciated by the employees. In this case, the move to the new location was made while some parts of the buildings were under construction, so support facilities were inadequate. This is considered as the cause of the low satisfaction regarding individual and organisational productivity.

The assumed causal relationship can be explained by the links of variables in the conceptual model as shown in Table 30. However, there should be a direct link between the organisation and the appraisal of change in the conceptual model; i.e. employee satisfaction in organisation and content and complexity of work. These two items are not related to the physical work environment, but they can have an impact on the appraisal of change. This has led to the slightly adapted conceptual model, which described in Chapter 10.

Cultural context

The field research identified different types and dimensions of organisational and national culture. However, the connections of both types of culture and the other variables in this study are difficult to trace and to understand. There is a link between employee responses to workplace change and a particular type of organisational culture. The typical workplace design with standard work settings reflects the efficiency focus in the hierarchical culture. The location of the operations department close to other departments and client premises supports efficient communication, and this matches the efficiency focus typically found in a hierarchical culture. The focus on efficiency is also visible in the high ranking of adjacency and locality of workplaces and the subdivision of the building, as being one of three most important aspects of the work environment.

A link between workplace change and organisational culture has been explained by the organisational life cycle. At the earliest stages of the organisation life cycle, the DAD case shared its workplace with another organisation. Subsequently, the company was faced with an increasing demand for space as it grew in size and in the number of employees. It was eventually faced with the need to emphasise structure and standard procedures in order to manage the increasing number of responsibilities. Order and stability were needed, which resulted in a move to a single tenant building. This corresponds with the hierarchical culture of the organisation (Cameron & Quinn, 2006).

There is a link to a more standardised workplace design in a high uncertainty avoidance society (Klote, 2007). The typical workplace design with standard work settings of the DAD case reflects the high uncertainty avoidant culture, and has resulted in a low percentage of satisfied employees in number, diversity, and functionality of spaces.

According to the literature, an extreme emphasis on owning space is an individualistic trait (Altman, 1975). People in individualistic cultures are more distant proximally (Gudykunst and Matsumoto, 1996). The relationship between individualism and workplace can be described as displaying the need for privacy which is signalled by closed doors, soundproofing, double doors, or trees along property lines (Hall, 1966, Altman & Gauvain, 1981). In the DAD case, the provision of private rooms and high partitions emphasises the privacy aspects and the individualistic culture. However, the high partitions have resulted in the high dissatisfaction percentage in openness and transparency in the DAD case.

§ 6.9   Conclusions

The research findings show that the performance measurement of the DAD case occurs at multiple levels (individual, organisation, community). The empirical data shows connections between the organisational context and workplace performance with regard to performance criteria and performance measures. The efficiency focus in the DAD case is demonstrated by the choice of a location near to client offices, and by the typical layout with standard work settings in order to achieve cost reduction, and less regarding for an effective use of space.

Thai governmental policy requires public organisations to measure performance based on a Balanced Scorecard, as has been seen in the DAD case. The six perspectives of corporate real estate performance measures noted in the literature can be used as a reference to compare the performance measures used in current practice, as input to considering for the improvement of the efficiency and effectiveness of performance measurement.

Our findings show connections between the variables in the conceptual model (i.e. organisation, workplace change, and employee responses to the work environment), and they confirm that the conceptual model can be used to understand the complex relationship between these variables. The findings also show that employee satisfaction with the organisation can have an impact on workplace appraisal, and should be included in the conceptual model. The cultural context variable enables a better understanding of the role of organisational and national culture in relation to workplace change and the subsequent appraisal of this change. However, the explanation of the findings (i.e. performance measurement, the appraisal of change) in connection to national and organisational culture is quite difficult and more explorative and interpretative than concluding. In addition, the impact of national culture is much less visible and explaining the results than might be expected.

7 Case 2: Philips, Bangkok, Thailand

Introduction

This chapter presents findings from a second case study in Thailand, Philips Electronics Thailand (PTH) Limited. The study was set up to identify performance measurement frameworks, criteria and performance measures/KPIs of the case organisation, and to investigate the impact of a workplace on employee satisfaction, perceived productivity, support, and prioritised aspects, both before and after the change. Another purpose was to explore contextual backgrounds of organisational and national culture that may have an impact on workplace performance. The findings from this case study are used for a cross-case comparison with another Thai and Dutch case study in Chapter 9.

Research methods

The data collection methods included interviews, document analysis, observations and findings from three separate questionnaires. Data on performance measurement were collected from company reports and information from the country human resource director. The impact of workplace change was examined through the work environment diagnosis instrument (WODI) questionnaire. The WODI tool (described in detail in Chapter 3) is used to evaluate employees' responses to the changed work environment in three areas: employee satisfaction, perceived productivity support, and prioritised aspects (Maarleveld et al., 2009). The Organisational Culture Assessment Instrument (OCAI; Cameron and Quinn, 2006) was used for assessing organisational culture. National culture was measured by using the Value Surveys Module 94 (VSM94; Hofstede, 1997). Both the OCAI and VSM94 questionnaires have been discussed in Chapter 4.

Documents used for analysis include PTH's post-move survey report and the workplace innovation report (Philips, 2011). The study by Gumbus and Lyons (2004) provides important information with regard to Philips' performance measurement; the findings on performance measurement are based on their study. A semi-structured interview was applied for four interviews: with the order desk manager, regional sales manager, general manager, and country human resource director. The interviews

included questions concerning performance measurement, perceptions about working environment and culture. The interview with the country human resource director focused on performance measurement of the organisation. Observations were conducted by a walk-through, recording where and when certain behaviour occurs. The WODI questionnaires were applied to the surveys both before and after the change. The evaluation of the workplace before the change was conducted from September to October 2010. The appraisal of the workplace which took place after the change was conducted from August to September 2011. Cultural surveys using OCAI and VSM94 were conducted during the first phase before the office moved to the new place.

§ 7.3 Case description

PTH manufactures, markets, and distributes lighting products, domestic electrical and electronic goods, audio-visual equipment, and professional products. Philips also sells medical systems, consumer communication, and semiconductors and components. In addition, it offers consumer electronics products, personal care products, and a shared service centre. The company was founded in 1952 and is based in Bangkok, Thailand. PTH is a subsidiary of Koninklijke Philips Electronics NV. The Philips' mission is to improve the quality of people's lives through the timely introduction of meaningful innovations with a vision to lead in bringing sense and simplicity to people. Philips' key values for their staff are: eager to win, take ownership and team up to excel. The organisation employs over 2,000 employees working in consumer and professional products, including three main services: healthcare, lighting and consumer lifestyle. Philips Electronics Thailand has expanded its product line to decorative lighting products and lamps in order to cover more market segments and become the market leader in the area within three years. The target is also part of the three-year Philips Electronics worldwide plan to become No.1 in the Asian consumer luminaires market (Bloomberg Businessweek, 2011). PTH has been awarded the following international quality management standards:

- ISO 9001 (quality management)
- ISO 14001 (environmental management)
- TIS 18001 (health and safety)

Organisation structure
Figure 46 shows the PTH organisation structure, comprising four sectors:

1 Lighting (lamps, LED components, lighting electronics, consumer luminaires, and professional luminaires)
2 Consumer lifestyle (domestic appliances, health and wellness, shaving and beauty, connected displays, peripherals and accessories, home networks, video and multimedia and professional and business solutions)

3   Healthcare (imaging systems, healthcare informatics, ultrasound & monitoring solutions and home healthcare solutions
4   Administrative (human resources, procurement and operators)
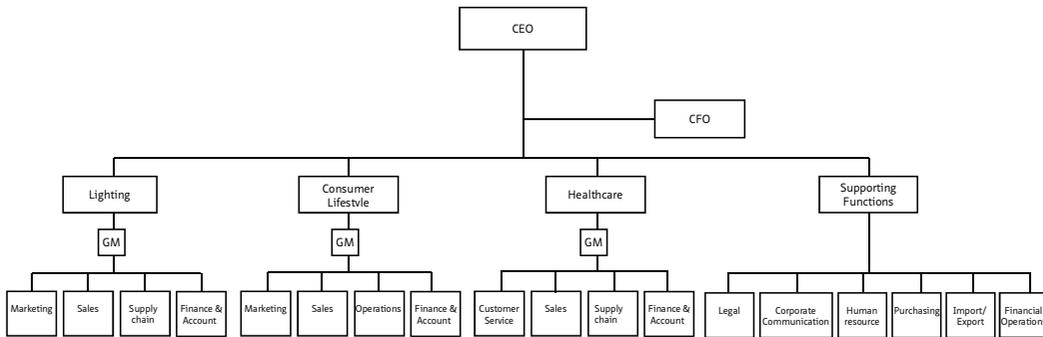
Figure 46
Organisation structure

The Management Team (MT), consisting of the CEO, CFO and GM of the four sectors, is responsible for decision making. All important changes in the organisation have to be approved by the MT.

Work process
The Philips Lighting department has a total of 76 employees who can be described as mobile and non-mobile workers. The mobile workers are employees that work out of the office for most of the time, for example, a salesperson who has to contact dealers/customers in other provinces or a marketing officer who has to promote campaigns and trade exhibitions in targeted locations. The mobile workers usually spend the time out of office and come to work or have a few meetings in the office for around 30 % of the total working time. The non-mobile workers are located at the office, taking orders from sales or doing administrative tasks; from time to time they attend meetings at clients' offices.

§ 7.4   **Workplace change**

The PTH headquarters are located in the city centre of Bangkok at the Thai Summit Tower office building (See Figure 47). Thai Summit Tower is a prime commercial property strategically located on New Petchburi Road near the Asoke intersection in Bangkok. The 34-storey building offers 33,242 sq.m. of office space. Designed and

constructed to international standards, the building is also professionally managed by Jones Lang LaSalle. It has 14 tenants with an occupancy rate of 72%. The building began construction in 1996 prior to the financial crisis and was completed in 2000. Typical unit size equals 1,200 sq.m. with 2.70 m. clear height (Joneslanglasalle, 2011). This modern design office building is considered as a "grade A" office; a high-rise purpose-built property owned and operated by a professional office landlord. The rental price is 500 Baht (12 euros)/sq.m./month, a moderate sum compared with other buildings in the CBD. The building can be easily accessed by car, subway and sky train.

Figure 47
Thai Summit Building

Amenities include:
- 700 car parking spaces
- Chilled-water air-conditioning system
- 14 high-speed passenger lifts and a separate service lift
- Building automation system
- International standard fire alarm and fire safety systems
- Meeting and conference rooms to cater up to 400 attendants
- Canteen

Workplace before the change
Before 2010, Philips Lighting occupied the 29th floor of the Thai Summit office building. The office space is described as an open plan with shared facilities. The general workers worked at workstations in the open plan, and the general manager had his own office. Figure 48 shows the office layout of Philips Lighting department before the change. Only half the floor space is allocated to office space which resulted

in a high concentration of people. For this reason, the department was relocated to the 26th floor in November 2010. The new working environment is fully adapted to the workplace innovation concept (WPI).
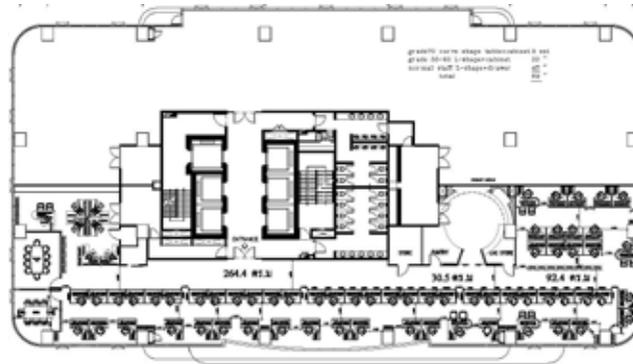
Figure 48
Open plan office at Philips Lighting department on the 29th floor, old situation (Ruethaivanich, 2011)

Figure 49
Open plan office at Philips Lighting department, old situation

Preparation and implementation process
The organisation notified all its employees about the move and set up a so-called WPI-team to manage the process. The WPI team consisted of the management team and representative committees from all working units. The WPI team then set up a meeting in regard to the preparation of the new workplace. The representative committees are in charge of spreading the information about the preparation process to members of each group. Samples of workstation furnishings were tested by employees to see whether they were comfortable and suitable for use in the new office. The layout of the WPI was posted on the wall so that everyone could learn about his/her location. In a regular meeting, the preparation process was discussed with the employees. The workstations were not fixed except for those of the non-mobile staff who regularly perform desk work. The organisation outsourced the office move to a professional removal firm. The removal boxes were provided by the firm. Computers and IT systems were collected and restored by the IT team.

One of the change management activities shown in the generic timeline is the preparation of change and communication plan to align with the overall project plan (Figure 50).
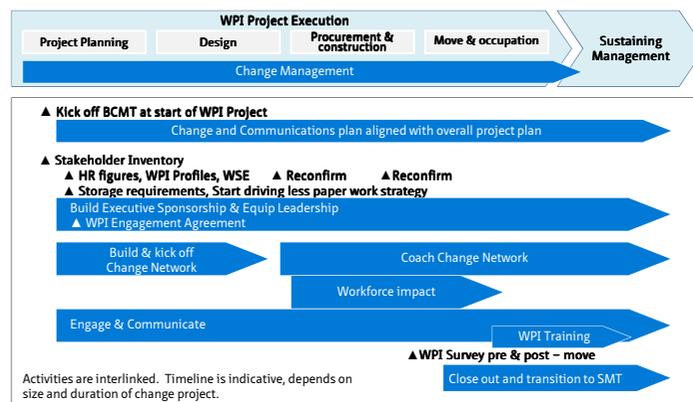
Figure 50
Change management activities in the generic timeline (Philips, 2011)

Workplace after the change
Philips Lighting moved from the former office on the 29th floor to the renovated office on the 26th floor of the same building. The new office has a larger floor area with a number of work settings including a standard work setting, an enclosed office, touchdown work settings, a break-out area, a meeting room and a board room. Figure 51 shows the new layout after the renovation. The new lighting department layout can be seen in Figure 52.
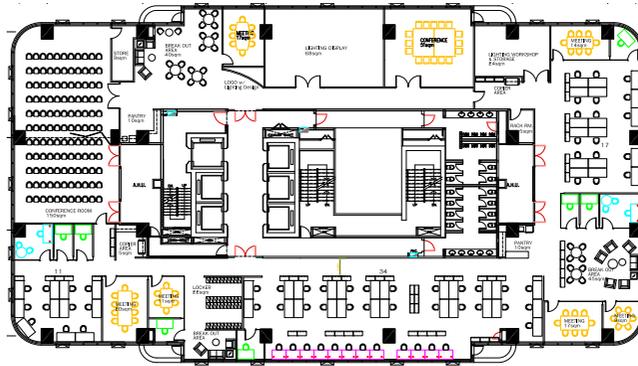
Figure 51
Open plan office at Philips Lighting department on the 29th floor, old situation (Ruethaivanich, 2011)

Figure 52
Workstations and work environment, new situation

§ 7.5   Performance measurement

This study is based on the Balanced Scorecard (BSC) of Philips Electronics (Gumbus and Lyons, 2004) who applied it to its performance measurement system in order to align the company vision and to educate employees about what drives the business.

The principle of the scorecard design is to determine which factors are critically important in order to achieve the organisation's strategic goals. The Philips Balanced Scorecard involves the implementation process of these critical success factors, the business variables important for creating value, which can be grouped as follows:
- Competence (knowledge, technology, leadership, and teamwork),
- Processes (drivers for performance),
- Customers (value propositions), and
- Financial (value, growth, and productivity).

The implementation process of the critical success factors
The principle of the implementation process is that the top level scorecard criteria are the driving determinants for the lower level scorecard criteria. The relationships to particular performance indicators (i.e. customer satisfaction and product sales) were translated into critical success factors to measure performance. Financial and customer critical success factors that give the company a competitive edge were identified. Subsequently, the processes of critical success factors that have the greatest impact on achieving that competitive edge were determined.

The Philips' management team, a group of high ranking personnel, established a performance management system that measures the progress made towards achieving the company's vision and links short-term operations with long-term strategy. In this way, the employees can understand how their day-to-day activities contribute to company objectives. The balanced scorecard has been cascaded down throughout the organisation. By setting annual organisational targets, top management deploy the balanced scorecard to the organisational layers in the form of goals at business unit level.

The BSC in the Business Units
Critical success factors were developed at business unit level for each of the four perspectives of the BSC: competence, processes, customers, and financial (Table 31).

Financial		Processes	
Economic profit realized		Percentage reduction in process cycle time	
Income from operations		Number of engineering changes	
Working capital		Capacity utilization	
Operational cash flow		Order response time	
Inventory turns		Process capability	
Customers		Competence	
Rank in customer survey		Leadership competence	
Market share		Percentage of patent-protected turnover	
Repeat order rate		Training days per employee	
Complaints		Quality improvement team participation	
Brand index			

Table 31
Indicators at the business unit level (Gumbus and Lyons, 2004)

The department had to select critical success factors that have a major control responsibility in order to deploy these at a lower level. Subsequently, the management team for each business unit agreed which critical success factors distinguished the business unit from the competition.

The management teams applied a value map to acquire customer critical success factors by analysing customer survey data that reflected perceived performance. Financial critical success factors were determined using standard financial reporting metrics. Process improvements that can deliver the customer requirements were determined for the process critical success factors. The competence critical success factors were identified by determining what human resources and competencies are needed in order to accomplish the targets set for the other three perspectives.

Each business unit had to determine its key performance indicators in order to measure the critical success factors. The relationships between processes and results were quantified and performance drivers determined. Targets were identified based on the gap between the actual and desired performance for the current year, plus two and four years into the future.

Six key performance indicators that applied to all of Philips' business units are (Gumbus and Lyons, 2004):
• Profitable revenue growth
• Customer delight
• Employee satisfaction
• Drive to operational excellence
• Organizational development
• IT support.

These key performance indicators were aligned with the four perspectives of the balanced scorecard: organisational development and IT support relate to the competence perspective; customer delight and employee satisfaction align with the customer perspective; operational excellence drives the process perspective; and profitable revenue growth drives the financial perspective. Table 32 shows the indicators of profitable revenue growth at the Philips Lighting department as the indicators for each business unit level.

Objective	KPIs
1. Growth	Overall Sales Growth %
2. Outgrow the market in LED	LED sales growth %
3. Professional Luminaires	Sales Growth %
4. Customer centricity	Market introduction in time
	Market introduction realized sales
	Approbation realization in time
5. Increase profitability	Integral sale margin %%
	Integral sale %% of LED
6. Draw productivity	Sales growth
7. Maximize cash	Overdue account receivable %% of gross account receivable
8. Breakthrough with end users & specifiers*	Brand preference for key account management
	Brand preference for specifier
9. Build lighting	Number of positions filled
10. Executive growth accelerators	End users key account sales (outdoors/rental/office)
	OEM sales

*The specifier's primary responsibility is to support specification production on projects.

Table 32
The profitable revenue growth KPIs of Philips Lighting department (Ruethaivanich, 2011)

§ 7.6 Employees' responses to the work environment: assessment before the change

Respondents
The questionnaires were completed by 42 of the 76 employees (55% response rate), 18 female and 24 male (1:1.3 ratio). The majority of participants are between 31 and 40 years old (50%). Most of the participants are well-educated with 55% holding a Bachelor's degree and 43% holding a degree higher than a Bachelor's. Employees responded to questions with regard to the time spent on different activities and in different types of workplaces, preferred places, satisfaction and dissatisfaction with different aspects, most important aspects, organisational culture and key dimensions of national culture.

Employee satisfaction
....

Figure 53 shows employee satisfaction on a range of items. Items that employees appreciate most are facilities for remote working (66.7% satisfied and very satisfied respondents), lighting/content and complexity of work (64.3%), organisation (59.5%), indoor climate/openness and transparency of environment (57.1%) and the accessibility of the building (54.8%). Many employees are dissatisfied with opportunities to concentrate (69.1% dissatisfied and very dissatisfied respondents), privacy (59.5%), number, diversity, and functionality of spaces (50%), sharing own ideas about working environment/archive and storage facilities (40.5%) and adjacency and locality of the spaces (33.3%).
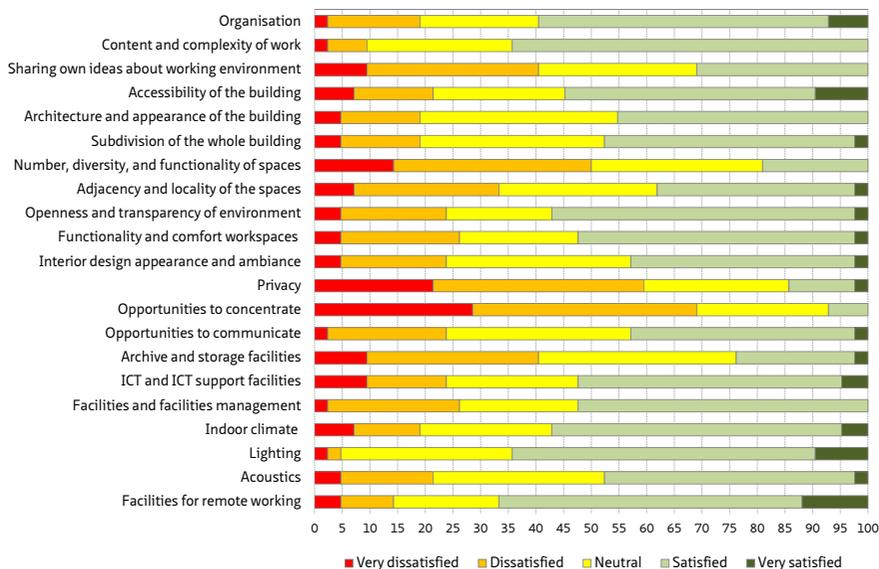
Figure 53
Percentage of satisfied and dissatisfied respondents with regard to different aspects (N=42)

§ 7.6.2   Perceived productivity support

Figure 54 demonstrates the extent to which the environment supports individual productivity (43.1%), team productivity (45.1%) and organisation productivity (42.5%).
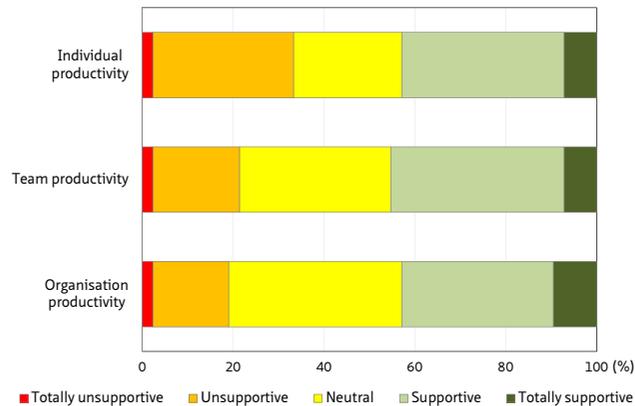
Figure 54
Percentage of participants that perceive the working environment as being supportive to different types of perceived productivity (N=42)

§ 7.6.3   Prioritised aspects

Figure 55 shows how employees rank the 3 most important aspects of the workplace environment. Functionality and comfort of the workspaces were mentioned by 43%, ICT facilities and ICT support facilities (33%), privacy (33%) and facilities for remote working (24%). The least prioritised aspects include the subdivision of the whole building (not mentioned by any of the respondents as being one as one of the three most important aspects), acoustics (2%), opportunities to communicate (2%) and sharing one's own ideas about the working environment (2%).
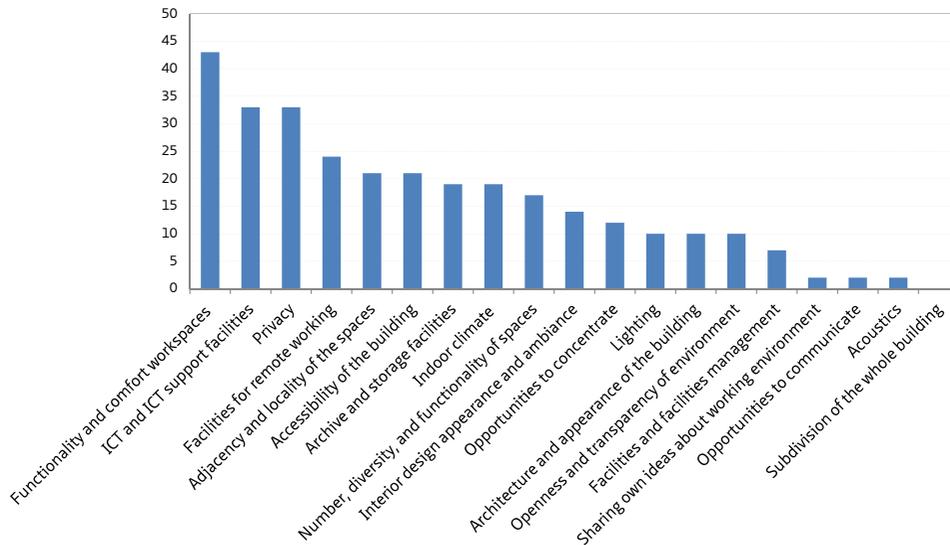
Ranking of % score awarded by respondents d showing a particular aspect as being one of the three most important aspects of the workplace environment (19 aspects) (N=42)

§ 7.7 Employees' responses to the work environment: assessment after the change

Respondents
The second phase of the research was carried out in August 2011. The questionnaires were completed by 32 of the 72 employees (44% response rate), 10 female and 22 male (1:2.2 ratio). The majority of participants are between 31 and 40 years old (59 %). Most of the participants are well-educated with 44 % holding a Bachelor's degree and 53 % holding a degree higher than a Bachelor's. Employees responded to questions with regard to the time spent on different activities and in different types of workplaces, preferred locations, satisfaction and dissatisfaction with different aspects, most important aspects, organisational culture and key dimensions of national culture.

Employee satisfaction

Figure 56 shows employee satisfaction on a range of items. Items that employees appreciate most are lighting (69% satisfied and very satisfied respondents), organisation (66%), accessibility of the building/functionality and comfort workspaces/interior design appearance and ambiance/facilities for remote working (62%) and content and complexity of work/indoor climate (59%). Some employees are dissatisfied with not having privacy (38% dissatisfied and very dissatisfied respondents), not being able to share their own ideas about working environment/ opportunities to concentrate/archive and storage facilities (31%) and ICT services and ICT support facilities (24%).
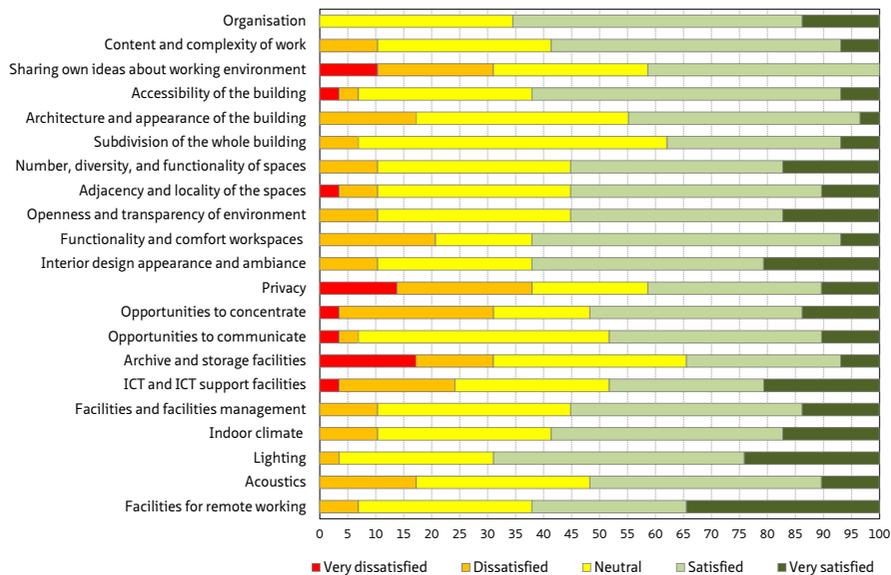
Figure 56
Percentage of satisfied and dissatisfied respondents with regard to different aspects (N=29)

§ 7.7.2   Perceived productivity support

Figure 57 demonstrates the extent to which the environment supports the individual productivity (55 %), team productivity (34 %) and organisation productivity (31 %).
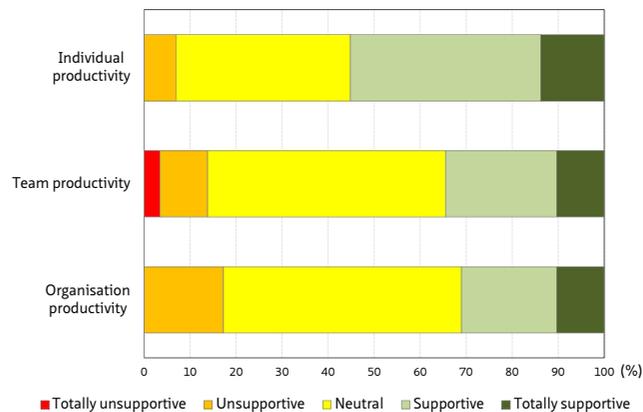
Figure 57
Percentage of participants that perceive the working environment as being supportive to different types of perceived productivity (N=29)

§ 7.7.3   Prioritised aspects

Figure 58 shows how employees rank the 3 most important aspects of the workplace environment. Opportunities to concentrate were mentioned by 45%, privacy (41%), functionality and comfort workspaces (34 %), ICT services and ICT support facilities (28%) and facilities for remote working (28%). The least prioritised aspects include architecture and the appearance of the building (not mentioned by any of the respondents as being one of the three most important aspects), indoor climate (3%), facilities and facilities management (3%) and interior design appearance and ambiance (3%).
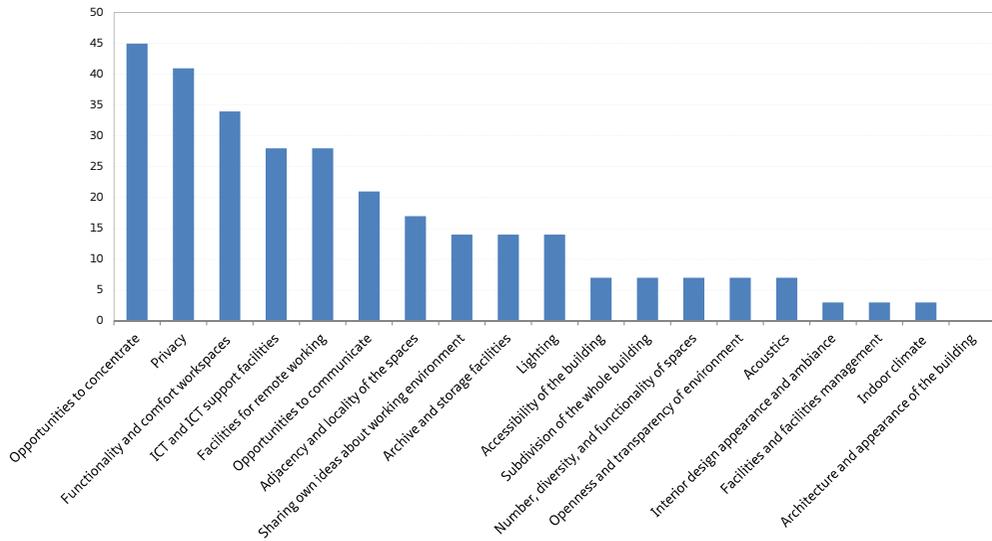
Ranking of % respondents marking a particular aspect as one of three most important aspects of the workplace environment (19 aspects) (N=29)

§ 7.8 Comparisons of employees' responses to the work environment before and after the change

Table 33 shows the comparisons made between the employees' responses on aspects of the work environment before and after the change. In the new situation, 16 of the 24 aspects have a higher percentage of satisfied respondents. In most of the aspects regarding the new workplace, the percentage of dissatisfied respondents has decreased.

	Workplace before the change			Workplace after the change		
	Dissatisfied	Neutral	Satisfied	Dissatisfied	Neutral	Satisfied
Organisation	19	21	60	0	34	66
Content and complexity of work	10	26	64	10	31	59
Sharing own ideas about working environment	41	29	31	31	28	41
Accessibility of the building	21	24	55	7	31	62
Architecture and appearance of the building	19	36	45	17	38	45
Subdivision of the whole building	19	33	48	7	55	38
Number, diversity, and functionality of spaces	50	31	19	10	34	55
Adjacency and locality of the spaces	33	29	38	10	34	55
Openness and transparency of environment	24	19	57	10	34	55
Functionality and comfort workspaces	26	21	52	21	17	62
Interior design appearance and ambiance	24	33	43	10	28	62
Privacy	60	26	14	38	21	41
Opportunities to concentrate	69	24	7	31	17	52
Opportunities to communicate	24	33	43	7	45	48
Archive and storage facilities	41	36	24	31	34	34
ICT and ICT support facilities	24	24	52	24	28	48
Facilities and facilities management	26	21	52	10	34	55
Indoor climate	19	24	57	10	31	59
Lighting	5	31	64	3	28	69
Acoustics	21	31	48	17	31	52
Facilities for remote working	14	19	67	7	31	62
Individual productivity	33	24	43	7	38	55
Team productivity	21	33	45	14	52	34
Organisation productivity	19	38	43	17	52	31

Table 33
Percentage of satisfied, neutral and dissatisfied respondents before and after workplace change with regard to different aspects

§ 7.9   Cultural context

The organisational culture survey was conducted using the Organisational Culture Assessment Instrument (OCAI; Cameron and Quinn, 2006). Four organisational culture types were used to characterise the survey results: clan, adhocracy, hierarchy, and club. The Value Surveys Module (VSM94; Hofstede, 1997) was used to identify five dimensions of national culture, i.e. power distance, individualism, masculinity, uncertainty avoidance, and long-term orientation.

§ 7.9.1　Organisational culture

In the case study, the current culture is perceived as a market culture (29.9 points), whereas the clan culture (29.8) is the most preferred, however, all of the other culture types also apply. A market culture scores high on organisational leadership (Cameron and Quinn, 2006); the leaders are considered to be demanding and management of employees is usually linked to an adhocracy culture type. The organisation's leadership is characterised by individual risk-taking, innovation, freedom, and uniqueness. The dominant characteristics are formalized and structured with procedures governing what people are to do, which fits with the hierarchy culture type. The glue that holds the organisation together is an emphasis on winning. Success is defined in terms of market share and penetration. Competitive pricing and market leadership are important. The organisational strategy emphasizes competitive action and achievement. Hitting stretch targets and winning in the marketplace are dominant. Table 34 displays the different aspects of the PTH organisational culture.

	CLAN			ADHOCRACY			MARKET			HIERARCHY		
	Current	Prefer	Dif.	Current	Prefer	Dif.e	Current	Prefer	Dif.	Current	Prefer	Dif.
Average	20.9	29.8	-8.9	25	23.4	1.6	29.9	22.9	7	24.3	23.9	0.4
Dominant characteristics	19.6	34.9	-15.3	21.3	19.7	1.6	28.9	28.9	0	30.3	16.4	13.9
Organisational leadership	21.2	27.2	-6	26.3	24.1	2.2	29.5	21.7	7.8	23	27	-4
Management of employees	22.8	31.3	-8.5	29.9	20.2	9.7	27.6	19.5	8.1	19.7	29	-9.3
Organisational glue	20.3	28.4	-8.1	22.8	25.9	-3.1	28.9	24.3	4.6	28	21.3	6.7
Strategic emphasis	20.2	28.8	-8.6	23.4	24.1	-0.7	33.5	23.3	10.2	23	23.8	-0.8
Criteria of Success	21.1	28.3	-7.2	26.1	26.6	-0.5	31	19.5	11.5	21.7	25.7	-4

Notes. Respondents are asked to divide 100 points among the four culture types. A higher number of points is given to the option that is most similar to the organisation.

Table 34
Organisational culture index according to the case study (N=42)

§ 7.9.2 National culture

The case study shows that much lower scores on power distance, masculinity and long-term orientation have been obtain than what is normally the case in Thailand, and much higher scores were obtained on individualism and uncertainty avoidance. According to Hofstede, cultural indexes are not supposed to be used as cultural generalisations to stereotype and to suggest that cultural groups are all the same or will not be altered at all by experience. This might explain why the cultural values in the case study show that the employees are quite different from those of the national Thai cultural indexes. The high individualistic culture and low power distance indicate that subordinates expect to be consulted and not to be told what to do. The low masculinity score may indicate that management is by consensus. The low long-term orientation index means that efforts should produce quick results (Hofstede, 1997). Table 35 compares the indexes of the PTH case with the national data from Thailand (Hofstede, 1997).

Index	Philips	Thailand*
1. Power Distance Index (PDI)	18.2	64
2. Individualism Index (IDV)	87.3	20
3. Masculinity Index (MAS)	-0.7	34
4. Uncertainty Avoidance Index (UAI)	84.1	64
5. Long-term Orientation Index (LTO)	38.4	56

* Thailand data according to Hofstede (1997). Notes. Values of each index is usually between 0 (small/weak in particular dimension) and 100 (large/strong in particular dimension), but values below 0 and above 100 are technically possible.

Table 35
Five key dimensions of national culture

§ 7.10 Reflections

§ 7.10.1 Performance measurement

The requirement to improve environmental quality of the workplace has an influence on specific performance criteria. The PTH case shows to be more concerned about the effective use of space through the implementation of the workplace innovation

concept. The four perspectives of the balanced scorecard have been found in the PTH case, including profitable revenue growth, customer delight, employee satisfaction, drive to operational excellence, organisational development and IT support. Being a market-oriented company, PTH focuses mainly on internal stakeholders, and less on external stakeholders. The concern with internal stakeholders is visible in performance measures such as market share, rank in customer survey, repeat order rate complaints, and brand index.

CRE performance measures in literature and what has been found in the PTH case
Based on the Balanced Scorecard, corporate real estate performance measures in the literature have been classified in six categories: stakeholder perception, financial health, organisational development, productivity, environmental responsibility and cost efficiency. Table 36 presents the proposed list of corporate real estate performance measures – classified according to Bradley's (2002) six categories – and the performance measures applied in the PTH case. When comparing the proposed performance measures from the literature with what was found in practice, it appeared that there were both striking similarities and differences.

1. Stakeholder perception	Proposed performance measures according to the literature	PTH
Employee satisfaction with work environment	· Quality of indoor environment: lightning, air conditioning, temperature, noise level, etc. · Provision of safe environment · Location success factors (access to employees, amount of local amenities) · Ratio of office to common areas · Provision of amenities · Amount of workplace reforms and space modifications	· Employee attitude survey (perceptions and attitudes related to employee satisfaction) · Employee satisfaction survey conducted by Philips Real Estate
Employee satisfaction with CRE services	· Employee satisfaction with professional skills · Employee satisfaction with information sharing	· Employee satisfaction survey conducted by the author (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 required transportation, access to customers, distance to other sites and businesses)	· Rank in customer survey* · Number of Complaints*
Community and well-being	· The contribution to public policy and societal priorities	NA
2. Financial health		
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	NA

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3. Organisational development	Proposed performance measures according to the literature	PTH
Quality of facilities	· Physical condition of facilities · Suitability of premises and functional environment · Number of building quality audits	· Risk management and business control (strategic, operational, compliance and financial risks)*
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
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	· Percentage reduction in process cycle time* · Number of engineering changes* · Capacity utilization* · Order response time* · Process capability*
4. Productivity		
Employee productivity	· Productivity (% of perceived productivity support from working environment) · Absentee rates by buildings	· Health & wellbeing in the workplace through the workplace innovation (WPI) · 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, or shared services opportunities	· The implementation of the WPI · Smart IT solutions for the introduction of WPI
5. Environmental responsibility		
Resource use	· Energy consumption · Number of energy audits	· Green products* · Energy efficiency improvement · Collection and recycling of company's products* · Amount of recycled materials in company's products*
Waste	· Contaminated sites management · Amount of garbage	NA
6. Cost efficiency		
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	· Office rent (Baht/sq.m./month)**
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)	· Utility (electricity & water) cost/unit · Parking cost/month · Overhead cost*

* does not directly relate to real estate, NA not applied i.e. not measured or no data available, **43 Baht = 1 euro

Table 36

CRE performance measures from the literature (left) compared to case study findings (right)

1   *Stakeholder perception*
    The findings show that in the PTH case, there is more concern with internal stakeholders (i.e. employees and clients). The concern with employee satisfaction with the work environment reflects workplace change objectives in improving the environmental quality of the workplace.

2   *Financial health*
    The PTH applies financial performance measures as demonstrated in the organisation's critical success factors (i.e. value, growth and productivity) and performance indicators including economic profit, income from operations, working capital, operational cash flow and inventory turns. Financial performance measures that are related to real estate appear to be missing.

3   *Organisational development*
    The organisational development perspective includes indicators related to the internal business process perspective of the balanced scorecard. Most PTH performance measures found in this perspective are not related to real estate. Although the PTH case includes performance measures related to risk management and business control, these measures are not related to the quality of facilities.

4   *Productivity*
    The PTH case focuses on smart IT solutions for the introduction of workplace innovations that are considered to be the strategic involvement of corporate real estate. The strategic involvement of corporate real estate in connection to human resource strategies is visible in the implementation of the workplace innovation (WPI) that helps to improve health and well-being in the workplace. According to the literature, this approach focuses on the provision of an office environment that enables employees to increase their productivity. This approach is considered as the shift from cost reduction to human contribution with regard to office productivity (Haynes, 2007).

5   *Environmental responsibility*
    PTH's concerns about energy performance are shown by the focus on green products, energy efficiency improvement, recycling of company's products, and the amount of recycled materials in the company's products. However, these performance measures are not directly related to real estate.

6   *Cost efficiency*
    PTH rents a commercial office space with a fixed rental price/square metre/month that is considered as occupancy costs. The PTH operating costs include utility costs/ unit (i.e. electricity & water) and parking costs/month. Another area related to cost efficiency is the overhead cost reduction, however, these performance measures are not related to real estate either.

Employee satisfaction

The findings show that the business type, staff characteristics and work processes of PTH have an influence on the implementation of the innovative workplace concept that may account for the high percentage of satisfied respondents in several aspects of the PTH workplace. The flat structure of the PTH organisation allows employees to become involved during the design process, which again has led to the higher satisfaction percentage in sharing their own ideas about the working environment, number diversity and functionality of spaces, interior design appearance and ambiance, and openness and transparency of environment.

The highly competitive business environment of PTH requires a particular type of employee. This results in high expectations regarding the effective workplace that supports creative and group work. In terms of work processes, there are two types of employees working at the Philips Lighting department, namely, mobile and non-mobile workers. The mobile workers work outside the office most of the time, whereas the non-mobile workers are office-based. The different work activities of these two groups require specific design criteria and policies regarding the use of work settings.

Located in the city centre, the PTH Grade A office building is appreciated by the employees, as this is reflected in the high satisfaction score regarding the accessibility of the building and interior design appearance.

The shared workspaces and storages for mobile workers, the various types of work settings and functional workspaces have been facilitated in the new workplace. This resulted in the high percentage of satisfied respondents regarding several aspects of the work environment including facilities for remote working, facilities and facilities management, and adjacency and locality of the spaces.

The new layout design has improved the connection between spaces compared to the previous one, and this has led to improved employee satisfaction with regard to the subdivision of the building. In addition, the more square meters per person has resulted in a much higher percentage of satisfied respondents regarding the opportunities for concentrated work. However, PTH separated the workplace of the lighting department from other units, which affects opportunities for communication.

The findings show that the ICT services and the ICT support facilities are a dissatisfier (Herzberg, 1987). This aspect showed slight improvement (52% of satisfied respondents compared with 48% in the former situation), and it was one of the top three 'most dissatisfied' aspects in the new situation. It is evident that dissatisfaction will remain high if this aspect is not fulfilled.

Perceived productivity support
The findings from the PTH case after the change show striking differences between the perceived productivity support. The perceived support of team and organisation productivity dropped whereas the individual productivity increased after the change to the new workplace. There are various groups of employees in the Philips lighting department, but team spaces were not provided to support group work which caused difficulties in communication and for working in teams. It was concluded that the lack of team space caused the lower satisfaction percentage in team and organisation productivity which was observed after the change. The negative impact of workplace design on perceived productivity support is visible in this case.

Prioritised aspects
PTH employees indicated that the need for functional comfort in order to support and improve task performance, received high priority regarding the functionality and comfort of the workspaces and the opportunities to concentrate. Functional comfort focuses on the generic human need for tools to perform specific tasks; it defines the workspace as a tool for getting work done (Vischer, 2008).

Conceptual model of workplace change appraisal
A conceptual model has been used to explore the relationship between the variables impacting on an appraisal of workplace change (Figure 59). The complex relationship between the three groups of variables (Start, Mediating and Outcome) of this conceptual model is shown in Table 37.
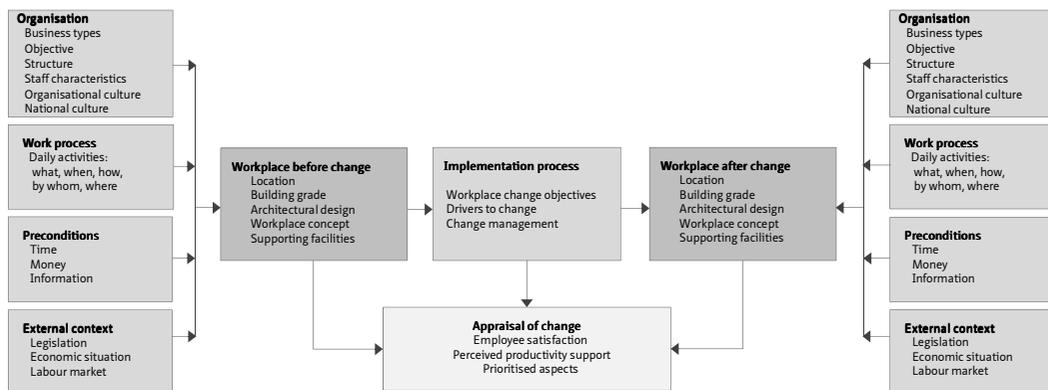
Figure 59
Relationship between variables impacting on an appraisal of workplace change (Riratanaphong & Voordt, 2012)

Relationships between variables of the conceptual model
Table 37 demonstrates assumed causal relationships between characteristics of the organisation, work process, preconditions, external context and implementation process as start variables with mediating variables of workplace change such as location, architectural design and workplace concept, and the appraisal of change as an outcome.

Start variables	Mediating variables	Outcome
Organisation	**Workplace change**	**Appraisal of change**
Business types Consumer lighting business	*Workplace concept* Different types of workspaces for lighting specialists	*Employee satisfaction* High satisfaction percentage in number, diversity, and functionality of spaces
Structure Flat structure	*Workplace concept* Employees become involved during the design process that contributed to the improved work environment	*Employee satisfaction* Higher satisfaction percentage in sharing own ideas about working environment and number diversity and functionality of spaces
Staff characteristics Mobile workers	*Workplace concept* Workplace with various types of work settings and functional workspaces	*Employee satisfaction* High percentage of satisfied respondents in facilities for remote working
Staff characteristics Specialists in consumer lighting industry	*Workplace concept* Layout and work settings designed for the effective use of spaces Workplace supports creative and group works	*Prioritised aspects* Employees indicate the emphasis on functionality and comfort of the workspaces and opportunities to concentrate.
Organisational culture Market culture	*Building grade, location* Grade A office* in the city centre	*Employee satisfaction* High percentage of satisfied respondents in interior design appearance and ambiance
National culture Individualistic culture	*Workplace concept* The provision of private rooms	*Prioritised aspects* Employees indicate the emphasis on privacy
Work process *Daily activities* Creative and group works	*Workplace concept* Workplace supports collaborative work	*Employee satisfaction* High satisfaction percentage in functionality and comfort workspaces
Precondition *Money* Investment budget	*Location, building grade* New workplace is located in the city centre in Grade A office*	*Employee satisfaction* High satisfaction percentage in accessibility of the building and interior design appearance
Implementation process *Workplace change objective* To increase floor space and to improve environmental quality	*Workplace concept* The new layout design that improves the connection between spaces better than the old one More square meters area per person	*Employee satisfaction* Improved employee satisfaction with regard to subdivision of the building and High percentage of satisfied respondents regarding the opportunities to concentrate
Change management Communication with employees	*Supporting facilities* ICT and ICT support facilities	*Employee satisfaction* ICT and ICT support facilities is one of the top three most dissatisfied aspect
	Workplace concept Team spaces are not provided to support group works	*Perceived productivity support* Lower satisfaction percentage in team and organisation productivity after the change

Bold = main variables, *characterised by an office that has exceptional building design and services (CBRE, 2012)

Table 37
Relationships between variables of the conceptual model applied to the PTH case

The consumer lighting business of the PTH case has been supported by the work environment that supports task performance such as a large workshop room for lighting specialists and a storage room for sample products. The policies with regard to the use of different types of workspaces have resulted in a high satisfaction percentage in number, diversity, and functionality of spaces and functionality and comfort workspaces.

The *flat structure* of the PTH case allows employees to get involved during the design process and has resulted in a higher satisfaction percentage in sharing own ideas about working environment and number diversity and functionality of spaces.

Staff characteristics influence workplace design with various work settings that can support different work activities which have resulted in the high satisfaction in facilities for remote working and facilities and facilities management. This also has resulted in the emphasis on functionality and comfort of the workspaces and opportunities to concentrate.

Market culture is reflected by the choice to occupy a Grade A office building in the city centre that aims to attract clients. The Grade A office resulted in a high employee satisfaction score regarding interior design appearance and ambiance. The provision of private rooms can be viewed as a way to strengthen the emphasis on privacy in the *individualistic culture.*

One precondition is an *investment budget* which enables PTH to rent office space in the city centre with high-quality building design and services. This resulted in a high satisfaction score regarding the accessibility of the building and interior design appearance.

Workplace change objectives influenced the decision to occupy a larger floor area and a new layout, which helped to improve the connections between spaces. This resulted in a high satisfaction score regarding the opportunities to concentrate, and the improved employee satisfaction with the subdivision of the building.

Supporting facilities such as ICT services and ICT support facilities were not appreciated by the employees because the office was simply moved to a new workplace, so some functions were not fully implemented. The lack of team space for group work caused a lower satisfaction score in team and organisation productivity following the workplace change. This indicates a need to have better channels of communication with employees during the implementation process.

The assumed causal relationship can be explained by the links of variables in the conceptual model as shown in Table 37. However, there should be a direct link between the organisation and the appraisal of change in the conceptual model; i.e.

employee satisfaction in organisation and content and complexity of work. These two items are not related to the physical work environment, but they can have an impact on the appraisal of change. This has led to the slightly adapted conceptual model, which described in Chapter 10.

§ 7.10.3   Cultural context

The field research identified the various types and dimensions of organisational and national culture. However, connections to other variables of the research are difficult to trace and to understand. PTH occupies a Grade A office in the city centre, which can be easily accessed for business contacts. The high quality of building design and services aim to attract clients. This focus on transactions with customers and suppliers is considered as a *market culture*. This culture type has had an effect on the high satisfaction percentages in the accessibility of the building and the interior design appearance and ambiance with regard to the location and building grade characteristics.

In addition, the implementation of PTH's workplace innovation program triggered the culture change, enabling cooperation within teams that also reflects the *clan culture*. By having a workplace that promotes teamwork, participation, and consensus, a successful internal climate which is concerned about people can be achieved in this culture (Cameron and Quinn, 2006).

According to the literature, an extreme emphasis on owning space is based on individualism (Altman, 1975). People in *individualistic cultures* are more distant proximally (Gudykunst and Matsumoto, 1996). The relationship between individualism and workplace can be described as displaying the need for privacy which is signalled by closed doors, soundproofing, double doors, or trees along property lines (Hall, 1966, Altman & Gauvain, 1981). The provision of the private rooms for telephone calls or meetings at the PTH workplace can be seen as placing an emphasis on privacy in the individualistic culture.

The characteristics of cultures that value individualism are described as a society where people's personal goals take priority over their allegiance to groups such as the family or the employer. A culture oriented to individualism might highly value the ability to work independently. In the individualistic culture, changing the work environment may influence the perceived productivity of the individuals better than those of the team and organisation.

§ 7.10.4   Conclusions

The research findings show that PTH applies performance measurement at multiple levels (i.e. individual and organisation). The connections between the variables in an organisational context, performance criteria and performance measures are visible in the case study. In the PTH case, we see a focus on an effective use of space in the implementation of workplace innovation, which can be explained by the type of business, staff characteristics, and PTH work processed. The findings show that performance measures in the PTH business units are aligned with the four perspectives of the balanced scorecard.

Based on the balanced scorecard, the six perspectives of corporate real estate performance measures in the literature can be used as a reference to compare with the performance measures used in current practice, as input to considering for the improvement of the efficiency and effectiveness of performance measurement.

The findings show connections between variables in the conceptual model (i.e. organisation, workplace change and employees' responses to the work environment), and confirm that the conceptual model can be used to understand the complex relationship between these variables. However, the satisfaction with organisation can also have an impact on workplace appraisal (indicated by employee satisfaction about the organisation itself) and should be brought into the model. The cultural context variable provides a better understanding of the role that organisational and national culture plays in relation to workplace change and the appraisal of change. However, the explanation of the findings (i.e. performance measurement, the appraisal of change) in connection to national and organisational culture is quite difficult and more explorative and interpretative than concluding. In addition, the impact of national culture is much less visible and explaining the results than might be expected.

8 Case 3: Waterschap Rivierenland, Tiel, The Netherlands

§ 8.1 Introduction

This chapter presents findings from a Dutch case study, Waterschap Rivierenland (WSRL), on the impact of workplace change after the organisation moved to a new building. This study aims to identify the performance measurement frameworks and criteria as well as the performance measures/KPIs taken by the case organisation, and to collect new data concerning the employees' responses to the changed work environment. Another goal is to explore the contextual backgrounds of both the organisational and national cultures that may have had an impact on workplace performance. The findings of this case study will be used for making a cross-case comparison with the other two Thai case studies in Chapter 9.

§ 8.2 Research methods

The data collection methods included document analysis and findings from three separate questionnaires. Data on performance measurement were collected from reviewing company's reports and information obtained from the International Affairs Officer of the case organisation. Information with regard to real estate performance was gathered from the Risk Inventory and Evaluation (RI&E) and interviews were conducted and reports were written by the Center for People and Buildings (CfPB). The findings concerning the impact of workplace change were derived from the results obtained from the post occupancy survey carried out by the CfPB in 2008 (Maarleveld and Brunia, 2009). The survey was conducted by using the work environment diagnosis instrument (WODI) tool to evaluate the employees' responses to the changed work environment in three areas: employee satisfaction, perceived productivity support and prioritised aspects. This tool has been described in more detail in Chapter 3. The Organisational Culture Assessment Instrument (OCAI; Cameron and Quinn, 2006) was used for assessing organisational culture. National culture was measured by using the Value Surveys Module 94 (VSM94; Hofstede, 1997). Both the OCAI and VSM94 questionnaires have been discussed in Chapter 4.

Case description

WSRL is a Dutch company which is responsible for the safety of water including dike management, water management, water treatment, waterways and groundwater management. It is an independent local authority governed by a democratically-elected government. The WSRL was established when following former polder districts merged together: Betuwe in Elst (Gld), Great Maas and Waal in Druten, Tieler and Culemborgerwaarden Geldermalsen, Linge, Geldermalsen and Riverland. The various tasks include water management, flood protection, water quality and waterway management and they have all been bundled together since this merger. Figure 60 depicts the new Waterschap Rivierenland building.

Figure 60
The Waterschap Rivierenland building, Tiel, The Netherlands. Source: Waterschap Rivierenland

The WSRL is responsible for water control in the river areas in The Netherlands. Its main objective is to protect the rivers so that it is safe for people to live along them. The management area is in four provinces of Gelderland, Utrecht, North Brabant and South Holland. The mission of the company is to "diligently work on sustainable water management". In terms of diligence, a certain degree of enthusiasm for one's work is encouraged in order to achieve efficient and effective results. Sustainability includes a number of interests such as man and nature and quantity and quality. Taxpayers are also taken into account. The 500 staff members work on the following main tasks:
- water management (i.e. maintenance, water levels, water quality)
- management of dikes and drainage quays
- management and maintenance of roads outside the built-up areas in the *Alblasserwaard* and the *Vijfheerenlanden*
- the treatment of waste water

- muskrat and coypu control in Gelderland
- management of the waterways in *Linge, Smoutjesvliet, Alblas, Giessen* and *Graafstroom*

Organisational structure

Figure 61 shows the organisational structure of the WSRL which includes five departments: 1) administrative and management support, 2) water management, 3) safety, 4) purification and 5) the audit committee department. Appointed by the government, the organisation's committee consists of a group of individuals who fill administrative roles and who are responsible for selecting core personnel, i.e. members of the audit committee and risk management personnel.
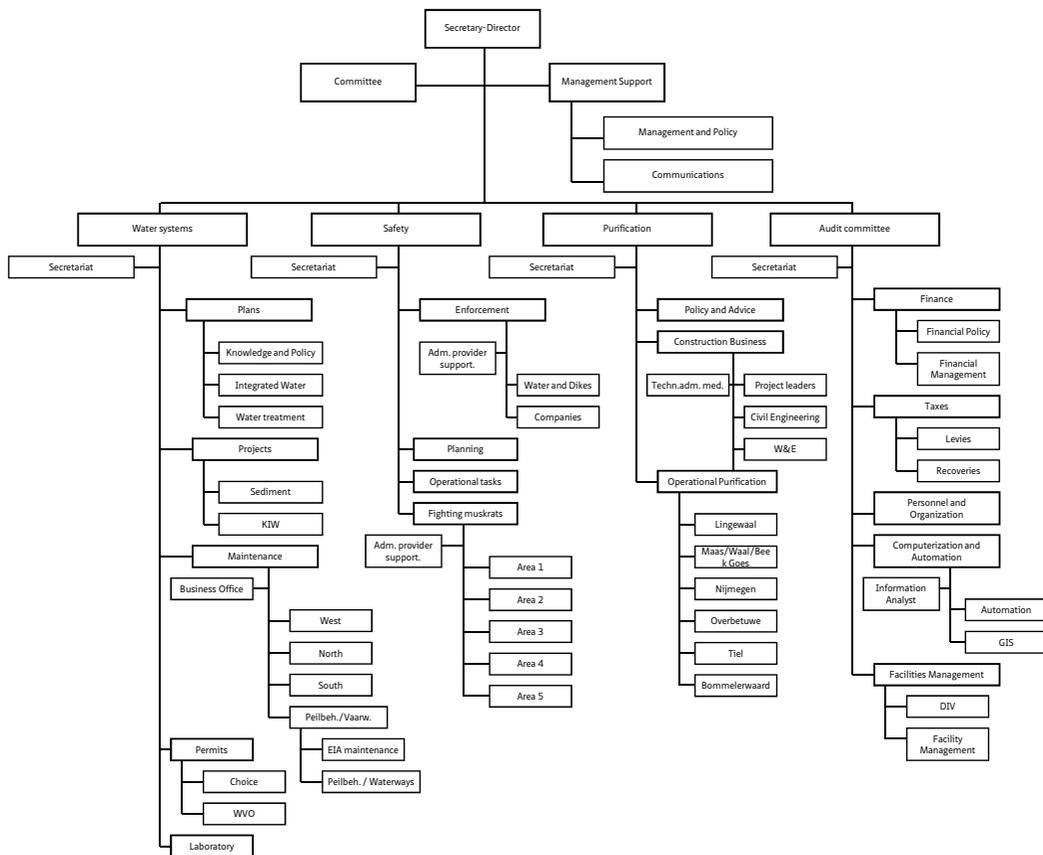
Figure 61
Organisational structure

Work process

The work activities determine the choice for the workplace. In this way, knowledge sharing is stimulated throughout the workplace more efficiently. The building has four floors and the visitors and staff are accommodated in a private reception hall. Each floor consists of several wings marked with numbers (floor) and letters (wing) on the carpet and columns in accordance with directions in which arrows point the way. Employees who have similar job positions and tasks are located in the same wing. There are 400 workstations for 500 employees that can be estimated to 7 square metres per person depending on their work activities. The total floor area is 12,500 square metres. A meeting area with informal seating and coffee machines is situated on each floor. Staff members occupy an open workstation separated by low cupboards. Team meeting rooms and cockpits with computers are provided. There is a staff dining room with an adjacent terrace on the ground floor. There are also several meeting rooms which staff can reserve in advance.

§ 8.4   Workplace change

Waterschap Rivierenland has been formed from several partners which used to be located in eight different locations. After the parties had all merged, these locations were reduced to include only three locations. In order to foster cooperation and integration, the organisation decided to accommodate all of the employees in one large building in 2002. In December 2006, the office in Tiel was chosen to be the new headquarters. Here, a new workplace concept was conceived which integrated work styles and in which digitalization was introduced. The objectives of the new workplace are to promote the quality of the work environment so that the space can be used effectively, and to convey a sense of professionalism by focusing more on the customer. Figure 63 demonstrates the new working environment that has been implemented at Waterschap Rivierenland. After the move, the objectives and principles of the new workplace were introduced and regulated as follows.

Objectives
- to promote the integration of the merger and integral partners
- to improve the quality of the work environment
- to stimulate mutual communication and the exchange of information to make more effective use of space

Principles
- there should be a suitable workplace for each activity
- multi-functional spaces should be maximised
- employees should work together whenever possible

- there should be a considerable degree of digitization
- the use of the workplace is oriented towards work processes

Workplace after the change

The main office building is based in Tiel. This building is easily accessible by car as it is only a few minutes off the exit from the highway. The accessibility by bus takes six minutes from the Tiel railway station to reach the building. There is an on-site car park for 320 cars. However, there are no amenities nearby. The office is a new, modern building designed that has been particularly designed for durability. Sustainability is clearly reflected in the use of materials and rainwater. The water that falls on the roof can be reused and collected to flush the toilets with. The climate control system of the building works according to the groundwater's temperature. This system reduces the emission of pollutants such as carbon dioxide as opposed to another system which works on gas.

The sustainable objective of the organisation is reflected in the design of the building and the workplace as well, for example, in the use of brick and the rounded shape of the building. The cockpits are decorated with natural materials such as sandbags, rocks and plants. The workplace has been facilitated so as to support the new way of working. The flex workplace has been provided with a variety of work settings and workspace layouts that can support various work processes. The application of the flex workplace concept with flexibility and the multifunctional use of space is appropriate to suit the changing needs of accommodation such as building extensions and/or any adaptations that might be made. The policies with regard to the flex workplace are also in place. This includes the clean desk policy, document management, and archive and storage facilities.
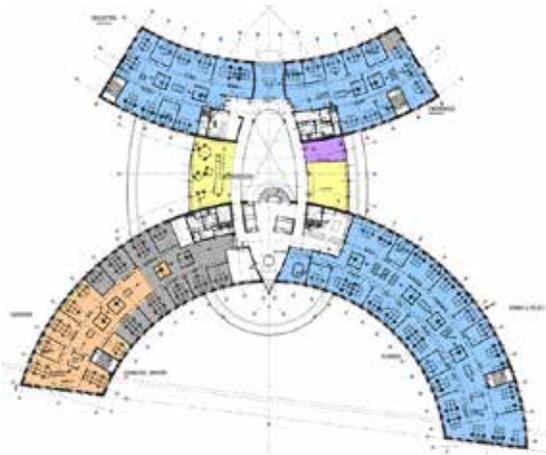
Figure 62
The Waterschap Rivierenland building, Tiel, The Netherlands. Source: Waterschap Rivierenland

Figure 63

Figure 63 (1-4 Interior and exterior of the new building. Source: Waterschap Rivierenland)
Figure 63 (5-8 Workspaces and support facilities. Source: Waterschap Rivierenland)

Preparation and implementation process
The workplace change was managed by a small steering committee that is chaired by the water board. The steering committee consists of resource directors, a daily board of resource portfolio, a secretary director, construction manager and representatives from workers as audience. The construction project was concerned with the 'hardware' (building) whereas the project Habit@ specifically dealt with the 'software' (the office concept and staff awareness). A human resource manager also served as a representative during the project Habit@ which was part of a training programme that allows employees to take part in the new workplace concept. The Human Resource Manager also sought to ensure that the new handling standards and the company's core competencies were aligned.

An advisory board was comprised of 50 employees who served as representatives of each group, which included approximately 10% of the total number of employees. The tasks of the board included: 1) gathering opinions and ideas and proposing decisions of the board, 2) transferring the plan to each group and 3) channeling input from the workplace. A focus group was carried out to gather opinions from an employee's perspective such as choosing office furniture and anticipating the regulations regarding the new office concept. Employees could express their ideas by sending their thoughts to the project's direct e-mail address.

The new building has been built with the aim of promoting integration and cooperation during the merger between the partners. It is meant to enhance the quality of the work environment and to use the space more effectively. In cooperation with the Center for People and Buildings (CfPB), the user satisfaction survey was carried out in 2007 and 2008 with the aim of assessing the employees' responses in regard to the new work environment concerning several aspects. The findings revealed that several aspects should be improved such as privacy, concentration, ICT and ICT support facilities, the accessibility of the building, and the archive and storage facilities.

Participatory project approach
- A human resource manager was a member of the steering committee and acted as an observer
- There was a focus group of 50 employees. All kinds of plans and ideas were presented to the focus group ranging from preliminary workplace design, choice of furniture and PCs, and specifications for telephoning, catering and cleaning
- The design was transparent. Employees participated in various stages of workplace design. This participation led them to choose PCs' with certain specifications and to decide to have windows that could be opened
- The project Habit@ involves different activities such as employee involvement and motivation and communication with employees
- In 2004, some areas of the WSRL's office spaces were transformed to include a flex workplace where employees could meet to air their opinions.

- A contest was held in order to find a name for the new office.
- Employees participated in the meeting and posed questions regarding the progress being made
- Employees can send questions or remarks concerning the project via e-mail
- The new ways of working such as the implementation of a clean desk policy were introduced through various activities
- Employees were regularly reminded about the impending construction
- Occupancy surveys were conducted after the implementation had been carried out in 2007 and 2008.

§ 8.5 Performance measurement

Performance measurement of Waterschap Rivierenland (WSRL) includes three main areas: 1) policy and management processes, 2) finance and 3) operation. Real estate performance can be divided into two categories: 1) User satisfaction survey and 2) Risk Inventory and Evaluation. In addition, the relationships with different stakeholders are described in this section.

1 Policy and management processes
Policy and management processes developed for the WSRL case can be described as follows (Waterschap Rivierenland, 2006):
- objectives are clear to all concerned
- scope of work is clearly described
- authorities and duties are understood by all parties
- collective responsibilities are clearly mentioned
- authorities enforced in the operation are kept to the minimum as much as possible
- unity of governance and administrative organisation should be promoted
- active participation in external consultation bodies should be undertaken

2 Finance
The financial needs are determined by the cash available to be deposited at the current value of the assets. In addition, cash limits and standard interest rates are two financial standards that have to be met according to company regulations.

3 Operation
The management of the WSRL is a combination between the internal organisational units and processes that support the primary functions of the organisation. This includes the management of the organisation, personnel, quality, health, safety & environment, policy accountability, information policy, accommodation, and facility

services. These support processes are essential for the primary functions to operate and for the efficiency and effectiveness of the policy implementation.

Real estate performance

1 User satisfaction survey

In terms of human resource management, the organisation implements a user satisfaction survey every two years. The survey evaluates the overall employee satisfaction, content of work, quantity of work and relationships with colleagues.
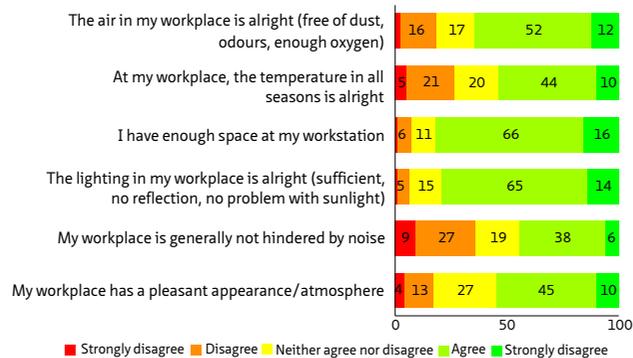
Figure 64
User satisfaction survey: workplace/physical conditions (InternetSpiegel, 2009)

A five-point scale questionnaire is made up of the modules. Each module consists of a number of specific topics which request the respondents' opinions. Figure 64 illustrates the results obtained from a topic of workplace/physical condition of the WSRL workplace in 2009. The green colour signifies 'very satisfied' or 'strongly agree' and red signifies 'very dissatisfied' or 'strongly disagree'.

2 Risk Inventory and Evaluation

The WSRL requested that the Arbo Unie, a company specialized in occupational health services, conduct a Risk Inventory and Evaluation (RI&E) assessment. RI&E consists of an inventory that has been taken of the risks that exist within a company concerning the health, safety and welfare of its employees. According to Dutch law regarding labour conditions, it is compulsory that large organisations in The Netherlands conduct an RI&E assessment. The organisations are examined by a certified occupational health service and/or professional service. The evaluation of these hazards consists of a risk estimate, which examines the probability of a hazard occurring, the effect it might have and the frequency with which workers are exposed to the particular hazard. The findings usually lead to a plan of action that includes plotting out the measures the employer intends to take in relation to the risks which have been identified, and the

period in which measures are to be taken in order to reduce these risks and to improve the health and safety (Blok et al., 2012).

The evaluation was conducted in November 2009. The RI&E includes the mapping of risks, estimating the risks according to a ranking that sets and tests standards and regulations. The risks were identified and classified so as to take appropriate action or make recommendations. The findings are tested to see if they adhere to statutory regulations and current insights. The evaluation covers the following subjects:

- Office
- Sanitary
- Relaxation areas
- Kitchen and canteen
- Climate
- Workstation
- Shaft spaces
- Structural safety
- Terrain and roads
- Company's emergency assistance
- Visitors
- Stairs
- Floors
- Lifts
- Lighting
- Aggression
- Electricity

These subjects consist of 101 assessment points. The assessment provides recommendations on how the risks can be reduced and/or controlled. The subjects are assessed and then they are provided with a risk classification as follows:

1 High Risk Action - immediate action is necessary
2 Moderate Risk - term action necessary
3 Low Risk - action advised

Relationships to different stakeholders (Polhuis and Hiemstra, 2004)
The various tasks of WSRL involve different stakeholders that can be linked to different perspectives regarding performance. Five aspects of the WSRL' characteristics, roles and responsibilities can be explained in relation to the performance measures such as:

1 *Weighing different interests*
The WSRL board is elected by voters in the management areas. Therefore, the general administrative control of this area in which interests often conflict must be weighed.

2 *Issuing and upholding of rules*

This aspect covers the issuing of licences and making exemptions concerning compliance. A tool such as administrative enforcement is applied. Official and administrative actions of the WSRL are the key for providing proper principles for directors.

3 *Developer/water manager*

The WSRL periodically makes a water management plan. This plan serves as the basis for an investment plan. The plan depends on other organisations such as the agricultural and fishing industry, as well as other governmental institutions that are found in the provinces and municipalities. The so-called 'waster chain' is the interface between the partners with regard to the sewage and water treatment. Finally, the relationship and role of the WSRL with other governmental agencies (rivers, coastal and territorial) focus on how external parties can become involved and how these parties can interact with the other parties.

4 *Administrator*

Administrative tasks include the dredging, management and maintenance of the waterways. The tasks regarding this aspect are expected to be rational and flexible. Rational refers to the efficiency of management implementation. The management responsibility includes the costs and benefits that can be achieved. Another task which needs to be done is the management of personnel. Employees are considered as representatives of the WSRL. Thus, employee satisfaction is believed to be very important. Human resources is an important factor that deserves attention in order to improve organisational performance. HRM is also one of the success factors of WSRL's performance. The development of tasks requires a different attitude towards the environment because each task carries with it a particular dynamic and entails the skills and competencies of personnel. For example, when the WSRL acts as a developer, the emphasis is on relationships and partnerships. Below Table 38 lists the various tasks and relationships with external parties in regard to the types of performance aspects (Polhuis and Hiemstra, 2004).

Tasks of WSRL	External relations	Nature of relationship	Type of performance
Weighing different interests	Voter	Representative	Recognizable, approachable
Service provider	Customer	Service	adequate, proactive
Issuing and upholding of rules	Subject	Subordinate	Predictable, consistent
Developer/water manager	Partner	Equivalent	Visionary, Partnership oriented
Administrator	User	Remote	Rational, flexible

Table 38
WSRL tasks and relationships with internal and external parties in relation to the types of performance aspects (Polhuis and Hiemstra, 2004)

§ 8.6   Employees' responses to the work environment

This research study investigates two separate areas: 1) the impact of workplace change on employee satisfaction, perceived productivity and the prioritised aspects of the work environment and 2) the evaluation of national and organisational culture. The first area of research was conducted by the Center for People and Buildings (Maarleveld and Brunia, 2009). The second area of research was conducted by the researcher of this PhD thesis.

Respondents
The WODI questionnaires, which are used as a tool for obtaining an indicative evaluation with a focus on overall employee satisfaction and the perceived support of labour productivity through the working environment. These questionnaires were completed by 307 employees from a total of 416 (74% response rate). Most of the respondents were between 31 and 40 years old, and 70% were male respondents. The majority of the participants were well-educated with 50% having received a college education. The largest group of respondents (32%) is employed by the Water Management, followed by the Resource Management department (22%), the Safety Management department (20%), the Human Resource department (15%) and the Treatment Management department (11%).

§ 8.6.1   Employee satisfaction

Figure 65 shows employee satisfaction on a range of items. Nearly half of all the aspects obtained a score indicating satisfaction from more than 70% of the employees. The items which received the most positive score included architecture and appearance of the building (91% satisfied and very satisfied respondents), content and complexity of work (83%), the subdivision of the whole building (80%), followed by adjacency and locality of the spaces (76%), opportunities to communicate (75%), accessibility of the building (72%) and functionality and comfort workspaces (70%). The less appreciated aspects were privacy (44% dissatisfied and very dissatisfied respondents) and opportunities to concentrate (40%). The respondents are also dissatisfied about the archive and storage facilities (30%), indoor climate, lighting and acoustics (29%) and ICT and ICT support facilities (27%).
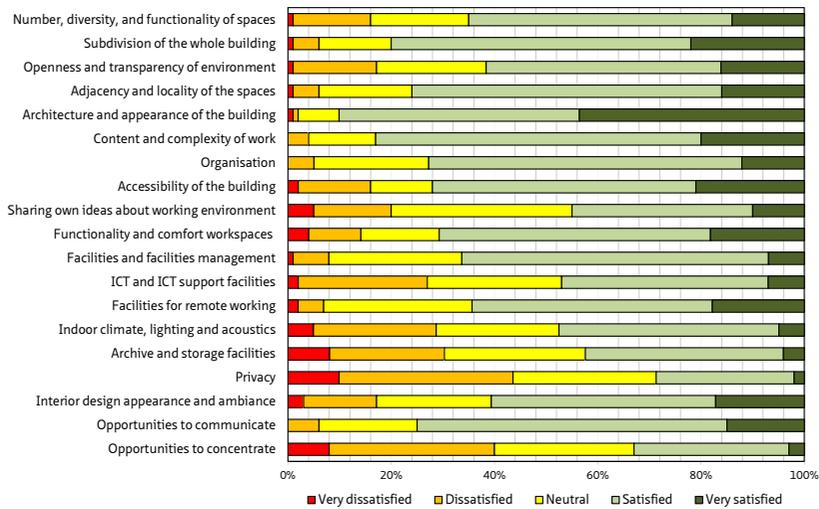
Figure 65

Percentage of satisfied and dissatisfied respondents with regard to different aspects (N=307)

§ 8.6.2 Perceived productivity support

The extent to which the working environment supports organisation productivity scored particularly neutral (52% neutral, see Figure 66) with 38% being satisfied respondents. Slightly less than half of employees are satisfied with the support given regarding their work environment and team productivity (45 and 46% respectively), but some respondents disagreed (20 and 13% respectively).
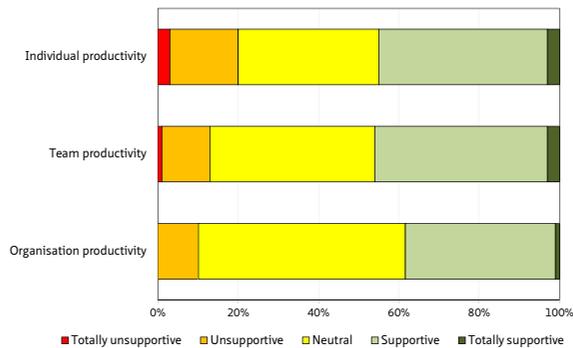
Figure 66

Percentage of participants that perceive the working environment as being supportive to different types of perceived productivity (N=307)

§ 8.6.3   Prioritised aspects

In addition, the employees found that the most important aspects of the workplace environment to be functionality and the comfort of their workspaces (mentioned by 55% in their top 3 most important aspects, see Figure 67), indoor climate, lighting and acoustics (29%) and opportunities to communicate (26%). The least prioritised aspects include the adjacency and locality of the spaces (mentioned by 5% as one of the three most important aspects), subdivision of the whole building (5%) and facilities and facilities management (6%).
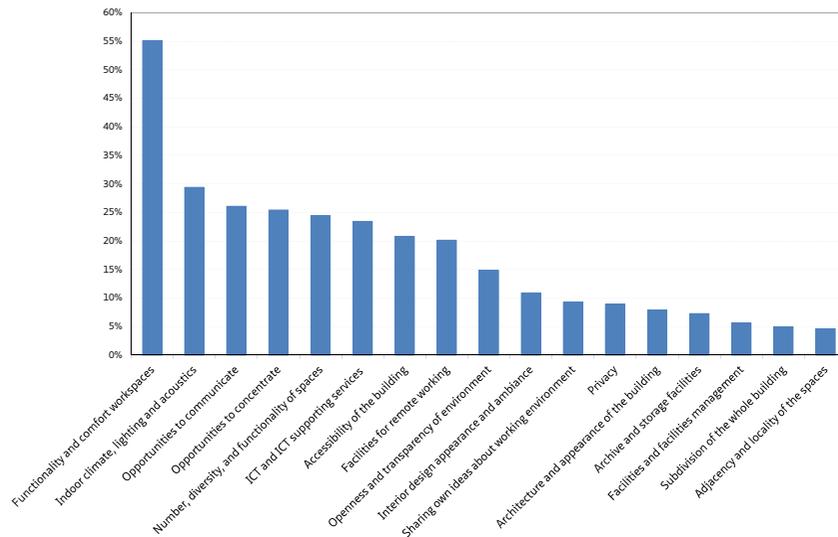
Ranking of % respondents marking a particular aspect as one of three most important aspects of the workplace environment (19 aspects) (N=307)

§ 8.6.4   Most positive and negative aspects

The employees were given the option to answer an open question concerning the three most positive and negative aspects of the work environment. The most appreciated aspect is workplace concept (mentioned by 135 respondents or 19%, see Appendix III, Table 72 and 73) followed by communication (128 respondents or 18%) and architecture and planning (122 respondents or 17%). The most negative aspect according to the employees was found to be the indoor climate, lighting and acoustics

(189 respondents or 25%) due to problems with acoustics and noise pollution in the open space. This aspect includes the less appreciated noise in the open spaces (109 respondents or 15%), followed by the indoor climate (59 respondents or 8%). The workstation was ranked in second place in regard to the most negative responses (170 respondents or 23%), which involved the lack of privacy (56 respondents or 7.5%) and the ability to concentrate (28 respondents or 4%). The third rank mentioned was facilities (126 respondents or 17%) which can be traced to the lack of a personal archive (40 respondents or 5%) and the shortage of meeting rooms (31 respondents or 4%).

§ 8.7 Cultural context

The organisational culture survey was conducted using the Organisational Culture Assessment Instrument (OCAI; Cameron and Quinn, 2006). Results from this survey were characterised in four organisational culture types, i.e. clan, adhocracy, hierarchy, club. The Value Surveys Modules (VSM94; Hofstede, 1997) was used to identify five dimensions of national culture, i.e. power distance, individualism, masculinity, uncertainty avoidance, and long-term orientation.

§ 8.7.1 Organisational culture

Currently, the organisational culture is perceived as a hierarchical culture, whereas the family-type culture (clan culture) is preferred most (see Table 39). The hierarchical culture emphasizes an environment that is relatively stable, where tasks and functions can be integrated and coordinated, uniformity in products and services can be maintained, and workers and jobs are under control. In this culture, success is defined by how decision-makers incorporate authority in a clear way, how they standardize rules and procedures, and how they monitor control and accountability mechanisms. The survey shows that there is a cultural preference in favour of a clan culture. The clan culture is similar to a family-type organization. A clan culture emphasizes teamwork and employee development, as customers are considered to be partners. This form of organization promotes a humane work environment, with the managerial goal of empowering employees by asking for their participation, their sense of commitment, and their loyalty. Leaders are considered mentors or parental figures, as loyalty, tradition, and commitment are emphasized. By encouraging staff to engage in teamwork, to participate fully, and to achieve a consensus, a successful internal climate can be achieved.

Although there are no huge discrepancies, this does not mean that important changes still are not needed (Cameron and Quinn, 2006). The other aspects of organisational culture should also be concerned. The organisation scores low in adhocracy and it did not exhibit signs of being a market culture type. The goal of the organisation in the adhocracy culture is to be innovative and adaptable as there is no form of centralized power or existing relationships of authority. Individuals in an adhocracy are often unique risk takers who anticipate and understand change. The market culture refers to a type of organization which functions as a market itself. This type of organisation is primarily concerned with the external environment as it focuses on transactions with such externalities as suppliers, customers, contractors, licensees, unions, regulators, etc. The market operates primarily through monetary exchange as competitiveness and productivity in these organizations are dependent on strong external positioning and control. Table 39 shows the six aspects that pertain to an organisational culture.

	CLAN			ADHOCRACY			MARKET			HIERARCHY		
	Current	Prefer	Dif.	Current	Prefer	Dif.	Current	Prefer	Dif.	Current	Prefer	Dif.
Average	26.9	31.6	-4.7	18.7	25.8	-7.1	19.5	17.3	2.2	35.1	25.4	9.7
Dominant characteristics	21.2	21.1	0.1	15.6	30.2	-14.6	26.2	29.3	-3.1	37.1	19.3	17.8
Organisational leadership	25.2	31.3	-6.1	20.1	24.2	-4.1	22.9	17.6	5.3	31.9	26.8	5.1
Management of employees	32.2	35.5	-3.3	17.2	25.7	-8.5	17.3	14.7	2.6	33.3	24.1	9.2
Organisational glue	28.5	34.5	-6	21.8	27.2	-5.4	17.8	16.8	1	31.9	21.6	10.3
Strategic emphasis	28	33	-5	18.7	25.5	-6.8	18.4	15	3.4	34.9	26.6	8.3
Criteria of Success	26	34	-8	18.8	21.8	-3	14.1	10.6	3.5	41.2	33.7	7.5

Notes. Respondents are asked to divide 100 points among the four culture types. A higher number of points is given to the option that is most similar to the organisation.

Table 39
Organisational culture index according to the case study (N=83)

§ 8.7.2   National culture

The case study shows much higher scores on power distance and much lower on masculinity than the overall cultural index of the Netherland (see Table 40). According to Hofstede, his cultural indexes are not supposed to be used as cultural generalisations to stereotype and to suggest that cultural groups are all the same or

that this cannot be altered at all by experience. This might explain why the cultural values found in the case study concerning employees were quite different from the national Dutch cultural indexes. A large power distance society indicates a strict hierarchy in organizations that reflects existential inequality between higher and lower levels. Managers rely on superiors and on formal rules. The individualistic culture means involves the management of individuals (Hofstede, 1997). A culture oriented to individualism might highly value being able to work independently (Leake and Black, 2005). The low masculinity score means management as ménage: intuition and consensus, resolution of conflicts by compromise and negotiation, rewards are based on equality and humanization of work through contact and cooperation (Hofstede, 1997).

Index	WSRL	Netherlands*
1. Power Distance Index (PDI)	141	38
2. Individualism Index (IDV)	80	80
3. Masculinity Index (MAS)	-41	14
4. Uncertainty Avoidance Index (UAI)	47	53
5. Long-term Orientation Index (LTO)	49	44

*The Netherlands data according to Hofstede (1997)   Notes. Values of each index is usually between 0 (small/weak in particular dimension) and 100 (large/strong in particular dimension), but values below 0 and above 100 are technically possible.

Table 40
Five key dimensions of national culture

§ 8.8   Reflections

§ 8.8.1   Performance measurement

The performance measurement of the WSRL case includes several aspects (i.e. policy and management processes, finance and operation) that are aligned with the four perspectives of the balanced scorecard (financial, customer, internal business processes, learning and growth). The WSRL case is more concerned with the effective use of space as has been shown in the choice of the flex workplace concept. The various types of work settings support the different activities associated with the work processes. As a public organisation, the WSRL appears to be concerned with both internal (employees) and external stakeholders (citizens).

CRE performance measures in literature and what has been found in the WSRL case

Based on the balanced scorecard, corporate real estate performance measures in the literature have been divided into six categories: stakeholder perception, financial health, organisational development, productivity, environmental responsibility and cost efficiency. Table 41 presents the proposed list of corporate real estate performance measures – classified according to the six categories from Bradley (2002) – and the performance measures applied in the WSRL case. The comparison between the proposed performance measures from the literature and what has been found in practice shows striking similarities and differences.

1. Stakeholder perception	Proposed performance measures according to the literature	WSRL
Employee satisfaction with work environment	· Quality of indoor environment: lightning, air conditioning, temperature, noise level, etc. · Provision of safe environment · Location success factors (access to employees, amount of local amenities) · Ratio of office to common areas · Provision of amenities · Amount of workplace reforms and space modifications	· Employee satisfaction survey (from the WODI tool) · User satisfaction survey
Employee satisfaction with CRE services	· Employee satisfaction with professional skills · Employee satisfaction with information sharing	· Employee satisfaction survey (from 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 required transportation, access to customers, distance to other sites and businesses)	· Customer satisfaction survey*
Community and well-being	· The contribution to public policy and societal priorities	· Provision of knowledge on water management to citizen*
2. Financial health		
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	NA
3. Organisational development		
Quality of facilities	· Physical condition of facilities · Suitability of premises and functional environment · Number of building quality audits	· Risk Inventory and Evaluation (RI&E)
Accommodation usage	· Square feet per employee · Effective utilisation of space (e.g. amount of teamwork space, time wasted with interruptions due to open space layout)	· Square metres per desk (in accordance with Dutch 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	· Design process descriptions and optimizing business processes*

> > >

4. Productivity	Proposed performance measures according to the literature	WSRL
Employee productivity	• Productivity (% of perceived productivity support from working environment) • Absentee rates by buildings	• 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, or shared services opportunities	• The implementation of the flex workplace
5. Environmental responsibility		
Resource use	• Energy consumption • Number of energy audits	• Introduction of sustainable approach to the new building • EU Energy label
Waste	• Contaminated sites management, Amount of garbage	NA
6. Cost efficiency		
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	• 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)	• 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

Table 41
CRE performance measures from the literature (left) compared to case study findings (right)

1   *Stakeholder perception*
Performance measure with regard to employee satisfaction with work environment is applied to support the WSRL's workplace change objectives. An employee satisfaction survey is carried out in this case every two years. The survey evaluates the overall employee satisfaction, content of work, quantity of work and relationship with colleagues. It turns out that the WSRL case, a public organisation, concerns interests and preferences of both internal and external stakeholders.

2   *Financial health*
Financial health focuses on profits. The findings show that the financial performance measures which are related to real estate are missing. The value of property, the plant and equipment (i.e. business return on real estate assets, real estate return on investment, real estate return on equity, space per unit of revenue, and return on property management) provide a source of information for determining the company's ability to invest or upgrade real estate or facilities.

3   *Organisational development*
A performance measure regarding accommodation usage is visible in this case (square metre area per desk according to the labour law). The WSRL applies Risk Inventory and

Evaluation as performance measures related to the quality of the facilities. In this way, risk management can be incorporated in real estate performance measurement and monitored by the corporate real estate unit of the organisation.

4   *Productivity*
The corporate real estate in connection to HR strategies is shown in the WSRL case through the introduction of the new workplace concept. This can be considered as the strategic involvement of corporate real estate. The implementation of the flex workplace and other issues relating to health and well-being can also contribute to employee productivity. According to the literature, this approach focuses on providing an office environment that enables employees to increase their productivity. This approach is regarded as the shift that has been made from cost reduction to human contribution with regard to office productivity (Haynes, 2007).

5   *Environmental responsibility*
The architectural design of the WSRL that concerns environmental impact contributes to its sustainable objective. According to the EU Energy Label, an energy consumption labelling scheme, the WSRL building is awarded with an A label which is the most energy efficient level of this standard. However, the concern about waste (i.e. contaminated sites management, amount of garbage) is absent in this case.

6   *Cost efficiency*
Although the WSRL concerns the operating costs (i.e. salary costs, social charges and personnel costs of a third party), these measures are not directly related to real estate and facilities. The depreciation expense has been included as a performance measure related to occupancy costs. However, other important occupancy costs appear to be missing including total operating expenditures versus budget: general administration, capital expenditures, moves, adds, rearrangements, facility/properties services and facility management costs (environment, working conditions, quality). These performance measures allow the company to take a holistic view of the overall portfolio performance.

§ 8.8.2   Employees' responses to the work environment

Employee satisfaction
The findings show that staff characteristics and the work process in the WSRL case have had an influence on the implementation of the innovative workplace concept that has resulted in the high satisfaction percentage rate with regard to number, diversity, and functionality of spaces, subdivision of the whole building, and adjacency and locality of the spaces. The rather high percentage of satisfied respondents regarding functionality and comfort workspaces can be explained by the change in function of team space and

the policies regard to how different types of workplaces are used. In addition, there are other factors related to the satisfaction of employees, such as the size of the workplace, the adjustability of the workstations, and the location of workspaces in relation to corridors

Although the employees reported that they are satisfied with the opportunities at their disposal to communicate, the findings show that there is a high percentage of dissatisfied respondents in regard to the aspect of privacy and the amount of opportunity to concentrate. This was caused by the distractions occurring in the work environment due to an open plan layout. It was assumed that this problem might be solved once the employees had become used to it, but the problem continues to exist. Moreover, a relatively large number of employees mentioned the lack of privacy as one of the three most negative aspects they found regarding the work environment. Whereas 59% of the employees indicated that they used the open space during the average amount of time they spent in various locations, 15% mentioned that the noise in the open area was one of the three most negative aspects. Their dissatisfaction concerned the ability to concentrate, which was also caused by poor lighting and the noise heard in the cockpit, which is not soundproof.

In comparison to the previous survey conducted in 2007 (Maarleveld and Wagtendonk, 2007), several aspects in the current situation were found to be more satisfying such as the facilities for remote working, the general facilities and facilities management, adjacency and locality of the spaces and number, diversity, and functionality of spaces. In addition, the results concerning several dissatisfying aspects, such as a lack of archives and storage facilities, sharing one's own ideas about the working environment and indoor climate, lighting and acoustics showed an improvement with fewer respondents who were dissatisfied compared to the previous year.

The ICT and ICT support facilities did not change in satisfaction (47% of satisfied respondents both in 2007 and 2008). This item increased in the percentage of those respondents who reported that they were dissatisfied (20% in 2007 and 27% in 2008). Furthermore, it was one of the top five most dissatisfied aspects of the working environment in the 2008 survey. In all likelihood, this issue could be considered as a 'dissatisfier' - if not applied, people are dissatisfied - rather than a 'satisfier' - which is a positive attribute that contributes to employee satisfaction (Herzberg et al., 1959; Hertzberg, 1966).

Perceived productivity support
The support of organisation productivity by the work environment was perceived as rather low (38%) whereas individual and team productivity was perceived better (45 and 46%, respectively). Negative effects from the work environment (i.e. the lack of ability to concentrate, little privacy and the lack of archiving and storage facilities) have accounted for the rather low perceived support of organisation productivity.

Prioritised aspects

Employees in the WSRL case indicate the emphasis on functionality and comfort workspaces, indoor climate, lighting and acoustics, as well as opportunities for communicating and concentrating. According to Vischer (2008), the preferences for functional comfort and concentration found in the case study can be interpreted as the shift from users' experience in individual and team effectiveness to organisational effectiveness. Due to the low level of indoor environmental quality, the indoor climate was found to be one of the least satisfied aspects. However, this issue has high priority from the employees' perspectives and should be a concern for further improvement. The information about employees' needs and preferences is important when developing a workplace concept in the changing organisational context, i.e. a relocation or an adaptation of the work environment.

Conceptual model of workplace change appraisal

The conceptual model below has been used to explore the relationship between variables impacting on an appraisal of workplace change (Figure 68). The complex relationship between the variables found in this conceptual model can be explained by dividing them into three groups: start, mediating and outcome (Table 42).
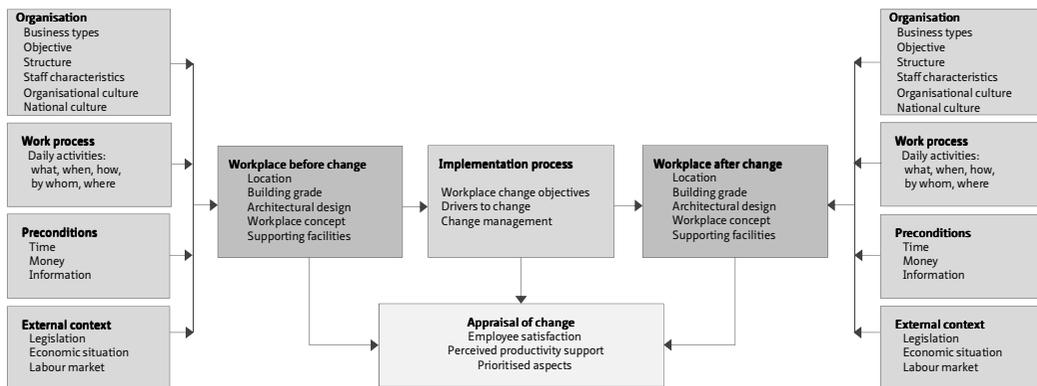
Relationships between the variables in the conceptual model

Table 42 depicts the assumed causal relationships between the characteristics of the organisation, work process, preconditions, external context and implementation process as start variables with mediating variables of workplace change such as location, architectural design and workplace concept, and the appraisal of change as an outcome.

Start variables	Mediating variables	Outcome
Organisation	**Workplace change**	**Appraisal of change**
Business types Water management business	*Workplace concept* Different types of workspaces for specialists	*Employee satisfaction* High percentage of satisfied respondents in number, diversity, and functionality of spaces
Structure Flat structure	*Workplace concept* Employees become involved during the design process that contributed to the improved work environment	*Employee satisfaction* High satisfaction percentage in number, diversity, and functionality of spaces, adjacency and locality of the spaces, and openness and transparency of environment
Staff characteristics Knowledge workers	*Workplace concept* Workplace with various types of work settings which promote team working	*Employee satisfaction* High satisfaction percentage in number, diversity, and functionality of spaces
Organisational culture Hierarchical culture	*Workplace concept* The move from several office locations to a single building and the optimising on the use of space	*Employee satisfaction* High percentage of satisfied respondents in opportunities to communicate
National culture Individualistic culture	*Workplace concept* The provision of cockpits for concentrated working versus open plan with no partitions	*Employee satisfaction* High percentage of dissatisfied respondents in regard to privacy due to open plan layout with no partitions
Work process *Daily activities* Creative work with groups, projects and interactive work	*Workplace concept* Workplace supports creative and group works and allows for the effective use of space	*Prioritised aspects* Functionality and comfort workspaces and opportunities to communicate found to be the most important aspects of the work environment.
Implementation process *Workplace change objective* To provide a better work environment to employees	*Architectural design* Move to a new building	*Employee satisfaction* High satisfaction percentage in architecture and appearance of the building
	Workplace concept Size of the workplace, the adjustability of the workstation	*Employee satisfaction* High percentage of satisfied respondents in functionality and comfort workspaces
	Workplace concept Workplace innovation concept	*Employee satisfaction* High satisfaction percentage in subdivision of the whole building and adjacency and locality of the spaces
Change management Communication with employees	*Supporting facilities* ICT and ICT support facilities	*Employee satisfaction* High percentage of dissatisfied respondents in ICT and ICT support facilities
	Supporting facilities Poor lighting and noise in the cockpit, which is not soundproof	*Negative aspects* Noise in open area found to be one of the three most negative aspects
	Workplace concept Open plan workplace with no partitions/ sound insulation	*Employee satisfaction/Negative aspects* Sitting near the corridors causes dissatisfaction in privacy. The lack of privacy is one of the three most negative aspects of the work environment.
		Negative aspects Noise is one of the three most negative aspects. Dissatisfaction in ability to concentrate is reported.

Bold = main variables

Table 42

Relationships between the variables in the conceptual model added to the WSRL case

The *policies* with regard to the use of different types of workspaces support different work processes (i.e. creative and group works) of the specialists in the water management business. This has resulted in a high satisfaction percentage in number, diversity, and functionality of spaces and functionality and comfort workspaces.

The *flat structure* organisation enables employees to become involved in the implementation process that contributed to the improved work environment which in turn could lead to the high satisfaction percentage on several aspects including number, diversity, and functionality of spaces, adjacency and locality of the spaces, and openness and transparency of the environment.

The *hierarchical culture* is reflected in the decision to move from several office locations to a single building and to maximise the space available. By providing cockpits, an emphasis on privacy can be seen which represents the *individualistic culture*. However, the open plan layout with no partitions has caused the high percentage of respondents who were dissatisfied regarding privacy.

The modern office building and the innovative *workplace concept* are meant to improve the work environment and this could account for the high satisfaction percentage regarding architecture and the appearance of the building, functionality and comfort of workspaces, the subdivision of the whole building and the adjacency and locality of the spaces.

Change management (i.e. communication with employees) can have an impact on workplace change and the appraisal of change. Several disadvantages of undergoing a workplace change are reflected in a high dissatisfaction percentage and the negative aspects found in the WSRL case; for example, the open plan workplace with no partitions and the absence of any sound insulation material could cause a high dissatisfaction percentage regarding privacy and the ability to concentrate.

The assumed causal relationship can be explained by the links of variables in the conceptual model as shown in Table 42. However, there should be a direct link between the organisation and the appraisal of change in the conceptual model; i.e. employee satisfaction in organisation and content and complexity of work. These two items are not related to the physical work environment, but they can have an impact on the appraisal of change. This has led to the slightly adapted conceptual model, which described in Chapter 10.

§ 8.8.3   Cultural context

The research findings have identified various types and dimensions of organisational and national culture. However, it is difficult to trace and to understand the relationships with the other variables connected to the research. The move from several office locations to a single building and the maximisation of space reflects the hierarchical culture which in turn emphasises an environment that is stable, one in which both tasks and functions can be integrated and coordinated (Cameron and Quinn, 2006). The new workplace that optimises the use of space has resulted in the high percentage of satisfied respondents in opportunities to communicate. When office space has been arranged in an effort to enhance communication, then this could be considered as displaying a preference for a clan culture type. According to Cameron and Quinn (2006), this type of culture promotes a humane work environment with the managerial goal of empowering its employees by gaining their participation, stimulating teamwork and achieving consensus.

Organisations in a low uncertainty avoidance are relatively open to new ways of working and will sooner adopt new spaces and processes (Steelcase, 2009). The innovative workplace design of the WSRL case reflects the low uncertainty avoidant culture, and has resulted in a high satisfaction percentage in functionality and comfort workspaces and number, diversity, and functionality of spaces.

According to the literature, a culture which places great emphasis on owning space is individualistic (Altman, 1975). People in individualistic cultures are also more distant proximally (Gudykunst and Matsumoto, 1996). The relationship between individualism and the workplace can be described as displaying the need for privacy which is signalled by closed doors, soundproofing, double doors or trees marking property lines (Hall, 1966, Altman & Gauvain, 1981). Providing staff with private rooms (cockpits) can be seen as placing an emphasis on privacy in the individualistic culture. However, the open plan layout with no partitions in the WSRL workplace has resulted in the high percentage of dissatisfied respondents in privacy.

§ 8.9   Conclusions

The empirical data indicate the implementation of performance measurement in multiple levels (individual, organisation, public). The research findings show that the organisational context can have an impact on particular performance criteria and the performance measures used in this case study. The characteristics of the staff and the work process in the WSRL case show how the implementation of the innovative

workplace can be influenced. Moreover, the findings show that the performance measures of the WSRL case can be compared with the four perspectives mentioned on the Balanced Scorecard.

Based on the balanced scorecard, the six perspectives of corporate real estate performance measures in the literature can be used as a reference to compare with performance measures used in current practice, as input to considering for the improvement of the efficiency and effectiveness of performance measurement.

The findings show connections between variables in the conceptual model (i.e. organisation, workplace change and the employees' responses to the work environment), and confirm that the conceptual model can be used in order to understand the complex relationship between these variables. However, employee satisfaction with an organisation can also have an impact on workplace appraisal (indicated by employee satisfaction about the organisation itself) and should be taken into consideration when adapting the model. The cultural context variable provides a better understanding of the role organisational and national culture plays in regard to workplace change and how it is appraised. However, the explanation of the findings (i.e. performance measurement, the appraisal of change) in connection to national and organisational culture is quite difficult and more explorative and interpretative than concluding. In addition, the impact of national culture is much less visible and explaining the results than might be expected.

9 Cross-case analysis: findings and reflections

Introduction

In this chapter, the findings from the case studies are discussed in regard to the integrated conceptual model and the separate conceptual models of performance measurement, employees' responses to the work environment and cultural context in order to explain the interrelationship between the variables and to improve the understanding of performance measurement of workplace change. Table 43 summarises the two main research topics and the contextual background that have been used to structure this chapter. The performance measurement frameworks and criteria described in part one of this dissertation are discussed in relationship to what was found in the case studies. The proposed list of corporate real estate performance measures have been divided into six categories and are subsequently compared with the empirical findings regarding workplace change practices. Data from the case studies regarding corporate real estate performance measures are discussed in connection to the different stakeholders, the scale levels of real estate, managerial levels and the various dimensions of value in the CREM and FM. Performance from an employee's perspective is reviewed by examining the impact of workplace change on employee satisfaction, perceived productivity and prioritised aspects.

	Theme 1 Performance measurement	Theme 2 Employees' responses to workplace change	Contextual background Organisational and national culture
Part I Theoretical framework	· Performance measurement theories and frameworks · Performance measurement in the context of FM and CREM · Added value of CREM · Performance measures and KPIs · Conceptual model	· Driving forces · Workplace typology · Current trends in workplace design and management · Impact of workplace change on employees: 1. employee satisfaction 2. perceived productivity support 3. prioritised aspects · Conceptual model	· Organisational culture theories · Four major culture types · Competing values framework · National culture theories · Five dimensions of national culture · Comparison between Thai and · Dutch cultural settings · Conceptual model
Part II Empirical research	· Performance measurement system · Performance criteria · Performance measures and KPIs	· Findings from WODI questionnaire: 1. Employee satisfaction 2. Perceived productivity support 3. Prioritised aspects	· Findings from OCAI questionnaire: - Organisational culture · Findings from VSM94 questionnaire: - National culture
	Connection between theoretical frameworks, conceptual models and findings from case studies		
Part III Conclusions & recommendations	· Conclusions and recommendations to improve performance measurement and workplace change processes		

Table 43

Research matrix: two main research themes and the contextual background

Figure 69 presents the conceptual model that was introduced in part one to link the four main variables of this research: 1) organisation (including organisational and national culture), 2) workplace change, 3) performance measurement (frameworks, criteria and measures/KPIs), and 4) employees' responses to the work environment, i.e. employee satisfaction, perceived productivity support, and prioritised aspects. According to the model, organisation and workplace change both affect workplace performance objectively (performance measurement frameworks and criteria, performance measures/KPIs) and subjectively (employees' responses to the work environment). Performance measurement is linked to the proposed measures in six categories according to the literature (Bradley, 2002) including: 1) stakeholder perception, 2) financial health, 3) organisational development, 4) productivity, 5) environmental responsibility and 6) cost efficiency. This conceptual model will be used as a reference when discussing the findings obtained from the case studies on the possible relationships between the research variables.

CONTEXT

Organisation
Business types
Objective
Structure
Staff characteristics
Work process & work pattern
Organisational culture
National culture

Workplace change
Workplace change objectives
Location
Building grade
Architectural design
Workplace concept
Supporting facilities
Implementation process

PERFORMANCE MEASUREMENT

Performance measurement
(Objective)

Performance measurement
frameworks and criteria
Performance measures/KPIs

Performance measurement
(Subjective)

Employee satisfaction
Perceived productivity support
Prioritised aspects

PROPOSED MEASURES

Stakeholder Perception

Financial health

Organisational development

Productivity

Environmental responsibility

Cost efficiency

Figure 69
Integrated conceptual model

Performance measurement in the three cases

The performance measurement frameworks that were found in the literature
include: seven generic performance criteria (Sink and Tuttle, 1989), the performance
measurement matrix (Keegan et al., 1989), the balanced scorecard (Kaplan and
Norton, 1992), the performance pyramid (Cross and Lynch, 1992), the performance
prism (Neely et al., 2001) and the Triple-P model (Tangen, 2005). These frameworks
provide a number of criteria that help to improve our understanding of performance
measurement. These performance measurement frameworks have been proposed by
their authors both to develop theories on performance management and performance
measurement and to be applicable in practice without having a particular type of
organisation in mind.

Various performance criteria can emerge in virtually any framework, for example,
productivity, customer satisfaction, quality and finance, whereas sustainability is only
visible in certain frameworks such as the six perspectives of performance measures
(Bradley, 2002), university real estate performance (Den Heijer, 2011) and the FM
Value map (Jensen, 2012). The performance pyramid (Cross and Lynch, 1992) turns
out to be useful for understanding performance measurement in all of the case studies

by showing that performance measurement is deployed to include several layers of an organisation, from business units to departments and work centres.

In all cases, organisational performance has been described according to the four perspectives of the balanced scorecard (i.e. financial, customer, internal business process, learning & growth). The main differences between the frameworks traced in literature and performance measurement in the three cases are the level of simplicity or complexity of the framework structure and the implementation from the individual organisation.

§ 9.3 Comparison between performance measurement in the cases and in the literature

The seven performance criteria mentioned by Sink and Tuttle (1989) and the four perspectives of the Balanced Scorecard (Kaplan and Norton, 1992) are compared with what has been found in the case studies. CRE performance measures of the case studies are also compared with the six perspectives of performance measures taken from the literature (Bradley, 2002), and are discussed in connection to the different stakeholders' perspectives regarding the different scale levels of real estate and managerial levels (operational, tactical and strategic). Value dimensions in CREM and FM are discussed in connection to the five value types which are found in the case studies.

§ 9.3.1 Application of Sink and Tuttle's seven performance criteria

Table 44 shows that in addition to cost efficiency, several other dimensions of performance measurement are included in the performance measurement systems that are used in practice. Actually, all of the seven performance criteria that were mentioned by Sink and Tuttle (1989) have been applied in the organisations' performance measurement systems in each of the three case studies, however, this has been done in different ways.

Performance criteria (Sink and Tuttle, 1989)	Performance measures from case studies		
	DAD [1]	PTH [2]	WSRL [3]
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)	· Internal audit - Quality assurance	· Quality improvement team participation	· Quality management
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 - Safety, health and environment	· Employee attitude survey (perceptions and attitudes related to employee satisfaction)	· User satisfaction survey
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 the Introduction of WPI	· 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

1. DAD = Dhanarak Asset Development, 2. PTH = Philips Thailand, 3. WSRL = Waterschap Rivierenland

Table 44
Performance criteria from the literature and performance measures from the case studies

1 *Effectiveness* is applied in all of the case studies including the different operationalisations of actual and expected output, i.e. work done according to plan, market introduction in time, benchmarking the company's output.
2 *Efficiency* is considered in terms of resource utilisation and has been found to be measured in all cases, e.g. operational cash flow, budget comparison.
3 *Quality* has been measured in the case studies by a quality audit, quality improvement and quality management.
4 *Productivity* is applied in all cases with the focus on the ratio of output to input. This includes the percentage of work done, sales growth and the product based on the number of hours' work.

5   *Quality of worklife* is a measurement contributing to workforces. The case
      organisations apply performance measures related to human resource management
      such as health, safety and well-being and employee satisfaction.
6   *Innovation*, a key factor in sustaining and improving performance, is being measured
      by technologies to improve quality of the work environment in all of the cases.
7   *Profitability* is considered from a financial perspective in all of the case studies.

The findings show that the performance measures applied depended on the
organisational context (i.e. business type, objectives, structure); for example:
- Being a public organisation, the DAD case focuses on effectiveness as demonstrated
  in the work done according to the plan assigned by the government.
- The focus on effectiveness of the PTH case is shown in performance measures
  such as market introduction in time and realized sales. This explains the external
  focus of the PTH case which has been influenced by the pressure to compete with
  competitors in the market.
- The focus on the productivity of the WSRL is shown in how the number of work
  hours that are needed to deliver the services are measured.

The findings show that most performance criteria found in the case studies are
measured by using similar performance measures such as operational cash
flow (efficiency), quality management (quality) and economic profits/earnings
(profitability). The observation of the three case studies confirmed that performance
measurement of an organisation is multi-dimensional and that it includes several
performance criteria and performance measures beyond cost efficiency.

§ 9.3.2   Application of the Balanced Scorecard

In Chapter 2, the Balanced Scorecard (Kaplan and Norton, 1992) was introduced
as a performance measurement framework that helps to translate the corporate
strategy into actions. The findings show that all three cases incorporate the Balanced
Scorecard in their performance measurement systems, but mainly in connection with
organisational performance and not so much in regard to real estate performance.
Furthermore, the research findings showed that performance measures of the three
case studies have been allocated to the four perspectives of the Balanced Scorecard (i.e.
financial, customer, internal business process, learning & growth) with different points
of focus (see Table 45).

BSC	DAD	PTH*	WSRL
Financial	· Income from commercially rented area · Earnings before interest, taxes, depreciation and amortization (EBITDA) · Return On Asset	· Economic profit - realized · Income from operations · Working capital · Operational cash flows · Inventory turns · Office rent · Utility and parking costs	· Cash limit · Interest standard · Depreciation expense
Customer	· Work done on delivering rentable area to other government agencies · Satisfaction of the government complex building users	· Rank in customer survey · Market share · Repeat order rate · Complaints · Brand index	· Provision of knowledge and information on water management to citizen
Internal business processes	· Work done according to plan assigned by government · Risk management · Internal audit	· Percentage reduction in process cycle time · Number of engineering changes · Capacity utilization · Order response time · Process capability · Risk management and business control	· Risk management · Product management - number of hours worked
Learning & growth	· Employee relations and communication · IT solution in HRM · Safety, health and environment	· Leadership competence · Percentage of patent-protected turnover · Training days per employee · Quality improvement team participation	· Health and safety policy

*Performance measures of PTH have been derived mostly from Gumbus and Lyons (2002)

Table 45
Balanced Scorecard as applied in the three case studies

1 ***Financial perspective***
All of the case organisations apply performance measures in regard to the financial perspective. The DAD case includes financial performance measures related to real estate, i.e. return on assets, income from commercially rented area, facility costs and taxes. The PTH case monitors office rent, utility and parking costs as the focus on cost efficiency. The WSRL case includes depreciation expense as a financial performance measure related to real estate.

2 ***Customer perspective***
The concern about stakeholders of the PTH is visible in the performance measures including market share, rank in customer survey, repeat order rate, complaints and brand index. The brand index is expressed on a scale of 0 to 100. It quantifies the strength of the brand relative to its main competitors, with reference to key business and brand attributes. On the other hand, the DAD and the WSRL case show that their concerns extend beyond the organisation's customers to its citizens and to the neighbouring community.

3   *Internal business process perspective*
    Regarding the internal business process perspective, risk management has been applied in all three cases. Performance measures related to internal processes are included in all of the cases, including the work done according to the assigned plan, internal audit, capacity utilisation, order response time, and number of hours worked.

4   *Learning & growth perspective*
    The learning & growth perspective is visible in the performance measures found in all three cases in connection to human resource management (i.e. employee relations and communication, training days per employee, team participation and health and safety policy).

The different points of focus reflect the different types of organisations. Although all three cases show financial performance measures related to real estate, only the DAD case focuses on revenue expansion by measuring income from a commercially rented area with regard to its' asset management business. Differences in organisations, i.e. public or private sector, indicate different objectives and roles. The concern regarding citizen well-being reflects that there is accountability towards the public organisation. The DAD and the WSRL case appear to be more concerned about external stakeholders (i.e. citizens and neighbouring community) due to their roles in the public sector.

§ 9.3.3   Application of Bradley's six categories

Table 46 presents the proposed list of CRE performance measures – divided according to Bradley's six categories (2002) – and the CRE performance measures applied in three cases. Some striking similarities and dissimilarities have come to the fore.

1. Stakeholder perception	Performance measures from the literature	DAD	PTH	WSRL
Employee satisfaction with work environment	· Quality of indoor environment · Provision of safe environment · Location success factors · Ratio of office to common areas · Provision of amenities · Amount of workplace reforms and space modifications	· Employee satisfaction	· Employee attitude survey · Employee satisfaction survey by Philips Real Estate	· Employee satisfaction survey (WODI) · User satisfaction survey
Employee satisfaction with CRE services	· Employee satisfaction with professional skills and information sharing	· Employee satisfaction survey (WODI)	· Employee satisfaction survey (WODI)	· Employee satisfaction survey (WODI)
Customer satisfaction with facilities	· Survey rating · Number of complaints · Average call frequency and cost per square foot help desk · Location success factors	· Satisfaction of the government complex building users	· Rank in customer survey* · Number of complaints*	· Customer satisfaction survey*
Community and well-being	· The contribution to public policy and societal priorities	· Percentage of complaints from public regarding environmental impact	NA	· Provision of knowledge on water management to citizen*
2. Financial health				
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 per unit of revenue · Return on property management	· Income from commercially rented area · Return on asset	NA	NA
3. Organisational development				
Quality of facilities	· Physical condition of facilities · Suitability of premises and functional environment · Number of building quality audits	· Work done on building management standard and ICT	· Risk management and business control (financial risks)*	· Risk Inventory and Evaluation (RI&E)
Accommodation usage	· Square feet per employee · Effective utilisation of space	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 government agencies · Percentage of allocating commercial area	· Percentage 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	Performance measures from the literature	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 & well-being in the work-place through the workplace innovation (WPI) · Productivity survey (WODI)	· Health & well-being 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, or shared services opportunities	· Master plan of the · IT system · Management of the information system · IT solution in HRM	· Implementation of the WPI · Smart IT solutions for WPI	· Implementation of flex workplace
5. Environmental responsibility				
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				
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, **43 Baht = 1 euro

Table 46

CRE performance measures from the literature (left) and what has been found in the case studies (right)

1 **Stakeholder perception**

All three cases measure employee satisfaction with the work environment; for example:

- The PTH's workplace innovation post-move survey was conducted.

- Generally, an employee satisfaction survey is carried out annually in the DAD case, and every two years in the WSRL case.
- The WODI assessments were conducted in all three cases by external parties, i.e. the author of this dissertation (DAD and PTH) and the Delft's Center for People and Buildings (WSRL).

Customer satisfaction with facilities is only mentioned in the DAD case (satisfaction of the government complex building users). In terms of the external stakeholders, the performance measures relating to *community and well-being* are visible in the DAD and the WSRL case (percentage of complaints from public regarding environmental impact).

Different roles of organisations can influence different concerns of stakeholders. The DAD and the WSRL cases, both public organisations, are 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. Only the DAD case conducted the customer satisfaction survey with regard to real estate and facilities as a part of it's asset management business. These measures have been used for evaluating the relationships with the customer and community.

The findings from all of the cases show that there are a few items that relate to *employee satisfaction with CRE services* (e.g. satisfaction with facilities management). The information found in this category can be used as a reference to benchmarking with internal units or external service providers (i.e. cleaning, catering, security, etc.).

Employee satisfaction with the work environment is linked with the planning, design, and management of the workplace. Decisions regarding whether or not to have an open plan or cellular office, to arrange team or meeting rooms, to provide amenities or ICT support facilities, or to change workplace concept, can all affect employee satisfaction; for example:
- The typical workplace design of the DAD case such as personal desks with high partitions and standard work settings have accounted for the quite modest percentages of satisfied respondents regarding *openness and transparency of environment* and *functionality and comfort workspaces*.
- The flexible workplace concept provides the PTH and WSRL employees with more choices to perform tasks on various occasions. Both cases have a higher satisfaction percentage regarding several aspects in comparison to the DAD case such as *number, diversity, and functionality of spaces* and *facilities for remote working*.

All of the case organisations have shown their concern regarding employee satisfaction with the work environment as this was indicated in their workplace change objectives.

This item emerged in the case studies as a performance measure that has been contributed to organisational performance:

- Measuring employee satisfaction with work environment is one of the organisation's performance measures of the organisational development including human resource management (safety, health and environment) in the DAD case.
- Monitoring employee satisfaction with work environment contributes to the performance measure of the quality improvement team participation in the PTH case.
- The improvement made to the WSRL's workplace is monitored by employee satisfaction with work environment which contributes to the performance measures of the internal processes including human resource management (user satisfaction survey) and accommodation (Risk Inventory and Evaluation).

2 *Financial health*

Financial health includes performance measures that are linked to the financial perspective of the Balanced Scorecard. All three case studies include financial measures in their performance measurement. However, the real estate performance measure is only visible in the DAD case (i.e. income from the commercially rented area and return on assets). The type of business also has an impact on the performance measures selected. Whereas the DAD's asset management business deals with commercially rented space (value of property), the other cases are not involved in real estate or the property business. This might then explain the emphasis placed on measuring the financial performance of real estate in the DAD case.

In addition, the DAD case measures income from the commercially rented area to evaluate the success in achieving economy of scale from an asset management business. This can be explained as the provision of bundled services (i.e. security, IT services, cleaning, catering) that offers the competitive commercial/office space rental rates for the government complex.

There are corporate real estate performance measures that are not visible in the case studies, but which are nevertheless important to include in a performance measurement system. Business return on real estate assets, real estate return on investment, real estate return on equity, sales or revenue per square foot, space per unit of revenue and return on property management can all provide a source of information for determining the company's ability to invest or upgrade real estate or facilities. If too little attention is paid to these measures, then the ability to determine the overall financial performance of organisations will be inhibited and this could cause adverse competitive consequences.

3 *Organisational development*

The organisational development perspective includes indicators related to the internal business process perspective of the Balanced Scorecard. This perspective covers the

area of operation and process management. Two cases apply performance measures regarding the quality of facilities including:

1 Work done according to the Building Management Standard (DAD case)
2 Risk Inventory and Evaluation (WSRL case)

Risk control has been mentioned as one of the possible added values of CREM (De Jonge, 1996, Den Heijer, 2011, Van der Zwart and Van der Voordt, 2012). In addition, findings from practice show that risk management is incorporated in facility performance measurement and monitored by the corporate real estate unit.

Whereas the other two cases focus on generic performance measures of internal processes such as percentage reduction in process cycle time or order response time, the DAD case applies performance measures of the *CRE unit quality*, including the delivery of a rentable area to government agencies and the percentage of allocating a commercial area.

According to the Dutch labour law, the WSRL case applies the square metre/desk as an *accommodation usage* measurement. Normally, the number of employees and desks are not equal in a flex environment, so it is quite difficult to evaluate workplace density in this workplace category. Nevertheless, measuring the number of square metres per employee and the effective utilisation of space (e.g. amount of teamwork space, vacancy rates) are fundamental performance measures which can be used for the purpose of benchmarking.

The findings show that all of the case studies apply performance measures regarding organisational development to contribute to their objectives:

- The DAD monitors the *development of a building management standard and ICT* that contributes to the objective which is to provide value for money to the client.
- The PTH implements performance measures by using *percentage reduction in process cycle time, the number of engineering changes,* and *process capability at the business unit level* that can reduce risks and support task performance. The facilitating and controlling production, operations and service delivery contribute to the organisational objective in attaining leadership in the lighting industry.
- *Design process descriptions and optimising business processes* are applied in the WSRL to monitor work processes that contribute the organisational objective in implementing water management.

4 *Productivity*

In all three cases, the performance measures related to *human resource management* focused on the occupiers being provided with an office environment that enables employees to increase their productivity. According to the literature, this approach focuses on the shift from cost reduction to human contribution with regard to office productivity (Haynes, 2007). Human resources are the most expensive item on the

company's balance sheet (Brill et al., 2001). Not surprisingly, the findings show that the performance measures of *employee health and well-being are being* applied in all cases. Lubieniecki and Desrocher (2003) mention the strategic involvement of corporate real estate that can be considered as indirect measures relating to productivity.

The *strategic involvement of corporate real estate* is visible in all of the case studies but with different points of focus; for example:
- The DAD and the PTH case focus on the incorporation of IT solutions to accomplish the set target.
- The concern about corporate real estate in connection to human resource strategies came to the fore in the PTH case, and in the WSRL case, this became apparent during the introduction of the new workplace concept.

Office productivity-related performance measures are applied to support workplace change objectives that in turn, can contribute to achieving the organisational objectives of the case studies:
- Employee health and well-being, IT solutions in human resource management, a master plan of the IT system, and management of the information system have all been applied in the DAD case to improve the organisation's resources (i.e. employees, IT, work environment) in an effort to provide value for money to the client.
- The PTH case focuses on the implementation of workplace innovation concept and smart IT solutions. The ability to enhance an employee's work output by increasing the quantity and improving the quality of the product and service they deliver contribute to the organisational objective concerned with attaining leadership in the lighting industry of the PTH case.
- The WSRL focuses on the implementation of the flex workplace to improve employee productivity so as to achieve the organisational objective concerned with implementing water management in the region.

Perceived productivity support from the working environment was implemented as a part of this PhD study, but this item has not been included in the three organisations' performance measurement systems. Absentee rates is another performance measure related to employee productivity. Data concerning this particular point is unavailable in the cases as well. These performance measures are important to both human resource and corporate real estate management and should be included in the organisation's performance measurement systems.

5   *Environmental responsibility*
The building and construction industries have a major impact on the environment as they consume raw materials to build and even more natural resources to operate (Van Meel et al., 2010). The DAD and the WSRL case are concerned about the environment

impact and their desire to promote sustainable design may be driven by either the public organisation's role or the company's values and beliefs. *Energy performance* is part of performance measurement in all of the cases:

- Energy performance of the DAD building was designed and tested using the HVAC system and other energy efficient materials (e.g. thermal insulation wall).
- The PTH case focuses on the measurement of energy efficiency improvement.
- According to the EU Energy Label, an energy consumption labelling scheme, the WSRL building has attained the *A label*, which is the highest energy efficiency level of this calibre.

The building sector is one of the sectors that allows possible gain from reducing energy consumption. According to the literature, existing buildings require over 40% of the world's total final energy consumption, and account for 24% of world's CO_2 emissions (International Energy Agency, 2006). The assessment of energy performance is demonstrated in all of the case studies which aids in providing tangible data on the sustainable design approach. The findings from all three cases show the missing performance measures on the *amount of garbage* and *contaminated sites management*. These measures assess the possible negative impact on the environment, which can directly be related to an environmental impact assessment (EIA). Performance measures in this aspect should be more concerned in order to build a stronger relationship with an external stakeholder such as the neighbouring community.

6   *Cost efficiency*

The DAD and the PTH cases include performance measures relating to *operating costs* concerning real estate, i.e. *facility costs* (buildings & equipment), *utility* (electricity & water) and *parking costs*. Organisations are forced to compete with rivals in the same business, which are offering the same products or services at a competitive price. The minimisation of resource utilisation in the built asset such as the reduction of operating costs can be used as an approach to strive in the business. In addition, the literature indicates that cost reduction is one of the most important drivers of workplace change. *Occupancy costs* have been found in all of the cases including *taxes* (property and land), *office rent* and *depreciation expenses*. The lack of performance measures in occupancy costs (i.e. total occupancy cost per employee, occupancy cost as a % of total operating expense) makes it difficult for the organisation to have a holistic view of the company's overall portfolio performance.

§ 9.3.4 Performance measures in connection to different stakeholders and different levels

Table 47 demonstrates the CRE performance measures from the literature (left column) and those being used in the case studies (shortened and summarised) in connection to different stakeholders, and different real estate and managerial levels.

CRE measures from literature	DAD	PTH	WSRL	Stake-holders	Scale level	Managerial level
Stakeholder perception Employee satisfaction with work environment	Employee satisfaction	Employee satisfaction survey	User satisfaction survey	Employees	Workspaces	Operational
Community and well-being	Percentage of complaints from public regarding environmental impact	NA	Provision of knowledge on water management to citizen	Policy maker	Buildings	Strategic
Financial health Value of property, plant and equipment	Income from commercially rented area	NA	NA	Controller	Rental space	Strategic
Organisational development Quality of facilities	Work done according to the development of building management standard (BMS)	Risk management & business control (strategic, operational, compliance and financial risks)*	Risk Inventory and Evaluation (RI&E)	Technical managers	Buildings	Operational
Accommodation usage	NA	NA	Square metre/desk	Employees	Workspaces	Tactical
Productivity Employee productivity	Employee health, safety and well being	Health and wellbeing in office through the WPI	Health &Safety	Employees	Workspaces	Tactical
Environmental responsibility Resource use	Introduction of green building Construction materials and equipment meet local content	Energy efficiency improvement* Collection and recycling of company's products*	Introduction of sustainable approach to the new building EU Energy label	Policy maker	Buildings	Strategic
Cost efficiency Operating costs (building and FM)	Operating costs - Facility costs (buildings & equipment) - Taxes (property & land)	Utility (electricity & water) cost/ unit Parking cost/ month	Operating costs - Depreciation expenses	Controllers	Building	Strategic

* does not directly relate to real estate, NA not applied i.e. not measured or no data available

Table 47
CRE performance measures of three cases in connection to stakeholders, real estate and managerial levels.

1   *Stakeholder perception*
    Employee satisfaction with the work environment as applied in the case studies is considered to be a performance measure of stakeholder perception. This measure focuses on the employees as end users of the workspaces relating to an operational level of CREM. Community and well-being related measures are connected to the policy maker and a focus on the strategic perspective of buildings. For example, the percentage of complaints received from the public regarding the environmental impact is thought to be a performance measure regarding this perspective.

2   *Financial health*
    Financial health emphasises revenue expansion. Only the DAD case includes income from a commercially rented area as a performance measure related to a rental space. This measure involves decisions from the controller on a strategic level of CREM.

3   *Organisational development*
    Quality of facilities is considered as a performance measure of organisational development. All of the case studies include performance measures related to the physical condition of their buildings (i.e. work done according to the development of building management standard, identifying building related risks). These measures are connected to technical managers and focus on improving building qualities at an operational level of CREM. Performance measures related to accommodation usage such as square metres allocated per desk, and the amount of teamwork space have an impact on the specific needs of employees and focus on space planning and evaluation at a tactical level of CREM.

4   *Productivity*
    This perspective does not only consider an efficient work environment, but it also focuses on effective accommodations and other facilities that support new ways of working. All of the case studies apply the performance measures related to the productivity of the work environment (i.e. health, safety and well-being) that places a focus on employees as viewed from a tactical level of CREM.

5   *Environmental responsibility*
    This perspective concerns the impact on the environment. Two cases studies, DAD and WSRL, include building performance measures (i.e. construction materials and equipment meet local content, energy performance) that are related to this perspective. These measures involve considerations for the whole corporation that call for decision making from the policy makers on a strategic level of CREM.

6   *Cost efficiency*
Unlike the financial health perspective, cost efficiency focuses on cost reduction. The findings show that all of the case studies include occupancy and operating costs of buildings (i.e. facility and utility costs, depreciation expenses) as performance measures related to this perspective. These measures involve decisions from the controllers on a strategic level of CREM.

The CRE performance measures from the literature that have been applied in connection to different stakeholders, and different real estate and managerial levels can be summarised as follows:

- *Employee satisfaction with the work environment* is a performance measure that is connected to the end users (employees) and focuses on improving the existing accommodation (workspaces) on an operational level.
- Performance measures related to *community and well-being* are connected to the policy makers and focus on the symbolic function of an organisation (e.g. company's reputation) at the strategic level.
- Performance measures of *financial health* and *cost efficiency* are connected to the controller as the focus is on revenue expansion and cost minimisation of corporate real estate (i.e. rental space and buildings) at a strategic level of CREM.
- Performance measures related to *organisational development* are connected to both technical managers and employees as the focus on the building qualities and the employees' specific needs at an operational and a tactical level.
- Performance measures of *productivity* have an impact on employees and focus on the employee's health, safety and well-being at a tactical level.
- Performance measures related to *environmental responsibility* are connected to policy makers and focus on the specific functions of buildings at the strategic level.

§ 9.3.5   **Value dimensions**

Value dimensions that have direct relevance in the field of CREM and FM include use value (Woodruff, 1997, Ostrom et al., 2010), social value (McMillan, 2004), environmental value (Senge et al., 2008), relationship value (Gwinner et al., 1998) and financial value (Bowman and Ambrosini, 2000, Lusch and Vargo, 2009). Table 48 demonstrates the applied value dimensions in the case studies.

Value dimension	DAD	PTH	WSRL
Use value	++	++	++
Social/Cultural value	+	+	++
Environmental value	++	+	++
Relationship value	++	++	++
Financial value	+	++	+

++ applied in the case study + applied to some degree

Table 48
Value types in three case studies

1   *Use value*
    Use value is defined as a customer's outcome, purpose or objective that is achieved through service (Woodruff, 1997). Use value is strongly related to the effectiveness of FM (Coenen et al., 2012). In all three cases, end users of the workplace have also been referred to the customer of the corporate real estate services. It is clear that in all of the case studies a strong focus is placed on use value as demonstrated in the provision of safe workplaces that promote employee health, well-being and satisfaction. In addition, the PTH and WSRL workplaces are designed to support flexible working, teamwork and communication that are considered as use value of CREM and FM. The findings from the three case studies show that use value is strongly related to effectiveness, i.e. safe workplaces, employee health, well-being and satisfaction.

2   *Social/cultural value*
    Coenen et al. (2012) mention that FM - being responsible for the built environment - can create social value by organising the physical setting according to organisational goals and desired behaviour as suggested by Bitner (1992). Indicators or metrics of social value are, for example, a sense of community and sense of place, civic pride and neighbourly behaviour, or reduced crime and vandalism. Organisational context can have an influence on value dimensions in CREM and FM. The findings from the case studies show that the organisations reflect social value in different ways with regard to their building appearance:
    - One of the DAD's workplaces was located in the conference centre of the government complex, so the organisation shows a lack of strong corporate identity in its building appearance.
    - The PTH case rents the space in a multi-tenant office building which makes it difficult to promote a sense of place.
    - The sustainable building design of the WSRL case reflects the organisational objectives and helps to promote social value.

    As a result, the opportunity to support social value by a building's appearance is minimised in the Thai cases.

3   *Environmental value*
Environmental value can be described as a concern for intergenerational equity, the protection of biodiversity and the precautionary principle in relation to the consumption of finite resources (McMillan, 2006). Principles include adaptability and/or flexibility, robustness and low maintenance, and the application of a whole-life cost approach. The immediate benefits are good local health and no or low pollution. Examples of indicators or metrics are environmental impact, amount of garbage produced and carbon footprint. The use of energy efficient materials in the DAD case and the sustainable design approach used in the WSRL case both reflect environmental value. The concern about the environmental impact in these two cases has been seen as one of the common roles of public organisation. In addition, the implementation of flexible workplace in the PTH and the WSRL cases can reduce the footprint which in turn contributes to the environmental value.

4   *Relationship value*
Relationship value consists of a relationship's benefits and the sacrifices made by stakeholders (Gwinner et al., 1998). All of the cases have a clear classification of stakeholders and their needs:
- The customer in the DAD case, which is a public organisation, needs to be informed about the support services with regard to the real estate and facilities such as its help desk and call centre.
- The customer of the PTH case, which is a supplier, requires easily accessible location for business contact.
- The customer of the WSRL case, which is citizens of the region, requires knowledge and information about duties and services concerning water management.

The analysis of stakeholders and their connection with CREM are essential in formulating the relationship value.

5   *Financial value*
The financial dimension of value is also called value-in-exchange, economic value, or financial value (Coenen et al., 2012). The financial value dimension describes the realised value "when the product is sold. It is the amount paid by the buyer to the producer for the perceived use value" (Bowman and Ambrosini, 2000, p.4). Exchange value is described as the exchange of money for a market offering (Lusch and Vargo, 2009, p.9) and focuses on cost and the connection between output and input in a business process (Jensen, 2010, p.177). The findings show that all of the case studies include several issues related to financial value; i.e. facility and utility costs (buildings & equipment). As a private company, the PTH case focuses more on this value dimension than the other two cases as was shown in several of the financial performance measures including the economic profit realised, income generated from operations, working capital, operational cash flows, inventory turns and office rent.

Value can be used in various ways and does not necessarily have the same meaning for all of the parties involved (Buttle, 2004). Thomson and Austin (2006) mention that stakeholders make different value judgements regarding the same object and the information that describes it, because they are each influenced by their own set of values. The findings from the case studies show the different classification of stakeholders and their relationships to the organisation. For example, the DAD's building users were classified into different groups of stakeholders (i.e. employees, customers, visitors) with their different needs and preferences.

The findings show that the corporate real estate performance measures in the six categories found in the case studies (see Table 46) can be connected to most of the areas included in *the added value of CREM* (see Table 6). Furthermore, these performance measures can also be considered in relation to the perceptions of stakeholders as value dimensions:

- Performance measures of *stakeholder perception* focus on the satisfaction aspects (work environment, CRE service, facilities) of different stakeholders that can be considered as relationship value.
- Performance measures of *financial health* focus on the overall financial aspect of organisation which is considered as financial value.
- Performance measures of *organisational development* focus on the quality of facilities (i.e. suitability of premises) that can be considered as cultural value.
- Performance measures related to *productivity* (i.e. health, safety and well-being in the workplace) can be considered as use value.
- The concern about the environmental impact, which has been shown in the performance measures of *environmental responsibility*, is aligned with environmental value.
- Performance measures of *cost efficiency* focus on the costs of occupancy and building/FM operation and are related to financial value.

The observation made in all three of the case studies showed that corporate real estate performance measures can be used as a means to measure the added value of CREM, and can be connected to the different value dimensions of the organisations.

§ 9.4   Employees' responses to the work environment

Employees' responses to the work environment have been evaluated in the following three ways: employee satisfaction, perceived productivity support and prioritised aspects of the work environment. The information from the three case studies was compared with similar data that had been obtained from the 96 Dutch cases (Center for People and Buildings indicator; Brunia, 2013).

§ 9.4.1   Employee satisfaction

Table 49 shows the percentages of satisfied respondents in the three case studies and the average percentage of satisfied respondents 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

Table 49

Percentage of satisfied respondents in three cases and the similar data in 96 Dutch cases (Brunia, 2013)

a. Comparison between the three cases

Findings showed that all three cases have rather low satisfaction percentages on archive and storage facilities and privacy. In regard to most of the items a much lower percentage of the DAD employees are satisfied in comparison to the PTH and the WSRL cases after the workplace change. One exception is that there is satisfaction regarding the architecture and appearance of the building and the opportunities to communicate.

In comparison with the DAD case, both the PTH and the WSRL cases have high percentages of satisfied respondents in the following areas: 1) accessibility of the building, 2) functionality and comfort workspaces, 3) facilities for remote working, 4) interior design appearance and ambiance, 5) facilities and facilities management, 6) number, diversity, and functionality of spaces, and 7) openness and transparency of environment. For example, the accessibility of the building is much less appreciated in the DAD case (37%) in comparison to the PTH case (62 %) and the WSRL case (72 %).

The WSRL case has much higher number of satisfied respondents on the three aspects compared with the Thai cases which include the following aspects: 1) architecture and appearance of the building, 2) subdivision of the whole building and 3) opportunities to communicate. For example, the percentage of satisfied respondents regarding architecture and the appearance of the building in the WSRL case is exceptionally high (91%). On the contrary, the PTH case has the lowest appreciation on this aspect (45% satisfied respondents both before and after the change). The average percentage of satisfied respondents regarding this item in the DAD case (59%) is slightly higher than the PTH case.

The findings of all three cases show mixed results in the following areas: 1) content and complexity of work, 2) adjacency and locality of the spaces, 3) lighting, 4) indoor climate, and 5) the opportunities to concentrate. In addition, the findings show that the WSRL case achieves the highest satisfaction percentage followed by the PTH and the DAD case respectively. For example, the WSRL case indicated a higher percentage of satisfied respondents regarding the content and complexity of work (83%) in comparison to the DAD case (32%) and the PTH case (59%).

b. Comparison with the CfPB satisfaction index

The findings obtained from all cases show that the PTH, the WSRL and 96 Dutch cases (Center for People and Buildings Indicator; Brunia, 2013) have high satisfaction percentages in: 1) accessibility of the building, 2) functionality and comfort workspaces, 3) facilities and facilities management, 4) openness and transparency of environment, and 5) interior design appearance and ambiance. The comparison between the findings from three case studies and the CfPB index shows striking similarities and differences:

- The findings show that the DAD employees are much less satisfied with most of the aspects that relate to their work environment compared with the Dutch employees in 96 cases (Brunia, 2013). There is an exception which regards the architecture and the appearance of the building (59%) which is slightly higher than the Dutch cases (55%).
- Several aspects of the PTH workplace have a much lower satisfaction percentage than the Dutch cases including content and complexity of work (59% versus 80% in the average Dutch cases) and opportunities to communicate (48% versus 71%). However, the satisfaction percentage in indoor climate is much higher in the PTH case (59%) in comparison to the Dutch cases (33%).
- The WSRL shows a much higher satisfaction percentage in several aspects compared with the other Dutch cases including architecture and the appearance of the building (91% versus 55% in the average 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%).

c. Reflections on how to explain similarities and dissimilarities

The similarities and dissimilarities obtained from the findings from the three cases have been explained in connection to the variables in the integrated conceptual model including:

1. organisation (business types, objectives, structure, staff characteristics, work process & work pattern)
2. workplace change (workplace change objectives, location, building grade, architectural design, workplace concept, supporting facilities and implementation process).

The findings from three case studies show that different organisation and workplace characteristics have different influences regarding the satisfaction of employees.

1. Organisation

Business types and objectives

The case studies have different policies on the implementation of workplace change with regard to the different business types and objectives:

- Most of the public organisations in Thailand are developing the personnel administration system that supports positive attitudes and working methods among public officials in order to deliver more efficient public services. This objective has led to the agreement that allows the DAD employees to personalise their workspaces which results in the high average satisfaction rating of workplace environment as friendly and enjoyable.
- The consumer lighting business of the PTH case and the water management business of the WSRL case have been supported by the work environment that supports task performance. Policies with regard to the use of different types of workspaces in the PTH and WSRL case have resulted in a high satisfaction percentage in number, diversity, and functionality of spaces and functionality and comfort workspaces.

Structure

The structure of case studies has been explained in connection to workplace change and the appraisal of change:

- The hierarchical structure of the DAD organisation reflects the bureaucracy of a public organisation. For example, the corporate decisions of the DAD case that were made by the organisation's committee must be aligned with the central government policy.
- The flat structure of the PTH and WSRL case allows their employees to become involved in the design process that contributed to the improved work environment which in turn could lead to the higher satisfaction percentage on several aspects including sharing one's own ideas about the working environment, number diversity and functionality of spaces, adjacency and locality of the spaces, and openness and transparency of environment.

Staff characteristics and work process & work pattern

Staff characteristics, work process & work pattern of the three case studies have been described in connection to workplace change and the appraisal of change:

- Most of the DAD employees are general office workers who carry out day-to-day routine operations. Permanent employees are supplemented by temporary workers. The DAD employees are given direct orders and are hardly given any opportunity to make decisions.
- The highly competitive business environment of the PTH case requires a particular type of employee. Most of the staff are qualified to work as specialists, so the expectations regarding the workplace quality are high. There are two types of PTH employees, mobile and non-mobile workers who are involved in projects or group work, and who subsequently need a change in the balance of various interdependent skills. The mobile workers usually spend much of their time out of the office and they only hold meetings occasionally in the office, whereas the non-mobile workers occupy specifically designated desks.
- The WSRL employees are skilled workers who carry out various types of office work and who need to interact with their colleagues. The WSRL staff share similar characteristics with the PTH staff in that they also require a creative and collaborative work environment.

Work processes of the DAD case can be described as routine office work with a regular working timetable from 9 to 5. The staff characteristics and work processes in the DAD case have led to the choice of the typical workplace design, i.e. a large open plan layout with high partitions and a few types of work settings. This may account for the quite modest percentages of satisfied respondents regarding several aspects of the DAD workplace including *openness and transparency of environment* and *functionality and comfort workspaces*. In addition, the working trends that are moving more towards dynamic working activities may account for the low employee satisfaction in *content and complexity of work* that was found in the DAD case.

On the contrary, the work processes of the PTH and the WSRL cases can be described as flexible working, depending on what needs to be done, and on individual arrangements with highly intermittent patterns of occupancy supports with shared task settings. The collaborative working environment with its various work settings in the PTH and the WSRL cases has been responsible for the high satisfaction percentage in *number, diversity, and functionality of spaces*.

2   *Workplace change*

Workplace change objectives

The findings from the three case studies show that workplace change objectives have been of influence regarding the choice of the new workplace:

- The DAD case requires more office space in order to cope with the increasing number of employees, so this entailed making a move to the larger workplace with an open plan layout.
- The new workplace concept was introduced in the PTH case to foster communication among employees.
- Having originated from several partners, the WSRL case decided to accommodate all of the employees who were dispersed over different locations to one building in order to foster integration and communication.

The PTH and the WSRL cases both needed to have a more effective use of space which in turn resulted in the implementation of the innovative workplace concept.

In order to improve the working environment, each case set up workplace change objectives in an effort to either to promote sustainable objectives, to increase floor space, or to promote mutual communication:

- The modern design of the DAD building can be seen in the building skin with its energy efficient materials (i.e. reflective glass). In order to reduce the cooling load, the energy conservation concept controls ventilation and infiltration through the tightly sealed building envelope that could result in some disadvantages such as the *indoor air quality*.
- The PTH case's office is characterised by a large and open floor plan in a tall office building, with lifts, shafts and sanitary facilities located in a central core that is similar to the typical North American office described by Duffy (1997).
- Just as in many other northern European office buildings, the design of the WSRL new workplace emphasises information exchange among employees.

Because of the architectural design, interior appearance and the functional space of the WSRL's new building, we can witness a higher percentage of satisfied employees in several aspects of the work environment of the Dutch case compared with the Thai cases, including *architecture and appearance of the building, subdivision of the whole building* and *adjacency and locality of the spaces*.

Location
Different real estate strategies with regard to *location* have led to different degrees of employee satisfaction:

- Situated in the city centre, the PTH's building location is more appreciated by the employees. We observe a higher percentage of satisfied respondents in the PTH case regarding the *accessibility of the building* compared to the DAD case.
- The WSRL's new building was located close to the railway station which was easily accessible for employees who are dispersed over several different locations. This has resulted in a high satisfaction percentage in *accessibility of the building*.
- The higher satisfaction percentage with regard to the *accessibility of the building* in a number of the Dutch cases might be due to the fact that many of the Dutch cases are located near a train station (Rothe et al., 2011).

Building grade
Building grade of the three case studies has been described in connection to the appraisal of change:

- The DAD's workplace is classified as the Grade B office, which is characterised as an office building with a lower quality and minimal decoration and economical cost of occupation (CBRE, 2012)
- The PTH case occupies the Grade A office which is characterised by an office that has an exceptional building design and services such as a decorative interior design in the common meeting areas and a provision of professional building management (CBRE, 2012).
- The WSRL case occupies a modern office building which has a high quality of interior design and work settings.

The higher building quality of the PTH and the WSRL case has resulted in the higher satisfaction percentage in *interior design appearance and ambiance* compared with the DAD case.

Architectural design
Employee satisfaction in *architecture and building appearance* in the PTH and the DAD cases is quite modest compared with the WSRL case:

- The DAD's modern design building with its aluminium composite material used in the building envelop is quite different from other public buildings in Thailand. However, the building appearance does not express corporate culture and it is difficult to recognize that the building accommodates a public institution.
- The PTH case rents the space in a multi-tenant office building that hardly creates a strong corporate identity and the "sense of place" through the building.
- The exterior of WSRL's office was specifically designed to retain the sustainable objective by using natural materials such as brick, stone and water.

Workplace concept
In all of the cases we observe that the selection of workplace concept depends on work processes:
- The routine office work of the DAD fits with the quite typical layout and the standard work settings.
- The more collaborative works found in the PTH and the WSRL cases have resulted in choosing the innovative workplace concept with its modern interior design and work settings.

The different workplace concepts that can be found in the case studies have resulted in the different feedback received from the employees. The flexible workplace concept provides the PTH and WSRL employees with more choices to perform tasks on various occasions. Both cases have a higher satisfaction percentage regarding several aspects in comparison to the DAD case including *number, diversity and functionality of spaces, openness and transparency of environment, functionality and comfort workspaces*, and *facilities for remote working*. In addition, the creative workplace design also drives the brand identity found in both cases.

Subdivision of the building is indicated by the orientation of the building, the adjacency of the various spaces and the practical usability of the building which have been discussed in the three cases:
- Without of the provision of support spaces, the quite typical layout of the DAD workplace has resulted in the lowest percentage of satisfied employees in the subdivision of the whole building (33%).
- Employee satisfaction regarding the subdivision of the building was not improved in the PTH case compared with the previous situation. This is because the new workplace is situated in the same building, so the usability of the building did not change. The satisfaction regarding this aspect was found to be rather low (38%).
- The layout of the WSRL workplace was designed to have every function under one roof, with short distances between the spaces that resulted in the high satisfaction percentage pertaining to this aspect (80%).

Not only workplace appearance expresses the brand, but it can also stimulate creativity and interaction as well as support culture change. The more attractive workplace design of the PTH and WSRL cases has led to a higher satisfaction percentage in the *interior design appearance and ambiance* than the conventional workplace concept of the DAD case.

The satisfaction percentage concerning the *opportunity to communicate* is higher in the Dutch case than the Thai cases that can be explained by the different workplace concept:
- The DAD case separated the operation department to a secondary building, away from the main building.

- The PTH case separated the workplace of the lighting department from the other units.
- The new building of WSRL has been designed to accommodate all functions under one roof and, moreover, to provide various functional spaces in order to support better communication between colleagues.

The separated buildings of the DAD case and the separated workplace of the PTH case are the major obstacle for conducting face-to-face communication. This separation makes it difficult to have effective communication between the functional units of the organisation.

Supporting facilities
Despite the fact that both the Thai cases have mobile workers, *facilities for remote working* are not equally provided. The PTH employees were provided with more support regarding the facilities and there were regulations for the mobile workforce that have resulted in the higher satisfaction percentage that was obtained for this item compared with the DAD case.

The findings from the PTH and the WSRL cases show that the *ICT and ICT support facilities* are a dissatisfier:
- The findings from the PTH case show that satisfaction with this aspect had slightly decreased (48% of satisfied respondents compared with 52% in previous situation), and it was one of the top three most dissatisfied aspects in the current condition.
- The ICT and support facilities in the WSRL case did not change in satisfaction (47% of satisfied respondents, both in the 2007 and 2008 surveys). This aspect was one of the top five most dissatisfied aspects of the work environment in the most recent survey.

It is evident that the dissatisfaction is high when this aspect was not fulfilled. Therefore, the ICT and support facilities can be considered as a dissatisfier according to Herzberg (1987).

Implementation process
Employee involvement during the design process has an influence on the workplace change of the three cases studies:
- The DAD case did not involve employees in the change process. The facilities department is in charge of the maintenance of the buildings and facilities as routine work.
- Both the PTH and the WSRL cases allow employees to become involved in the implementation process. For example, the PTH employees had an opportunity to test office chairs, and to participate in the selection of furniture which contributed to the positive change in the workplace.

Employee involvement has had an influence on workplace concept, which affects employee satisfaction as demonstrated in several satisfied aspects in the PTH and the WSRL cases including *number, diversity, and functionality of spaces, adjacency and locality of the spaces,* and *interior design appearance and ambiance.*

Non-work related variables: age and gender
The work environment has an impact on employee satisfaction and productivity, but other variables including aspects that are not work-related can also play a role such as an employee's private life (Van der Voordt, 2003). Evidence suggests that age, gender, education, status or social role can affect productivity and satisfaction at work (Farshchi and Fisher, 2006). Differences in age and gender in the case studies have been discussed:
- The findings show a much higher number of young employees in the DAD case (48% younger than 31 years old) compared with the PTH and the WSRL cases (22% and 9% younger than 31 years old, respectively).
- The number of female employees in the DAD case (63%) is much higher than in the PTH and the WSRL cases (31% and 30%)

The age and gender differences may have an influence on the different percentages concerning employee satisfaction with the work environment. For example, a much higher percentage of the DAD employees indicate *neutral* with regard to the satisfaction in different aspects of the work environment in comparison to the PTH and the WSRL cases.

Concluding on employee satisfaction, the physical characteristics of workplace change have a stronger influence on satisfaction of employees than the other variables as have been shown in the findings of the three cases

§ 9.4.2 Perceived productivity support

Table 50 shows the percentage of satisfied respondents in the three case studies and the average percentage of satisfied respondents in 96 Dutch cases (Brunia, 2013).

	DAD	PTH (before change)	PTH (after change)	WSRL	CfPB
Individual productivity	30	43	**55**	45	**40**
Team productivity	**35**	**45**	34	**46**	38
Organisation productivity	17	43	31	38	31

Table 50
Percentage of satisfied respondents in three cases and the similar data in 96 Dutch cases (Brunia, 2013)

a. Comparison between the three cases

Perceived productivity support of the work environment can be measured at different levels (individual, team and organisation) which have been described in the three case studies:

- Comparing all three cases, the DAD case has the lowest percentage of satisfied respondents in the extent to which the working environment supports individual and organisation productivity (30% and 17%, respectively). One exception is team productivity (35%), which appears to be slightly higher than the PTH case after the workplace change (34%).
- An improvement can be observed in the individual productivity of the PTH case after the workplace change occurred. Satisfaction with the individual productivity (now 55 %) is higher compared to the previous situation (43%, therefore 12% more employees remarked that the work environment currently supports their productivity). However, satisfaction percentages regarding team productivity (currently at 34%) and organisation productivity (currently 31%) are lower after the workplace change (10.7 % and 11.9 % with less satisfied respondents, respectively, compared to the previous situation).
- The WSRL case achieves a higher satisfaction percentage in team and organisation productivity (46% and 38%), whereas the PTH employees are more satisfied with the individual productivity (55%) than the other two cases.

b. Comparison with the CfPB satisfaction index

The average percentage of satisfied respondents with perceived support of individual productivity in the DAD case (30%) is slightly lower than in the 96 Dutch cases (40%) (Center for People and Buildings Indicator; Brunia, 2013). The findings show that the PTH and WSRL employees are more satisfied with the perceived support of individual productivity (55% and 45%) compared with the Dutch employees in 96 cases.

The satisfaction percentage regarding team productivity in the DAD case (35%) and the PTH case (34%) are slightly lower than in the 96 Dutch cases (38%). Again, the satisfaction percentage regarding organisation productivity is quite modest in the DAD case (17%) in comparison to the average Dutch cases (31%).

The comparison between the findings from three case studies and the CfPB index shows striking similarities and differences:

- In comparison to 96 Dutch cases (Brunia, 2013), all of the levels pertaining to the perceived productivity percentage (individual, team and organisation) in the DAD case are less appreciated than the CfPB indicator.
- The findings show mixed results between the perceived productivity percentage of the PTH case and the CfPB indicator.
- The satisfaction percentage for perceived productivity support in the WSRL case at all levels was higher than the CfPB indicator.

c. Reflections on how to explain similarities and dissimilarities

The WODI questionnaire asks employees how they perceived the work environment that supports their productivity, team and organisation. The findings from three cases show that the DAD case has a modest percentage of satisfied respondents with regard to *individual and organisation productivity* compared with the PTH, WSRL and a number of the Dutch cases.

The findings showed that the choices of work settings, workplace layout, support facilities or public spaces have an influence on employee productivity. Additionally, the negative impact of workplace design on perceived productivity support has been shown in all of the three cases:

- The quite typical layout and standard work settings that were based on the work processes in the DAD case may have resulted in the low individual and team productivity. The lack of support spaces also has had an impact on team productivity. From the interviews conducted with the DAD employees, it was concluded that the separation of workplaces to two separate building locations in the DAD case caused difficulties for collaboration and team working which has resulted in the lower perceived productivity percentage in the DAD case compared with the other cases.
- Findings from the PTH case after the change show striking differences between the perceived productivity levels. The perceived support of *team and organisation productivity* dropped, whereas *individual productivity* increased after the change to the new workplace. The decreased *team productivity* can be explained by how the workplace layout was arranged. There are various groups of employees in the lighting department, but team spaces have not been provided to support group work. This created difficulties and prevented each group of employees from being able to effectively communicate with one another. It was concluded that due to the miscalculation of the team space requirement in the PTH case during the implementation process, a lower satisfaction percentage in team productivity was obtained compared to the previous situation.
- The WSRL case achieved the highest percentage of satisfied respondents in team and organisation productivity which have been explained by the specifically designed interior, the workspace layout, the arrangement of various work settings, and the collaborative work environment. However, the lack of privacy and concentration in the open plan office has affected the overall productivity support in the Dutch case.

Several studies investigate the relationship between employee satisfaction and perceived productivity support of the work environment (Kroner et al., 1992, Leifer, 1998).   The study by Kroner et al. (1992) showed that there is a positive association between change in productivity and change in regard to satisfaction with the work environment. According to Public Work Canada, the two environmental dimensions that have a greater effect on both worker productivity and satisfaction are *spatial*

comfort and *privacy* (See Section 3.5.1, Table 16). The findings from all three cases show that the quality of the work environment not only impacts on employee satisfaction, but it also affects the perceived productivity support of the work environment.

In comparison with the CfPB indicator, the remarkably high satisfaction percentage in the individual productivity of the PTH case and the team productivity of the WSRL case can be accounted for by the workplace changes that are based on the *staff characteristics* and the *work processes* found in both cases. These findings indicate that the work environments of both cases are more appreciated with regard to the support of individual and team productivity in comparison with a number of the Dutch cases. The CfPB indicator can be used as a benchmark for the DAD case to improve the work environment that supports *individual* and *organisation productivity*.

The physical characteristics of workplace change showed to be more important to the perceived productivity support than the implementation process as has been demonstrated in PTH case. Although the PTH case has set up the systematic implementation process, the lack of team spaces has resulted in the decreased team and organisation productivity. The study showed that the different choices of workplace change have positive or negative impacts on the perceived productivity support with regard to the needs and preferences of employees.

§ 9.4.3   **Prioritised aspects**

Table 51 shows the ranking percentage respondents in the three cases marking a particular aspect as one of three most important aspects of the workplace environment and the similar data in the average percentage of satisfied respondents in 96 Dutch cases (Brunia, 2013).

	DAD	PTH (before change)	PTH (after change)	WSRL	CfPB (2013)
Functionality and comfort workspaces	15	**43**	34	**55**	**48**
Accessibility of the building	20	21	7	21	35
Opportunities to concentrate	5	12	**45**	25	35
Indoor climate	14	19	3	29	28
Opportunities to communicate	0	2	21	26	24
Number, diversity, and functionality of spaces	20	17	7	24	17
ICT and ICT support facilities	21	33	28	23	17
Facilities for remote working	5	24	28	20	17
Interior design appearance and ambiance	2	14	3	11	12
Privacy	18	33	41	9	11
Openness and transparency of environment	24	10	7	15	10
Adjacency and locality of the spaces	**39**	21	17	5	8
Subdivision of the whole building	35	0	7	5	7
Sharing own ideas about working environment	31	2	14	9	6
Architecture and appearance of the building	24	10	0	8	5
Archive and storage facilities	7	19	14	7	4
Facilities and facilities management	14	7	3	6	4
Lighting	6	10	14	29	4
Acoustics	1	2	7	29	4

Table 51

Ranking % respondents in three cases marking a particular aspect as one of three most important aspects of the workplace environment and the similar data in 96 Dutch cases (Brunia, 2013)

a. Comparison between the three cases

The findings showed that all three cases allocated a high priority to the following aspects: 1) number, diversity, and functionality of spaces, 2) ICT and ICT support facilities, and 3) the accessibility of the building. For example, the findings show that number, diversity, and functionality of spaces is indicated as an important aspect in the DAD case (20%), the PTH case (17%), and the WSRL case (24%).

The most important aspect which was indicated by the DAD employees was *adjacency and locality of the spaces* (39%) whereas this item proved to be less significant in the PTH and the WSRL cases (mentioned by 17% and 5%). The DAD employees ranked the *subdivision of the whole building* as one of the top three most important aspects (35%), which was given a much higher priority than in the PTH and the WSRL cases (mentioned by 7% and 5%). *Sharing one's own ideas about the working environment* was considered as an important aspect for the DAD employees (mentioned by 31% in their top three of the most important aspects), but this item had much less significance in the WSRL case (9%).

In comparison with the DAD case, the PTH and the WSRL assigned a much higher priority to the following aspects: 1) functionality and comfort workspaces, 2) opportunities to concentrate, 3) facilities for remote working and 4) opportunities to communicate. For example, the employees of both the PTH and WSRL cases allocated a higher priority to *functionality and comfort of the workspaces* (34% and 55%) than the DAD respondents (15%). The perceived high importance of *opportunities to concentrate* in the PTH and the WSRL cases (45% and 25%) is much higher than in the DAD case (5%).

b. Comparison with the CfPB satisfaction index

The three aspects concerning the work environment that all of the case studies and 96 Dutch cases (Brunia, 2013), which were perceived as being the most important, are as follows: 1) number, diversity, and functionality of spaces, 2) ICT and ICT support facilities, and 3) the accessibility of the building. For example, all three cases indicated the *accessibility of the building* as highly important including the DAD case (20%), the WSRL case (21%) and 96 Dutch cases (21%). Remarkably, in the PTH case this percentage dropped from 21% before the change to 7% after the change.

Except for the DAD case, the PTH, the WSRL and the 96 Dutch cases perceive *functionality and comfort workspaces, opportunities to concentrate, facilities for remote working and opportunities to communicate* as highly important. *Functionality and comfort of workspaces* is mentioned as less important for the DAD case (15%), whereas this item is highly prioritised in the PTH before the change (43%), and respectively the WSRL (55%) and 96 Dutch cases (48%).

Sharing one's own ideas about the working environment is more important for the employees of the DAD and the PTH cases than in the 96 Dutch cases (mentioned by 31% in the DAD case, 14% in the PTH case and 6% in the Dutch cases).

c. Reflections on how to explain similarities and dissimilarities

The findings show mixed results between the case studies on items that employees mention as being the most important. A work environment aspect that is important to one organisation may appear to have less prominence than for the others because of the differences in organisational context such as organisational objectives, work processes, staff characteristics, workplace concept and culture. For example, the DAD employees indicate *architecture and appearance of the building, subdivision of the whole building*, and *adjacency and locality of the spaces* as the most important aspects, but these aspects are less significant in the PTH, the WSRL case and the 96 Dutch cases.

The findings show different levels of environmental comfort between the case studies:

- Regarding environmental comfort, the DAD respondents show much concern about physical comfort as indicated in the preference for *adjacency and locality of the spaces* and *subdivision of the whole building*. Physical comfort is assured by a well-considered building design and operation, as well as by setting and meeting standards of health and safety (Vischer, 2008). The DAD employees seem to place a high importance on basic human needs and necessary conditions for building habitability.
- The employees of the PTH, the WSRL and the 96 Dutch cases (Brunia, 2013) indicated that there was a need to place an emphasis on functional comfort to support and improve task performance as shown in the high priority of *functionality and comfort of the workspaces* and *opportunities to concentrate*. Functional comfort focuses on the generic human needs for tools to perform specific tasks; it defines workspace as a tool for getting work done (Vischer, 2008).

The different levels of environmental comfort can be explained by staff characteristics, work processes, and workplace concept of all three cases:

- The routine office workers with a regular working timetable have caused the quite typical layout and standard work settings of the DAD workplace. The working trends that are moving towards more dynamic working activities have resulted in the requirement for better housing standards and environmental conditions in the DAD case, which explains the emphasis on physical comfort.
- The staff of the PTH and the WSRL cases share similar characteristics as they are all experts in their various fields. Work processes of the PTH and the WSRL cases are more creative works with groups, projects and interactive works that have led to the provision of the innovative workplace design with collaborative work settings, which explains the emphasis on functional comfort.

The different emphases on environmental comfort have been explained by the different staff characteristics, work processes and workplace concept between the DAD case and other cases. The requirement for better housing standards and environmental conditions in the DAD case has resulted in the high emphasis on *sharing one's own ideas about the working environment* in comparison with the other cases.

The environmental comfort can also be used to discuss the finding from the case studies and the CfPB indicator:

- All of the case studies and the 96 Dutch cases (Brunia, 2013) allocated a priority to the *accessibility of the building* which was found to be a concern regarding the physical comfort as it was one of the basic needs regarding the work environment in all of the cases.
- The PTH, the WSRL and 96 Dutch cases (Brunia, 2013) indicated *functionality and comfort workspaces, opportunities to concentrate, facilities for remote working*, and *opportunities to communicate* as being highly important. The emphasis placed on

these work environment aspects are considered to pose a concern for the functional comfort in that the workplace has been designed to support task performance and environmental competence.

The respondents in the WSRL and the 96 Dutch cases display more concern about the *indoor climate* than the respondents in the Thai cases. In The Netherlands, issues concerning the safety, health and welfare of employees are found to be important. The issues related to *indoor climate* are included in the Risk Inventory and Evaluation, which is obligatory for large organisations in The Netherlands. This could explain the high priority assigned to an indoor climate which was indicated in the WSRL and 96 Dutch cases.

In order to increase satisfaction, preferences also need to be fulfilled (Rothe et al., 2012). For example, the emphasis on the *accessibility of the building* in the Dutch cases has been fulfilled due to the fact that many of the Dutch cases are located near a train station (Rothe et al., 2011). This item achieves a high satisfaction percentage in a number of the Dutch cases (Brunia, 2013).

§ 9.5   Cultural context

§ 9.5.1   Organisational culture

Table 52 shows the findings obtained from the organisational culture survey that were measured by the *organisational culture assessment instrument* (Cameron and Quinn, 2006), i.e. the percentage of respondents that perceive the present and preferred culture to be a clan, adhocracy, market and hierarchy.

	Clan		Adhocracy		Market		Hierarchy	
	Now	Preferred	Now	Preferred	Now	Preferred	Now	Preferred
DAD	21.8	**30.9**	23.8	22.5	25.2	21.5	**29.3**	25.1
PTH	17.6	**24**	21.4	20.2	**25.1**	18.1	19.2	21.1
WSRL	26.9	**31.6**	18.7	25.8	19.5	17.3	**35.1**	25.4

Table 52
Organisational culture index in three cases according to the organisational culture assessment instrument

The findings from the current organisational culture surveys show that the DAD and the WSRL cases are perceived as a hierarchical culture which has a tendency to shift to a clan culture as the preferred culture. The current organisational culture of the PTH case is perceived as a market culture, whereas a clan culture is preferred the most.

Reflections

The findings show that the dominant organisational culture types including *hierarchy* and *market* have been influenced by the *structure* and *staff characteristics* of the case studies:

- The bureaucracy in public organisation influences the strong hierarchical culture found in the DAD and the WSRL cases.
- DAD employees are given direct orders with little discretion. Tasks are broken down to small components. These characteristics influence a hierarchical culture that focuses on stability and control and commands an orderly work situation.
- The staff characteristics found in the PTH case (i.e. eager to win, take ownership, team up to excel) influence the current market culture in such a way that the organisation wants to empower its employees to team up and to win in the markets (Berger, 2011).

Organisational culture, workplace change and appraisal of change
The findings show that the dominant culture types including hierarchy and market have a stronger effect on workplace change and the appraisal of change than the other cultures. The findings from all three cases show that workplace characteristics have also been explained in connection to organisational culture in the various stages of the organisational life cycle. In the earliest stages of the organisation life cycle, the DAD case had to share its building with another organisation. As a consequence, the company was confronted with a greater need for space as it was growing in size and the number of employees had increased. It eventually found itself faced with the need to emphasise structure and standard procedures in order to control the expanding responsibilities. Order and stability was needed so therefore a move to a single tenant building occurred. This fits in with the hierarchical culture of the organisation. The close proximity of the operation department to the other departments combined with the client's premises supported the efficient communication that, in turn, corresponds well with the emphasis that is placed on efficiency in a hierarchical culture. The focus on efficiency is also visible in the high ranking of *adjacency and locality of workplaces* and the *subdivision of the building*.

By the same token, the move in which the WSRL workplaces transferred its various office locations to a single building and the minimising of the use of space reflects a hierarchical culture which places an emphasis on an environment that is stable, where tasks and functions can be integrated and coordinated (Cameron and Quinn, 2006). The new workplace that optimises the use of space has resulted in the high percentage of satisfied respondents in *opportunities to communicate*.

The PTH occupies a Grade A office in the city centre, which can be easily accessed for business contact. The high-quality building design and services are meant to attract clients. The focus placed on transactions with customers and suppliers is considered to be a market culture. This culture type has had an effect on the high satisfaction percentages in the *accessibility of the building* and the *interior design appearance and ambiance* with regard to the location and building grade characteristics.

The organisational culture survey provides quantitative data. According to Cameron and Quinn (2006), to conduct comparisons between multiple cultures, quantitative approaches must be used. However, even though a study may have been conducted objectively, it is still value bound. In addition, the availability of quantitative data does not guarantee reliability. It might happen that if people fill out the questionnaire at another moment they will do so slightly different. For this reason, triangulation of data has been applied in this research. Data collected from different sources (documents, surveys, interviews) can facilitate validation of data though cross verification.

§ 9.5.2 National culture

Table 53 shows the findings obtained from the national culture survey that were based on the *Value Surveys Module 1994* (Hofstede, 1997), and which were found in all three case studies and the national culture indexes of Thailand and The Netherlands.

	Power Distance	Individualism	Masculinity	Uncertainty Avoidance	Long-term Orientation
Thailand*	64	20	34	64	56
DAD	25	83	6	100	38
PTH	18	87	-1	84	38
WSRL	141	80	-41	47	49
The Netherlands*	38	80	14	53	44

*Thailand and Netherlands data according to the national culture index from Hofstede (1997)

Table 53
Indexes of five key dimensions of national culture in three cases according to the Value Surveys Module

The findings from the national culture survey of the DAD case show lower scores regarding masculinity, power distance and long-term orientation than the country of Thailand as a whole and much higher scores on individualism and uncertainty avoidance. The PTH case shows much lower scores on power distance, masculinity and long-term orientation than the country of Thailand as a whole, and much higher scores on individualism and uncertainty avoidance. The WSRL case shows much higher scores on power distance and much lower scores on masculinity than The Netherlands as a

whole. The Dutch case reflects a large power distance and weak uncertainty avoidance in comparison to the two Thai cases.

Reflections

The findings proved that the national culture data from Hofstede cannot be generalised to the case studies. The findings from the national culture surveys of the Thai and Dutch cases show large differences compared with the literature and the national culture index from Hofstede (1997). These differences can be explained by the organisational context of the case studies as well as the changing social and work norms.

The high power distance of the WSRL case (141) is in contrast to the national culture index of The Netherlands (38). Power distance can be defined as the extent to which the less powerful members of institutions and organisations within a society expect and accept that power is distributed unequally (Hofstede, 1997). According to the literature, the Dutch culture does not accept inequality. The Dutch tend to emphasise egalitarianism and respect for differences between individuals (Benedict, 1974). In the workplace, power is decentralised. Managers count on the experience of their team members and the employees expect to be consulted (Hofstede, 2001).

The findings in the power distance show contrasting results between the national culture survey (VSM 94) from the respondents and the characteristics of Dutch society as a whole. The high power distance in the WSRL case could be explained by the distinct characteristics of the case organisation. The WSRL is a local authority in which the governance structure is similar to that of a municipality. The role and responsibilities of the WSRL's president is similar to that of a mayor. The president is empowered to take independent decisions (Waterschap Rivierenland, 2013). This reflects inequality between the higher and lower levels of a large power distance organisation. According to Hofstede (1997), centralisation is one of the characteristics of large power distance organisations. The high power distance of WSRL can be explained by the centralised planning and decision-making as a result of the merger from several partners.

The implementation process of the innovative workplace in which top managers focus on the decision process and concern themselves with strategy reflects the low uncertainty avoidance of the WSRL case (Hofstede, 1997).

Both of the Thai cases have much higher scores on individualism (83 and 87) than the national culture index of Thailand (20). Individualism stands for a society in which the ties between individuals are loose; an individual is expected to look after himself or herself and his or her immediate family only. Generally, the Thai culture is described as collectivism where people are integrated into strong cohesive in-groups which protect them in exchange for unquestioning loyalty. In Thai business culture, personal and family connections play an integral role in the daily business operations. However, today Thailand is faced with the disruptive impact on its traditional core

values and institutions, rooted in hierarchy and patriarchy, by the emerging forces of individualism, egalitarianism and good governance (Klausner, 1997). Thais are becoming more confident and comfortable in expressing their individual views in many aspects of life such as Thai civil and political rights. In addition the word 'Thai' means 'independence' or 'free man' which in turn implies individualism.

The competitive market of the PTH case has put a greater requirement for specific skills from the employees that have led to several issues on human resource management such as criteria for recruitment and career ladder that are based on expertise and experience of the individuals. These issues reflect the individualistic culture (Hofstede, 1997).

In the individualistic culture, occupational mobility is high in which the employer-employee relationship is a contract between parties on a labour market (Hofstede, 1997). The DAD employees usually perform day-to-day operations. The permanent employees are supplemented by temporary workers. The short-term employment is high that may have resulted in a highly individualistic culture. As a result of the changing social and work norms and the distinct characteristics of the organisations, the individualistic culture is high in both the DAD and PTH cases.

National culture, workplace change and appraisal of change
The findings show that the national culture dimensions including *individualism* and *uncertainty avoidance* have a stronger effect on workplace change and the appraisal of change than the other cultures. According to the literature, individualism is inextricably entwined with the aspects regarding immediacy and accessibility as well as the use of space. An extreme emphasis on owning space is based on individualism (Altman, 1975). People in individualistic cultures are more distant proximally (Gudykunst and Matsumoto, 1996). Individualistic cultures emphasise privacy needs that are signalled by closed doors in the United States, soundproofing, double doors in Germany (Hall, 1966), large doors in Norway, and trees along property lines in England and Canada (Altman and Gauvain, 1981).

All of the case studies show an emphasis on privacy (i.e. the provision of private rooms, break out areas, high partitions) that might have resulted from the individualistic culture. The emphasis on privacy has both an effect on the choice of workplace concept and on employee appraisal of the work environment:

- The open plan layout with high partitions has resulted in the high dissatisfaction percentage regarding *openness and transparency* in the DAD case.
- The PTH employees consider *privacy* to be an important aspect (mentioned by 33% and 41% in their top three most important aspects, before and after the change) that reflects the individualistic culture.
- The findings from the WSRL case show that the open plan layout which had no partitions in the workplace, resulted in the high percentage of dissatisfied respondents regarding *privacy*.

The organisations need to realise that the data on national culture can have an impact on workplace change and the appraisal of change. The interpretation of the national culture data in connection to workplace change and the appraisal of change should be taken into consideration along with the other variables of the organisational contexts, including organisation (e.g. objectives, structure, work process) and workplace change (e.g. location, building grade, workplace concept).

Organisations with a low uncertainty avoidance are relatively open to new ways of working and will adopt new spaces and processes sooner (Steelcase, 2009). In addition, there is a link to a more standardised workplace design in a highly uncertainty avoidance society (Kloet, 2007). The findings obtained in all three cases show different workplace concepts that can be explained in connection with the uncertainty avoidant dimension:

- The typical workplace design of the DAD case and the PTH case before the change has been influenced by the high uncertainty avoidance. Both cases have a lower percentage of satisfied employees in *number, diversity, and functionality of spaces* in comparison to the WSRL case.
- The innovative workplace design of the WSRL case that reflects the low uncertainty avoidance culture has resulted in a high satisfaction percentage in *functionality and comfort workspaces* and *number, diversity, and functionality of spaces.*

In this research, the national culture survey (VSM94) has been applied in three case studies to measure if and how employees represent national culture characteristics and to compare the overall pictures between cases and with the national country indexes from Hofstede (1997). This method is an attempt to quantify national culture at a micro-local level or to treat the miniscule local as being representative of the national (McSweeney, 2002). However, it turned out that the scores on the Hofstede dimensions in the local questionnaires were quite different from the national scores. This shows that findings from a national culture survey should not be considered as being representative of national culture at organisational level. Local surveys are needed to get an idea of the impact of cultural attitudes on change processes and appraisal of workplace change. The findings showed to be useful to initiating a dialogue about similarities and dissimilarities between the case studies regarding cultural dimensions and to explore its impact on drivers to change, change processes and appraisal of change. However, it also turned out that no dominant impacts were found and connections between national culture characteristics and other variables in the conceptual model of the appraisal of workplace change were difficult to trace.

Furthermore the OCAI questionnaire has been used to assess the individual perceptions of actual and desired organisational culture of the three case organisations. Assessing organisational culture means that the overarching elements are the focus of measurement, and the organisation level of analysis is the intended target of assessment when using the instrument (OCAI; Cameron and Quinn, 2006).

However, the findings show no absolute dominance with regard to the impact of organisational culture on employees' appraisals. In addition, the impact of a subculture such as occupational culture was found in the PTH case as the requirement for specific work settings of the lighting specialist. The cultural surveys using OCAI and VSM94 provide a practical way to measure organisational and national culture. Nevertheless, there are also other factors that have to be taken into the consideration such as a heterogeneous set of data that may influence the findings. The more in depth study of the diversity of subcultures of organisations in different contexts may improve our understanding with regard to the impact of culture on workplace change and the appraisal of change.

PART 3   **Conclusions & recommendations**

10 Conclusions and recommendations

Introduction

This study focuses on two main research themes, namely performance measurement and workplace change, and how they are related to the cultural background of the particular organisations involved. The overall theoretical framework connects the fields of performance measurement, the impact of workplace change on employees, and organisational and national culture. The two research themes and the contextual background have been depicted in conceptual frameworks as well. The empirical data was gathered in a multiple case study which included two cases in Thailand and one case in The Netherlands. In order to answer the research questions, the empirical data on performance measurement was compared with findings from literature. The findings from workplace change appraisal were analysed according to the variables in the conceptual model regarding workplace change: drivers to change, characteristics of the organisations, work processes, constraints and external context, the change itself (both regarding the environment and the implementation process), and an appraisal of the workplace after change. The cultural context was explored to collect background information in order to examine if similarities and dissimilarities between the findings in Thailand and The Netherlands could be influenced by different corporate and national cultures. The focus during data collection was to understand the phenomenon of: 1) measurement of organisational and corporate real estate performance and 2) measurement of employees' appraisal of workplace change.

The management of corporate real estate involves the decision on how to align the real estate portfolio and services to the needs of the core business in order to contribute to the organisational performance. To support decision making an effective tool is needed for measuring corporate real estate performance in order to suggest possible improvements. This study confirmed that the role of real estate exceeds an operational asset focusing on cost efficiency. Corporate real estate is also a strategic resource contributing to other criteria of an organisational performance. A step-by-step plan for prioritisation of corporate real estate performance measures and KPIs is introduced as a means to evaluate the influences of the corporate real estate performance that contribute to achieving the organisational objective and supporting the core business and organisational performance. This chapter presents the main conclusions and gives recommendations for practice and further research.

§ 10.2 Conclusions

1   *The corporate real estate performance measures relate to different stakeholders, and different real estate and managerial levels.*

The findings from the three cases show that employee satisfaction with the work environment is a performance measure that is connected to the end users (employees) and focuses on improving existing accommodation (workspaces), thus taking into account an operational level of CREM (Table 54). However, the impact of accommodation usage on employees has also been considered as a focus on employees' specific needs at a tactical level, e.g. the amount of teamwork space and time wasted with interruptions due to having to work in an open space layout. On the other hand, operating costs are concerned with the controllers' decisions that are strategically made in regard to minimising the costs of buildings.

CRE measures from literature	DAD	PTH	WSRL	Stake-holders	Scale level	Managerial level
Stakeholder perception Employee satisfaction with work environment	Employee satisfaction	Employee satis-faction survey	User satisfaction survey	Employees	Workspaces	Operational
Community and well-being	Percentage of complaints from public regarding environmental impact	NA	Provision of knowledge and information on water management to citizen	Policy maker	Buildings	Strategic
Financial health Value of property, plant and equipment	Income from commercially rented area	NA	NA	Controller	Rental space	Strategic
Organisational development Quality of facilities	Work done according to the development of building management standard (BMS)	Risk management and business control (strategic, operational, compliance and financial risks)*	Risk Inventory and Evaluation (RI&E)	Technical managers	Buildings	Operational
Accommodation usage	NA	NA	Square metre per desk	Employees	Workspaces	Tactical

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CRE measures from literature	DAD	PTH	WSRL	Stake-holders	Scale level	Managerial level
Productivity **Employee productivity**	Employee health, safety and well being	Health and wellbeing in office design through the WPI	Health &Safety	Employees	Workspaces	Tactical
Environmental responsibility **Resource use**	Introduction of green building Construction materials and equipment meet local content	Energy efficiency improvement* Collection and recycling of company's products*	Introduction of sustainable approach to the new building EU Energy label	Policy maker	Buildings	Strategic
Cost efficiency **Operating costs (building and FM)**	Operating costs - Facility costs (buildings & equipment) - Taxes (property & land)	Utility (electricity & water) cost/ unit Parking cost/ month	Operating costs - Depreciation expenses	Controllers	Building	Strategic

* NA = not applied i.e. not measured or no data available

Table 54

CRE performance measures of three cases in connection to stakeholders, real estate and managerial levels.

2 *This study confirms that measuring employee satisfaction of the work environment can be used as a means to measure organisational performance.*

Employee satisfaction with the work environment emerged in the case studies as one of the organisations' performance measures:

- Measuring employee satisfaction with work environment is one of the organisation's performance measures of the *organisational development* including human resource management (safety, health and environment) in the DAD case.
- Monitoring employee satisfaction with work environment contributes to the performance measure of the quality *improvement team participation* in the PTH case.
- The improvement made to the WSRL's workplace is monitored by employee satisfaction with work environment which contributes to the performance measures of the *internal processes* including human resource management (user satisfaction survey) and accommodation (Risk Inventory and Evaluation).

3 *The empirical findings confirm the relevance of the variables shown in the conceptual model of workplace change appraisal.*

The expected relationships between *workplace change* and *organisation* and *work process characteristics* are confirmed. The findings from all three cases show that organisation and work process influence *workplace change*, which affects the appraisal of change as shown in Table 30, 37 and 42. For example, the flexible working of the PTH and the WSRL cases influences the innovative workplace design with various work

settings which has resulted in the high satisfaction percentage in number, diversity, and functionality of spaces. The findings also show the relationships between the *appraisal of change* and *implementation process*. For example, the PTH and the WSRL cases appear to be more concerned with employee involvement, which contributes to a higher satisfaction percentage of employees in sharing their own ideas about the working environment in comparison to the DAD case.

The relationships between *workplace change* and the *preconditions* and *external context* appeared to be ambivalent. The Dutch labour law was an important variable in the WSRL case with regard to the minimum space requirement per desk. This law is not applicable to organisations in Thailand, so this item is absent in the DAD and the PTH cases. The relationships between workplace environment and legislation are varied between different countries.

The expected relationships between most of the variables in the conceptual model of workplace change appraisal that were described in Section 3.6 have been confirmed. However, a link between the organisation variables and the appraisal of change (indicated by employee satisfaction about the organisation itself) should be added, as it is clearly shown below in the slightly adapted conceptual model (Figure 70). Additionally, the findings from all three cases show that the conceptual model of workplace change appraisal can be used both ex ante and ex post.
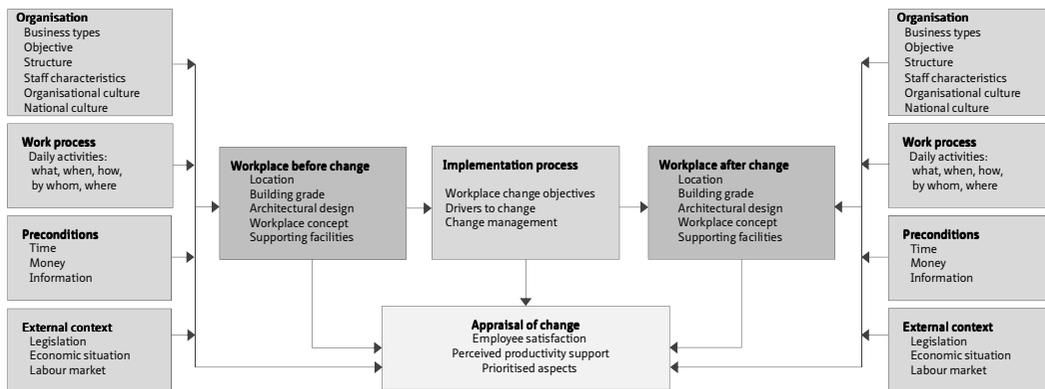

Figure 70

Relationship between variables impacting on an appraisal of workplace change (Riratanaphong & Voordt, 2012)

4   *The empirical findings confirm the relevance of the variables in the integrated conceptual model.*

In this research, the integrated conceptual model was introduced to link the four main variables: 1) organisation, 2) workplace change, 3) performance measurement frameworks and criteria, performance measures/KPIs, and 4) employees' responses to the work environment (Figure 71). Employee satisfaction, perceived productivity support and prioritised aspects are described as performance measures used in corporate real estate performance measurement, thus a strong link between these two variables has been presented. The relationships between performance measurement (frameworks, criteria and measures/KPIs), organisation and workplace change have been confirmed. In the case studies, different points of focus regarding corporate real estate performance measurement were explained in connection to organisation and workplace characteristics. For example, according to the asset management business, the financial focus in the DAD case is indicated by the financial performance measures related to real estate, such as return on asset and income from the commercially rented area. The appraisal of change was measured in connection to organisation (e.g. employee satisfaction about the organisation) and workplace change (e.g. productivity support of the work environment). The relationships between variables of organisation and workplace characteristics are clearly evident in all three case studies. For example, the variety of work settings was provided for creative group works of the PTH and the WSRL cases, whereas the open plan layout with its high partitions was provided for the day-to-day operation in the DAD case.
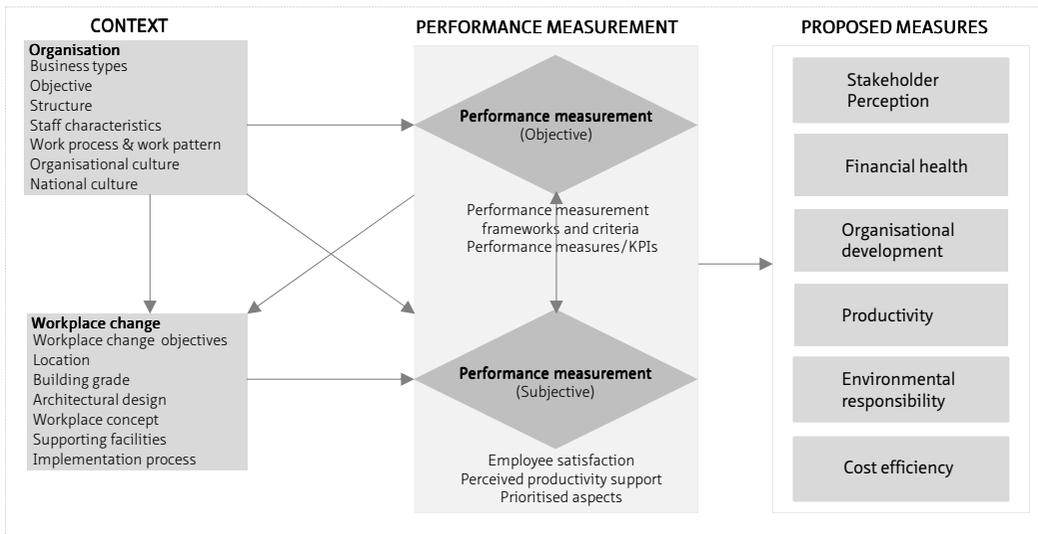

Figure 71
Integrated conceptual model

5   *The findings show that information about organisational and national culture is vital for the interpretation of workplace characteristics and the appraisal of change.*

The findings from the three cases show that workplace characteristics (i.e. location, building grade, workplace concept) have been explained in connection to particular types and dimensions of organisational and national culture; for example:

- The PTH occupies a Grade A office in the city centre, which can be easily accessed for business contact. The focus on transactions with customers and suppliers is considered to be a *market culture*. This culture has an effect on the high satisfaction percentages regarding the accessibility of the building and the interior design appearance and ambiance.
- With regard to the *individualistic culture*, the PTH employees indicated that they assigned a high priority to privacy which was supported by the provision of private rooms for telephone calls or meetings in the workplace.

The findings show that the other dimensions of national culture, including *power distance*, *masculinity*, and *long-term orientation* are related to organisation and management (social working environment), and less regarding the physical characteristics of the work environment.

My personal observations are that the Dutch employees are more concerned about the quality of the working environment such as a focus on the use of ergonomic furniture, bright colours in the interior space, a variety of work settings and social spaces. This can be explained by the rather low uncertainty avoidance culture of The Netherlands and this was shown in the WSRL case. Organisations in this dimension are relatively open to new ways of working (Steelcase, 2009). The Thai employees are much more concerned about job security, salary, promotion and career prospects, and they are less concerned about having a better physical work environment than the Dutch employees are. The findings show that the DAD case allocated a priority to the physical settings that meet the standards of health and safety. This can be explained by the high uncertainty avoidance culture found in the DAD case. According to the literature, there is a link to a more standardised workplace design in a highly uncertainty avoidant society (Kloet, 2007). Although the PTH case implemented the workplace innovation, it was initiated by the mother company in The Netherlands which has implemented this workplace concept worldwide. The PTH case is an example of a multinational corporation in Thailand that has been influenced by the Dutch culture.

The findings show that the dominant organisational culture types, including *hierarchy* and *market* and the national culture dimensions, which include *individualism* and *uncertainty avoidance*, have a stronger effect on workplace change and the appraisal of change than the other cultures. However, it is difficult to conclude the influence of national culture on the basis of two Thai cases and one Dutch case. More case studies are necessary in order to confirm the findings of this study.

6   *In terms of the impact of culture, the study shows that neither organisational nor national culture has absolute dominance in the employees' appraisals.*

In addition to the organisational and national culture, a subculture such as *occupational culture* and other non-cultural factors such as administrative and social institutions also have their impacts on the employees' appraisals; for example:

- The staff characteristics of the PTH employees reflect the *occupational culture* of the lighting specialist that leads to the provision of a large workshop and storage room which in turn has resulted in the improved satisfaction percentage in archive and storage facilities.
- The top-down approach of the DAD case that has been influenced by the *bureaucracy* in Thai public organisations has an impact on employee involvement which resulted in the rather low satisfaction percentage in sharing own ideas about working environment.

It is difficult to separate the impact of these cultures and non-cultural factors on the workplace change and employees' appraisals. Therefore, the understanding of the possible relationships between variables in the integrated conceptual model is essential for the decision making processes regarding the corporate real estate.

7   *The findings proved that the national culture data from Hofstede cannot be generalised to the case studies.*

The data from the national culture surveys that were conducted in the case studies show large differences in comparison to the findings from the studies by Hofstede (1997). The two Thai cases show much higher scores on individualism whereas the Dutch case shows a much higher score on power distance in comparison to the cultural indexes from Hofstede (1997) regarding Thailand and The Netherlands. These differences have been influenced by the organisational characteristics in each case study. For example, according to Hofstede (1997), centralisation is one of the characteristics of large power distance organisations. The high power distance of WSRL can be explained by the centralised planning and decision-making as a result of the merger from several partners.

However, culture is not static, but tends to change over time. The relevance to performance management is that the organisations should be aware of the possible relationships between variables in the integrated conceptual model which could have an impact on performance measurement.

The research question is answered regarding how performance of workplace change can be measured according to theory (literature) and practice (three cases). The questions regarding the workplace change characteristics and the employees' responses to the work environment are answered based on the findings from the three case studies so as to illustrate and to understand the whole process of workplace change and the appraisal of change.

1. How can the performance of workplace change be measured according to the literature and how is it measured in practice?

The six perspectives of corporate real estate performance measures in the literature can be used as a reference, to provide input so as to improve performance measurement further.

The six perspectives of corporate real estate performance measures that were found in the literature (Bradley, 2002) were compared with current performance measures in the three cases. It turned out that all six perspectives - 1) stakeholder perception, 2) financial health, 3) organisational development, 4) productivity, 5) environmental responsibility and 6) cost efficiency – have been applied in all three cases, but in different ways and using different points of focus. A check by organisations on lacking measures can be used for improving performance measurement even more. The Balanced Scorecard and the seven performance criteria that were presented by Sink and Tuttle (1989) criteria have been applied in all three cases as well, again in different ways and using different highlights.

2a) What are the main drivers and objectives of workplace change?

The main objectives of the workplace change in the three cases proved to reduce the costs and to improve effectiveness.

In all of the case studies, cost reduction was found to be an important factor for bringing about a change occur in their workplaces:
- The DAD case moved to a new location which was close to the clients' offices in order to reduce costs and travel time.
- The PTH and WSRL cases have applied the flex workplace concept in order to optimise the use of space in their offices (i.e. shared space and flexible working time), thus this concept helps to improve effectiveness. In addition, both cases could accommodate more employees than the workstations actually provided, which subsequently reduced the occupancy costs.

2b) Which stakeholders are involved in the implementation process and what are their roles?

In all three cases the various groups of stakeholders have different degrees of involvement in the implementation process due to the different organisational context.

Different roles and responsibilities of the stakeholders involved in the three case studies can be explained in connection to the different business types, objectives, structure, preconditions (investment budget), external context (labour law) and workplace characteristics. For example:

- The DAD's senior management personnel initiated the government complex buildings (including the DAD's workplace) as being the direct policy of the central government. The responsibility to control the investment budget led to the implementation of a traditional workplace concept that is required a lower investment cost per workplace compared with the innovative approach.
- The move from the PTH workplace to another floor located in the same building required much less planning and monitoring of the project compared to the DAD and the WSRL cases.
- The independent local authority characteristics of the WSRL offered more opportunity to implement new ways of working in the WSRL's new workplace.

With regard to the top-down approach, the DAD employees were less involved in the implementation process than the employees in the PTH and the WSRL cases. The flat structure of the PTH and the WSRL cases enabled the employees to become more involved for example, by sharing their ideas about the workplace.

The consultant involved in the WSRL case (Arbo Unie) provides feedback by making a building assessment (including employee satisfaction of the work environment) every two years according to the Dutch labour law. The regular building assessment from a consultant has not been applied in either of the Thai cases. Other involved stakeholders include designers, construction managers and service providers who have similar roles and responsibilities in all three cases.

2c) What is the impact of organisational structure, staff characteristics and work processes on workplace change?

The three case studies showed that different organisational characteristics lead to different choices of workplace change.

The findings from the three case studies show that the choices of workplace change such as location and workplace concept were based on the organisational characteristics including organisational structure, staff characteristics and work processes. For example, the different work processes influenced the choices made regarding locations as this was shown in all three cases:

- The DAD's workplaces were located in the suburbs close to the client's premises in order to reduce costs and travel time and to promote efficient communication with the clients.
- The PTH's workplace was located in the city centre, which can be easily accessed for the purpose of conducting business and transactions with customers and suppliers.
- The WSRL's new building was located close to the railway station which was easily accessible for employees who are dispersed over several different locations.

Each organisation implemented a workplace concept that was partly based on work processes:
- The traditional workplace design with standard work settings of the DAD case has been implemented based on the rather routine work processes.
- The implementation of the innovative workplace design of the PTH and the WSRL cases has been based on the creative work with groups, projects and the interactive work done in both cases.

3. How satisfied or dissatisfied are employees with the various aspects of their work environment and the perceived support of productivity, and which aspects do they perceive as being the most important?

Different organisational characteristics have an impact on both workplace change and employees' needs and preferences, which result in different responses concerning employees' appraisals in the three case studies.

a) Employee satisfaction
The findings from all three cases show that the WSRL case has achieved higher satisfaction percentages in many aspects when it is compared with the DAD and the PTH cases. A much lower percentage of the DAD employees said that they were satisfied for most of the items compared to the PTH and the WSRL employees after the workplace change.

In comparison with the DAD case, both the PTH and the WSRL cases have higher satisfaction percentages in: 1) accessibility of the building, 2) functionality and comfort workspaces, 3) facilities for remote working, 4) facilities and facilities management, 5) number, diversity, and functionality of spaces, 6) openness and transparency of environment, and 7) interior design appearance and ambiance.

The DAD case shows a much lower satisfaction percentage in most aspects of the work environment in comparison with the similar data on 96 Dutch cases (Center for People and Buildings Indicator; Brunia, 2013). The findings from the PTH, the WSRL and 96 Dutch cases (Brunia, 2013) show high satisfaction percentages in the following aspects: 1) accessibility of the building, 2) functionality and comfort workspaces, 3) facilities and facilities management, 4) openness and transparency of environment, and 5) interior design appearance and ambiance.

Different *objectives, structure, staff characteristics* and *work processes* of organisations have an impact on workplace change approaches, which in turn have resulted in the different findings concerning employee satisfaction between the case studies; for example:

- The routine office work of the DAD employees has led to the choice of the traditional workplace such as personal desks with high partitions which have resulted in a low satisfaction percentage in *openness and transparency of environment*.
- The flexible working of the PTH and the WSRL cases has led to the choice of the working environment with various work settings which have been responsible for the high satisfaction percentage in *number, diversity, and functionality of spaces*.

In comparison with the CfPB indicator (Brunia, 2013), the high satisfaction percentage obtained for the five aspects previously mentioned reflect the workplace characteristics of the PTH and the WSRL cases that may be similar to those of the 96 Dutch cases such as *location* (indicated by high satisfaction in accessibility of the building), *workplace concept* (high satisfaction in functionality and comfort workspaces, openness and transparency of environment), *implementation process* (high satisfaction in facilities and facilities management), and *building grade* (high satisfaction in interior design appearance and ambiance).

The physical characteristics of workplace change that have influenced different degrees of employee satisfaction can be summarised as follows:

- *Location* (city centre vs. suburban) affects satisfaction in accessibility of the building
- *Building grade* (higher vs. lower building quality) affects satisfaction in interior design appearance and ambiance
- *Architectural design* (specifically designed or new building) affects satisfaction in architecture and appearance of the building
- *Workplace concept* (flexible vs. traditional workplace) affects satisfaction in: 1) number, diversity and functionality of spaces, 2) adjacency and locality of the spaces, 3) openness and transparency of environment, 4) functionality and comfort workspaces, 5) subdivision of the building, 6) privacy, 7) opportunities to concentrate, 8) opportunities to communicate, 9) indoor climate, 10) lighting, and 11) acoustics
- *Supporting facilities* (ICT, storage room, etc.) affect satisfaction in: 1) facilities for remote working, 2) archive and storage facilities, and 3) ICT and ICT support facilities

The implementation process has an impact on the satisfaction in facilities and facilities management and sharing own ideas about working environment. Issues related to organisation and management (social working environment) have an impact on the satisfaction with the organisation and content and complexity of work.

Particularly, this study shows that physical characteristics of workplace change is dominant in the employees' appraisals. The findings from all three cases showed that the *physical characteristics of workplace change* such as location, building grade, architectural design and workplace concept have been used to explain most findings on the employees' appraisals. Among these characteristics, the impact of *workplace concept* on employee satisfaction has been highly evident in the case studies. The other variables such as staff characteristics and work process & work pattern have to be described in connection to the work environment in order to explain the similar findings.

b) Perceived productivity support

When comparing all three cases, the DAD case appears to have the lowest percentage of satisfied respondents in individual and organisation productivity. The PTH case has achieved the highest satisfaction percentage in individual productivity, whereas the WSRL case has obtained the highest satisfaction percentages in team and organisation productivity.

Although satisfaction with individual productivity in the PTH case is higher than it was in the previous situation, satisfaction percentages regarding team and organisation productivity appeared to have decreased after the workplace change.

In comparison to the 96 Dutch cases (Brunia, 2013), all of the levels of perceived productivity support in the DAD case (individual, team and organisation) were less appreciated than the CfPB indicator. The findings show mixed results between the perceived productivity support of the PTH case and the CfPB indicator. All of the levels regarding the perceived productivity percentage of the WSRL case appear to be higher than the CfPB indicator.

The negative impact of workplace design on perceived productivity support has been shown in all of the three cases:
- The lack of support spaces has had a negative impact on team productivity in the DAD case.
- The lack of team space in the PTH's workplace case has accounted for a lower satisfaction percentage in team productivity when compared to the previous situation.
- The lack of privacy and concentration in the open plan office has negatively affected the perceived productivity support in the Dutch case as a whole.

In comparison with the CfPB indicator, the remarkably higher satisfaction percentage in individual productivity in the PTH case and the team productivity in the WSRL case indicate that the work environments of both cases are more appreciated with regard to the support of individual and team productivity in comparison with a number of the Dutch cases.

The findings showed that the choices of work settings, workplace layout, support facilities or public spaces have an influence on employee productivity. Furthermore, the study showed that the results from employees' appraisals are affected by the workplace as a final product rather than a process. For example, although the PTH case has set up the systematic implementation process, the lack of team spaces has resulted in the decreased team and organisation productivity.

c) Prioritised aspects

The findings have shown that all three cases allocated a high priority to ICT services and ICT support facilities and the accessibility of the building. In comparison with the DAD case, the PTH and the WSRL indicated a much higher priority to the following aspects: 1) functionality and comfort workspaces, 2) opportunities to concentrate, 3) facilities for remote working, and 4) opportunities to communicate. The DAD employees have indicated that the adjacency and locality of the spaces and the subdivision of the whole building was the most important aspect.

Accessibility of the building is the aspect that all three cases and 96 Dutch cases (Brunia, 2013) perceive as being the most important. Except for the DAD case, the PTH, the WSRL and the 96 Dutch cases perceived functionality and comfort of the workspaces, opportunities to concentrate, facilities for remote working and opportunities to communicate as being highly important. Sharing their own ideas about the working environment is more important to the employees of the DAD case, than it was in the 96 Dutch cases.

The study has shown that a work environment aspect which may be important to one organisation may appear to be less of a concern for the others because of the differences in organisational context such as work processes, staff characteristics, workplace concept and culture. The WSRL case and the 96 Dutch cases (Brunia, 2013) showed much more concern for the indoor climate than was found in the Thai cases. The results show that in The Netherlands, issues such as safety, health and welfare of employees are important.

The different emphasis placed on environmental comfort can be explained by the different staff characteristics and work processes between the DAD case and other cases. The DAD employees are described as routine workers that put high priority to the *adjacency and locality of the spaces* and *subdivision of the whole building* as the focus regarding the basic requirements of the working environment. The PTH and the WSRL employees are described as creative workers that indicated high priority to the *functionality and comfort of the workspaces, opportunities to concentrate, facilities for remote working*, and *opportunities to communicate* as the focus on task performance.

In summary, the different levels of environmental comfort that lead to different aspects which employees perceive as most important are:

- *physical comfort* - indicated by the routine workers - leads to the high priority of adjacency and locality of the spaces and the subdivision of the whole building
- *functional comfort* - indicated by creative workers - leads to the high priority of functionality and comfort of the workspaces, opportunities to concentrate, facilities for remote working and opportunities to communicate

§ 10.4   Recommendations

1   *Corporate real estate performance measures and KPIs should be reviewed and reprioritised when significant changes in the internal and/or external environment occur.*

Zairi (1994) suggested that the function of measurement is to develop a method for generating a class of information that could be useful in a wide variety of problems and situations. There is a need to develop corporate real estate performance measurement systems that respond to constant changes in both the internal and external environment. This is because changes in real estate are usually implemented together with changes in one or more other corporate assets such as capital, technology, human resources and information and communication technology. These changes take place within a dynamic context with regard to demography, economy, social issues, time spirit, governmental policy and legislation (De Vries et al., 2008).

For example, the increasing importance of social values such as employee health, safety and well-being requires more attention to measuring the accessibility of buildings for employees with physical disabilities. The enforcement of legislation related to environmental performance (e.g. the Environmental Impact Assessment, EIA) requires that special attention be devoted to energy performance measurement and the environmental impact from the built environment. According to labour law, large organisations in The Netherlands are obligated to conduct a Risk Inventory and Evaluation.

The prioritisation of corporate real estate performance measures and KPIs which in turn respond to the changes made in corporate strategies can be viewed as the transition from performance measurement to performance management (Amaratunga and Baldry, 2002).

2   *Employee involvement should be included throughout the implementation process.*

 According to the literature, employee involvement in the implementation process can help to reduce resistance to change. In fact, the research findings show that employee involvement during the implementation process (i.e. project planning, design, procurement and construction, move and occupation) allows the organisations to inform employees about the changes and to set mutual objectives on the actual needs of the organisations and the end users. This could subsequently reduce the negative responses opposing the changed work environment and they should therefore be included as a part of change management.

Unlike the PTH and WSRL cases, the DAD case has focus more on the implementation process after the change, and less on employee involvement. The findings from the three case studies show that the lack of user involvement in the DAD case resulted in the misinterpretation of the employees' needs and preferences and as a consequence the changed work environment was at a disadvantage. For example, the separated building locations, the lack of privacy and the insufficient storage facilities in the DAD's workplace after the change explain the rather negative responses received from employees with regard to how the dissatisfaction they felt in regard to the adjacency and locality of the spaces, privacy and archive and storage facilities.

3   *The workplace should be defined as a strategic resource instead of operational asset.*

The workplace as a strategic resource which can be used as a unique firm-related set of symbols or behaviours in different physical environments can also help to improve workplace performance as has been shown in the PTH and WSRL cases. These two cases emphasised how space can be used effectively to foster integration and collaboration that not only helps to improve employee satisfaction, but which can also promote shared cultural values. On the contrary, the DAD case focuses more on an efficient work environment that aims to support the basic needs of its employees. However, user preferences have not been fulfilled which in turn might explain the rather low employee satisfaction percentages regarding most of the aspects related to this work environment.

ⓘ

Step-by-step plan to select and prioritise CRE performance measures and KPIs

There are six main steps for prioritising CRE performance measures and KPIs including:

1 Inventory
2 Cluster
3 Classify
4 Compare
5 Reflect
6 Prioritise

The steps below could be implemented in a workshop with participants from various departments who fill different positions. The workshop could be organised by a facilitator to assist the participants and to moderate the workshop. The facilitator should be someone who is involved in the management of corporate real estate such as a facilities manager or a corporate real estate manager. The output of each step would be subsequently derived from discussions and a consensus of opinions received from the participants.

Step 1: Inventory
The first step is to make an inventory of currently applied performance measures and indicators. At a business unit level, the department discusses the relevance of current measures in connection to factors which are critical for achieving the organisation's strategic goals. The critical success factors are linked to different categories of an organisation's performance measurement. The output from this step consists of a list of performance measures/indicators linked to different categories. For example, the organisation that applies the Balanced Scorecard provides the measures with regard to the four categories of financial, customer, internal business processes and learning and growth.

Step 2: Cluster
Step 2 clusters performance measures into two groups: organisational performance and CRE performance measures and indicators according to the organisation's own categories. Table 55 depicts an example of a possible end result of Step 2. In this table, examples of organisation and CRE performance measures/indicators in different categories have been provided. The number of performance measures/indicators in this table has been used as an example of the end result of Step 2 which can be extended when appropriate.

Organisational performance measures and indicators	CRE performance measures and indicators
Financial	**Financial**
1. Income from operations	1. Business return on real estate assets
2. General costs (overhead, administrative costs)	2. Occupancy costs (occupancy cost/employee, lease costs/sq.m.)
Customer	**Customer**
1. Customer satisfaction	1. Proximity to required transportation
2. Survey index ratings for customer choice	2. Overall tenant satisfaction with property management services
3. Percentage of customers with service level agreements	3. Rating based on building attributes

Table 55

Examples of organisation and CRE performance measures/indicators in financial and customer categories

Step 3: Classify

Step 3 classifies the CRE performance measures that are used by the organisation into six categories according to Bradley (2002): 1) stakeholder perception, 2) financial health, 3) organisational development, 4) productivity, 5) environmental responsibility, and 6) cost efficiency. Table 56 shows six categories of performance measures in the literature (left) that are used to classify the CRE performance measures being used by the organisation (right).

Six categories of performance measures in literature	CRE performance measures being used by the organisation
1. Stakeholder perception • **Employee satisfaction with work environment** • **Employee satisfaction with CRE services** • **Customer satisfaction with facilities** • **Community and well-being**	1. Stakeholder perception • Rating based on building attributes • Overall tenant satisfaction with property management services
2. Financial health • **Value of property, plant and equipment**	2. Financial health • Return on Investment for owned market - comparable office buildings • Income from commercially rented area
3. Organisational development • **Quality of facilities** • **Accommodation usage**	3. Organisational development • Amount of distance work settings in use • Gross floor area per usable floor area
4. Productivity • **Employee productivity** • **Strategic Involvement (CRE involved in corporate strategic planning, CRE integrated with HR strategies and CRE actively involved in firm-wide initiatives)**	4. Productivity • Distance employees commute • Employees' opinions on how well the workplace supports their productivity
5. Environmental responsibility • **Resource use** • **Waste**	5. Environmental responsibility • Energy efficiency improvement • Construction materials and equipment meet local content • Average amount of waste per person
6. Cost efficiency • **Occupancy costs** • **Operating costs (building and FM)**	6. Cost efficiency • Utility (electricity & water) cost/unit • Facility costs (buildings & equipment), Depreciation expense

Table 56

Six categories of performance measures in literature (left) and what is being used by the organisation (right, examples)

Step 4: Compare

Step 4 is comparing current CRE measures of the organisation classified in six categories with the proposed list of CRE performance measures from the literature. Table 57 serves as an example of a possible end result of Step 4. This table shows six categories of performance measures in the literature (left) and the CRE performance measures that are used by the organisation and classified according to the same categories (right).

1. Stakeholder perception	Proposed performance measures according to the literature	CRE performance measures being used by the organisation
Employee satisfaction with work environment	· Quality of indoor environment: lightning, air conditioning, temperature, noise level, etc. · 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	· User satisfaction survey · Employee attitude survey (perceptions and attitudes related to employee satisfaction)
Employee satisfaction with CRE services	· Employee satisfaction with professional skills · Employee satisfaction with information sharing	· Overall tenant satisfaction with property management services
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 required transportation, access to customers, distance to other sites and businesses)	· Rating based on building attributes · Rank in customer survey · Media monitoring
Community and well-being	· The contribution to public policy and societal priorities	· Percentage of complaints regarding environmental impact
2. Financial health		
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 (dollar) of revenue · Return on property management	· Return on Investment for owned market - comparable office buildings · Sales and leaseback
3. Organisational development		
Quality of facilities	· Physical condition of facilities · Suitability of premises and functional environment · Number of building quality audits	· Risk Inventory and Evaluation
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)	· Gross floor area per usable floor area · Amount of distance work settings in use.
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	· Number of development projects of obsolete properties

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4. Productivity	Proposed performance measures according to the literature	CRE performance measures being used by the organisation
Employee productivity	· Productivity (% of perceived productivity support from working environment) · Absentee rates by buildings	· Number of formal and informal meetings with top executives
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, or shared services opportunities	· Management of the information system · IT solution in HRM. · Master plan of the IT system
5. Environmental responsibility		
Resource use	· Energy consumption, · Number of energy audits	· Energy efficiency improvement · Construction materials and equipment meet local content
Waste	· Contaminated sites management · Amount of garbage	· Average amount of waste per person
6. Cost efficiency		
Occupancy costs	· Total occupancy cost per employee · Occupancy cost as a % of total operating expense · Occupancy cost as a % of operating revenue by building	· Office rent (Euros/sq.m./month)
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)	· Utility (electricity & water) cost/unit. · Facility costs (buildings & equipment) · Depreciation expense.

Table 57

Six categories of performance measures found in literature (left) and which ones can be used by the organisation (right, examples)

Step 5: Reflect

Step 5 reflects on the output obtained from Step 4. Similarities and dissimilarities between the currently applied CRE performance measures that have been classified into six categories and those recommended from the literature should be discussed here. Dissimilarities of CRE performance measures can be identified as the measures that could be developed even further they have been deemed as being important for the particular company (i.e. add/replace particular performance measures). Similarities between the current and recommended CRE performance measures should be reflected upon as well: are they still appropriate? Why, and for whom or for which purpose? Table 58 is an example of a possible end result of Step 5. In this table, examples are given depicting the reflections on the similarities and dissimilarities of the employee productivity.

CRE performance measures being used by the organisation
Similarities:
· *Employees' opinions on how well the workplace supports their productivity*
This measure is similar to the perceived productivity support of the work environment. This item is important to both human resource and corporate real estate management and should be included in the organisation's performance measurement system.

Dissimilarities
· *Communication time with top executives and the number of formal and informal meetings with top executives*
These two performance measures are not necessarily involved in corporate real estate management. However, the provision of flex workplace and other support spaces (i.e. informal meeting spaces, break out areas) can influence positive results from these performance measures. The implementation of these performance measures in connection to corporate real estate can help to develop effective communication that impacts on the improved productivity support of the work environment.

Table 58
Reflections of the current CRE performance measures and those recommended from the literature. (examples)

Step 6: Prioritise

The conceptual model of performance measurement (Figure 72) can be used to discuss the output from Step 5 in connection to organisational context, operations, resource utilisation, impacts (i.e. to core business, real estate and surroundings) and stakeholders in the different processes of an organisational system. Table 59 shows the variables in the conceptual model of performance measurement (left) in connection to the key questions regarding the prioritisation of CRE performance measures and KPIs.

The final step is the decision to add, remove, change and prioritise particular CRE performance measures and KPIs based on the justification of the measures that are aligned with the literature as well as the variables in the conceptual model of performance measurement, i.e. organisational context, corporate and real estate strategies, input, process, output, outcome, stakeholders and external context (Figure 72).

According to Table 59, the variables in the conceptual model of performance measurement should be discussed in connection with the key questions regarding the prioritisation of CRE performance measures and KPIs. For example, healthcare providers that focus on customer intimacy can be expected to focus more on the interior of their buildings (quality of space), to wish for flexibility in their real estate (real estate strategy), and to regularly enter into a joint venture with other health centres (corporate strategy) (Fritzsche, Hoepel et al., 2004: 51-52). CRE performance measures and KPIs selection should be considered in connection to these elements.
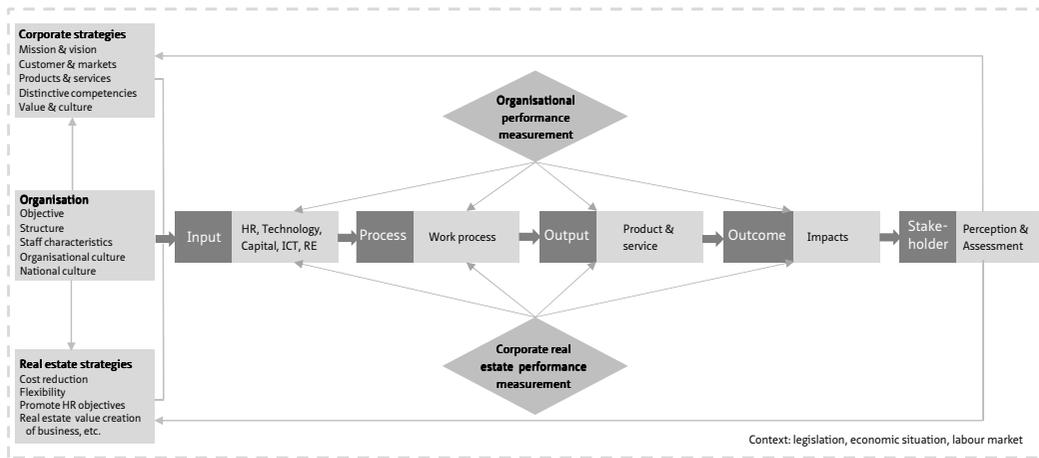

Figure 72
Conceptual model of performance measurement

Variables in the conceptual model of performance measurement	Key questions regarding the prioritisation	
	Understanding variables	CRE performance measures and KPIs selection
Organisational context: **Objective** **Structure** **Staff characteristics** **Organisational and national culture**	What are the objectives of the organisation? What characteristics can describe the organisational structure? How can staff characteristics be described? How can the organisational and national culture of the organisation be described?	Which CRE performance measures/KPIs can be applied to align with: - organisational objectives? - structure of the organisation? - staff characteristics of the organisation? - particular types and dimensions of organisational and national culture?
Corporate strategies: **Mission & vision** **Customer & markets** **Products & services** **Distinctive competencies** **Values & culture**	What is the mission for today and vision for the future? What are the focus points on customers & markets? Which strategies have been used to organise products & services? Which strategies have been applied to develop competencies or skills unique to the organisation? Which strategies have been introduced to improve the values & culture of the organisation, e.g. work-life balance initiatives?	Which CRE performance measures/KPIs can be applied to align with: - mission and vision of the organisation? - particular customers & markets of the organisation? - particular products/services of the organisation? - distinctive competencies of the organisation? - values & culture of the organisation?
Real estate strategies: **Cost reduction, flexibility, promote HR objectives, real estate value creation of business, etc.**	Which approaches of real estate can be aligned with and reinforce real estate and corporate strategies?	Which CRE performance measures/KPIs can be applied in connection to real estate approaches (e.g. quality, cost, quantity, location, technology of space and practices for providing space) in order to support real estate and corporate strategies?
Input: **HR, technology, capital, ICT, real estate**	How are resources utilized for business processes to accomplish the set targets?	Which CRE performance measures/KPIs can be used to evaluate how an organisation's resources are used?
Process: **Work processes**	What are the work processes of the organisation?	Which CRE performance measures/KPIs can be used to evaluate work processes?
Output: **products & services offerings**	What type of products and services does the organisation offer?	Which CRE performance measures/KPIs can be used to evaluate output (i.e. products/services)?
Outcome: **Impacts**	What are the impacts of an organisation's input process and output to core business, real estate and environments?	Which CRE performance measures/KPIs can be applied in regard to different aspects of core business, real estate and environments?
Stakeholders: **Perception and assessment**	What are the impacts of business operation on different stakeholders?	Which CRE performance measures/KPIs can be applied to different perception of stakeholders?
External context **Legislation, economic situation, labour market, societal value**	What are the impacts of legislation, economic situation, labour market on performance measurement?	Which CRE performance measures/KPIs can be applied with regard to legislation, economic situation, labour market and societal value?

Table 59

Key questions for the prioritisation of CRE performance measures/KPIs according to the conceptual model of performance measurement

Methodological reflections

1   *Data from a number of Dutch cases (CfPB index) is useful for benchmarking purpose.*

Data from a number of Dutch cases (CfPB index, 2013) was used to compare the findings of the three case studies. The CfPB indix provides a point of reference with regard to the data on employees' responses to the work environment that is useful for benchmarking with the findings from the three case studies. However, information about the workplaces themselves was not available or not recorded, whereas workplace change contexts, both before and after the change (i.e. location, architectural design, workplace concept and support facilities), is essential information to understand satisfaction levels in connection to actual characteristics of the work environment.

2   *A combination of inductive and deductive reasoning can help to clarify the relationship between the variables found in the theoretical and conceptual frameworks and the broader context of theory.*

Data from the case studies which were conducted inductively can help to understand workplace change phenomenon and to clarify the relationships between the variables in the conceptual framework of workplace change and workplace change theory. For example, the findings obtained from observations and interviews with the PTH employees showed that the ICT services and the ICT support facilities had not been fully implemented after the workplace change. The findings obtained from the WODI light questionnaire showed that this aspect had made a slight improvement in satisfaction, and it was one of the top three most dissatisfying aspects in the current condition. It is evident that dissatisfaction was high when this aspect was not fulfilled. According to the literature, ICT services and the ICT support facilities can be seen as a dissatisfier (Herzberg, 1987). This answers a research question which was deductively formulated at the beginning of this research study with regard to employees' responses to various aspects of the work environment.

3   *The combination of quantitative and qualitative research methods proved to be useful for the data analysis and cross case comparison.*

In research on workplace change and the appraisal of change some elements can be described objectively such as floor plans, square metre per person, employee satisfaction and perceived productivity support by the built environment. Various tools are available to measure these elements according to the literature (Public Works Canada, 1987; Building Use Studies, 2005; WODO Light, 2010).

However, these tools not only use the quantitative approach to deliver the output, but also apply qualitative data by including detailed description of the workplace such

as building history, building characteristics, environmental systems, operation and occupancy profile. In research of employee satisfaction and perceived productivity support of the work environment, this PhD study applies the WODI Light questionnaire in combination to other techniques including interviews with employees and managers, walk through observations and document analysis. The qualitative data such as workspace quality (i.e. location, architectural design, building grade, interior environment and work settings, workplace before and after change) was described in the case studies. The perception of managers and employees through interviews with regard to the changed work environment has been included in the data analysis and cross case comparison (Section 6.6.2, 9.4.2) in order to identify the assumed cause effect relationships between employees' appraisals and the changed work environment. Significant information was found during the interviews such as the lack of support spaces in the DAD case and team space in the PTH case after the change, and the poor indoor environment (indoor climate, lighting and acoustics) was reported in the WSRL case. Practically, the use of the WODI instrument provided data that have been compared with data from a number of Dutch cases summarised in the so-called CfPB indicator: an overview of average percentages of satisfied employees in 96 Dutch cases. The current study can be used as input to extend the CfPB indicator with data from Thailand. Future studies in various countries could help to extend the CfPB indicator furthermore in order to explore the impact of workplace change on organisations in different contexts.

4   *More cases are needed to test the instrument, i.e. the step-by-step plan for the prioritisation of performance measures and the KPIs*

The final chapter introduced the instrument for the prioritisation of performance measures and KPIs. Although this instrument was designed for the purpose of using it in a workshop, some parts of the instrument were tested in the case studies by the researcher of this thesis. The instrument was tested from Step 1 to Step 5. However, step 5, reflection on dissimilarities, and step 6, prioritisation, that require team discussions and consensus of opinions from participants of the case organisations have not yet been implemented.

More cases are needed to test the instrument in order to increase the validity and to make further progress. The issues for discussion with regard to the step-by-step process of the instrument include: 1) the comparison and reflection of the current CRE performance measures and KPIs in six categories and those recommended from the literature, 2) prioritisation of CRE performance measures and KPIs according to the variables found in the conceptual model of performance measurement (Figure 72). The discussion should focus on the feasibility of the process and the output from each step and the suitability and applicability of the instrument. The application of this instrument in various types of cases should identify the areas that could be developed further.

5   *More case studies are needed to validate the findings of this research.*

This research study is an exploration of performance measurement concerning workplace change in different contexts. The conclusion of this study is based on the findings from two Thai cases and one case in The Netherlands. Although there are assumed cause-effect relationships between the variables in the conceptual models, more case studies are needed in order to collect more reliable and comparable data that support the findings of this kind of research.

§ 10.7   Suggestions for further research

1   *Occupancy and operating costs*

Chapter 2 noted that cost efficiency is an area related to the added value of CREM that has been mentioned by several authors (see Table 6). This item showed up in several performance measurement frameworks and criteria such as the Seven Performance Criteria (Sink and Tuttle, 1989), Performance Measurement Matrix (Keegen, et al., 1989) and the Balanced Scorecard (Kaplan and Norton, 1992). It has been realised that the cost of real estate are the second or third largest cost factor in most companies (Stoy and Kytzia, 2006). The proposed list of CRE performance measures includes cost efficiency, which focuses on occupancy costs and operating costs (building and FM) (see Table 15). In terms of the occupancy costs, the total occupancy costs per employee provide the most accurate picture of the overall portfolio performance (Lubieniecki and Desrocher, 2003). Chapter 3 mentioned cost reduction as one of the most important factors driving change in the workplace (Becker, 2004, Van Meel et al., 2010).

Although the findings from the empirical research show that all of the case studies include operating costs as their performance measures, the data concerning occupancy costs is limited (i.e. not measured or no data available). The DAD's new office has been considered as a traditional workplace, whereas the PTH and the WSRL cases have implemented the innovative workplace concept. The previous study from the Center for People and Buildings reveals that the accommodation costs per square metre are generally significantly higher in the innovative workplaces, but the costs per employee are often considerably lower (Van der Voordt, 2003). There is a need for further research regarding cost efficiency in various types of workplaces. One question that can be used to guide further research is, for example: "What are the differences of occupancy and operating costs between traditional and innovative workplaces, and what influences these differences?" In order to answer this question, hard data with regard to occupancy and operating costs is required.

2   *Environmental responsibility*

Chapter 2 raised the concern about environmental responsibility which is becoming
more and more important nowadays. Environmental responsibility is related to terms
such as environmental impact, energy performance and environmental performance.
All these topics are seen as an environmental perspective contributing to economic and
social perspectives of sustainability. The influences of the environmental responsibility
on property are becoming more evident such as the environmental impact assessment
(EIA) that is now in force in many countries (e.g. the United States, The Netherlands,
China, India, Malaysia, and Thailand). Green building rating systems such as BREEAM
and LEED were mentioned as the performance measurement related to the energy
efficiency of buildings. Surprisingly, it has been noted in Chapter 2 that environmental
responsibility is one of the added values of CREM that has been mentioned less often
in the literature compared to the other areas. The findings from the case studies
show that the organisations can have benefits from environmental responsibility
such as the improved energy performance in the DAD and the WSRL case through
building innovation, i.e. highly efficient building materials. The concern about the
environmental impact has also given positive feedback from surrounding communities
with regard to the ongoing construction project in the DAD case. This issue is closely
related to Corporate Social Responsibility (CSR). There is a need for further research
in the areas related to environmental responsibility such as the development
management guidelines or assessment protocols for green buildings. One question
that can be posed to guide future research is for example: how can the impact of green
buildings, i.e. from the core business and surroundings, be measured?

3   *Corporate branding*

Chapter 2 mentioned PR and marketing and corporate branding as areas related to the
added value of CREM (see Table 6). Brand strategy showed up in several performance
measurement frameworks such as the performance prism (Neely et al., 2001), the
strategy map (Kaplan and Norton, 2004) and the FM value map (Jensen, 2010).
Branding is a strategy required to ensure the needs and desires of stakeholders that
can enhance customer value (Neely et al., 2010, Kaplan and Norton, 2004). Chapter
3 noted that the physical working environment can be used to convey a particular
message or identity by incorporating 'brand visuals' (logos, slogans and company
colours) that can bring brand recognition to public. Becker (2004) mentioned that
workspace performance can be assessed in terms of outcomes such as in the number
of media mentions in the national press and the potential client visits that enhance
the firm's brand and strengthen its client relationships. The study by Sarasoja and
Aaltonen (2012) showed that the impact of green FM on core business includes
marketing, sales and organisational brand. The interior decoration and layout with
a modern design utilising LEGO products as design objects in the LEGO case put a
focus on LEGO's brand for both visitors and staff (Jensen and Katchamart, 2012). A

Master's degree thesis conducted at the Faculty of Architecture at the Delft University of Technology focuses on different corporate real estate strategies that are being used to communicate brand values, i.e. innovation, sustainable, reliable, people oriented and transparent (Khanna, 2012). The findings from the case studies show that the PTH case includes the brand index and brand preference for end users as indicators at the business unit level (see Table 31,32). The sustainable design concept of the DAD and the WSRL buildings helps to promote corporate brand values. The new workplaces in the PTH and the WSRL cases do not only help to express the brand, but they help to improve culture value as well. The future study could focus on particular real estate strategies that promote brand values. The questions that could be posed to guide further research are, for example: How can the positive results of brand values be measured? How can real estate be implemented to deliver brand visuals and to strengthen corporate identity, and what is the role of the corporate real estate manager regarding this approach?

4   *Further empirically testing of the conceptual models and the step-by-step plan*

The application of the conceptual models (i.e. the performance measurement, workplace change appraisal and integrated model), as well as the instrument for prioritising the performance measures and the KPIs of this research to various types of organisations in the public and private sector which implement workplace change might all serve as subjects for further research. More references regarding the comparison between ex ante and ex post evaluation of workplace change are needed. By applying the conceptual model to the workplace change appraisal, both before and after the change, further research could also be carried out in the future.

5   *Statistical analysis*
In this study, the case study approach allowed to exploring relationships between employees' responses to the work environment (the dependant variable in the conceptual model on employees' appraisal of workplace change) and organisational characteristics, cultural characteristics, work processes and implementation processes (the independent variables) in a qualitative way. The empirical findings confirm the relevance of the variables shown in the conceptual model of workplace change appraisal and the integrated conceptual model that connects organisational characteristics and characteristics of work processes to objective and subjective performance measurement indicators. These conceptual models can be used as a reference to provide input for further improvement of performance measurement and performance management.

The findings show that information about organisational and national culture is vital for the interpretation of workplace characteristics and the appraisal of change. In addition, the study shows that neither organisational nor national culture has absolute dominance in the employees' appraisals. The data from the questionnaires

about employees' responses and organisational and national culture types and dimensions make it possible to further explore relationships in a quantitative way. A first statistical analysis of the available data did not show significant relationships between organisational and national culture and employees' responses to work environment (see Appendix VI). Additional statistical analysis of the currently available data from the questionnaires and data from other case studies could help to improve our understanding of the complex relationships between huge numbers of interrelated variables and to explain which factors affect employees' appraisal of workplace change, how and how strongly.

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AI Dhanarak Asset Development data

Data from the WODI assessment
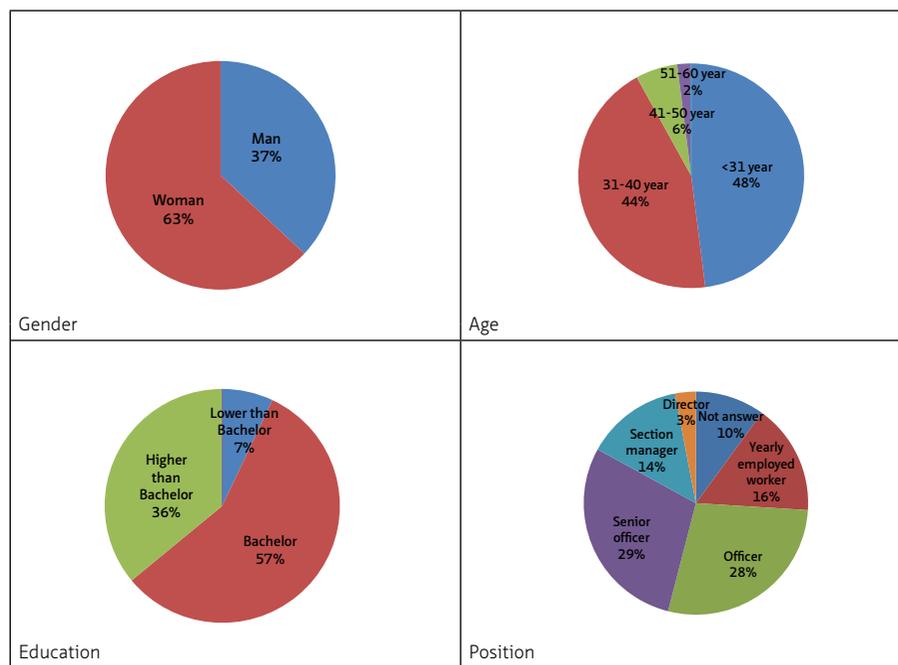
Figure 73

Characteristics of participants in the survey in the DAD case

Activity	Avg.(%)	Min (%)	Max (%)
General desk work	33	0	95
Desk work where you are not to be disturbed	8	0	50
Desk work where interaction with colleagues is necessary/required	13	0	80
Planned meetings/ interaction	11	0	35
Unplanned meetings/ interaction	7	0	45
Telephone	11	0	31
Reading (longer than 30 minutes in one stretch)	4	0	25
Document management (archiving, copying, drawings, etc.)	11	0	60
Other	2	0	50

Table 60

Time spent on different activities in the DAD case (N=85)

| Type of place	Avg.(%)	Min (%)	Max (%)
1-person workspace	30	0	100
Silence workspace	4	0	30
2-person workspace	4	0	40
Team space	14	0	100
Open workspace	7	0	100
Half-open workspace	13	0	95
Lounge workspace	1	0	20
Small meeting space	7	0	30
Large meeting space	5	0	20
Brainstorm space	7	0	40
Open meeting space (small)	4	0	30
Open meeting space (large)	4	0	40

Table 61
Time spent in various types of places in the DAD case (N=85)

Type of place	Average rating
1-person workspace	20
Silence workspace	8
2-person workspace	2
Team space	21
Open workspace	7
Half-open workspace	5
Lounge workspace	7
Small meeting space	6
Large meeting space	1
Brainstorm space	17
Open meeting space (small)	4
Open meeting space (large)	2

Table 62
Preferred places in various types of places in the DAD case (N=85)
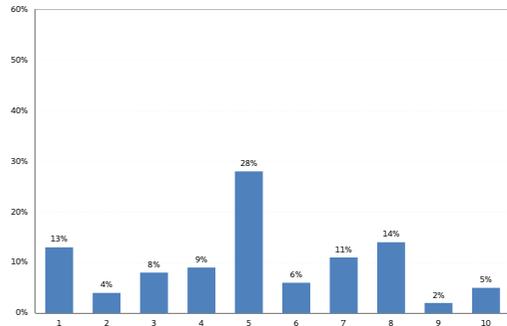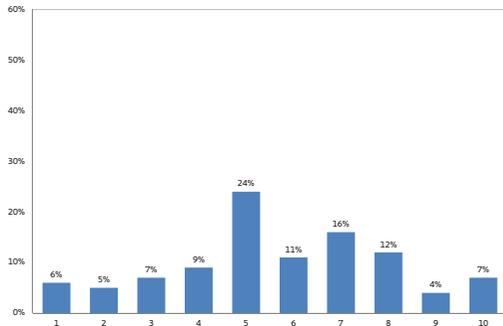
1. Satisfaction with organisation (% respondents)
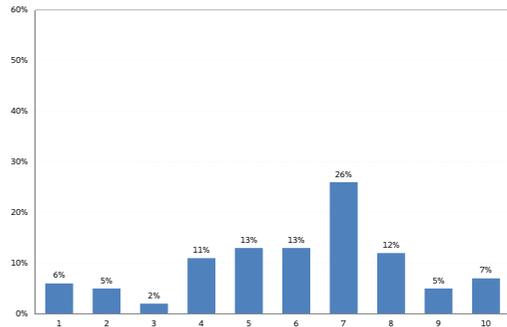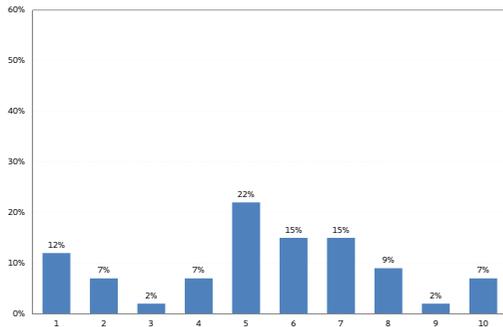
2. Satisfaction with work and work process

3. Satisfaction with workplace concept

4. Satisfaction with facilities
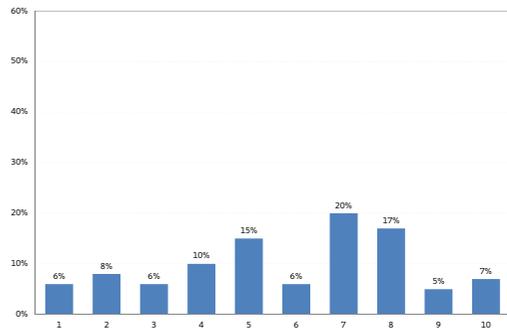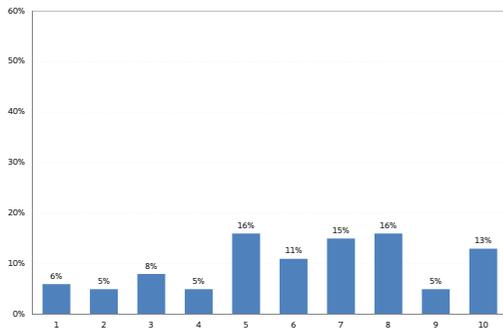
5. Respondents perceive the workplace environment as friendly and enjoyable

6. Respondents perceive the workplace environment as supporting productivity

Figure 74

1 - 6 Average satisfaction rating in the DAD case on a 10-point scale from '1' = not satisfied at all to '10' = very satisfied (N=85)

	Current	Preferred
CLAN	21.8	30.9
ADHOCRACY	23.8	22.5
MARKET	25.2	21.5
HIERARCHY	29.3	25.1
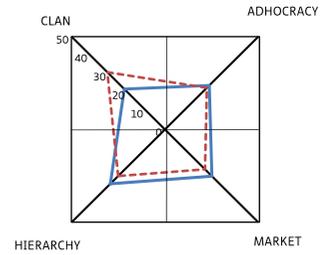
1. Average culture profile scores
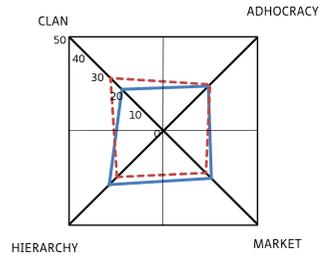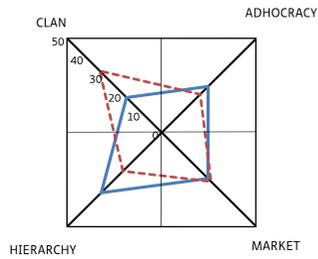
2. Average culture profile

3. Dominant characteristics

4. Organisational leadership
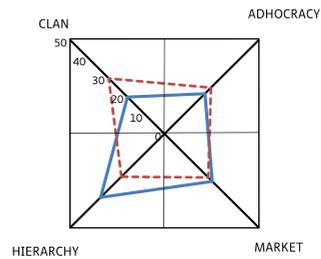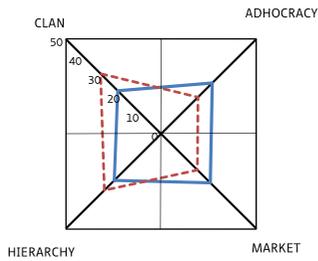
5. Management of employees

6. Organisational glue
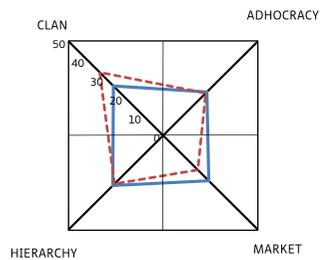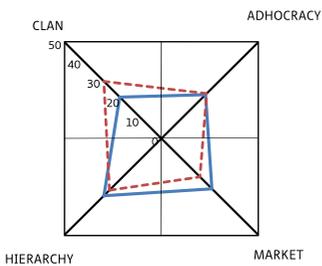
7. Strategic emphasis

8. Criteria of Success

Figure 75

Average culture profile with six aspects of organisational culture (blue = current, red = preferred culture)

A II   Philips Thailand data

1   **Data from the WODI assessment before change**
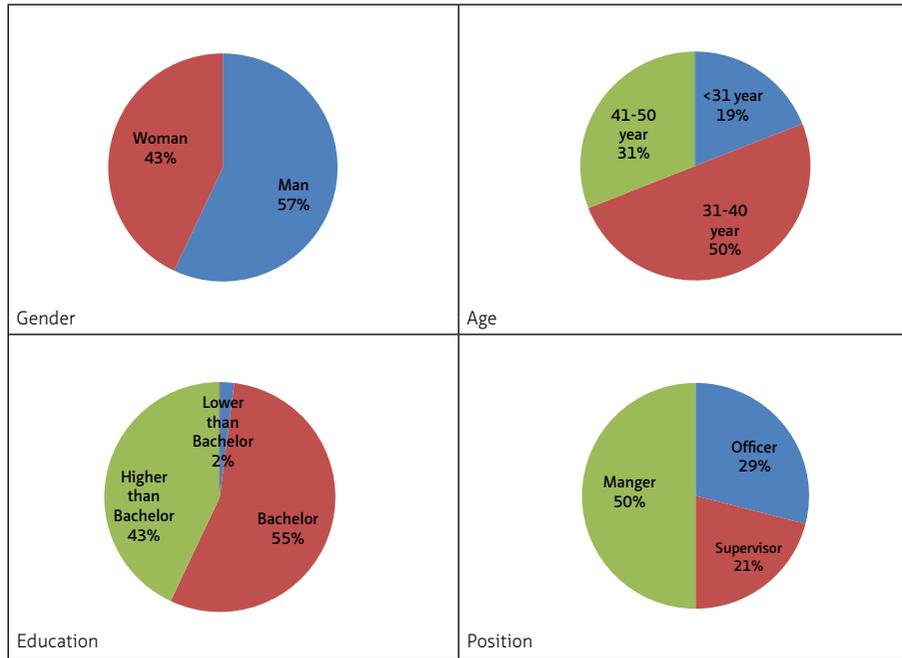
Figure 76
Characteristics of participants in the survey in the PTH case before change

Activity	Avg.(%)	Min (%)	Max (%)
General desk work	43	2	70
Desk work where you are not to be disturbed	6	0	20
Desk work where interaction with colleagues is necessary/required	11	0	45
Planned meetings/ interaction	11	0	60
Unplanned meetings/ interaction	7	0	30
Telephone	12	0	80
Reading (longer than 30 minutes in one stretch)	2	0	10
Document management (archiving, copying, reference work, etc.)	5	0	20
Other	3	0	40

Table 63
Time spent on different activities in the PTH case before change (N = 42)

Type of place	Avg.(%)	Min (%)	Max (%)
1-person workspace	33	0	90
Silence workspace	3	0	20
2-person workspace	4	0	30
Team space	9	0	30
Open workspace	16	0	100
Half-open workspace	10	0	100
Lounge workspace	1	0	30
Small meeting space	8	0	30
Large meeting space	5	0	20
Brainstorm space	5	0	40
Open meeting space (small)	4	0	30
Open meeting space (large)	2	0	20

Table 64
Time spent in various types of places in the PTH case before change (N = 42)

Type of place	Average rating
1-person workspace	22
Silence workspace	14
2-person workspace	1
Team space	17
Open workspace	6
Half-open workspace	9
Lounge workspace	7
Small meeting space	7
Large meeting space	1
Brainstorm space	10
Open meeting space (small)	6
Open meeting space (large)	0

Table 65
Preferred places in various types of places in the PTH case before change (N=42)
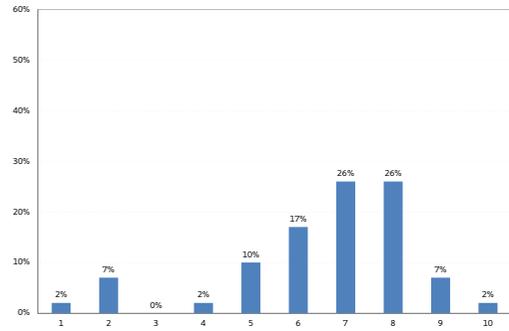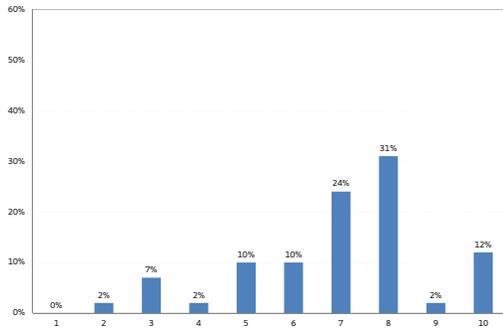
1. Satisfaction with organisation (% respondents)
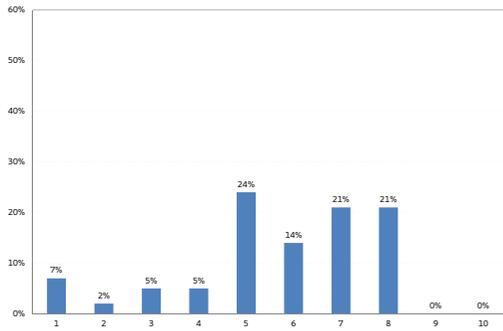
2. Satisfaction with work and work process
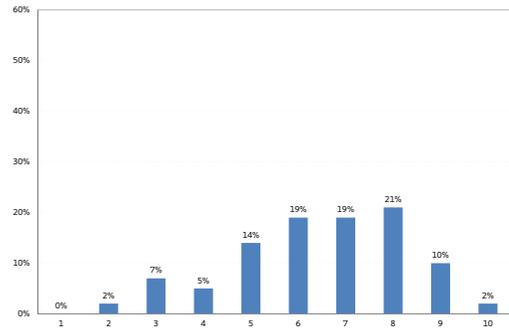
3. Satisfaction with workplace concept
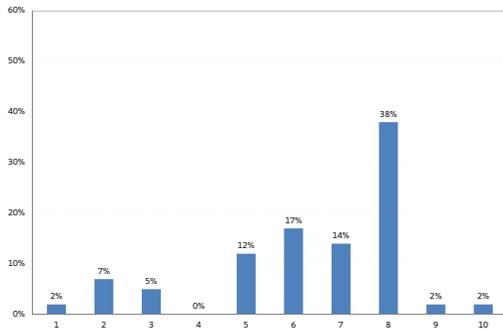
4. Satisfaction with facilities
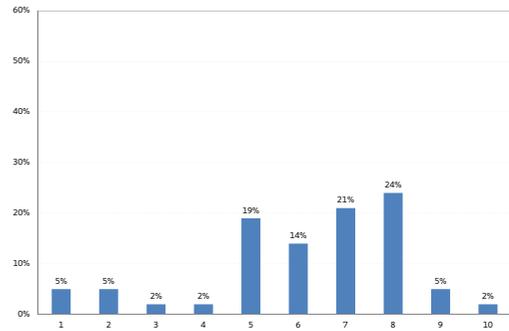
5. Respondents perceive the workplace environment as friendly and enjoyable

6. Respondents perceive the workplace environment as supporting productivity

Figure 77

1 - 6 Average satisfaction rating in the PTH case before change on a 10-point scale from '1' = not satisfied at all to '10' = very satisfied (N=42)

2   Data from the WODI assessment after change
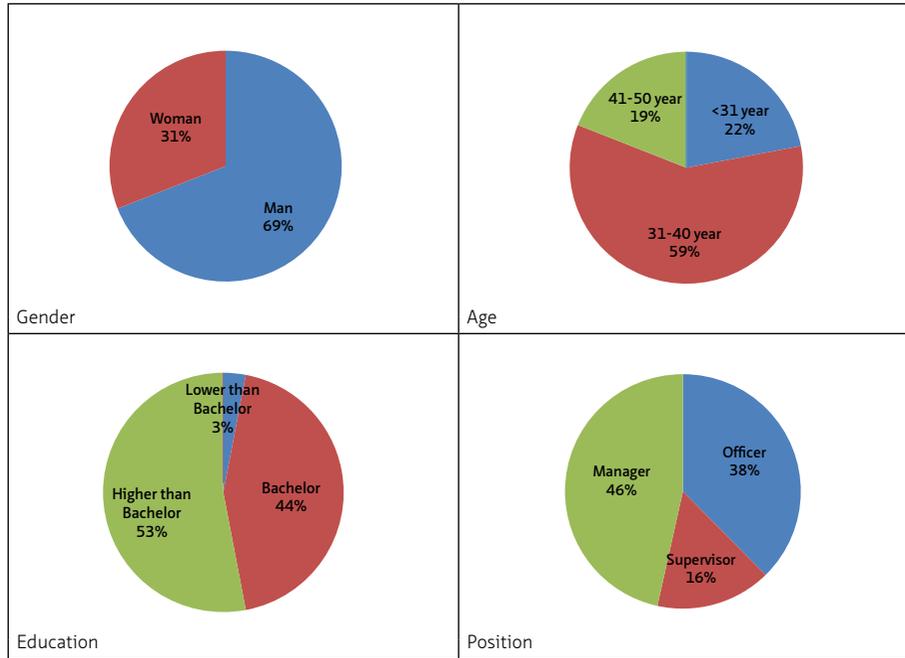
Figure 78

Characteristics of participants in the survey in the PTH case after change

Activity	Avg.(percent)	Min	Max
General desk work	34	0	80
Desk work where you are not to be disturbed	11	0	25
Desk work where interaction with colleagues is necessary/required	17	0	40
Planned meetings/ interaction	13	0	30
Unplanned meetings/ interaction	6	0	20
Telephone	10	0	30
Reading (longer than 30 minutes in one stretch)	3	0	20
Document management (archiving, copying, reference work, etc.)	6	0	20
Other	0	0	0

Table 66

Time spent on different activities in the PTH case after change (N = 32)

Type of place	Avg.(%)	Min (%)	Max (%)
1-person workspace	17	0	60
Silence workspace	6	0	20
2-person workspace	7	0	40
Team space	17	0	80
Open workspace	19	0	100
Half-open workspace	3	0	10
Lounge workspace	1	0	5
Small meeting space	11	0	80
Large meeting space	9	0	30
Brainstorm space	5	0	20
Open meeting space (small)	3	0	20
Open meeting space (large)	2	0	5

Table 67
Time spent in various types of places in the PTH case after change (N = 32)

| Type of place	Average rating
1-person workspace	22
Silence workspace	10
2-person workspace	3
Team space	10
Open workspace	7
Half-open workspace	8
Lounge workspace	3
Small meeting space	18
Large meeting space	2
Brainstorm space	10
Open meeting space (small)	5
Open meeting space (large)	0

Table 68
*Preferred places in various types of places in the PTH case after change (N=32)*
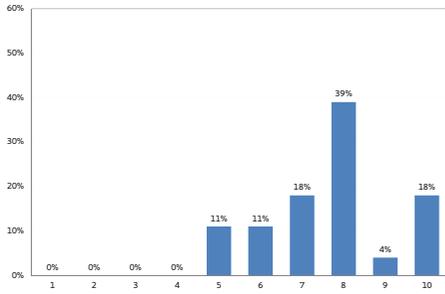
1. Satisfaction with organisation (% respondents)
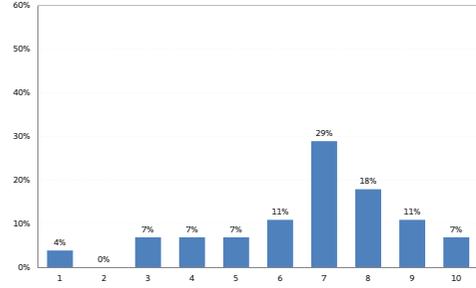
2. Satisfaction with work and work process
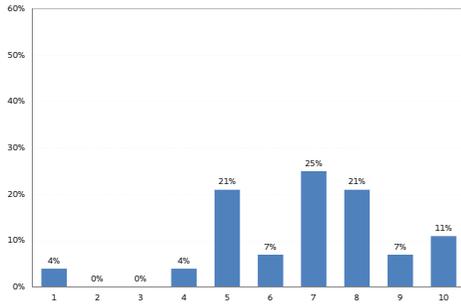
3. Satisfaction with workplace concept
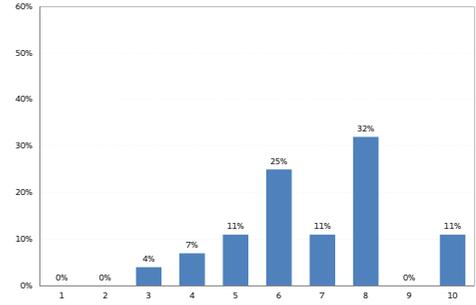
4. Satisfaction with facilities
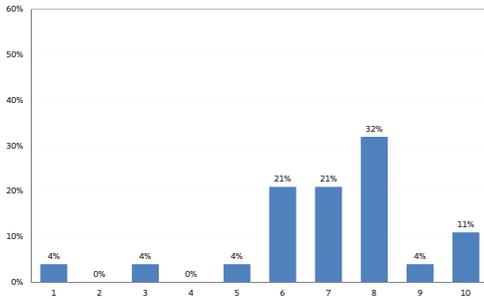
5. Respondents perceive the workplace environment as friendly and enjoyable
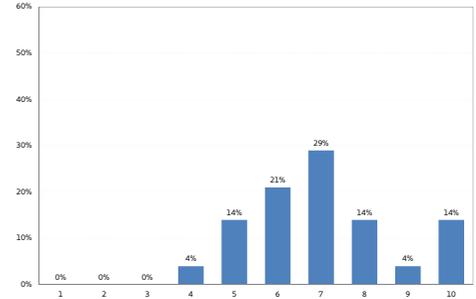
6. Respondents perceive the workplace environment as supporting productivity

Figure 79

1 - 6 Average satisfaction rating in the PTH case after change on a 10-point scale from '1' = not satisfied at all to '10' = very satisfied (N=28)

	Current	Preferred
CLAN	20.9	29.8
ADHOCRACY	25	23.4
MARKET	29.9	22.9
HIERARCHY	24.3	23.9
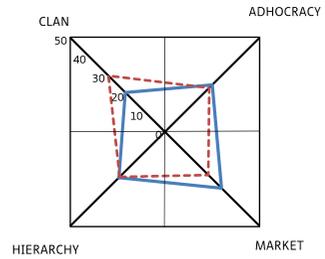
1. Average culture profile scores
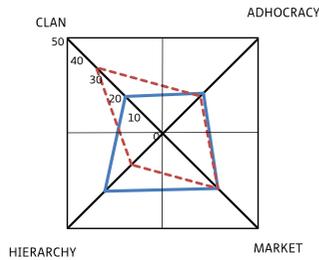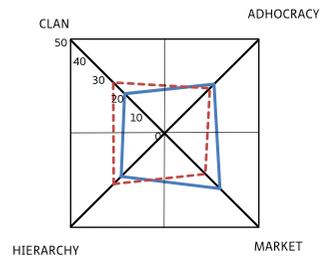
2. Average culture profile

3. Dominant characteristics

4. Organisational leadership
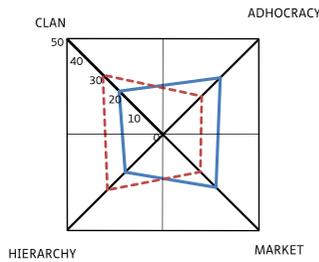
5. Management of employees
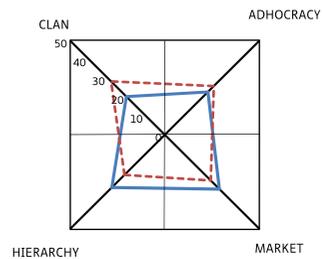
6. Organisational glue
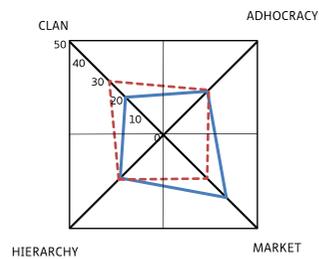
7. Strategic emphasis
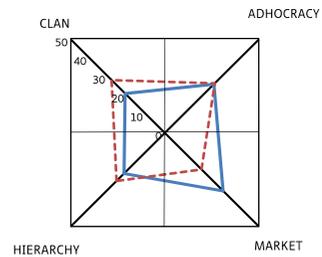
8. Criteria of Success

Figure 80

Average culture profile with six aspects of organisational culture (blue = current, red = preferred culture)

A III Waterschap Rivierenland data

Gender

Woman 30%
Man 70%

Age

> 60 year 2%
< 31 year 9%
51-60 year 23%
31-40 year 35%
41-50 year 31%

Education

secondary 2%
University 22%
MBO 26%
HBO 49%

Position

Treatment managment 11%
Department staff 15%
Water management 32%
Safety management 20%
Resource management 22%
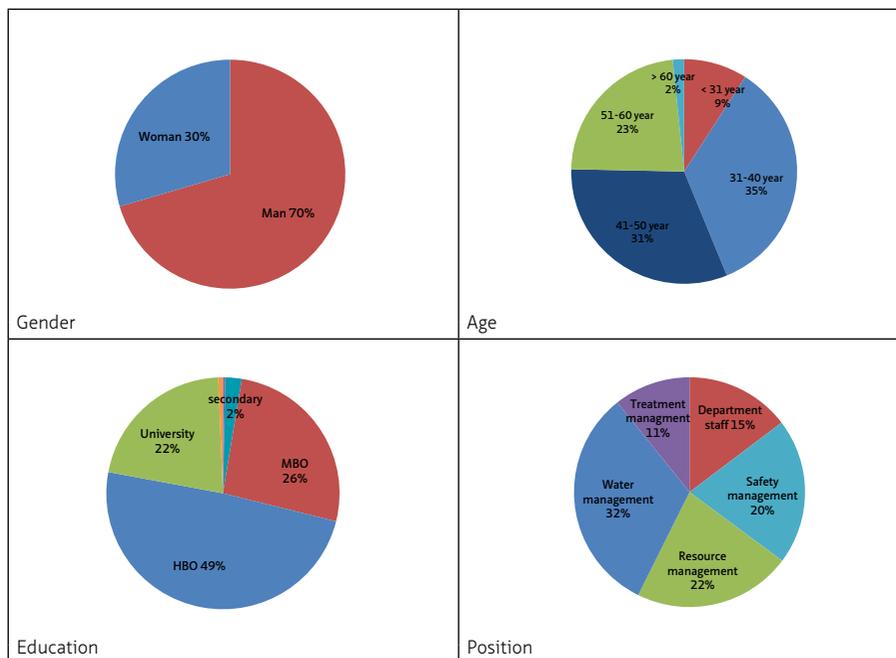
Figure 81

Characteristics of participants in the survey in the WSRL case

Activity	Avg. (%)
General desk work	38
Planned meetings/ interaction	15
Desk work where interaction with colleagues is necessary	14
Unplanned meetings/ interaction	8
Telephone	6
Desk work where you are not to be disturbed	5
Reading	5
Document management	4
Other	5

Table 69

Time spent in different activities in the WSRL case (Maarleveld and Brunia, 2009)

Type of place	Avg. (%)
Open workspace	60
Team space	13
Cockpit	2
Open meeting space	6
Meeting room	9
Library	4
Commercial	2
Meeting space	3
Project area	1

Table 70
Time spent in various types of places in the WSRL case (Maarleveld and Brunia, 2009)

Type of place	Survey in 2007 (%)	Survey in 2008 (%)
Open workspace	61	60
Team space	11	13
Cockpit	3	2
Open meeting space	5	6
Meeting room	10	9
Library	3	4
Commercial	3	2
Meeting space	4	3
Project area	2	1

Table 71
Comparison between time spent in various types of places in the 2007 and 2008 survey (Maarleveld and Brunia, 2009)
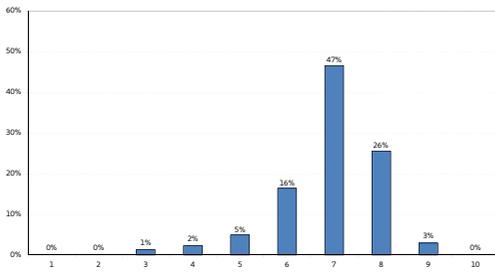
1. Satisfaction with organisation (% respondents)
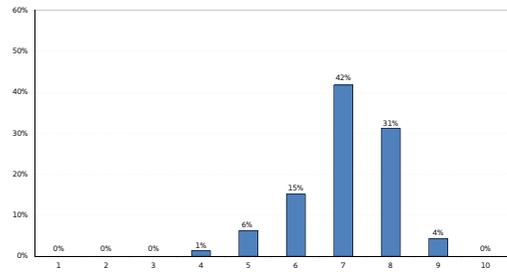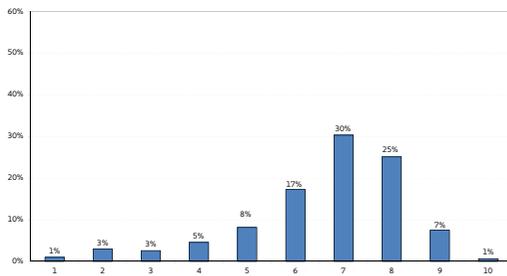
2. Satisfaction with work and work process

3. Satisfaction with workplace concept
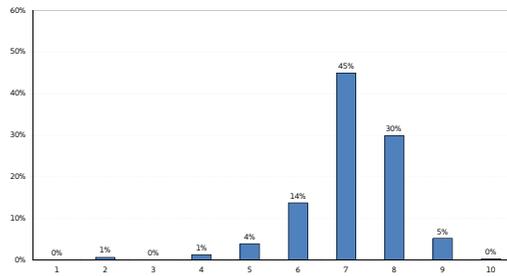
4. Satisfaction with facilities
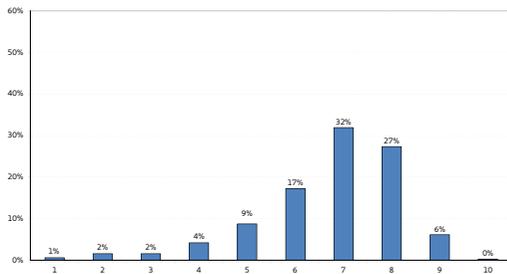
5. Respondents perceive the workplace environment as friendly and enjoyable
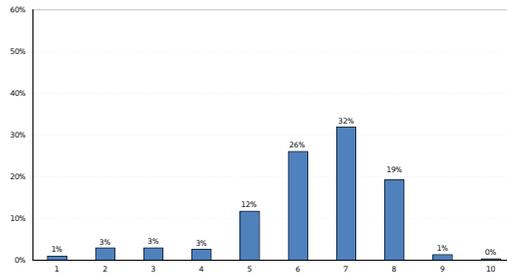
6. Respondents perceive the workplace environment as supporting productivity

Figure 82

*1 - 6 Average satisfaction rating in the WSRL case before change on a 10-point scale from '1' = not satisfied at all to '10' = very satisfied (N=307) (Maarleveld and Brunia, 2009)*

Most positive aspects of the current situation			
Aspect	**Items**	**N**	**Percent**
Housing concept	Open space, character and transparency	56	7.9
	Opportunities to choose the workplace	24	3.4
	Flexible working and clean desk	14	1.9
	Ability to allocate colleagues in the flex workplace	11	1.5
	Pleasant working environment	9	1.3
	Flex work provides openness and transparency of environment	5	0.7
	Ability to work from home	5	0.7
	The efficient use of the workplace	3	0.4
	Work environment support work process	3	0.4
	Housing concept	1	0.1
	Equality	1	0.1
	More social control	1	0.1
	local housing	1	0.1
	Flexibility to changes	1	0.1
	Total	**135**	**19**
Communication	Much interaction with (new) colleagues throughout the organization	48	6.8
	Good communication	22	3.1
	All colleagues, departments and facilities in single building	20	2.8
	Open and warm atmosphere	17	2.4
	Ability to have conversations in many activities	7	0.9
	Better coordination between work	7	0.9
	Knowledge sharing	5	0.7
	Unity at own department	1	0.1
	Limitations of meeting culture	1	0.1
	Total	**128**	**18**
Architecture and planning	Architecture	38	5.3
	Clear layout building	18	2.5
	Fresh, new and clean	14	1.9
	Spatial	12	1.7
	Functional aspects	10	1.4
	Nice interior	10	1.4
	Health and Safety	7	0.9
	Modern and contemporary	5	0.7
	Materials	4	0.6
	Eco-friendly aspects of the building	2	0.3
	Beautiful atrium	2	0.3
	Total	**122**	**17**

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Most positive aspects of the current situation			
Aspect	**Items**	**N**	**Percent**
Workstations	Good desks, chairs and screens (adjustable)	66	9.3
	Fine workplaces	12	1.7
	Flexibility of workstations	6	0.8
	Quiet spaces	5	0.7
	Professional appearance workplaces	2	0.3
	Open workstations	2	0.3
	Absence of fixed locations	2	0.3
	Informal seating areas/meetings	2	0.3
	Opportunities to work with concentration	1	0.1
	Private rooms	1	0.1
	Total	**99**	**14**
Facilities and ICT	Good facilities services	23	3.2
	Coffee Corners	21	2.9
	Canteen, catering	19	2.7
	Development of ICT to support workflow	10	1.4
	Work documents are available digitally	8	1.1
	Open meeting space	8	1.1
	Archives	3	0.4
	Good networking and login options	3	0.4
	Team Rooms	2	0.3
	The frequency of cleaning	1	0.1
	Outdoor facilities	1	0.1
	Total	**99**	**14**
Accessibility	Location building	46	6.5
	Ample parking	6	0.8
	Additional locations are easily accessible	1	0.1
	Total	53	7.4
Image	Appearance of the building	38	5.3
	Customization	1	0.1
	Total	**39**	**5.4**
Indoor climate, lighting and acoustics	Climate	21	2.9
	Adequate and comfortable light (natural light)	14	1.9
	Acoustics	1	0.1
	Total	**36**	**5**
Total of most positive aspects		711	100 %

Table 72

Most positive aspects of the work environment (N = 307) (Maarleveld and Brunia, 2009)

Most negative aspects of the current situation			
Aspect	**Items**	**N**	**Percent**
Indoor climate, lighting and acoustics	Noise in the open spaces	109	14.6
	Indoor climate (too hot, too cold, drafts, dry air)	59	7.9
	Unpleasant acoustics	16	2.1
	Incidence of light / bright lighting	5	0.7
	Total	**189**	**25**
Workstations	Lack of privacy places	56	7.5
	Lack of good location of the workspace	28	3.8
	Cockpits are not soundproof	22	2.9
	Cockpits are unpleasant	15	2
	Too few workplaces	15	2
	Cockpits are little use	9	1.2
	Lack of own office	7	0.9
	Too much distraction and open workplaces	6	0.8
	Arrangement of workspaces (too close to each other)	6	0.8
	Lack of CAD/GIS workstations	3	0.4
	Poor seating	2	0.3
	Unplanned meeting in the open spaces	1	0.1
	Total	**170**	**23**
Facilities	Lack of adequate personal archive	40	5.4
	Lack of meeting rooms	31	4.2
	Facility services	12	1.6
	Cleaning (inadequate and troublesome during office hours)	11	1.5
	Lack of adequate toilets and cleanliness	6	0.8
	Location next to highway (the ability to get fresh air')	5	0.7
	Bicycle storage	4	0.5
	Furniture and equipment in meeting rooms	3	0.4
	Noise in team rooms	3	0.4
	Meeting room next to smoking area	2	0.3
	Mailroom	2	0.3
	Lack of project areas	1	0.1
	Copier rooms are too small	1	0.1
	Lack of copiers	1	0.1
	Lack of fixed bins for staplers	1	0.1
	Expensive catering	1	0.1
	Bad coffee in the coffee machines	1	0.1
	Nuisance in canteen	1	0.1
	Total	**126**	**17**

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Most negative aspects of the current situation			
Aspect	Items	N	Percent
Accessibility	Too few car parking spaces	59	7.9
	Poor accessibility by public transport	14	1.9
	Congestion at the end of the day	2	0.3
	Parking is not easily accessible	1	0.1
	Total	76	10
Architecture and planning	Impersonal appearance	39	5.2
	Too few plants	10	1.3
	Poor cockpits	3	0.4
	Clusters are not easily recognizable	2	0.3
	Cloth hanging	2	0.3
	Headquarters and field locations	1	0.1
	Quality coffee rooms	1	0.1
	Poor use of materials	1	0.1
	Too many boxes	1	0.1
	Wall coverings	1	0.1
	Aquarium	1	0.1
	Layout of the building	1	0.1
	Atmosphere of the ground floor meeting rooms	1	0.1
	Total	64	8.6
Housing concept	Flexwork is inconvenient	17	2.3
	No radios allowed	14	1.9
	Flexwork is not consistently applied	5	0.7
	The use of lockers is impractical	2	0.3
	The needs of concentration	1	0.1
	Cleandesk policy	1	0.1
	Poor survey work by always cleaning up	1	0.1
	Cumbersome process of data	1	0.1
	Digital work	1	0.1
	Ability to find colleagues	1	0.1
	Little opportunity to work from home	1	0.1
	Departmental occupation wings	1	0.1
	Not allowed to eat in the workplace	1	0.1
	Total	47	6

Most negative aspects of the current situation			
Aspect	**Items**	**N**	**Percent**
ICT	Computer system is too slow	23	3.1
	ICT services	8	1.1
	ICT programs are not user friendly	6	0.8
	Poor telephone system	3	0.4
	No internet access with own laptop	2	0.3
	No provision of the notebooks	1	0.1
	Total	43	6
Communication	To get to know each other is difficult	11	1.5
	Difficult to find colleagues	8	1.1
	Lack of team spirit	4	0.5
	Ability to work in teamspace	3	0.4
	No interaction with other departments on different wings/floors	3	0.4
	Coffee Corners	1	0.1
	Total	30	4
Image	Expensive look	1	0.1
	Total	**1**	**0.1**
Total of most negative aspects		746	100 %

Table 73
Most negative aspects of the work environment (N = 307) (Maarleveld and Brunia, 2009)

	Current	Preferred
CLAN	26.9	31.6
ADHOCRACY	18.7	25.8
MARKET	19.5	17.3
HIERARCHY	35.1	25.4
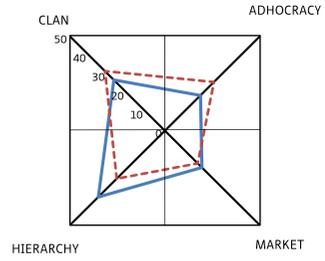
1. Average culture profile scores

2. Average culture profile
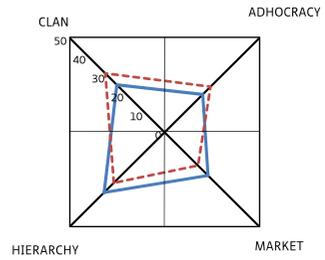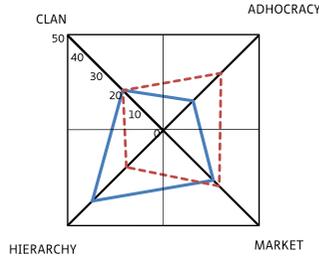
3. Dominant Characteristics

4. Organizational Leadership
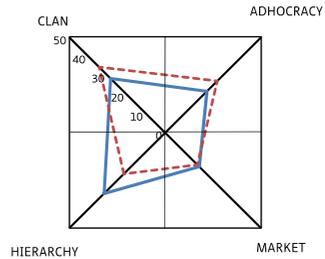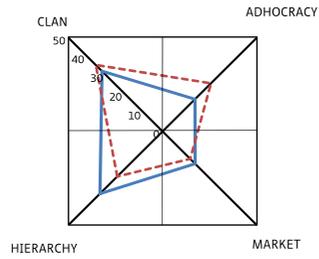
5. Management of Employees

6. Organizational Glue
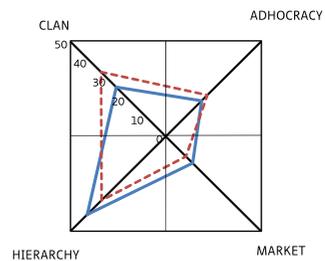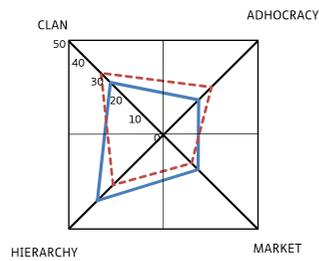
7. Strategic emphasis

8. Criteria of Success

Figure 83

Average culture profile with six aspects of organisational culture (blue = current, red = preferred culture)

A IV Organisation and workplace characteristics in three cases

	DAD	PTH	WSRL
Business type	Public sector	Private sector	Public sector
	Asset development	Lighting industries	Water management
Objectives	- To achieve economy of scale from asset management - To provide value for money to the client.	To become number 1 in the Asian consumer lighting market.	To protect rivers to remain safe and liveable
Structure	Hierarchy	Flat	Flat
Staff characteristics	Employees carry out day-to-day operation and are given orders with little discretion.	Mobile and non-mobile workers in projects or group works, needing a changing balance of different skills.	Staff carry out various types of office works. Office work involves interaction with colleague.
Work processes	Routine works, 9 to 5 time-table. Full time occupancy of space with exception of the operation department.	Flexible working time depending on what needs to be done and on individual arrangements. Highly intermittent pattern of occupancy supports shared use of task settings.	Flexible working in open plan workspace and routinely use of group space, meeting rooms and team rooms.

Table 74
Organisation characteristics of the three cases

	DAD	PTH	WSRL
Workplace change objectives	- To increase employee satisfaction and productivity from the new work environment - To promote sustainable objectives through the energy efficient design concept - To increase more office space	To increase floor space and to improve environmental quality	- To provide a better work environment to employees - To promote mutual communication and information exchange among employees - To promote sustainable objectives through architectural design
Location	Suburb	City centre	Outer part of town
Building grade	Grade B office	Grade A office	High quality of interior design
Workplace concept	Open plan with partitions Psonal desks, private offices	Open plan with various types of work settings and shared facilities	Flexible office with multifunctional use of space and shared facilities.
Implementation process	An inspection team is in charge to 'check and correct' whether everything is in place or requires further correction.	The WPI team set up a meeting in regard to the preparation and implementation process of the new workplace.	- A steering committee is in charge of ideas, decisions and implementation of the new workplace concept. - Occupancy surveys were carried out by the CfPB in 2007 - 2008.

Table 75
Workplace characteristics in three cases

A V Performance measures/KPIs according to the literature

(i)

Perspectives	Items (Riratanaphong, 2011)	Lindholm and Gibler, 2005	>>>
Stakeholder perception	**Employee satisfaction** Employee satisfaction (Hagarty and Wilson, 2002; Kaczmarczyk and Morris, 2002; RPS, 2003; Statsbygg, 2003; van der Voordt, 2004) Employee satisfaction survey (NPB, 2003) Percentage of Employees Indicating Satisfied or Very Satisfied on Employee Survey (BCBC, 2003)	**The most commonly used performance measures found in the literature** Employee satisfaction with work environment (Arthur Andersen, 1993; Nourse 1994; Bdeir, 2003) Provision of amenities (Bdeir, 2003) Absentee rates by buildings (Massheder and Finch, 1998) **Innovative performance measures found in literature** Employee satisfaction Quality of indoor environment (lightning, air conditioning, temperature) (Kincaid, 1994) Noise level (Kincaid, 1994) Location success factors (proximity to required transportation modes, access to employees; amount of local amenities) (Duckworth 1993; Lubieniecki and Desrocher, 2003) Ratio of office space to common areas (Lubieniecki and Desrocher, 2003) CRE unit efficiency and quality Employee satisfaction with CRE services (Duckworth, 1993; Lubieniecki and Desrocher, 2003) **The most commonly used corporate real estate performance measures in studied organisations** Employee satisfaction with working environment **Innovative performance found through interviews** Employee satisfaction Amount of workplace reforms and space modifications Distance to employees' homes CRE unit quality Employee satisfaction with professional skills Employee satisfaction with information sharing	

>>> Hinks and McNay, 1999	Organisational performance	Building performance
Environment Satisfactory physical working conditions Provision of safe environment	**1. Employee satisfaction** (Hagarty and Wilson, 2002; Kaczmarczyk and Morris, 2002; RPS, 2003; Statsbygg, 2003; van der Voordt, 2004)	**1. Employee satisfaction with work environment** (Arthur Andersen, 1993; Nourse 1994; Bdeir, 2003; Hinks and McNay, 1999; Lindholm and Gibler, 2005) Quality of indoor environment (lightning, air conditioning, temperature) (Kincaid, 1994) Noise level (Kincaid, 1994) Provision of safe environment (Hinks and McNay, 1999) Amount of workplace reforms and space modifications (Lindholm and Gibler, 2005) Ratio of office space to common areas (Lubieniecki and Desrocher, 2003) Provision of amenities (Bdeir, 2003) **2. Employee satisfaction with CRE services** (Duckworth, 1993; Lubieniecki and Desrocher, 2003) Employee satisfaction with professional skills (Lindholm and Gibler, 2005) Employee satisfaction with information sharing (Lindholm and Gibler, 2005) **3. Location success factors** (proximity to required transportation modes, access to employees; amount of local amenities) (Duckworth 1993; Lubieniecki and Desrocher, 2003; Lindholm and Gibler, 2005)

Perspectives	Items (Riratanaphong, 2011)	Lindholm and Gibler, 2005	>>>
Stakeholder perception	**Customer perception** Customer satisfaction (Carder, 1995; Bradley, 2002; Hagarty and Wilson, 2002; Kaczmarczyk and Morris, 2002; GSA Real Property Performance Results, 2006; NPB, 2003; BCBC, 2003) Overall Client Satisfaction with RPS services (RPS, 2003) Overall Tenant Satisfaction with Property Management Services (RPS, 2003) Percentage of Customers with Service Level Agreements in Place (BCBC, 2003) Percentage of Customers and Associated Revenues Retained (BCBC, 2003) Survey Index Ratings for Customer Choice (BCBC, 2003) Survey Rating of Extent to Which Full Service Workplace Provisioning Solutions Meet Customer Needs (BCBC, 2003) Percentage of Customers Indicating Information Technology Solutions Fulfilling Their Expectations (BCBC, 2003) Rate of customer and revenue retention (Kaczmarczyk and Morris, 2002) Customer commitment (Kaczmarczyk and Morris, 2002) Customer surveys (NPB, 2003) Customer choice rating (BCBC, 2003)	**The most commonly used performance measures found in the literature** Customer satisfaction (Bdeir, 2003) Number of helpdesk calls per square foot (Bon et al., 1994) **Innovative performance measures found in literature** CRE unit efficiency and quality Customer satisfaction with responsiveness (Amaratunga and Baldry, 2000) Marketing and sales Location success factors (proximity to requires transportation, access to customers, distance to other sites and businesses) (Duckworth, 1993; Lubieniecki and Desrocher, 2003) Rating based on building attributes (Duckworth, 1993) **The most commonly used corporate real estate performance measures in studied organisations** Customer satisfaction with facilities **Innovative performance found through interviews** CRE unit quality Service level agreements (SLA's) in use with service providers BSC for partners in use Audits for service providers in use Marketing and sales Distance to customers Use of company logos and colour in workplace design	
	Community and well being Loyalty (Bradley, 2002) Community sentiment (Bradley, 2002) Contribution to public policy and societal priorities (RPS) (Hagarty and Wilson, 2002; RPS, 2003) Positive market profile (Kaczmarczyk and Morris, 2002) Political results (Kaczmarczyk and Morris, 2002) Percentage of positive and neutral press coverage (Statsbygg, 2003) Registration of all properties according to plan for protection of historical/cultural values (Statsbygg, 2003) Media monitoring (NPB, 2003)		

>>> Hinks and McNay, 1999	Organisational performance	Building performance
General Customer satisfaction	**1. Customer satisfaction** (Carder, 1995; Bradley, 2002; Hagarty and Wilson, 2002; Kaczmarczyk and Morris, 2002; GSA Real Property Performance Results, 2006; NPB, 2003; BCBC, 2003): Percentage of Customers Indicating Information Technology Solutions Fulfilling Their Expectations (BCBC, 2003) Customer choice rating (BCBC 2003) **2. Percentage of Customers with Service Level Agreements in Place** (BCBC, 2003; Lindholm and Gibler, 2005) **3. Percentage of Customers and Associated Revenues Retained** (BCBC, 2003; Kaczmarczyk and Morris, 2002) **4. Customer commitment** (Kaczmarczyk and Morris, 2002)	**1. Location success factors** (proximity to required transportation, access to customers, distance to other sites and businesses) (Duckworth, 1993; Lubieniecki and Desrocher, 2003; Lindholm and Gibler, 2005) **2. Customer satisfaction with facilities** (Lindholm and Gibler, 2005) Overall Tenant Satisfaction with Property Management Services (RPS, 2003) Survey Rating of Extent to Which Full Service Workplace Provisioning Solutions Meet Customer Needs (BCBC, 2003) Rating based on building attributes (Duckworth, 1993) Use of company logos and colour in workplace design (Lindholm and Gibler, 2005)
	1. Community sentiment (Bradley, 2002) Positive market profile (Kaczmarczyk and Morris, 2002) Political results (Kaczmarczyk and Morris, 2002) **2. Media monitoring** (NPB, 2003) Percentage of positive and neutral press coverage (Statsbygg, 2003)	**1. Contribution to public policy and societal priorities** (Modern Comptrollership, Workplace of the Future, Government Online, Greening of Government Operations) (Hagarty and Wilson, 2002; RPS, 2003)

Perspectives	Items (Riratanaphong, 2011)	Lindholm and Gibler, 2005	>>>
Financial health	Net income (BCBC, 2003; NPB, 2003)	**Innovative performance measures found in literature**	
	Economic/market value added (Bradley, 2002)	Ratio of expenses to revenue (for income statement) (Lubieniecki and Desrocher, 2003)	
	Partnership (Kaczmarczyk and Morris, 2002)	Capital expenditures (for cash-flow statement) (Lubieniecki and Desrocher, 2003)	
	Budgetary discipline (Kaczmarczyk and Morris, 2002)	Value of property, plant and equipment (for balance sheet) (Lubieniecki and Desrocher, 2003)	
	Budget Management (operating and capital, services revolving fund and disposals revolving fund) (RPS, 2003)		
	Accuracy of Financial Forecasting Compared to Year-end Results (RPS, 2003)		
	Set clear priorities (Kaczmarczyk and Morris, 2002)		
	Capital planning implemented (Kaczmarczyk and Morris, 2002)		
	Transfer of budgeted funds to next year's budget (Statsbygg, 2003)		
	Total income from consulting and planning, construction project management and property management (Statsbygg, 2003)		
	Total Proceeds on Properties Sold (BCBC, 2003)		
	Return on property management. Result before finance cost as percentage of invested capital per year (Statsbygg, 2003)		
	Return on equity (NPB, 2003)		
	Return on investment (Hagarty and Wilson, 2002; BCBC, 2003; RPS, 2003)		
	Return on Investment for Owned Market-Comparable Office Buildings (BCBC, 2003)		
	Return on invested capital (Kaczmarczyk and Morris, 2002)		
	Capital reinvestment rates (Hagarty and Wilson, 2002)		
	Number of Agreements / MOUs Signed in Health, Education and Other Government Sectors (BCBC, 2003)		
	Business Volumes (Revenue Generated Through Optional Services in the Services Revolving Fund) (RPS, 2003)		

>>>	Hinks and McNay, 1999	Organisational performance	Building performance
	Value for money No loss of business due to failure of premises services	**1. Value for money** (Hinks and McNay, 1999) Economic/market value added (Bradley, 2002) **2. Financial:** Return on investment (Hagarty and Wilson, 2002; BCBC, 2003; RPS, 2003) Net income (BCBC, 2003; NPB, 2003) Return on invested capital (Kaczmarczyk and Morris, 2002) Return on equity (NPB, 2003) **3. Budget Management** (operating and capital, services revolving fund and disposals revolving fund) (RPS, 2003) Set clear priorities (Kaczmarczyk and Morris, 2002) Budgetary discipline (Kaczmarczyk and Morris, 2002) Transfer of budgeted funds to next year's budget (Statsbygg, 2003) Accuracy of Financial Forecasting Compared to Year-end Results (RPS, 2003) Capital planning implemented (Kaczmarczyk and Morris, 2002) Capital reinvestment rates (Hagarty and Wilson, 2002) Ratio of expenses to revenue (for income statement) (Lubieniecki and Desrocher, 2003) Capital expenditures (for cash-flow statement) (Lubieniecki and Desrocher, 2003)	**1. No loss of business due to failure of premises services** **2. Value of property, plant and equipment** (Lubieniecki and Desrocher, 2003) Total Proceeds on Properties Sold (BCBC, 2003) **3. Value of property, plant and equipment** (for balance sheet) (Lubieniecki and Desrocher, 2003) Return on Investment for Owned Market-Comparable Office Buildings (BCBC, 2003) Return on property management. Result before finance cost as percentage of invested capital per year (Statsbygg, 2003) Total income from consulting and planning, construction project management and property management (Statsbygg, 2003)

Perspectives	Items (Riratanaphong, 2011)	Lindholm and Gibler, 2005	>>>
Organisational Development	Staff attitudes index (Carder, 1995)	**The most commonly used performance measures found in the literature**	
	Innovation quality and quantity (Bradley, 2002)	Space efficiency	
	Cultural factors (Bradley, 2002)	Square feet per employee (Arthur Andersen, 1993; Nourse, 1994; Massheder and Finch, 1998; Bdeir, 2003)	
	Team formation (Bradley, 2002)		
	New process introduction rate (Bradley, 2002)	Percent of space occupied (Nourse, 1994; Bdeir, 2003)	
	Accommodation usage (Hagarty and Wilson, 2002; Kaczmarczyk and Morris, 2002)	Gross floor area per usable floor area (Massheder and Finch, 1998)	
	Area leased as percentage of total area (m2) (Statsbygg)	CRE unit efficiency and quality	
	Space Supply and Demand Ratios (RPS, 2003)	Number of service requests handled in a month (Tranfield, 1995)	
	Accommodation Usage (rentable m2/full time equivalent employee, cost/rentable m2 and cost/full time equivalent employee) (RPS, 2003)	Response time to the service requests (Tranfield, 1995; Kincaid, 1994; Varcoe, 1996)	
	Employees housed (GSA, 2006)	Range of services offered (Amaratunga and Baldry, 2000)	
	Total square feet employees housed (GSA, 2006)	**The most commonly used corporate real estate performance measures in studied organisations**	
	Project efficiency (Hagarty and Wilson, 2002; Kaczmarczyk and Morris, 2002; RPS, 2003)	Physical condition of facilities	
	Project group work done according to approved project strategies/plans (Statsbygg, 2003)	Square feet per employee	
		Quality of facilities	
	New quality plan implemented (Statsbygg, 2003)	Vacancy rate	
	All work on properties done in accordance with approved maintenance plan (Statsbygg, 2003)	**Innovative performance found through interviews**	
	Improved horizontal communication (Kaczmarczyk and Morris, 2002)	Amount of teamwork space	
	Performance against corporate-wider customer service standards (Kaczmarczyk and Morris, 2002)	Time wasted with interruptions (due to open space layout)	
	Overall Performance Development Process Participation Rate (BCBC, 2003)	CRE unit quality	
		Time used in project versus time budgeted for the project	
	Contributing to customer success (Kaczmarczyk and Morris, 2002)	Money spent on project versus money budgeted on the project	
	Research, evaluate and replicate feasible emerging trends (Kaczmarczyk and Morris, 2002)	Amount of advice given to other business units	
	The divisions' satisfaction with one another (Statsbygg, 2003)	Portfolio	
		Percentage of surplus assets sold	
	Service degree (internal production and services) (Statsbygg, 2003)	Number of development projects (obsolete properties)	
	Development of unique system to measure the quality of internal and external facility services (NPB, 2003)	Flexibility	
		Leased space relative to total space	
		Length of lease terms	
		Amount of distance work settings in use	
		Risk management	
		Number of building quality audits	

>>> Hinks and McNay, 1999	Organisational performance	Building performance
Business benefit Suitability of premises and functional environment **Equipment** Equipment provided meets business needs Correction of faults **Space** Effective utilisation of space **Change management** Effective communication Quality of end product Responsiveness of PD to changes/requirements Achievement of completion deadlines Completion of project to customer satisfaction **Maintenance/services** Management of maintenance Reliability Effectiveness of helpdesk service Standards of cleaning	**1. Project efficiency** (Hagarty and Wilson, 2002; Kaczmarczyk and Morris, 2002; RPS, 2003) Response time to the service requests (Tranfield, 1995; Kincaid, 1994; Varcoe, 1996) Time taken to turn around jobs (Tranfield, 1995; Hinks and McNay, 1999) Projected revenue against budget (Lubieniecki and Desrocher, 2003) Improved horizontal communication (Kaczmarczyk and Morris, 2002) New process introduction rate (Bradley, 2002) Team formation (Bradley, 2002) Project group work done according to approved project strategies/plans (Statsbygg, 2003) New quality plan implemented (Statsbygg, 2003) Correction of faults Management of maintenance reliability (Hinks and McNay, 1999) **2. Quality of the process** Quality of Data Integrity (RPS, 2003) Effective communication (Hinks and McNay, 1999) Development Process Participation Rate (BCBC, 2003) Quality of end product (Hinks and McNay, 1999) Responsiveness of PD to changes/requirements (Hinks and McNay, 1999) Achievement of completion deadlines (Hinks and McNay, 1999) **3. Customer relations** Performance against corporate-wider customer service standards (Kaczmarczyk and Morris, 2002) Contributing to customer success (Kaczmarczyk and Morris, 2002) Customer SLA implementation (BCBC, 2003) Service degree (internal production and services) (Statsbygg, 2003) Range of services offered (Amaratunga and Baldry, 2000) Completion of project to customer satisfaction (Hinks and McNay, 1999) Effectiveness of helpdesk service (Hinks and McNay, 1999)	**1. Accommodation usage** (Hagarty and Wilson, 2002; Kaczmarczyk and Morris, 2002; RPS, 2003) Area leased as percentage of total area (m2) (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 (Lindholm and Gibler, 2005) Number of workstations per employee (Lindholm and Gibler, 2005) Vacancy rates (Hagarty and Wilson, 2002; GSA, 2006; BCBC, 2003; RPS, 2003; Lindholm and Gibler, 2005) **2. Employees housed** (GSA, 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, 2006) Area managed/employee (BCBC, 2003) **3. 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) Equipment provided meets business needs (Hinks and McNay, 1999) Time wasted with interruptions (due to open space layout) **4. CRE unit quality** (Lindholm and Gibler, 2005) Time used in project versus time budgeted for the project Amount of advice given to other business units

Perspectives	Items (Riratanaphong, 2011)	Lindholm and Gibler, 2005	>>>
Productivity	Area managed/employee (BCBC, 2003) Quality of Data Integrity (RPS, 2003) Productivity (%)(Carder, 1995; van der Voordt, 2004) Learning investment per employee (Hagarty and Wilson, 2002; RPS, 2003; Kaczmarczyk and Morris, 2002; BCBC, 2003) Percentage of Employees Indicating a Strong Understanding of How Their Jobs Fit Into Attaining Corporate Objectives (BCBC, 2003) Human Resource Plan Objectives (percentage of employees with learning plans in place, employment equity targets, inflows and outflows) (RPS, 2003) Workforce Profile (total population by employment status) (RPS, 2003) Age distribution (Hagarty and Wilson, 2002; RPS, 2003) Absence (Hagarty and Wilson, 2002; Kaczmarczyk and Morris, 2002; BCBC, 2003; RPS, 2003; van der Voordt, 2004) Sickness levels (Statsbygg, 2003) Staff turnover (Hagarty and Wilson, 2002; Statsbygg, 2003) and New employee retention (Kaczmarczyk and Morris, 2002) Employee motivation/engagement (Kaczmarczyk and Morris, 2002) High level of competence (Kaczmarczyk and Morris, 2002) Working environment (Kaczmarczyk and Morris, 2002) Alternative Workplace Arrangements (GSA, 2006) Employee understanding of alignment with plan (BCBC, 2003) IT solution expectation fulfilment (BCBC, 2003) Implement pre-project plan for new knowledge and best practice database (Statsbygg, 2003) Implement new strategic system (Statsbygg, 2003) Clarification of employees' individual competence requirements (Statsbygg, 2003) Human resource centre's ability to deliver competent employees according to other divisions' needs (Statsbygg, 2003)	**Innovative performance measures found in literature** Productivity Distance employees commute (Duckworth, 1993) **Innovative performance measures found in literature** Strategic involvement CRE involved in corporate strategic planning (Lubieniecki and Desrocher, 2003) CRE integrated with HR strategies (Lubieniecki and Desrocher, 2003) CRE actively involved in firm-wide initiatives such as special asset use, consolidations, or shared services opportunities (Lubieniecki and Desrocher, 2003) **Innovative performance found through interviews** Strategic involvement Communication time with top executives Number of formal and informal meetings with top executives Productivity Employees' opinion on how well the workplace supports their productivity Number of workstations per employee (information workers) Strategy implementation Fulfilment of strategic aims Self-evaluation of how well decisions support strategy	

>>>	Hinks and McNay, 1999	Organisational performance	Building performance
	General Responsiveness to problems Management information Professional approach of premises staff Competence of staff	**1. Productivity** (%)(Carder, 1995; van der Voordt, 2004) **2. Human Resource** Learning investment per employee (Hagarty and Wilson, 2002; RPS, 2003; Kaczmarczyk and Morris, 2002; BCBC, 2003) Absence (Hagarty and Wilson, 2002; Kaczmarczyk and Morris, 2002; BCBC, 2003; RPS, 2003; van der Voordt, 2004) Age distribution (Hagarty and Wilson, 2002; RPS, 2003) Staff turnover (Hagarty and Wilson, 2002; Statsbygg, 2003) Human Resource Plan Objectives (percentage of employees with learning plans in place, employment equity targets, inflows and outflows) (RPS, 2003) Percentage of Employees Indicating a Strong Understanding of How Their Jobs Fit Into Attaining Corporate Objectives (BCBC, 2003) Workforce Profile (total population by employment status) (RPS, 2003) Sickness levels (Statsbygg, 2003) Employee motivation/ engagement (Kaczmarczyk and Morris, 2002) High level of competence (Kaczmarczyk and Morris, 2002) Employee understanding of alignment with plan (BCBC, 2003) Clarification of employees' individual competence requirements (Statsbygg, 2003) Human resource centre's ability to deliver competent employees according to other divisions' needs (Statsbygg, 2003) **3. Strategic involvement /implementation** Communication time with top executives (Lindholm and Gibler, 2005) Number of formal and informal meetings with top executives (Lindholm and Gibler, 2005) IT solution expectation fulfilment (BCBC, 2003) Self evaluation of how well decisions support strategy (Lindholm and Gibler, 2005)	**1. Workplace** Working environment (Kaczmarczyk and Morris, 2002) Alternative Workplace Arrangements (GSA , 2006) Distance employees commute (Duckworth, 1993) **2. Strategic Involvement** CRE involved in corporate strategic planning (Lubieniecki and Desrocher, 2003) CRE integrated with HR strategies (Lubieniecki and Desrocher, 2003) CRE actively involved in firm-wide initiatives such as special asset use, consolidations, or shared services opportunities (Lubieniecki and Desrocher, 2003) **3. Human Resource** Absentee rates by buildings (Massheder and Finch, 1998) Employees' opinion on how well the workplace supports their productivity (Lindholm and Gibler, 2005)

Perspectives	Items (Riratanaphong, 2011)	Lindholm and Gibler, 2005	>>>
Environmental responsibility	Transport-related sustainability effects (Bradley, 2002) Sustainable development objectives (Hagarty and Wilson, 2002) Sustainability (GSA, 2006) Energy use/square meters (Statsbygg). Contaminated sites management (BCBC, 2003) Energy Intensity (BCBC, 2003) Progress Against Sustainable Development Objectives (RPS)	**Innovative performance found through interviews** Corporate social responsibility Energy consumption (conservation) Number of energy audits Amount of garbage	
Cost efficiency	Total occupancy cost related to revenue generation (Bradley, 2002) Total Annual Building Occupancy Charges (BCBC, 2003) Savings Realised From Government Restructuring (BCBC, 2003) Cost: income ratio (Carder, 1995) Administration cost/total income (Statsbygg). Cost of leased vs. owned inventory (Hagarty and Wilson, 2002) Lease costs per square metre (BCBC, 2003) Corporate Operating Margin (BCBC, 2003) Percentage of expenditures with private sector (Hagarty and Wilson, 2002; BCBC, 2003) Vacancy rates (Hagarty and Wilson, 2002; GSA, 2006; BCBC, 2003; RPS, 2003) Maintenance costs (Hagarty and Wilson, 2002; NEN 2748) Annual cost savings to customer (Kaczmarczyk and Morris, 2002) Overhead costs (Kaczmarczyk and Morris, 2002; NEN 2748) Cost of services and resources (cleaning, catering, furnishing, office articles) (NEN 2748) ICT costs (NEN 2748) External facilities costs(external accommodation, layout of home workplace, transport) (NEN 2748) Facility management costs (environment, working conditions, quality) (NEN 2748)	**The most commonly used performance measures found in the literature** Cost Occupancy Cost per square foot (Arthur Andersen, 1993; Nourse 1994; Bon et al., 1994; Massheder and Finch, 1998; Bdeir 2003) Occupancy cost per customer (Bon et al., 1994) Occupancy cost per employee (Arthur Andersen, 1993; Massheder and Finch, 1998; Bdeir, 2003) Occupancy cost per dollar or per unit of revenue (Nourse, 1994) Occupancy cost per seat (Bdeir, 2003) Occupancy cost as a % of total operating expense (Arthur Andersen, 1993; Bdeir, 2003) Occupancy cost as a % of operating revenue by building or business unit (Massheder and Finch, 1998) CRE unit efficiency Cost per CRE employee (Bdeir, 2003) Actual extra occupancy cost versus predicted cost (Massheder and Finch, 1998) Portfolio efficiency Cost of acquisitions versus returns (Massheder and Finch, 1998) Holding costs per year (Massheder and Finch, 1998)	

>>> Hinks and McNay, 1999	Organisational performance	Building performance
Environment Energy performance	**1. Energy performance** (Hinks and McNay, 1999) Energy use/square meters (Statsbygg) Energy Intensity (BCBC, 2003) Energy consumption (conservation) (Lindholm and Gibler, 2005) Number of energy audits (Lindholm and Gibler, 2005) **2. Environmental impacts** Transport-related sustainability effects (Bradley, 2002) Sustainability (GSA, 2006) Progress Against Sustainable Development Objectives (RPS)	**1. Environmental impacts** Contaminated sites management (BCBC, 2003) Energy consumption (conservation) Number of energy audits Amount of garbage
	1. General costs Maintenance costs (Hagarty and Wilson, 2002; NEN 2748) Overhead costs (Kaczmarczyk and Morris, 2002; NEN 2748) Operating costs (Hagarty and Wilson, 2002; Kaczmarczyk and Morris, 2002) Total operating expenditures versus budget (Hinks and Mcnay, 1999; Lubieniecki and D3) O&M costs per square metre (BCBC, 2003) Cost per person (GSA, 2006) Total occupancy cost related to revenue generation (Bradley, 2002) Cost: income ratio (Carder, 1995) Administration cost/total income (Statsbygg). Corporate Operating Margin (BCBC, 2003) Transaction cost/all purchases (Statsbygg) General and Administrative Cost (BCBC, 2003) Energy costs (Hagarty and Wilson, 2002) ICT costs (NEN 2748) IT-cost/employee (Statsbygg) IT-cost/total administration cost (Statsbygg) Capital Reinvestment in Owned Space (RPS, 2003)	**1. Occupancy Cost** Occupancy cost per square foot (Arthur Andersen, 1993; Nourse 1994; Bon et al., 1994; Massheder and Finch, 1998; Bdeir 2003) Occupancy cost per employee (Arthur Andersen, 1993; Massheder and Finch, 1998; Bdeir, 2003) Occupancy cost as a % of total operating expense (Arthur Andersen, 1993; Bdeir, 2003) Occupancy cost as a % of operating revenue by building or business unit (Massheder and Finch, 1998) Occupancy cost per dollar or per unit of revenue (Nourse, 1994) Occupancy cost per seat (Bdeir, 2003) Occupancy cost per customer (Bon et al., 1994) Actual extra occupancy cost versus predicted cost (Massheder and Finch, 1998) Occupancy cost per sales or turnover Occupancy cost per business unit Occupancy cost per square foot Occupancy cost per employee Occupancy cost per seat Building Occupancy Charge (BOC) savings to customers (BCBC, 2003) Lease costs per square metre

Perspectives	Items (Riratanaphong, 2011)	Lindholm and Gibler, 2005	>>>
Cost efficiency	Energy costs (Hagarty and Wilson, 2002) Cost per square foot (owned) (GSA, 2006) Cost per square foot (leased) (GSA, 2006) Cost per person (GSA, 2006) Total project cost in relation to budget, the exceeding of total property management budget and administration budget (Statsbygg) Operating costs (Hagarty and Wilson, 2002; Kaczmarczyk and Morris, 2002) Operation cost/square meters (Statsbygg) Maintenance cost/square meters (Statsbygg) IT-cost/employee (Statsbygg) IT-cost/total administration cost (Statsbygg) Transaction cost/all purchases (Statsbygg) Different costs per square metre, such as energy consumption; operations and maintenance cost; and leasing costs (NPB) O&M costs per square metre (BCBC, 2003) General and Administrative Cost (BCBC, 2003) Capital Reinvestment in Owned Space (RPS, 2003) Building Occupancy Charge (BOC) savings to customers (BCBC, 2003)	**Innovative performance measures found in literature** Total operating expenditures versus budget (Hinks and Mcnay, 1999; Lubieniecki and Desrocher, 2003) **The most commonly used corporate real estate performance measures in studied organisations** Occupancy cost per square foot Occupancy cost per employee Occupancy cost per business unit Occupancy cost per seat Occupancy cost per sales or turnover **Innovative performance found through interviews** Cost Number of moves per year Cost of under utilized space Workplace standards in use Number of service providers	

Table 77
Corporate real estate performance measures/KPIs according to the literature

>>> Hinks and McNay, 1999	Organisational performance	Building performance
		2. Building and FM Costs Total Annual Building Occupancy Charges (BCBC, 2003) Cost of services and resources (cleaning, catering, furnishing, office articles) (NEN 2748) External facilities costs(external accommodation, layout of home workplace, transport) (NEN 2748) Facility management costs (environment, working conditions, quality) (NEN 2748) Cost per square foot (owned/leased) (GSA Real Property Performance Results, 2006) Cost per CRE employee (Bdeir, 2003) Operation cost/square meters (Statsbygg) Maintenance cost/square meters (Statsbygg) Different costs per square metre, such as energy consumption; operations and maintenance cost; and leasing costs (NPB) Cost of leased vs. owned inventory (Hagarty and Wilson, 2002) Total project cost in relation to budget, the exceeding of total property management budget and administration budget (Statsbygg) Number of moves per year Cost of under utilized space Workplace standards in use Cost of acquisitions versus returns (Massheder and Finch, 1998) Holding costs per year (Massheder and Finch, 1998)

Performance measurement of workplace change

A VI Statistical analysis

		Employee Satisfaction			Productivity	Prioritised aspect			National culture					Organisational culture			
		SAT_ORG	SAT_BLD	SAT_QID	PROD	PRI_ORG	PRI_BLD	PRI_QID	PD	UA	IDV	MAS	LTO	CLAN	ADHOC	MARK	HIER
Satisfaction	SAT_ORG	1															
	SAT_BLD	.446	1														
	SAT_QID	.623	.583	1													
Prioritised aspects	PROD	.494	.325	.561	1												
	PRI_ORG	.017	-.040	-.107	-.104	1											
	PRI_BLD	-.071	-.043	-.031	.044	-.278	1										
	PRI_QID	.052	.069	.110	.041	-.516	-.679	1									
National Culture	PD	-.221	-.172	-.164	-.202	-.020	.090	-.068	1								
	UA	-.235	-.196	-.175	-.160	-.044	.250	-.193	-.249	1							
	IDV	.095	.196	.089	.132	.001	.172	-.156	-.183	.086	1						
	MAS	.044	-.007	.016	.008	.109	-.006	-.078	-.285	.047	.020	1					
	LTO	.018	.037	.070	.063	-.087	-.064	.125	.241	-.180	.019	.040	1				
Organisation Culture	CLAN	.181	.071	.159	.062	-.002	-.016	.017	.221	-.302	.047	.072	.139	1			
	ADHOC	-.130	.012	.002	.142	-.062	.095	-.035	-.236	.085	-.095	.149	-.090	-.192	1		
	MARK	.002	-.103	-.107	-.042	.049	-.057	.011	-.304	.334	-.075	-.008	-.200	-.673	.203	1	
	HIER	-.074	.029	-.032	-.115	-.002	.013	-.011	.229	-.090	.091	-.154	.116	-.150	-.701	-.433	1

*p < .01 **p < .001

Figure 84
Correlation analysis (n=235)

This table shows the relationships between groups of variables: 1) national and organisational culture, and 2) employees' responses to workplace change. The statistical analysis using Pearson correlation shows a rather weak relationship between groups of variables.

- Values from the variables national culture and employees' responses to workplace change range from -0.235 to -0.006 (negative correlation), and 0.001 to 0.18 (positive correlation).
- Values from the variables organisational culture and employees' responses to workplace change range from -0.107 to -0.002 (negative correlation) and 0.181 to 0.002 (positive correlation).

These values can be considered as weak correlation. It can be interpreted that there are no significant relationships between national and organisational culture and employees' responses to workplace change.

Items	Abbreviation	Description
Organisational culture	CLAN, ADHOC, HIER, MARK	Clan, Adhocracy, Hierarchy, Market
National culture	PD, UA, IDV, MAS, LTO	Power distance, Uncertainty Avoidance, Individualism, Masculinity, Long term orientation
Employee satisfaction	SAT_ORG	*Employee satisfaction about organisation* (Organisation, Content & complexity of work, Sharing own ideas about working environment, Facilities & facilities management, Facilities for remote working)*
	SAT_BLD	*Employee satisfaction about building* (accessibility of the building, architecture & appearance of the building)*
	SAT_QID	*Employee satisfaction about quality of indoor environment* (Subdivision of the whole building, Number, diversity, and functionality of spaces, Adjacency and locality of the spaces, Openness and transparency of environment, Functionality and comfort workspaces, Interior design appearance and ambiance , Privacy, Opportunities to concentrate, Opportunities to communicate, Archive and storage facilities, ICT and ICT support facilities, Indoor climate, Lighting, Acoustics)*
Perceived productivity support	PROD	Individual productivity, Team productivity, Organisation productivity
Prioritised aspects	PRI_ORG	Organisation aspects employees mark as most important (as one of three most important aspects from 19 aspects) (Organisation, Content & complexity of work, Sharing own ideas about working environment, Facilities & facilities management, Facilities for remote working)*
	PRI_BLD	Building aspects employees mark as most important (as one of three most important aspects from 19 aspects) (accessibility of the building, architecture & appearance of the building)*
	PRI_QID	Quality of indoor environment aspects employees mark as most important (as one of three most important aspects from 19 aspects) (Subdivision of the whole building, Number, diversity, and functionality of spaces, Adjacency and locality of the spaces, Openness and transparency of environment, Functionality and comfort workspaces, Interior design appearance and ambiance , Privacy, Opportunities to concentrate, Opportunities to communicate, Archive and storage facilities, ICT and ICT support facilities, Indoor climate, Lighting, Acoustics)*

*Work environment aspects according to the WODI Light tool

Table 76
Description of abbreviation in the correlation analysis

A VII WODI Light Questionnaire
(CfPB, 2010)

1 Sex:
  1 Male
  2 Female

2 What is your age?
  1 <31 years
  2 31 - 40 years
  3 41 - 50 years
  4 51 - 60 years
  5 > 60 years

3 What is your level of education?
  1 Primary Education
  2 Secondary Education
  3 Vocational Secondary Education
  4 Undergraduate (University Bachelor Level)
  5 Postgraduate (University Master or PhD)
  6 Other

4 How long have you been working for this organization?

5 How many hours per average workweek are you in the office?
  1 Minimum … hour
  2 Maximum … hour
  3 Average … hour

6 What percentage of your time do you spend on the following activities?
  The total number of hours you spend in the office per week is regarded as 100%. Divide your time percentage wise between the various activities so that the total amounts to 100%. Calculate the total number of hours, and thereby also your average activity pattern, by referring to a standard work week.
  1 General desk work
  2 Desk work where you are not to be disturbed
  3 Desk work where interaction with colleagues is necessary / required
  4 Planned meetings / interaction
  5 Unplanned meetings / interaction
  6 Telephone

7 Reading (longer than 30 minutes in one stretch)

8 Document management (archiving, copying, reference work, drawings, etc.)

9 Other

7 What type of places do you use?
Indicate, by using percentages, how much time you spend using the various types of places. The total number of hours spent in the office per week is seen as 100%.

1 1-person workspace
2 Silence workspace
3 2-person workspace
4 Team space
5 Open workspace
6 Half-open workspace
7 Lounge workspace
8 Small meeting space
9 Large meeting space
10 Brainstorm space
11 Open meeting space (small)
12 Open meeting space (large)

8 Select from the list below your three preferred places:
Mark on one of the three most preferred places, and then you can move this place to the right with the arrow that points to the right. If you want to remove a place from the list with preferred places, you can move this place to the left with the arrow that points to the left.

1 1-person workspace
2 Silence workspace
3 2-person workspace
4 Team space
5 Open workspace
6 Half-open workspace
7 Lounge workspace
8 Small meeting space
9 Large meeting space
10 Brainstorm space
11 Open meeting space (small)
12 Open meeting space (large)

The following questions (9 till 29) are to be answered according to a five-point scale from very dissatisfied to very satisfied. Also the option 'not applicable' can be selected.

9   How satisfied are you with this organization?
This includes the way in which guidance is provided, contact with colleagues, agreements regarding the use of the workplace environment, labor agreements, career advancement, provision of information, and freedom in your choice of workplace, work style, and working hours.

10   How satisfied are you with the content and complexity of your work?

11   How satisfied are you with the possibility of sharing your own ideas with regard to the workplace environment?
This includes the extent to, and manner in which the organization responds to your ideas with regard to the workplace concept, the planning and layout of the workplace, agreements regarding the use of the workplace environment, manner of archiving, and ICT

12   How satisfied are you with the accessibility of the office building?
This includes the accessibility by public transport, the accessibility by car and the parking facilities.

13   How satisfied are you with the architecture and 'look' of the building as a whole?
This includes the exterior of the building.

14   How satisfied are you with the subdivision of the whole building?
This includes the orientation of the building, the adjacency of the various spaces and the practical usability of the building.

15   How satisfied are you with the number, diversity and functionality of the spaces?
This includes the place(s) you often use, including the meeting spaces, concentration spaces and spaces for informal meeting and discussion.

16   How satisfied are you with the adjacency and locality of the spaces in your direct work environment?

17   How satisfied are you with the openness and transparency of the workplace environment?

18   How satisfied are you with the functionality and comfort of your own workplace?
This includes the size, comfort and functionality of the furniture, as well as the layout of the workplace itself.

19 How satisfied are you with the ambience and 'look' of the interior? This includes the use of color, choice of materials and the interior design.

20 How satisfied are you with the manner in which the workplace environment facilitates privacy?
Privacy refers to whether or not you can be heard, seen, or disturbed by others, as well as differences based on status, space for personal attributes, freedom to act and appropriate space according to your work requirements, and the possibility to work with confidential documents.

21 How satisfied are you with the possibilities for concentrated working?
Can you perform your work without being unnecessarily distracted?

22 How satisfied are you with the opportunities for communication and social interaction?
Communication refers to the quality, possibility and support of formal and informal meeting with colleagues, managers and external contacts. This also includes accessibility via e-mail and telephone, the manner in which you and your colleagues can be located by others and the sharing of knowledge and experience.

23 How satisfied are you with the archive and storage facilities?
This question refers to both your personal archive, the departmental and the central archive - both in digital and physical format.

24 How satisfied are you with the ICT and ICT related support services?
This includes not only all computers and software, the speed and stability of the network, printers, copiers and fax machines, but also new software and the support/ help desk service for troubleshooting.

25 How satisfied are you with the facilities and the management of the facilities?
This includes reception, mail handling and delivery, helpdesk, cleaning, security and reservation of conference rooms. In addition, this question refers to your satisfaction with the lunch area and the tea/coffee provision and facilities.

26 How satisfied are you with the indoor climate of your own workplace?
Indoor climate refers to temperature, air quality, humidity and the possibility of regulation of the climate..

27 How satisfied are you with the lighting of your own workplace?
Lighting refers to the access of day light, the possibility of regulation of daylight, de lighting and the possibility of regulation if the amount of artificial light.

28 How satisfied are you with the acoustics of your own workplace?
Acoustics refers to the way sounds are spread through the workspace.

29 How satisfied are you with the possibilities of working outside of your own office? This includes the possibility to work at home, en route to the office, or in other (regional) offices.

The following three questions (30 – 32) are to be answered on a five-point scale from completely unsupportive to fully supportive. Also the option 'not applicable' can be selected.

30 To what extent does the workplace environment support your own productivity? The workplace environment can support activities such as deskwork, telephoning, meeting or archiving. It can also contribute to the possibility for communication or concentration, and provide stimulation for performing productive, high quality work. As such, the workplace environment can improve your own productivity, that of your team or even that of the whole organization

31 To what extent does the workplace environment support the productivity of your team as a whole?

32 To what extent does the workplace environment support the productivity of the organization as a whole?

The following questions (33-39) are to be answered by rating it from 1 (lowest) to 10 (highest). Also the option 'not applicable' can be selected.

33 Indicate your overall satisfaction with this organization.

34 Indicate your overall satisfaction with the work and work processes.

35 Indicate your overall satisfaction with the workplace concept.

36 Indicate your overall satisfaction with the facilities.

37 Indicate your overall satisfaction with the extent to which you experience the workplace environment as friendly and enjoyable.

38 Indicate your overall satisfaction with the extent to which the workplace environment supports productivity.

39 Indicate your overall satisfaction with the extent to which the workplace environment supports productivity.

40   Select from the list below the three most important aspects of the workplace environment:

Select one of the three most important aspects, then you can move this aspect to the right with the arrow that points to the right. If you want to remove an aspect from the list with most important aspects, you can move this aspect to the left with the arrow that points to the left.

1   Sharing own ideas with regard to the workplace environment
2   Accessibility of the office building
3   Architecture and 'look' of the building
4   Subdivision of the whole building
5   Number, diversity and functionality of the spaces
6   Adjacency and locality of the spaces in direct work environment
7   Openness and transparency
8   Functionality and comfort of the workplace
9   Ambience and 'look' of the interior
10 Privacy
11 Possibilities for concentrated working
12 Opportunities for communication and social interaction
13 Archive and storage facilities
14 ICT and ICT related support services
15 Service provision and management of the facilities
16 Indoor climate
17 Lighting
18 Acoustics
19 Possibilities of working away from your own office

A VIII Organizational Culture Assessment Instrument (Cameron and Quinn, 2006)

1. Dominant Characteristics		Current	Preferred
A	The organization is a very personal place. It is like an extended family. People seem to share a lot of themselves.		
B	The organization is a very dynamic entrepreneurial place. People are willing to stick their necks out and take risks.		
C	The organization is very results oriented. A major concern is with getting the job done. People are very competitive and achievement oriented.		
D	The organization is a very controlled and structured place. Formal procedures generally govern what people do.		
	Total		

2. Organisational Leadership		Current	Preferred
A	The leadership in the organization is generally considered to exemplify mentoring, facilitating, or nurturing.		
B	The leadership in the organization is generally considered to exemplify entrepreneurship, innovating, or risk taking.		
C	The leadership in the organization is generally considered to exemplify a no-nonsense, aggressive, results-oriented focus.		
D	The leadership in the organization is generally considered to exemplify coordinating, organizing, or smooth-running efficiency.		
	Total		

3. Management of Employees		Current	Preferred
A	The management style in the organization is characterized by teamwork, consensus, and participation.		
B	The management style in the organization is characterized by individual risk-taking, innovation, freedom, and uniqueness.		
C	The management style in the organization is characterized by hard-driving competitiveness, high demands, and achievement.		
D	The management style in the organization is characterized by security of employment, conformity, predictability, and stability in relationships.		
	Total		

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4. Organization Glue	Current	Preferred
A	The glue that holds the organization together is loyalty and mutual trust. Commitment to this organization runs high.		
B	The glue that holds the organization together is commitment to innovation and development. There is an emphasis on being on the cutting edge.		
C	The glue that holds the organization together is the emphasis on achievement and goal accomplishment. Aggressiveness and winning are common themes.		
D	The glue that holds the organization together is formal rules and policies. Maintaining a smooth-running organization is important.		
	Total		

5. Strategic Emphases	Current	Preferred
A	The organization emphasizes human development. High trust, openness, and participation persist.		
B	The organization emphasizes acquiring new resources and creating new challenges. Trying new things and prospecting for opportunities are valued.		
C	The organization emphasizes competitive actions and achievement. Hitting stretch targets and winning in the marketplace are dominant.		
D	The organization emphasizes permanence and stability. Efficiency, control and smooth operations are important.		
	Total		

6. Criteria of Success	Current	Preferred
A	The organization defines success on the basis of the development of human resources, teamwork, employee commitment, and concern for people.		
B	The organization defines success on the basis of having the most unique or newest products. It is a product leader and innovator.		
C	The organization defines success on the basis of winning in the marketplace and outpacing the competition. Competitive market leadership is key.		
D	The organization defines success on the basis of efficiency. Dependable delivery, smooth scheduling and low-cost production are critical.		
	Total		

Organizational Culture Assessment Instrument (Cameron and Quinn, 2006)

List of publications

Riratanaphong, C. 2006. Flexible Workplace: Benefits and Concerns in Facilities Management. Journal of Architectural/Planning Research and Studies, 4(2), 41-52.

Riratanaphong, C. 2009. Innovative Workplace Design: A Case Study of the Faculty of Architecture, Delft University of Technology. Journal of Architectural/Planning Research and Studies, 6(3), 67-86.

Riratanaphong, C. and van der Voordt, Th. 2011. Impact of Workplace Change on Satisfaction and Productivity: a comparative analysis of case studies in Thailand and the Netherlands. Conference paper, European Facility Management Conference. 23-25 May 2011, Vienna, Austria.

Jensen, P.A., van der Voordt, Th., Coenen, C., von Felten, D., Lindholm, A., Balslev Nielsen, S., Riratanaphong, C. and Schmid, M. 2012. In Search for the Added Value of FM: What we know and what we need to learn. Facilities, 30(5/6), 199-217.

Riratanaphong, C., van der Voordt, Th. and Sarasoja, A-L.. 2012. Performance Measurement in The Context of CREM and FM in Jensen, P. A., Van der Voordt, D. J. M., & Coenen, C. 2012. The added value of facilities management: concepts, findings and perspectives. Lyngby Denmark: Polyteknisk Forlag.

Riratanaphong, C. and van der Voordt, Th. 2012. Performance Measurement of Workplace Change: A Comparative Analysis of Data From Thailand, The Netherlands and Finland in Jensen, P. A., Van der Voordt, D. J. M., & Coenen, C. The added value of facilities management: concepts, findings and perspectives. Lyngby Denmark: Polyteknisk Forlag.

Summary

Nowadays, organisations must cope with the pressure of cost reduction and efficiency in order to succeed in a highly competitive business environment. However, drivers to improve social interaction and employee's performance and as such to contribute to organisational goals and objectives make it necessary to be concerned with other performance criteria as well, such as effectiveness, flexibility, employee satisfaction, productivity and creativity. There is a growing need for performance management and performance measurement that not only covers all aspects of an organisation, but which can be applied to various situations in a changing internal and external environment. Performance measurement methods which include an integrated perspective of performance have become essential. In addition, it has been realised that corporate real estate can contribute to organisational performance (Nourse and Roulac, 1993, De Vries et al., 2008, Lindholm, 2008, Den Heijer, 2011, Jensen et al., 2012). For this reason, worldwide organisations started to implement new ways of working in a more open and flexible work environment. Although there are various objectives and drivers of workplace change, the common objectives are to reduce costs and to increase efficiency. The changing organisational and external contexts, such as the increasing demand for talented knowledge workers and changing work patterns, have led to the development of new offices that can promote social networks and interaction among employees. The new workplace does not only aim at achieving cost efficiency, but it should also support employee satisfaction and productivity.

This PhD research focuses on both themes i.e. performance measurement of workplace change. The aim of this research is to provide a conceptual framework that visualises the impact of workplace change on employees' responses to the new work environment and to present guidelines on performance measurement of workplace change in different contexts. Two organisations in Thailand and one organisation in The Netherlands were selected to serve as case studies. The impact of culture was explored as a contextual background.

Research methods
Based on literature review an overview of performance measurement systems and measures has been developed. The list of corporate real estate performance measures has been classified in six categories according to Bradley (2002) and subsequently compared with the findings from the case studies. The six categories include: 1) stakeholder perception, 2) financial health, 3) organisational development, 4) productivity, 5) environmental responsibility and 6) cost efficiency. The impact of workplace change was examined using the work environment diagnosis instrument (WODI) questionnaire which evaluates employees' responses to the changed work environment in three areas: employee satisfaction, perceived productivity support and

prioritised aspects (Maarleveld, et al., 2009). The Organisational Culture Assessment Instrument (OCAI; Cameron and Quinn, 2006) was used to assess organisational culture. National culture was measured by using the Value Survey Module 94 (VSM94; Hofstede, 1997).

Research findings

The conceptual framework that came to the fore from the literature review showed to be useful for both theoretical understanding of performance measurement and practical applications. Proposed performance measures have been applied in all three case studies but in different ways. The three case studies showed that performance measurement of an organisation is multi-dimensional. It includes several performance criteria and performance measures beyond cost efficiency. All seven performance criteria mentioned by Sink and Tuttle (1989) have been applied in all three cases including effectiveness, efficiency, quality, productivity, quality of worklife, innovation and profitability. The four perspectives of the Balanced Scorecard (financial, customer, internal business process, learning & growth) are applied in all three cases as well, with different points of focus regarding their business types. The corporate real estate performance measures found in the case studies and classified in the six categories can be aligned with most of the areas of the added value of CREM in the literature and can also be viewed as value dimensions. In all three cases, the performance measures related to human resource management were focused on the occupiers having been provided with an office environment that enables employees to increase their productivity.

The findings show that organisation and workplace change characteristics have an influence on the satisfaction of employees. The physical characteristics of workplace change that have influenced different degrees of employee satisfaction include location, building grade, architectural design, workplace concept and supporting facilities. The findings also show a negative impact of workplace design on perceived productivity support, due to the miscalculation of the users' needs and preferences during the implementation process. Furthermore staff characteristics, the work process and work patterns showed to have an effect on which work environment aspects employees perceive as being most important.

Regarding the impact of culture, the findings show that the dominant organisational culture types obtained from the organisational culture survey have been influenced by the structure and staff characteristics of the case organisations. The data from the national culture surveys that were conducted in the case studies show large differences in comparison to the findings from the studies by Hofstede (1997). These differences can be explained by the organisational context.

Conclusions

The cross-case analysis led to several conclusions:

- The relevance of corporate real estate performance measures depends on different stakeholders, and different real estate and managerial levels.
- The study confirms that measuring employee satisfaction of the work environment can be used as a means to measure organisational performance.
- The empirical findings confirm the relevance of the variables shown in the conceptual model of workplace change appraisal and the integrated conceptual model that connects organisational characteristics and characteristics of work processes to objective and subjective performance measurement indicators.
- The findings show that information about organisational and national culture is vital for the interpretation of workplace characteristics and the appraisal of change.
- The study shows that neither organisational nor national culture has absolute dominance in the employees' appraisals.
- The findings proved that national culture data from Hofstede cannot be generalised to organisations; on organisational level huge discrepancies were found with employees' between scores on cultural dimensions and national culture indices.

These conceptual frameworks on performance measurement and employees' appraisals of workplace change can be used as a reference to provide input for further improvement of performance measurement and performance management. Many variables such as staff characteristics, work process, cultures and workplace characteristics simultaneously impact the performance measurement of workplace change. The relevance to performance management is that the organisations should be aware of the possible relationships between variables in the integrated conceptual model which could have an impact on performance measurement.

The role of real estate that exceeds an operational asset focusing cost efficiency to also include a strategic resource contributing to other criteria of an organisational performance has been shown in this study. A step-by-step plan for prioritisation of corporate real estate performance measures and KPIs has been introduced as a means to find a balance between the costs of measuring and the benefits of being able to manage corporate real estate efficiently and effectively and as such to contribute to achieving organisational objectives and to supporting the core business and organisational performance.

Methodological reflections

The empirical studies include a combination of both qualitative and quantitative methods. The qualitative data from the case studies which were analysed inductively helped to understand workplace change phenomenon, to clarify the relationships between the variables in the conceptual framework of workplace change, and to answer the research questions formulated at the beginning of the thesis. So far, the quantitative data from questionnaire surveys were used to explore the relationships

between employees' responses to workplace change and organisational and national culture in a qualitative way. The collected data can be used for further exploration of complex relationships by statistical analysis.

Triangulation of data collected from different sources (documents, surveys, interviews) helps to validate the findings through cross verification, i.e. reduce weakness or intrinsic biases from the researcher's background knowledge. The assessment of both tangible (physical characteristics) and intangible components (perceived quality) of the office environment can help to validate the findings from the empirical research.

This research study is an exploration of performance measurement concerning workplace change in different contexts. The conclusion of this study is based on the findings from two Thai cases and one case in the Netherlands. Although there are assumed cause-effect relationships between the variables in the conceptual models, more case studies are needed in order to collect comparable data that support the findings of this kind of research.

Samenvatting

Wereldwijd hebben organisaties te kampen met de druk van kostenreductie en efficiency om succesvol te kunnen zijn in een sterk concurrerende omgeving. Sturen op kosten alleen is echter niet genoeg. Om de prestaties van werknemers te optimaliseren en organisatorische doelen te realiseren zijn ook andere prestatiecriteria relevant, zoals effectiviteit, flexibiliteit, medewerkerstevredenheid, productiviteit en creativiteit. Er is een groeiende behoefte aan een meer geïntegreerde benadering en onderbouwde methoden voor prestatiemanagement en prestatiemeting in een continu veranderende omgeving, intern en extern. De laatste decennia is er tevens een groeiend besef dat ondernemingsvastgoed (corporate real estate) een substantiële bijdrage kan leveren aan het presteren van en organisatie (Nourse en Roulac, 1993, Joroff et al., 1993, Dewulf et al., 2000, Becker, 2004, De Vries et al., 2008, Lindholm, 2008, Haynes, 2008, Den Heijer, 2011, Jensen et al., 2012, Van der Zwart, 2014). Om efficiënter en effectiever gebruik te maken van huisvesting en andere faciliteiten zijn veel organisaties overgegaan op nieuwe manieren van werken in een meer open en flexibele werkomgeving met gedeeld gebruik van een variëteit aan werkplekken, afgestemd op verschillende activiteiten. Naast kostenbesparing beogen nieuwe kantoorconcepten ook bij te dragen aan meer interactie tussen medewerkers, betere kennisuitwisseling, aantrekken en vasthouden van getalenteerde kenniswerkers, medewerkerstevredenheid en een hogere arbeidsproductiviteit.

Dit promotieonderzoek combineert beide thema's. Het onderzoekt meetmethoden om de effecten van veranderingen in de werkomgeving op de prestaties van de betrokken organisatie te kunnen vaststellen. Het doel van dit onderzoek is om een conceptueel kader te ontwikkelen voor de invloeden van organisatiekenmerken, activiteitenpatronen en contextvariabelen op drijfveren voor verandering, implementatie van veranderingen, en de waardering van de medewerkers. Voorts beoogt het onderzoek om inzicht te geven in bestaande meetmethoden en richtlijnen te presenteren voor het meten van organisatieprestaties onder invloed van veranderingen in de werkomgeving, in verschillende contexten.

Onderzoeksmethoden

In aanvulling op een uitgebreide literatuurstudie naar methoden en systemen voor prestatiemeting zijn drie case studies uitgevoerd: twee in Thailand en één in Nederland. De Thaise achtergrond van de auteur en zijn verblijf in Nederland waren aanleiding om de impact van cultuur in het onderzoek mee te nemen als een extra (achtergrond) vraag. Daarom is ook literatuurstudie verricht naar dimensies van nationale cultuur en organisatiecultuur. Op basis van de inventarisatie van meetsystemen en prestatiecriteria uit de literatuur is en groslijst van mogelijke prestatiecriteria opgesteld. De lijst werd erg lang en bleek onvoldoende praktisch bruikbaar. Daarom

is de lijst ingekort door deze te screenen op overlap en te focussen op veel gebruikte prestatiecriteria. Vervolgens zijn de prestatiemaatstaven ingedeeld in zes categorieën volgens de indeling van Bradley (2002): 1) perceptie van belanghebbenden; 2) financiële gezondheid van de organisatie; 3) organisatieontwikkeling; 4) productiviteit; 5) milieu; en 6) kostenefficiëntie. Ten slotte is onderzocht welke prestatiemaatstaven uit de literatuur daadwerkelijk worden toegepast in de praktijk en in welke vorm. De waardering en beleving van de veranderingen op de werkvloer door de medeweerkers is onderzocht met behulp van het werkomgevingsdiagnose-instrument WODI (Maarleveld et al., 2009). De WODI-survey meet de reacties van de medewerkers op drie manieren: tevredenheid over de organisatie, werkprocessen en faciliteiten, gepercipieerde ondersteuning van de arbeidsproductiviteit door de werkomgeving, en de top drie van als meest belangrijk ervaren aspecten. De Organisational Culture Assessment Instrument (OCAI; Cameron en Quinn, 2006) is gebruikt om de organisatiecultuur te beoordelen. De nationale cultuur is gemeten met behulp van de Value Survey Module 94 (VSM94; Hofstede, 1997).

Onderzoeksresultaten

Het conceptuele kader, de conceptuele modellen die op basis hiervan ontwikkeld zijn voor het meten van organisatieprestaties en het in kaart brengen van reacties van medewerkers op veranderingen in de werkomgeving, en een geïntegreerd conceptueel model blijken bruikbaar om de effecten van interventies in de gebouwde omgeving helder te kunnen beschrijven en deels ook te kunnen verklaren. Tegelijkertijd blijkt, zoals verwacht, dat de grote hoeveelheid variabelen het lastig maakt om eenduidige oorzaak-gevolgrelaties te kunnen definiëren. Geen enkel meetsysteem uit de literatuur blijk integraal te worden toegepast in de praktijk, met uitzondering van de Balanced Scorecard. In alle drie de cases worden de prestatie van de organisatie bekeken vanuit de vier perspectieven van de Balanced Scorecard: financieel, de klant, interne bedrijfsprocessen, en het leren en groeiperspectief. Ook worden alle categorieën prestatiecriteria volgens Bradley in alle drie de cases toegepast, zij het met verschillende interpretaties en op verschillende manieren. Dit geldt eveneens voor de zeven door Sink en Tuttle (1989) genoemde prestatiecriteria: effectiviteit, efficiency, kwaliteit, productiviteit, kwaliteit van werk, innovatie en winstgevendheid. De drie case studies laten duidelijk zien dat het meten van prestaties van een organisatie een multidimensionaal verschijnsel is, met een variëteit aan prestatiecriteria en prestatie-indicatoren die verder gaan dan alleen kostenefficiëntie. De prestatiemaatstaven voor het meten van de prestaties van de huisvesting en andere faciliteiten zijn goed te koppelen aan de verschillende typen toegevoegde waarde van ondernemingsvastgoed die in de CREM literatuur worden onderscheiden. In alle drie de cases zijn prestatie-indicatoren met betrekking tot human resource management gericht op het voorzien in een kantooromgeving waar werknemers prettig en productief kunnen werken. Op basis van de bevindingen is een stappenplan ontwikkeld om per organisatie de belangrijkste prestatie-indicatoren te kunnen selecteren in relatie tot de visie, missie en doelstellingen van de desbetreffende organisatie:

1   Inventarisatie van de prestatie-indicatoren die momenteel door de organisatie worden toegepast.
2   Clustering van deze KPIs in twee groepen: prestaties van de organisatie en prestaties van de huisvesting.
3   Classificatie van alle indicatoren en meetmethoden in de zes categorieën van Bradley (2002).
4   Vergelijking van toegepaste en mogelijke prestatie-indicatoren.
5   Reflectie op overeenkomsten tussen toegepaste metingen en mogelijke meetmethoden in samenhang met de visie, missie en doelen van de organisatie.
6   Prioritering van KPIs op basis van de belangrijkste doelstellingen en contextvariabelen zoals de huidige economie en verwachtingen voor de toekomst en het eigen concurrerend vermogen.

Fysieke omgevingskenmerken die van invloed zijn op medewerkerstevredenheid hebben betrekking op de locatie, gebouwindeling, architectonische vormgeving, het werkplekconcept en de ondersteunende faciliteiten. De arbeidsproductiviteit blijkt negatief beïnvloed doordat tijdens het implementatieproces onvoldoende rekening is gehouden met de wensen van de medewerkers. Wat medewerkers als meest belangrijk beschouwen in hun werkomgeving hang zowel af van hun persoonskenmerken als van welke activiteiten zij uitvoeren.

Met betrekking tot de nationale cultuur blijkt dat de scores op de dimensies van Hofstede (1997) in de lokale enquêtes fors afwijken van de uitkomsten uit nationale surveys. Dit valt vooral te verklaren uit het feit dat nationale cultuurkenmerken overruled kunnen worden door lokale subculturen in relatie tot de structuur en cultuur van de organisatie en de organisatorische context.

Conclusies
Uit de cross-case analyse zijn de volgende conclusies te destilleren:
- De relevantie van vastgoedprestaties verschilt voor verschillende belanghebbenden (topmanagers, afdelingsmanagers, medewerkers) en ook op strategisch, tactisch en operationeel niveau.
- Het meten van de tevredenheid van de medewerkers is belangrijk om inzicht te krijgen in de prestaties van de organisatie.
- De empirische bevindingen bevestigen de relevantie van de in de conceptuele modellen opgenomen variabelen en de veronderstelde relaties tussen de variabelen. Dit geldt zowel voor de conceptuele modellen voor prestatiemeting en waardering van ingrepen in de huisvesting door de medewerkers als voor het geïntegreerde model dat relaties legt tussen organisatiekenmerken (inclusief nationale cultuur en organisatiecultuur), werkprocessen, en objectieve en subjectieve meting van prestaties van de organisatie en de huisvesting.
- De bevindingen tonen aan dat informatie over de organisatorische en nationale cultuur bijdraagt aan het begrijpen van de drijfveren tot verandering, kenmerken

van de huisvesting en waardering van de huisvesting. Tegelijkertijd blijkt de invloed van de nationale cultuur en de organisatiecultuur minder dominant dan vooraf verwacht en zijn het vooral bedrijfsmatige overwegingen en het optimaal willen faciliteren van de werkprocessen die leiden tot ingrepen in de huisvesting.

• Kenmerken van de nationale cultuur gemeten aan de hand van de dimensies van Hofstede (1997) kunnen niet worden gegeneraliseerd naar organisaties. Er zijn forse verschillen gevonden tussen de scores op organisatieniveau en de resultaten uit nationale surveys.

De conceptuele kaders voor prestatiemeting en medewerkerstevredenheid over ingrepen in de werkomgeving kunnen worden gebruikt voor verder bewustwording van relaties tussen ingrepen en effecten en mogelijkheden tot verbetering van prestatiemeting en performance management. Daarmee kan de studie bijdragen aan het inzetten van huisvesting als een strategisch asset en het vinden van een goed balans tussen sturen op kosten en baten c.q. het ondersteunen van de core business, op kostenefficiency en optimaal presteren van de organisatie.

Methodologische reflectie

Voor de empirische studies is gebruik gemaakt van triangulatie door een combinatie van kwalitatieve en kwantitatieve onderzoeksmethoden toe te passen in de vorm van literatuurstudie en case studies aan de hand van observaties op locatie, documentanalyse en enquêtes. De kwalitatieve gegevens uit de case studies zijn deels deductief geanalyseerd met gebruik van de conceptuele modellen uit de literatuurstudie en deels inductief geïnterpreteerd om een zo helder mogelijk antwoord te vinden op de onderzoeksvragen.

Vooralsnog zijn de kwantitatieve gegevens uit enquêtes vooral gebruikt om de verschillen tussen de cases te kunnen duiden. Vervolgonderzoek met behulp van kwantitatieve multivariate statistische analyses kunnen voor een verdere verdieping van de inzichten zorgen in de complexe relaties tussen de grote hoeveelheid variabelen. Om beter te kunnen begrijpen waarom de tevredenheidspercentages in de drie onderzochte cases afwijken van de gemiddelde percentages over een groot aantal Nederlandse cases die onderzocht zijn door het Delftse Center for People and Buildings is meer kennis nodig van de feitelijke omgevingskenmerken van deze cases. Vervolgonderzoek zou zich zowel moeten richten op ene uitbreiding van het aantal cases als op een verdieping van de interpretatie van de gegevens en verdere exploratie van verbanden tussen fysieke ingrepen en de effecten hiervan op de organisatie en de medewerkers.

Performance measurement of workplace change

Curriculum Vitae

Chaiwat Riratanaphong graduated as an architect from King Mongkut's Institute of Technology Ladkrabang, Thailand in 1997. From 1998 to 2002 he received his Master of Science degrees in Facilities Management at Heriot-Watt University Edinburgh and Building Sciences at Rensselaer Polytechnic Institute New York.

From 2002 to 2005 he worked as an architect at various architecture firms in Bangkok. As an architect, he held different positions, from project coordinator to architect and researcher. In 2005, he joined the Faculty of Architecture and Planning at Thammasat University in Thailand to start his academic career. He currently holds a position as a faculty member in the Real Estate Development division at the same university.

While conducting research for his PhD study, he joined the EuroFM research group and participated in several activities, such as being one of the speakers at the European Facilities Management Conference 2011 in Vienna and writing several scientific journal articles and conference papers. He also contributed to the book chapters "The Added Value of Facilities Management: concepts, findings and perspectives" published by Polyteknisk Forlag in 2012. His contribution as a co-author of the article "In search for the added value of FM: what we know and what we need to learn" was published in the journal 'Facilities' and was chosen as a Highly Commended Award Winner at the Emerald Literati Network Awards for Excellence 2013.