



# Towards evidence-based reasoning in Facilities Management – The Language Game of 4D Thinking

***Wim Pullen, Centre for People and Buildings, Delft, the Netherlands***

Presented at Ideaction 2005

19 May 2005

---

## **ABSTRACT**

*Facilities Management has been and will be a practical profession. Experience plays a major role in the life of the Facility Manager (FM). However, I believe that – as in medicine – the FM will need to move forward and develop the practice of evidence-based reasoning. Interventions in the physical assets – as suggested by the FM - will have consequences including all sorts of risks. The theme of Ideaction2005- 4D Thinking- allows us to play a language game: are 4 dimensions enough to cover the road towards evidence-based reasoning? Attention will be paid to Define, problem framing, Decide, consensus or not, Data, always welcome, Diagnose, what's the matter and finally where the action will lead us: Design, or creating options of possible futures: workable solutions.*

## **1. DAILY PRACTICE OF THE FACILITY MANAGER**

The life of a Facility Manager is no fairy tale even though the figure 1001 applies to his day-to-day activities. If the well-known management author Michael Porter says that strategy is not the same as operational excellence (Porter 1996), then he should talk to a Facility Manager to acquire a deeper insight into the concept of strategy. Excelling in operational processes is, in fact, a fundamental aspect in the life of the Facility Manager: ensuring that people can start work in the morning, that a building is protected and that everything is tidy. In particular, a manager must have a trained eye for what people want if he is to excel in facilities management. He must ensure that employees need not worry about being unable to carry out their work properly: he has to 'de-worry' them. And the sector in which he works is irrelevant. This assignment is applicable everywhere – in healthcare, education, hotels, airports and offices. Facilities management is an experience-based profession since if you lack experience, you will not be able to keep up with all of the tasks that you have to carry out.

But the Facility Manager is not only occupied with 999 operational tasks. In more abstract terms, there are two primary tasks that make up the aforementioned total of 1001. The first primary task entails ensuring that the building performs as such and that the services in question are provided, employees can perform, pupils can learn and patients can receive appropriate care.

These tasks tie in well with the first association I had when reading the theme of Ideaction 2005, namely 4D Thinking. After all, ‘what does 4D refer to?’ Is it simply about three-dimensional structures (buildings) in which three-dimensional objects (people) work? Does the fourth D then stand for the dimension of time? If so, is Ideaction 2005 just about buildings that accommodate organisations and people over the course of time?

The second primary task of the Facility Manager is to add value. Given that this is such a vague term, this article will focus on it. The following questions are not always posed: what type of value is involved, what is this value added to, for whom is it intended and what can be used to achieve it? To achieve value, the Facility Manager often has to fall back on his experience (experience-based reasoning) during daily practice. Added value will have to be based on knowledge more and more. Years of experience will no longer satisfy many principals and customers. People demand expertise.

In short:

Much of the work of the Facility Manager is one-dimensional: resolving problems. Success is also measured in one dimension: the satisfied customer. Solutions occur in or around a building (3D). The building must be able to withstand the ravages of time (4D).

The theme of Ideaction 2005 4D Thinking invites us to play language games varying from the development of a simple mnemonic aid to slightly more serious reflections. Both will be discussed in this article and will result in a new method of reasoning: from experience-based to evidence-based. I will examine the motives and the experience that we have acquired in the Netherlands to realise a scientifically based development direction for Facilities Management. I enjoy playing along with the language game and will opt for 5D Thinking.

## **2. THE ADDED VALUE OF FACILITIES MANAGEMENT: A LANGUAGE GAME OR HOW TO READ THIS ARTICLE?**

As mentioned earlier, I wish to focus on the task of the Facility Manager to add value. Countless opinions on this topic appear in professional and scientific literature, but the most important question we must ask ourselves is why do we talk about providing added value? And is the provision of value 'alone' sufficient?

Organisations are associations of people that work together and act for the sake of organisational goals. As long as people perceive their actions and the organisational goals to be of value, they will strive to ensure the existence of the organisation (van Diest, 1997). Individuals within an organisation are usually unaware that they are constantly evaluating the meaning or value of their work. The moment people become employees in a specific position, they start working on mission statements, visions and value chains. In this way the legitimacy of existence or actions become open to discussion. Thus people are making decisions that provide something to hold on to e.g. practical catalogues of why's and to do's. The article will also look at how the negative sides of decisions that have been taken do not have to lead to objections or undesired developments (Giddens, 1992). I will touch upon undesirable developments and risks shortly. Academics can also be pragmatic about added value. In a process of permanent reflection, academics are searching for generically applicable rules, principles or methods that can be valuable in various contexts, without reverting to slogans or clichés.

In literature on Facilities Management, added value is discussed in completely different ways.

Defining lists with statements are made about functions of Facilities Management (Grimshaw, 2003):

“Statements and language become important pointers to our relationship with physical space. In this spirit FM could be characterized (and defended) by any or all of the following five statements:

- (1) FM is a technical function concerned with maintaining the practical utility of the physical infrastructure to ensure it supports the core activity of an organisation (operational maintenance).
- (2) FM is an economic function concerned with ensuring the efficient use of physical resources function concerned with the forward planning of physical infrastructure resources to support organisational development and reduce risk (change management).
- (3) FM is a social function concerned with ensuring the physical infrastructure of work meets the legitimate needs of users within their organisational role (user interfacing).
- (4) FM is a service function concerned with the provision of non-core support services (support service).
- (5) FM is a professional function with social responsibility for people in the workplace (advocacy)."

In literature on Corporate Real Estate (Krumm, 1999), added value is divided into two groups of focal areas that are a mishmash of motives, conditions and activities.

**resource sharing:** focuses on the use and management of buildings, land and services. This also includes ‘economies of scale in acquisition of products and services, alignment in use and management of real estate and real estate services and the provision of high-quality services at competitive prices’.

**capabilities transfer:** focuses on the availability of information and expertise within the corporation. This includes ‘knowledge of business and management processes, collection of scarce expertise, risk sharing, confidentiality of information, formal and informal networks, speed of actions and transactions and strategy formulation, anticipation and innovation’.

Each of these lists appears to function as a practical catalogue for the Facility Manager to make himself aware of focal areas in which he is expected to perform. Or it puts forward a theme that he will use in his work since this is what his view of his profession entails.

Literature also contains critical views on the Added Value of Facilities Management. A Facility Manager who talks in slogans without that much knowledge about the foundations cannot expect a lot of sympathy (Cairns 2003). With regard to theory, language and applicability, he states:

“much of what is currently held forth as theory in the field of FM is little more than slogans, sound bytes that have little or no empirical or theoretical foundation to justify their transfer into knowledge. Ideas such as homeworking, teleworking, hot-desking, outsourcing are presented as universal panaceas for organizational problems. That they may prove effective, or have done so at some point in organizations in which they were developed, is not contested. I do not argue that some or all of these ideas are not good, and could not be turned, in part at least, into generalized models. But, that they are transferable into other contexts, to different organizations with different people, different

problems, without critical appraisal of their applicability in these other contexts is contested.”

The extent to which added value is realised is put into perspective by Price (Price, 2004):

“On the one hand, FM can claim a longer history and greater global spread than most emergent fashions. On the other hand, despite many claims concerning added value, reduced risk and multiple futures the subject remains rooted to an operational and cost focussed stance unable to enunciate its contribution to “the core business”. Indeed, the language of “core” and “non-core”, into which FM so easily falls arguably serves to subtly reinforce a perception of unimportance”.

He also adds:

“Without that engagement (with human dynamics of the organisation) and without the frameworks and evidence to demonstrate the contribution, FM is condemned to operate in the commodity box, seen as mere support rather than as a true enabler of business”.

These critical voices also reveal that motives are involved that reflect values: the value of knowledge and contextual knowledge (Cairns) or the appreciation of own performance (Price). Both are required in order to make a significant contribution to the existence of organisations.

On the face of it, a type of philosophical language game appears to be involved. In this language game about added value, the biggest bluffer may win just like that. The following question that therefore arises is “what must be done to face the future with more than just an opportunistic attitude, with the possibility of a permanent contribution instead of occasional success?” Price offers an indication in his statements quoted above: it is about engagement, frameworks and evidence.

The Center for People and Buildings (CfPB) has accepted the outlined challenge to tackle the considerable lack of empirical evidence on the influence of the work environment in and on employees and the organisation. We have taken the path towards evidence-based reasoning, which is why this topic is the focal point of this article.

### **3. THE LANGUAGE GAME AND THE CONTEXT OF THE FACILITY MANAGER: QUESTIONS AND CHALLENGES**

#### **Context: ambiguity and knowledge**

The Facility Manager has to continue doing a lot and has to do more explaining. If he only “does”, he confirms his role as the executor of operational support processes that merely cost money and produce vague results as a contribution to company outcomes. If the Facility Manager only provides explanations, his colleagues will view him as someone who insists on contributing to the formulation of a corporate strategy. Both ways of behaving will give rise to an ambivalent attitude towards Facilities Management like ‘of what use are they to you, they play a minor operational role’ or ‘they insist on doing so’ as opposite to thinking. I define an ambivalent attitude as “simultaneous and contradictory attitudes or feelings (as attraction and repulsion) toward an object, person, or action, leading to uncertainty as to which approach to follow”.

This outline – a caricature of course – does reveal, however, that the evaluation of the FM discipline also involves ambiguity, a state of being understood in two or more possible senses or ways. Ambiguity as opposed to uncertainty. Uncertainty entails a lack of information – you do not know everything. You will have to collect information for that purpose. Ambiguity involves a lack of meaning. The people involved do not know how they must interpret things. The meaning is in the heads of people (Noordegraaf , 2004). If a Facility Manager presents various workplace options for a flexible workplace strategy, there will still be employees who reduce the variations to a picture of doom featuring the open-plan office (Bürolandschaft) of the 1970s.

### **How can the Facility Manager deal with this paradoxical situation?**

He has to answer the following three questions and organise the implementation in practice accordingly:

- when does it work better? (increase in labour productivity);
- when does it work more pleasantly? (job satisfaction);
- when does it work more economically? (reduction in overall costs).

He has to better comprehend the underlying mechanisms: how do you know it is working better, what is the reason for this and what can I do to ensure it works even better? At the same time, he has to account for related expenditure. After all, some people regard the Facilities Management department as a spending department (cost centre).

More than ever, the Facility Manager will need to develop teaching strategies. He can combine the need for accountability with his urge to develop. Engagement is present, now knowledge is required.

### **The Three Futures**

While answering the three questions, the Facility Manager is still busy contemplating the future. At Delft University of Technology, Prof. Taeke de Jong (de Jong 2004) developed a useful version of the language game facing the challenges of the future, but which one?

- The probable future?
- The possible future?
- The desirable future?

#### **The probable future**

There are more and less probable futures. In any of the probable futures the element of chance is included. Anything probable is per definition possible, but not everything possible is also probable. The probable future could be predicted which is supported by evidence strong enough to establish presumption but not proof; likely to be or become true or real.

#### **The possible future**

There are a lot of possible futures that are within the limits of ability of thinking, capacity of imagination, or realisation. Facility Managers who occupy themselves with this theme often use scenario methods to chart possible futures. Within the profession of Facilities Management, we are familiar with studies on the office of the future or the future competencies of the Facilities Manager.

#### **Desirable futures**

Desirable futures are described in policy plans; sometimes we can discern obvious futures and impossible futures. Obvious are those futures that are also probable. Sometimes managers are striving after impossible futures.

The combination contains two interesting areas:

1. Possible and desirable futures, for which the probability distribution of the consequences (goals) is unknown.
2. The possible and probable but undesirable futures (problems).

**Example 1: Possible and desirable but uncertain futures**

In many organisations, facility services are subcontracted with conviction and with the aim of improving efficiency. Within countless organisations, the FM function has shifted to the purchase of services (contract managers). Services are provided by a number of contracted partners (service providers). And then there are those that profit from the services (end users). Constant discussion with end users (strategic alignment) is required in order to provide suitable services. Knowledge about the required workplace will have to be translated into new service contracts. Two problems may arise in practice. Firstly, more and more long-term contracts are being concluded (up to thirty years), often under the regime of public private partnerships.

No one knows what the future holds in store and the implications for service contracts. The element of time yields uncertainty. The second problem concerns the number of contract partners. As service contracts increase in number, contract partners will have to manage more content-related relationships. What will happen if the contract manager is no longer present? Will providers then have all the required knowledge on hand and won't some of the important added values of the FM function such as organisational knowledge and confidentiality disappear as a result? Much has been written about service organisations, but empirical data on managing uncertainties is also lacking in this field (Tuomela, 2003).

**Example 2: Possible and probable but undesirable futures**

Over the past few years organisations have been shocked by attacks on buildings in which they are housed (Oklahoma bombing, Twin Towers). The threat of terrorism is the dormant but also more commonly evident consequence of radicalised modernisation. Such a threat, for which we have no overview of the "what, when and the effects", is referred to as a risk. This category also includes natural risks such as hurricanes, earthquakes and flooding. Undesirable futures can also be formulated for three organisational domains: customer care, business (corporate, commercial, legal and financial) and facilities (employee health, satisfaction and the work environment). Underlying relationships are relevant.

A Facility Manager who takes his work seriously and wishes to develop himself and his occupation at the same time can benefit from the language game of the various futures. The systematic exploration of possible futures and related risks is an important competence that has to be developed. Experience in the resolution of issues no longer suffices. The aforementioned examples show that sometimes no knowledge is available to face desirable but uncertain futures or that experience is lacking in domain of facilities management to deal with problems. Many Facility Managers can testify on the basis of everyday practice that there are numerous Human Resource Managers who believe that accommodation has nothing to do with the HR profession anyway! Coordination between the various support functions in the organisation is difficult but necessary.

In that case, should we simply do nothing? Or only take precautionary measures to avoid being affected by a risk? With regard to this problem, the Danish theologian Kierkegaard once said that life must be lived forwards, but can only be understood backwards. For accommodation professionals in practice, it is customary for them to tell one another stories, which are usually referred to as 'best practices'. However, it is a well-known human trait to keep quiet about negative aspects – the 'bad practices' – out of shame and due to the potential disgrace. Some managers are not even able to disclose them any longer - they have been marked out as scapegoats and subsequently were asked to leave the company.

#### **4. TOWARDS EVIDENCE-BASED REASONING**

Every Facility Manager lives with the knowledge that the power supply can fail, something can go wrong in the company restaurant while food is being prepared, the window-cleaner can tumble from a ladder, employees can fall ill because of the indoor climate and a workplace shortage can suddenly occur. We prefer to work in an environment in which we do not become sick, where minimal effort can produce good results, and in particular where damage and shame do not occur. Evidence-based reasoning is developing strongly in areas where we wish to avoid risks as much as possible, namely health and safety. What can be learnt?

##### **Two examples: Intelligence and Medicine**

###### **Intelligence**

Information and intelligence services study methods for assessing the value of data in an effort to limit damage to national interests where possible. The CIA republished a classic book entitled *The Psychology of Intelligence Analysis* that contains the following statement from the author (Heuer, 1999): "Major intelligence failures are usually caused by failure of analysis, not failure of collection". The reasoning process of data analysts is crucial. They have to think about how they form their judgement, not only about the judgement itself. Hence the development of reasoning protocols on the basis of rules of logic. These rules are not based on statements but on various situations and indicators that support or justify the statements in a particular situation. Intelligence analysis entails the systematic assessment of data (factual sources and indicators) for different situations (Devlin, 2003).

###### **Medicine**

Medical science defines evidence-based medicine as:

"The process of systematically finding, appraising and using contemporaneous research findings as the basis for clinical decisions" (Jenicek 2003).

The concept dates back to the 1980s when the focus within health care shifted from trust, conviction and authority to best available research and practice. A classification exists relating to the interpretation of evidence that varies, in a number of steps, from controlled analytical studies to expert judgements. Evidence is defined as 'any data or information used to identify health problems, to assess its magnitude, to explain it and to make decisions about its solution.'

Both security and healthcare-related issues involve an approach that focuses on taking risks seriously, assessing the consequences and developing strategies aimed at avoiding problems or responding in an adequate manner. During the preparation of decisions in the FM field, discussions are held in which opinions and examples, incomplete information and decrees are bandied about, irrespective of whether they are relevant or not. Is this conducive to the development of the profession, does it help the end user to assess the value of facilities and use them in a conscious manner? Not

at all. As Price observed earlier, the FM profession must take itself seriously. I share this opinion and believe that instead of engaging in positional play, the Facility Manager should intervene in every relevant dialogue in a knowledgeable manner. Evidence-based reasoning could be a step in the right direction. However, a number of drawbacks are attached to the use of the term 'evidence'. When is something evidence? On what information is it based, what are the methods of reasoning and which normative points of departure (which are often concealed) such as management vision and perception of people do we use? Whichever way we look at it, an approach along the lines of 'evidence based' is geared towards spelling out the context and intention in the dialogue between the Facility Manager and his principals, clients and contractors (Upshur, 2003).

### **Evidence-based Facility Management: definition and steps**

I wish to define Evidence-Based Facility Management (EBFM) as<sup>1</sup>:

"The process of systematically finding, appraising and using contemporaneous research findings as the basis for FM decisions".

Here are some steps of its practice (as derived from Jenicek, 2003):

- Formulation of a clear question
- Searching the literature for relevant articles, exploring sources of information
- Critical appraisal of the evidence
- Selection of the best evidence
- Linking evidence with practical FM experience, end users' values and preferences
- Implementation of findings in FM practice
- Evaluation of the implementation and overall performance of the EBFM practitioner
- Teaching others how to practise EBFM

### **EBFM is 5D thinking**

The knowledge centre 'Center for People and Buildings' (CfPB) was established in the Netherlands in order to escape the fact that many (unilaterally positive) stories are told but few facts and data are available for Facilities Management. The CfPB has formulated five focal areas for evidence-based reasoning. The language game takes the form of a mnemonic aid: EBFM is 5D thinking.

*The five Ds stand for:* Define, problem framing, Data, always welcome but not enough, Diagnose the context, using frameworks, Decide, consensus or not, and finally where the action will lead us: Design, or creating valuable and workable solutions.

I will elaborate on these five themes, but would first like to inform the reader about the context in which our way of thinking and acting in the Netherlands has developed.

### **The Context of our thinking: what is the Center for People and Buildings?**

The Center for People and Buildings (CfPB) is a knowledge centre that focuses on the relationship between people, work and the workplaces. The aim of the centre is to promote research, product development and the transfer of knowledge in this field. The CfPB also encourages multidisciplinary cooperation between the chairs of various universities and professional practice insofar as this concerns the relationship between people, work and workplaces. The CfPB was established in 2001 by the Dutch Government Buildings Agency (Rijksgebouwendienst), the Delft University of Technology and the bank ABN AMRO. There appears to be a great need for knowledge that is compiled in an independent and objective manner and that can be

---

<sup>1</sup> I happily use the definitions for evidence-based medicine as developed by Jenicek, Rosenberg, Donald, Sacket (Jenicek 2003).

presented without any intervention by consultants. The CfPB currently also receives support from the Dutch tax authority and a large number of public and private organisations inside and outside the Netherlands. The knowledge centre works for and with companies and institutions intent on managing real estate, an operating asset, in a serious manner, but that are not actively involved in this field.

### **Core activities**

The aforementioned aims are achieved via three core activities.

Identifying relevant needs for scientific research and education.

Initiating, supervising and carrying out fundamental and applied scientific research and development (or allowing it to be carried out). Preferably, this should result in knowledge and instruments that can be applied in practice, where possible.

Transferring the acquired knowledge via publications, lectures and presentations, working conferences and instruments that can be applied in practice.

### **Roles**

The CfPB can fulfil various roles. It acts as an initiator or intermediary in particular in order to ascertain the need for knowledge. With regard to the creation of knowledge, the centre acts as a producer but can also assume the role of director if research projects are outsourced. To share the acquired knowledge, CfPB personnel act primarily as speakers, but also supervise workshops and publish research results. The CfPB is also involved in diverse accommodation projects and occasionally acts as a coach or as a party that also participates in the thinking process.

### **Research results**

The results of the research that is carried out are made available to the public and can be used for scientific purposes and publications, anonymously if required. Details provided in written surveys cannot be traced back to individuals, which guarantees the anonymity of respondents.

### **Define, problem framing**

We know from textbooks that problems are often ill-defined. If the Facility Manager does likewise, he can also be called to account for providing poor solutions. What can we learn from theory and from practice?

Three important aims for office accommodation can be distinguished in theory (Frankema, 2003):

- *Economic aim* - geared towards the optimal use and allocation of production factors (people and resources) with the greatest yield possible;
- *Social aim* - geared towards increasing job satisfaction or, more generally, enhancing well-being on the workfloor, and;
- *Consumer aim* - geared towards displaying and ‘consuming’ an exemplary function.

These theoretical concepts appear very different in practice, where directors, CEOs or other managers formulate aims. The CfPB (van de Voordt, 2003, Pullen, 2004) has observed that the following aims for new forms of business accommodation occur repeatedly:

- Better performance/greater labour productivity
- Better communication and cooperation
- Supporting and guiding change processes
- Greater pleasure in work/more job satisfaction
- Managing space and resources more efficiently
- Greater flexibility in use/ sustainable
- Image enhancement, internal and external

- Serving as an example
- Acquiring experience with new concepts
- Counteracting removal motives

In many cases we notice that aims are vague in terms of content and are often linked to a Christmas tree of organisational developments. In the worst case, they have not been formulated at all. Ambiguous aims, which fail to describe the appraisal standards for ascertaining what actually has to be achieved, give rise to a situation dominated by “something for everyone”. This does not help the Facility Manager to communicate and legitimise an accommodation-related intervention throughout the entire organisation – unless an expiry period is attached to the aims. They initiate a process, and are more likely motives (reasons to move). In this sense, aims represent management views that are often hidden. In the cases we studied, legitimising an accommodation-related intervention relates more to the nature of an office concept and less to management's justification of the choice for types of flexible working. It appears that the aims for workplace innovation projects rarely originate from a clear definition of a problem. It can be beneficial to formulate the aim by answering this question first: for which problem is an innovative workplace concept the solution? Considering aims and conditions in full helps to generate an image of any dependencies: elements, characteristics and their underlying relationships. New software is available for carrying out a problem, organisation or accommodation analysis on the basis of these three dependencies, resulting in an intrinsically consistent program of requirements (van Meel, 2004).

### **Data, always welcome but never enough**

Numerous experts and scholars repeat one another: ‘minimal data is available’. Indeed, the knowledge domain of facilities does not feature that many (developing) data collections on workplaces that can be consulted systematically. I can, however, name a few positive exceptions:

The ABSIC consortium is supporting Carnegie Mellon University's Building Investment Decision Support tool (BIDS) that uses international case studies and lifecycle calculations to reveal the critical importance of multidisciplinary decision making to ensure high performing buildings for improved productivity and health (Loftness, 2005).

### **Probe studies**

Probe (Post-Occupancy Review of Buildings and their Engineering) was a research project in the UK which ran from 1995-2002 under the Partners in Innovation scheme. It was carried out by Energy for Sustainable Development, William Bordass Associates,

### **Building Use Studies and Target Energy Services**

The Usable Buildings Trust (UBT) is a charity dedicated to achieving buildings with better all-round performance through the effective routine use of feedback at all stages in the lifecycle ([www.usablebuildings.co.uk](http://www.usablebuildings.co.uk)).

Numerous evaluation methods are also available that have been used now and again. Requirements can be set regarding the practicability of data for well-founded forms of benchmarking and multivariate cross-case analysis. EBFM revolves around reliability, validity. If no data is present, then we will have to go after it ourselves. The ambition of CfPB is to create a collection of international data sets in due course. This data will come from case studies defined, compiled and saved in a clear manner. The acquisition of this data must also yield something for those who provide it, which is why we have developed the infrastructure discussed below.

**Diagnosis of the context, using frameworks**

In order to diagnose what is wrong in a work environment, we need access to data as well as a framework in which we can place it. This will enable us to formulate meaningful conclusions and hold discussions with managers and personnel so that these conclusions can be translated into practice. The Work Environment Diagnostic Infrastructure (WEDI) was developed during a two-year project entitled Public Administration and Work Environment. For a detailed description of the evaluation methods, please refer to Volker and van der Voordt (2005).

This project arose because Facility Managers in the Dutch government could not turn to systematically compiled data during consultations with their end users, HRM and IT colleagues. Moreover, views on specific workplace solutions could not be checked with existing data collections or other well-founded standards. With due observance of the trend to introduce workplace solutions involving the flexible use of space, the Center for People and Buildings initiated the development of a work environment diagnostic infrastructure (WEDI), which focuses on a broad, deep and more rigorous scientific measurement of the workplace environment. The term 'diagnostic' is used to distinguish an extensive evaluation from an 'indicative' or 'investigative' post occupancy evaluation (Preiser, Rabinowitz and White, 1988). The term 'infrastructure' comprises:

- an instrument for data collection and analysis;
- a database for the collection of evaluation data from a growing number of projects;
- a network of partners that uses the set of instruments in accordance with a licensing agreement, submits data to the database and receives knowledge in turn that is acquired by analysing projects from the database.

The instrument has been designed for the collection of data in order to support organisation-based accommodation i.e. an optimal fit between housing, IT and other facilities, changes in the organisation and new methods of working in the interests of maximum organisational effectiveness. The data from the diagnosis may be used at three policy levels: strategic, by way of substantiation for accommodation policy and policy changes; tactical, by way of substantiation for interventions consistent with the strategic plan; and operational, in the form of concrete interventions in the daily use and management of the work environment. This makes the instrument relevant for various actors: the board of directors, management, staff, the works council and support services such as FM, IT and HRM.

The instrument has a modular structure (refer to figure 1)

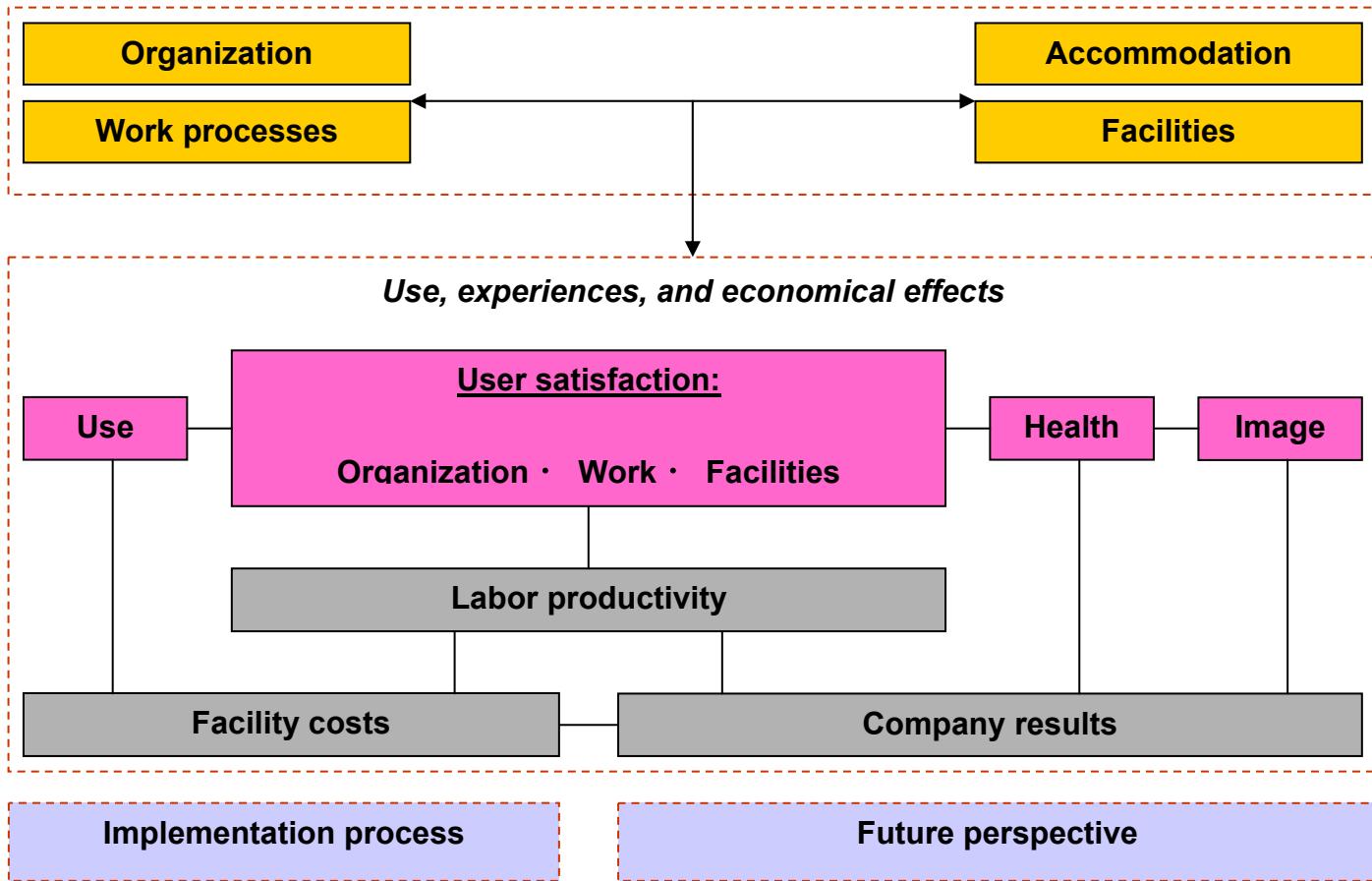


Figure 1 Modular structure of the Workplace Environment Diagnosis Instrument  
(source: Volker van der Voordt, 2005)

Three introductory modules guide the user in choosing the scope of the evaluations, the objectives, research methods and prerequisites with respect to time and money, leading to an evaluation study that suits the conditions of the organisation. The point of departure of the evaluation is the preliminary objectives set for the work environment, e.g. "better communication and collaboration", "improving labour productivity", "easier attraction and retention of employees and clients", or "reduction of the facility costs". The next three modules collect data on the new and old situation with respect to the organisation, working processes, and facilities, in order to assess the suitability of the accommodation for the organisation and its working processes. Six modules have been set up in order to measure the way in which the work environment is experienced and actually used. In addition there are three modules for measuring economic effects: labour productivity, the operating results and the facility costs and two modules for measuring the future value, i.e. future developments and flexibility. The final module deals with the implementation process. A process evaluation is important for determining the extent to which the use and experience of the accommodation have been influenced by the method of implementation. Each module consists of instructions for use accompanied by a little theory, a brief discussion of the relevance, a description of possible measurement methods and questionnaires for oral and written interviews.

The first results will be discussed below.

### **Decide, consensus or not**

Decision-making is definitely not a transparent process. Once a project has finished, try to use the minutes from meetings to deduce how the decisions that were taken were formulated. Check what the perceptions of personnel exactly entail. You will be surprised to discover how limited the methods that many of us learned at school or university really are when applied. Roughly speaking, the famous 'garbage can' decision-making process is involved. This is a model in which decision-making is presented as a haphazard and coincidental connection of decision streams that exist independently of each other (Cohen et al, 1972).

Our research project entitled 'The Integrated Workplace Roadmap' (Guiza et al, 2003), which is focussing on decision-making processes, has revealed that a number of lessons can be formulated:

- The need to properly formulate and keep on formulating roles and responsibilities in a professional accommodation team. In the cases we studied, problems arose on a regular basis that could have been prevented if roles and responsibilities had been discussed frequently.
- The need to calibrate information in order to adapt points of departure (e.g. the number of people to be accommodated) to the actual situation. Some projects were a disaster (time and budget overruns resulting in a loss of face) because no one was monitoring that part of the accommodation process properly.
- Developing an accommodation concept without consulting end users is asking for trouble and confidence in management sank to a precarious level.

We have attempted to summarise these lessons in a number of principles:

- Activities or events often result in decisions. Due to their implicit character, differences in interpretation lead to difficulties later on.
- Activities must therefore be evaluated simultaneously according to the following five aspects:
  - 1) Which information or knowledge has been used as input for the decision?
  - 2) How does the activity contribute to situational awareness among stakeholders?
  - 3) How does the activity contribute to the process to be followed; are adjustments required?
  - 4) How do activities contribute to the actual design of an accommodation concept?
  - 5) How are decisions formulated and communicated, and how do they contribute to legitimacy?
- Failure to observe these five steps may cause – perhaps unintentionally - a 'landmine' to be left behind that could 'explode' and inflict damage on the project, those involved and/or the work environment.

This research project has now entered a second phase, the details of which will be published in due course.

### **Design, or creating valuable and workable solutions**

EBFM involves the substantiation of decisions, but the Facility Manager still has more to do. A work environment needs to be provided, managed and maintained. Valuable solutions are more than just economically and socially sound. They also include aspects such as aesthetics, justification and ethics. These words form, as it were, part of the process to lend meaning (equivalents are: sense, value, usefulness) to words that have been discussed on the workfloor and relevant terms such as aims, organisational views, desires and demands regarding privacy, territory, etc. We do not

have the presumption to develop a simple evaluation framework for accommodation projects: what is valuable and justified? Sense, however, does have everything to do with our experience of reality. That is why the opinions of end users are of paramount importance to us. The participation of end users in design processes is essential and easy to realise. Three questions can be used to determine (Dewulf, 2002):

- Who the users are. Are they all managers and personnel or also visitors, cleaners, passers-by, technicians, building supervisors and suppliers?
- The decisions for which the input of users is required. Does this involve decisions regarding location and office concept or only colour and type of furniture?
- The extent to which users must participate. Will they also be involved in discussions, thinking and decision-making? This touches upon the division of power within the organisation.

We employ two approaches: the first is passive whereby personnel are only asked to give their opinion: they are a source of information. The other approach is interactive and participatory whereby users become joint problem owners. A great deal of research is available that reveals the more the participation model is used, the greater the acceptance for the definitive solution.

## **5. FIRST RESULTS OF THE EBFM APPROACH**

In this section I will touch briefly upon the practical side of EBFM in our work. The explanation will focus initially on knowledge that has been developed and explanations (evidence) and then on the intended training in practice. Sources from which I quote are listed in CfPB (2004, 2005)

### **Workplace Environment Diagnostic Infrastructure results**

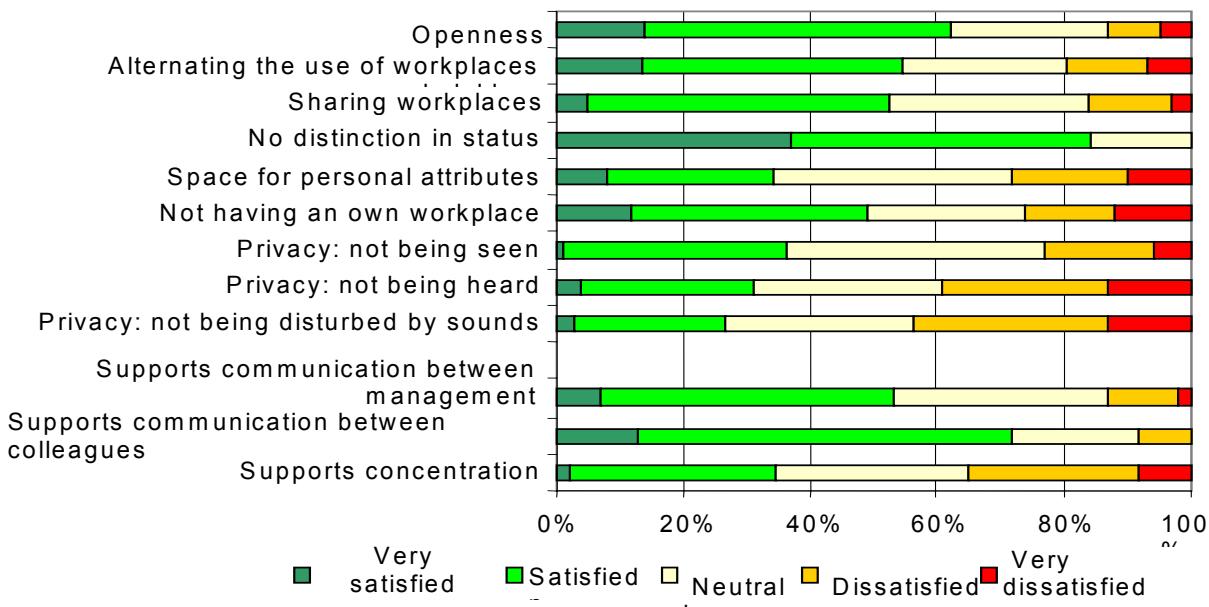
Several office concepts have been evaluated as part of the development of the workplace diagnosis instrument, the results of which are provided in various publications. Users have rated new work environments with an average report mark of 6.7, which is amply sufficient but not really that good (a report mark of 8 would be good). Individually, opinions differ greatly. Aspects that have been rated positively generally include communication with colleagues, the design and quality of the furnishings and fittings, the openness and the option to choose between various workspaces. Negative aspects commonly mentioned are noise nuisance, climate and IT-related problems, lack of privacy (especially acoustics: hearing and being heard), distraction and as a result greater difficulty to concentrate while working. People also miss décor such as plants and art, the social relationship between teams and the lack of an own permanent workplace. The cases that were studied revealed that the number of workspaces were well dimensioned. The measured occupancy rate is still fairly low after the introduction of flexible working (approximately 50% on average). Consequently, there is less need to swap places regularly, which means that many employees can often also be found seated in the same workplace.

The prediction referred to earlier that definitely 50% of employees would not spend a certain number of working hours in the office already appears to be true for these cases. We do not know whether this is the case in all flexible offices, but we suspect as much. The bandwidth will probably be above 50% or less than 20%. Making working hours and workplaces more flexible appears to change the behaviour of people: if there is less space in the office, we will simply work at home today or visit a customer. Nevertheless, employees do show their faces: they are absent less often. The question

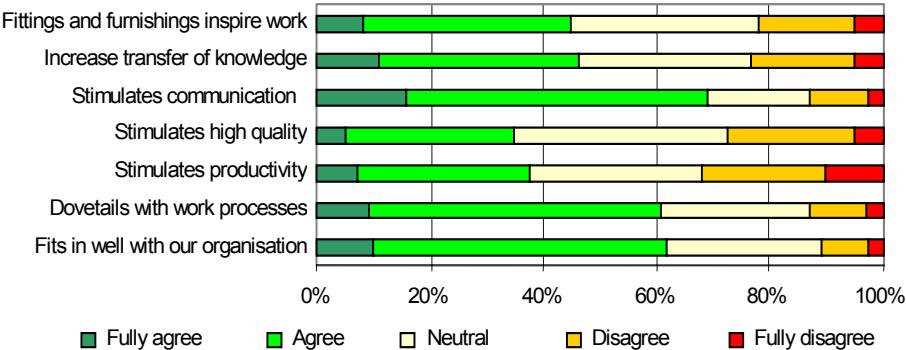
that does arise though is whether they are productive. In this context, two terms are doing the rounds: 'presenteeism' and moral absenteeism.

The level of satisfaction with the concept is connected to the nature of the work. With respect to people who must be able to concentrate often while working, the percentage that would prefer to return to a traditional office concept is higher than average. They also assign a low score to facilities relatively often. Practically everyone is satisfied with communication. An innovative concept seems to have a positive effect on communication, but concentration-related activities receive inadequate support. It appears that people frequently remain in the same place out of habit and do not change, even if the nature of the work requires them to do so. Occasionally not enough concentration workplaces are available due to inadequate physical planning and a failure to properly observe rules of conduct such as 'no loud conversations in open areas'.

Personal characteristics also appear to influence the way in which people appraise various aspects. The case studies indicated that women have slightly less difficulty than men do with regard to sharing workplaces, not having an own place, fewer opportunities to express their status and a lack of space for personal items. Men, on the other hand, have less difficulty with the lack of auditory privacy. Older members of staff (aged 50 and over) are least satisfied with sharing and changing workplaces as well as the level of openness. These employees are also less positive about how the work environment supports their productivity (employees aged 50 and over award a report mark of 6.2 on a scale of 1 to 10, while those under the age of 50 award 6.9 on average). Older employees signal relatively often that they rate the traditional situation more positively and would prefer to revert to the old situation. A possible explanation for this is the fact that in some cases older employees have worked in a traditional manner for decades and find it less easy to switch to a new way of working. Another explanation is that older people become tired more quickly in general and are therefore more sensitive to the numerous stimuli present in an open work environment.



**Figure 2 Satisfaction regarding psychological aspects on the basis of three evaluation studies with the help of WEDI(source: Volker van der Voordt, 2005).**



**Figure 3 Views regarding experienced productivity on the basis of three evaluation studies with the help of WEDI((source: Volker van der Voordt, 2005).**

Figure 2 reveals that relatively small percentages of employees are really dissatisfied. Dissatisfaction stems in particular from aspects such as not being heard, disturbed and the lack of personification. According to theories originating from environmental psychology, this dissatisfaction could actually influence the well-being of people. "Overall" satisfaction should therefore be lower in a traditional concept.

For the time being, it appears as if these psychological effects are more than adequately compensated for by the preference for a modern, efficient and effective work environment in which people find that they have considerable freedom of choice. Loss of concentration and distraction caused by open work environments was also a common phenomenon in open-plan offices from the 1970s.

The idea behind a combi office is that concentration workplaces would eliminate this disadvantage and people would switch places if the nature of their work required them to do so. But switching is precisely something that employees do not do easily. However, a question also remains, namely to what extent does an employee who complains about noise nuisance personally contribute to this inconvenience? People generally find it difficult to enforce their own moral values in a consistent manner. Indicating that you are concerned about your privacy in the office is one thing, but asking colleagues to keep quite or going to sit elsewhere is another.

### **Training in practice**

The Center for People and Buildings has a partner relationship with the Dutch tax authority. As a result, personnel from the tax authority/Centre for Facility Services have been seconded to the CfPB in order to develop new competencies and services. They are participating in CfPB projects, for their own department but also for other partners. By familiarising themselves with methods and transferring knowledge on the job, they are learning to apply acquired knowledge. The benefits are three-fold: productive work is being delivered in projects, and personal competencies and proposals for organisational competencies (products and services) are being developed.

In another research project, people are working together in a team to formulate a new facilities policy for various organisations. These collaborations usually last two to three years. Thanks to continuous input from various disciplines (economics, organisational anthropology, public administration, industrial psychology and architecture), the CfPB team can offer varying perspectives on facility management. In this way managers and

academics can interact and learn while working within their own practical situation, data can be collected and theories can be tested.

### **Epilogue**

The application of Evidence-Based reasoning in Facility Management is context-bound. The strong point is that it revolves around making hypotheses explicit within the context of Facilities Management, but it does raise questions such as: what is evidence, what is the relationship with experience, and is too much emphasis placed on quantitative methods? The methods developed by the CfPB are a healthy hybrid: qualitative and quantitative. We have high hopes that the collected data, the manner in which it is interpreted and the attention paid to underlying value concepts will result in a balanced contribution to Facilities Management. Facility Managers who wish to start using the EBFM approach in their work will repeatedly have to estimate the contextual value of decisions that are to be taken including the players involved in the game. Knowledge of research results alone will not help. And as indicated in the step-by-step plan in section IV, we will need to evaluate the progress consistently and check how personnel value the shifting authority of Facility Managers — from doers to participants in the thinking process.

What began as the slogan ‘Many stories, few facts’ appears to be developing into a valued educational and development mechanism for the Facility Management discipline. Practice and science clasp each other in a symbiotic union. What works in a small country like the Netherlands can also work in the rest of the world.

**References:**

- Cairns. G., (2003), Seeking a facilities management philosophy for the changing workplace In: Facilities, vol 21, no 5. 95-105, FMA Ideaction 2002
- CfPB case studies 2004, 2005:
- Maarleveld, M., L. Volker & D. Borgman (2005). Eén voor allen, allen voor één? Een onderzoek naar het gebruik en de beleven van drie Haagse locaties van de Rijksgebouwendienst. Delft: Center for People and Buildings
- Groot.L.,L.E.M. Mascini, & L. Volker , (2005) Van B tot Z, de beleven van de huisvesting van het ministerie van Buitrenlandse Zaken in Den Haag geëvalueerd. Delft: Center for People and Buildings
- Volker, L. & D.J.M. van der Voort (2004). Flexen in Forum Flex. Een onderzoek naar de beleven van het innovatieve kantoorconcept van het Centrum voor Facilitaire Dienstverlening van de Belastingdienst in Utrecht. Delft: Center for People and Buildings.
- Ree, H.J. van, D.J.M. van der Voort & L. Volker (2004). Van vast naar flexibel. Een onderzoek naar de beleven van het innovatieve kantoorconcept van de VROM inspectie Zuid West te Rotterdam. Delft: Center for People and Buildings.
- Wanner, J. & L. Volker (2004). Van binnenstad naar haven. Een onderzoek naar de beleven van een innovatief kantoorconcept voor de Kamer van Koophandel Rotterdam, regiokantoor Dordrecht. Delft: Center for People and Buildings.
- Volker, L. & D.J.M. van der Voort (2003).Van Beurs naar Blaak. Een onderzoek naar de beleven van het innovatieve kantoorconcept van de Kamer van Koophandel te Rotterdam. Delft: Center for People and Buildings.
- Cohen, M.D., J.G. March and J.P. Olsen, (1972), "A Garbage Can Model of Organizational Choice". In: Administrative Science Quarterly, vol 17 (1) pp 1-25
- De Jong, T., (2004) Policy, research and design, different language games, paper for 2nd WHO International Housing & Health Symposium 2004 Vilnius Lithuania  
Available at: [http://www.bk.tudelft.nl/urbanism/TEAM/Publications/2004/Language\\_games\\_in\\_policy02.doc](http://www.bk.tudelft.nl/urbanism/TEAM/Publications/2004/Language_games_in_policy02.doc)
- Devlin, K., (2003), A framework for modeling evidence based context-influenced reasoning, a paper presented at Context 2003, Stanford University
- Dewulf, G.P.R.M. and J.J. van Meel,(2002), User participation, and the role of information and communication technologies, In: Journal of Corporate Real Estate, vol 4, no 3, pp 237-247
- Diest, H. van., (1997), Zinnig ondernemen, van Gorcum, Assen
- Frankema, E.H.P. (2003), Kantoorinnovatie in economisch perspectief, Delft: Center for People and Buildings.
- Giddens, A., (1992) Modernity and self identity. Self and society in the late modern age, Polity press, Cambridge
- Grimshaw, R., (2003) FM: the professional interface, In: Facilities, vol 21, no 3 pp 50-57
- Guiza, B.M., H.J. van Ree, A. Hartjes and W.R. Pullen (2003), The Integrated Workplace Roadmap for successful delivery, Delft, Center for People and Buildings
- Heuer, R.J., (1999), Psychology of intelligence analysis, Washington, CIA

Available at <http://www.odci.gov/csi/books/19104/>

Jenicek, M., and S. Stachenko, (2003), Evidence based public health, community medicine, preventive care, In Med Sci Monit, vol 9 no 2 sr1-7,  
Available at [www.MedSciMonit.com/pub/vol\\_9n0\\_2/3375.pdf](http://www.MedSciMonit.com/pub/vol_9n0_2/3375.pdf)

Krumm, P.J.J.M., (1999), Corporate Real estate in multinational corporations, Nieuwegein, ARKO Publishers

Loftness, V., Khee Poh Lam, V. Hartkopf, Education and environmental performance based design: a Carnegie Mellon Perspective, In: Building Research and Information, vol 33 no 2 pp 196-203

Meel, J. van, and F. Lohman (2004), Een innovatief programma van eisen - Kwaliteitssturing door het modelleren van de wensen en eisen van opdrachtgevers, In: Real Estate Magazine, December 2004

Porter. M.E (1996), What is Strategy, In: Harvard Business Review, Nov/Dec pp 61-79

Preiser, W.F.E., Rabinowitz, H.Z., & White, E.T. (1998), Post-Occupancy Evaluation. New York: Van Nostrand Reinhold

Price, I. (2004), Business critical FM, In: Facilities, vol 22, no 13 pp 353-358

Pullen, W.R., H.J. van Ree and L. Volker, (2004) Waardevolle ontwerpen, economisch en sociaal verantwoord, Delft, Center for People and Buildings

Tuomela, A., (2003) Tracing workplace knowledge in 'network service organisations' In: Journal of Facilities Management, vol 2, no2 pp 160-174

Upshur, R.E.G., and E. Clark (2003), Argumentation and evidence, In: Theoretical Medicine vol 24, pp 283-299

Volker, L., D.J.M. van der Voort (2005), An integral tool for the diagnostic evaluation of non-territorial offices. In: B. Martens & A. Keul (eds), Evaluation in Progress. Göttingen: Hogrefe & Huber Publishers. In press

Van der Voort, (2003), Costs and Benefits of innovative workplace design, Delft Center for People and Buildings

**This paper was presented at Ideaction 2005, the 16th National Conference of the Facility Management Association Australia, Ltd. May 18-20, Melbourne, Australia**

**© Mr W. Pullen, Centre for People and Buildings NL, 2005 – material contained in this paper cannot be reproduced or re-used without written permission from the author.**