

## **Variability in the Application of Space Management Tools for Facilities Managers**

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### **Abstract**

Facilities Management is increasingly developing as a profession with space management as its core activity and opportunity to add considerable value to clients. Space management has seen many changes over the last few decades due to the development of Information and Telecommunications Technologies and Automation (ICT&A). These technologies such as the internet and mobile phones has resulted in people moving out of the traditional office and being able to work anywhere, anytime. A wide range of organisations have embraced the opportunities opened up by telecommunications and has given the option to employees who can work 'smart' or 'flexible'.

Current methods of gathering information for space management involve observers recording use of space or activities that engage staff. Records are made manually, in a fashion similar to old 'time and motion' studies. It is evident that Facility Management decisions on space take time as all information and assessment are carried out manually. It is argued that the continued use of informal evaluation techniques is likely to exacerbate the disparity between actual and expected performance of spaces.

### **Keywords**

Facilities management, Space utilisation, ICT&A, Flexible working and productivity

### **1. Introduction**

Building performance has received greater attention after evidence revealing the direct relationship with health effects of the office environment and occupant productivity. Optimised performance of space along with increased sustainability demands remains a priority for organisations with the level of Sustainability Policy within respondent organisations increasing to 73% level. However, the most common aspects within these policies are driven by legislation rather than best practice (Pastou *et al.*, 2008).

Landlords are applying ever more pressure to Facilities Management (FM) to be more cost effective, in an attempt to further balance their diminishing business revenue. In doing this, facilities managers are often forced to focus on short term cost objectives instead of concentrating on true value of space (Booy *et al.*, 2009b). Almost 40% of 274 companies that completed a survey in 1994 for IFMA

(International Facility Management Association) reported having formal, written standards for space planning that were used on a consistent basis. The majority of companies 60% reported that they used a mix of explicitly and casual space standards, granted exceptions, or allocated space on a case by case basis (IFMA, 1994).

This paper investigates the current knowledge gap between facilities managers and current methodologies for effective space management. It introduces an ongoing survey that investigates current practice in space management techniques within industry. It also introduces ASOA space optimisation algorithm software that allows facilities managers to tailor workspace according to a specified weighting of key performance indicators.

## 2. Current Space Management Methodologies

There is currently no de-facto methodology for space management within office and commercial buildings and is solely determined by the experience and ability of the Facilities Manager. The pressure from external influences on FM is increasing as global economies weaken in 2008 in not only focusing on cutting building services cost but also in new innovation despite potential improved performance or overall sustainability. However, this has forced FM to concentrate on short term cost; instigated by short term contracts allocated by landlords, in order to reduce risk exposure. As a result, FM opt for more traditional approaches to space management such as time and motion studies or manual data gathering of events as they occur resulting in inaccurate solutions being implemented. In some cases, FM concentrates their efforts elsewhere and employs specialist space management consultancies to optimise the space and create a framework for future space and event planning.

Utilising available technologies within the building services sector can have a strong influence in optimising building effectiveness and occupant efficiency. However, this is dependent on the current knowledge and awareness of Facilities Management and can often result in incorrect or erroneous outcomes due to misrepresentative data being inputted into the software. Current methods of space management still involve manual gathering of information by observers recording the current use of space in which analysis is made upon previous experience or 'gut feeling' rather than objective reasoning (Booy *et al.*, 2008a).



**Figure 1: Types of Space Management Practice from a IFMA survey 1994 (Aronoff and Kaplan, 1996)**

The most popular of these technological aids is the Computer-Aided Facilities Management Software Solution (CAFM) which can provide a detailed overview of inner building services with varying complexity. Services such as asset, stock and occupant tracking, helpdesk and automated room booking systems comes as standard with most packages. Over the years, CAFM solutions have become increasingly complex providing a comprehensive insight into building performance such as key performance indicators monitoring across the lifecycle of tasks, CAD viewer of building which can be incorporated to customisable functions to suit the exact needs of the Facilities Manager. New innovations also include real-time depictions of environmental conditions and office space personalisation linked via a wireless network zone (Booy *et al.*, 2008b; c). There is no single software solution that can completely cover all facets of Facilities Management due to shifting strategic management across different organisations and over complexity. A combination of software is often employed and used in conjunction with each other as part of the decision making process. However, facilities managers' are required to find a balance of integration of such systems in order to avoid voluminous, poorly focused and irrelevant information. The facilities manager needs to ensure that a

balance is maintained between the capital and running costs of the information system and the value of the information generated by software (Aronoff and Kaplan, 1996).

### 3. The Spearhead Online Survey

In order to ascertain an objective status on industry perspective from FM towards effective space management and building performance methodologies, an online survey was developed targeting Facilities Managers & Estate Management professionals. The survey's objective is for identifying any knowledge gap between stakeholders towards determining value of space, assessing building performance and current space management practices. The survey will also form a foundation of the development of ASOA (Advanced Space Optimisation Algorithm); a standalone software solution that enables FM to tailor space according to current KPI requirements in which are detailed in later sections of this paper.

The online survey comprises of 22 questions divided into three sections; Section A (personal demographics and job title), Section B (Current general portfolio details) and Section C (Space management methodologies, KPI perspective, benchmarking, workplace issues) which can be completed per contract.

|          |   |           |                          |
|----------|---|-----------|--------------------------|
| <b>8</b> | What percentage of Key Performance Indicators are you satisfied with the current layout of this workspace area? |           |                          |
|          | Sustainability  | 15%-25% ▾ | Any Additional Comments? |
|          | Adaptability  | 55%-65% ▾ |                          |
|          | Productivity  | 65%-75% ▾ |                          |
|          | Satisfaction  | 25%-35% ▾ |                          |
|          | Performance   | 65%-75% ▾ |                          |
|          | Operability   | 75%-85% ▾ |                          |

**Figure 2: Question 8 from the Spearhead Survey (Booy *et al.*, 2009a)**

Figure 2 depicts a sample answer of a key question within the Spearhead Survey, assessing the FM's current perception of space management within a real life scenario using key performance percentage bands as a measurement tool. This question remains significant to the study, as it will determine the correlation between Facilities managers and how they prioritise the importance of key constituents of effective space management. The results of the survey will be disseminated in further publications and influence the scope on the development of the ASOA software solution.

### 4. Managing Space within a Dynamic Workplace

There is considerable research and commercial incentive in optimising office space, resulting in a noticeable financial & performance return to stakeholders (Booy *et al.*, 2008a). This issue is ever more prevalent to current conditions for effective space management due to the increase of 'smart working' or 'teleworking' resulting increased absenteeism from the work place. About 2.2 million people in the UK used IT to work away from the office when the numbers were last counted in spring 2001. The total increased by 65 percent in the four years to 2001 and will grow at about 400,000 a year (Veitch, 2003). The development of Information and Telecommunications Technologies and Automation (ICT&A) offers a virtual workspace providing access to files, shared folders and communication with other colleagues using email, instant messaging and video conferencing software. There is a constant debate on whether this type of working improves productivity due to factors such as the lack regulation of work. Against this background, it is important to be able to monitor the prevalence and nature of teleworking and the characteristics of those involved in it. However, since teleworking is an evolving concept covering an increasingly wide range of technologies and working practices, it is becoming more difficult to measure (Ruiz and Walling, 2005).

However, some organisations have welcomed the notion and have become less rigid in working hours and offered the opportunities to employees to work from home, under certain conditions. In a report published by the DTI (Department for Trade and Industry) in 2003, states that by allowing more flexible ways of working, teleworking can increase employment opportunities, particularly for those with families or who have long journeys to work. In turn this can ease pressure on infrastructure, facilitate regional development and help employees improve the balance between work and home life. For business these new ways of working can offer new business opportunities, improve productivity and maintain competitiveness (Sutcliffe, 2003). It is apparent, home working has its advantages and disadvantages with increased isolation and possibility of working relationships deteriorating over time. However, home workers emphasize they do not need an office for face to face communication and networking and deem human contact low on factors affecting their productivity (Clements-Croome, 2005).

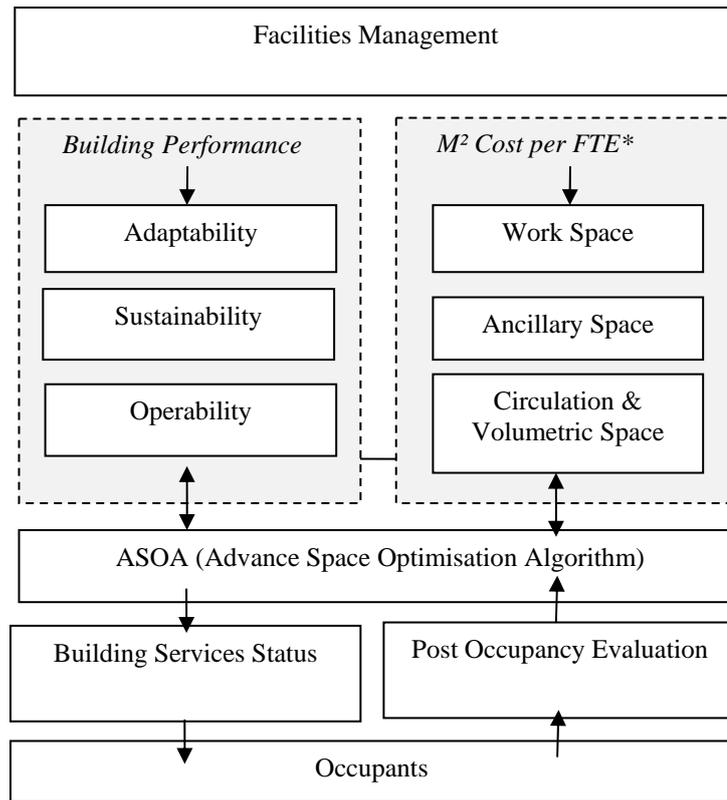
This has evidently freed up more space within the office but also resulted in a more volatile space within the workplace that requires a more dynamic approach to space management.

In order to comprehensively and accurately assess space a consistent reassessment is required in order to adapt the changing conditions of the workplace. The prevalence of assessment would be decided on by the Facilities Manager and would vary according to the size, type, industry and activity within the building. However by analysing building performance (sustainability, operability, adaptability) with occupant satisfaction and productivity an accurate depiction of current performance status can be achieved and improved upon. In reaching an accurate representation of occupant satisfaction, interaction from the occupants themselves may also be required in the form of post occupancy evaluation or similar assessment tool. Government endorsed benchmarks such as those from IPD (Investment Property Databank) offer a baseline solution for measurement for calculating current space management of buildings that have been tested within a specific dataset of government office buildings varying in size and purpose. This methodology is calculated by comparing building efficiency (cost of m<sup>2</sup> per full time employee) with building effectiveness (sustainability and productivity) (IPD, 2008).

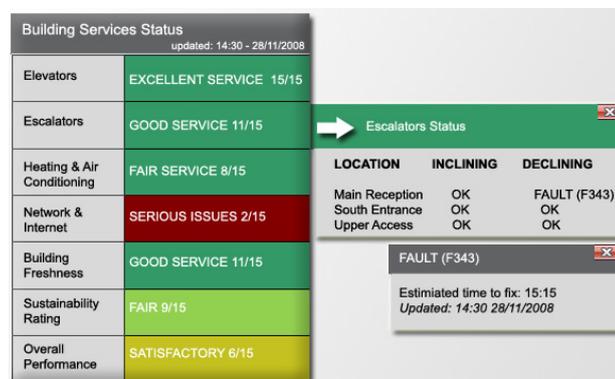
## **5. The Advanced Space Optimisation Algorithm Software (ASOA)**

The ASOA is an analytical software tool that allows FM to assess and tailor space within the workplace at real time, using key building performance and productivity indicators. The software allows collaboration between FM and occupants to communicate their current status within the building which allows for more effective space management decisions.

Occupants can communicate with FM via a feedback assessment facility based on the widely used Post Occupancy Evaluation test (POE). In which not only displays their current satisfaction rating but also would provide critical event information relating to the user via a daily logbook. This feature allows occupants to successfully plan their daily movements, attendance, meeting room bookings and entering and leaving times. In doing so, FM have an accurate depiction of occupant movements within the building and allows for spaces to be adapted to their current usage need. The ASOA interface also includes a feature to display current status of assets within the building to other stakeholders. This allows stakeholders to have a greater awareness of Facilities Management operations when it is both operational and non-operational. It also displays an estimated time on when a technical fault is likely to be repaired.



**Figure 3: The ASOA Event Flow Diagram**



**Figure 4: Building Services Screenshot**

The Building Services feature of ASOA is colour coded according to level of severity of the issue. Figure 4 displays an example of a serious issue with Network & Internet. Each asset is also scored out of 15 with 0-4 (serious), 5-10 (satisfactory) and 10-15 (excellent). Each asset upon selection will also display a status window as shown above.

## 6. Conclusion

Current space management techniques involve analysis made on previous experience and 'gut feeling' resulting in a unidirectional approach to building performance and occupant satisfaction. As organisations cut back on costs, Facilities managers are under increasing pressure to save money and yet improve overall building performance. This paper introduced an online survey in an attempt to ascertain industry perspective first towards space management and key performance indicators. It also introduces ASOA, an analytical software tool that allows FM to track occupant movement and tailor

space according to its own key performance indicator targets. The variability of space management tools for facilities managers is somewhat limited and is usually left to the Facilities Manager to develop their own customised approach. However, despite evidence gathered from the Spearhead Survey and the obvious benefit that ASOA could make in conjunction with other CAFM software used. In the current global economic condition, adjusting landlords focus from short term position heads the greatest challenge.

## 7. Future Work

The ASOA is still currently under development and is set for completion February 2009 for Alpha testing. After testing is complete, a plan to test within an industrial setting is set to take place in April 2009 in which Facilities Management will be able to apply their current contracted building to the software.

## 8. Acknowledgement

The work is part of the SPEARHEAD collaborative research and development project funded by the Technology Strategy Board, UK.

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