Altering Design Decisions to Better Suit Facilities Management Processes

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ABSTRACT

Research work reported in this paper tackles the communication between processes of both facilities management (FM) and design, showing the effect of such communication on the capability of newly built facilities in supporting organizations. Facilities management and design are seen as two different routes whereby the former starts on with the commencement of the building realisation process while the latter engages in post construction practices. Such a view suggests the existence of a gap between both processes which could influence the level of performance of the built facility and consequently the facilities management measures that would then be warranted. Therefore, the aim has been to reveal the distant relationship between facilities management and design as well as to unveil the FM potential in enhancing design decisions for achieving better performing facilities. Various factors leading to the aforementioned gap and reasons for bridging it have been presented. It was deduced that FM feedback is necessary for making informed design decisions, as it enhances the final design outcome and consequently results in better achieving FM goals during building occupancy.

INTRODUCTION

Organizations these days, and due to rapid changes in technology as well as increased competition, are forced to create an efficient supporting services system that is crucial for achieving business objectives. Building design is considered one of the factors which affect both the organisational business and facilities management (FM) practices, the latter being the above mentioned supporting services system established to ensure that business goals are achieved.

Due to having a more knowledgeable networked society, designers nowadays tend to deal more with members of different cultures and various professional backgrounds. Therefore, facilities management needs to be systematically integrated within design processes, to bridge the gap existing between both disciplines for the purpose of effectively considering FM-related issues when designing facilities.

This paper comprises information about how matters take place within both facilities management and design disciplines, and how the relationship between the two would be approached to serve innovation. Facilities management, its components and relation to the core business are first introduced. Design processes are handled next, elaborating on the various design phases and the importance of design's front end, in particular. The problem is then consequently generated through considering the FM/design relationship and its characteristics. Relevant information concerning the approach to solving this problem is discussed after that, followed by mentioning contributions to the knowledge in regard to the aforementioned relationship.

FACILITIES MANAGEMENT DISCIPLINE

Once an organization occupies any facility for the purpose of implementing its core business services and processes, facilities management is then inevitably required to ensure continuity.

Defining Facilities Management

Facilities management as defined by the Centre for Facilities Management (Quoted in Alexander 1996 p. 1) is "the process by which an organization delivers and sustains support services in a quality environment to meet strategic needs." According to Teicholz (2001 p. 21), facilities management is considered to be "multidisciplinary or trans-disciplinary" dealing with knowledge from engineering, architecture, design, accounting, finance, management, and behavioural science.

As a result, it is deduced that FM is not only correlated with the operations and maintenance works in a building. "It is clear that facilities management is not simply the operation and maintenance of buildings, the provision of cleaning services or the recording and rearranging of furniture in offices"; but instead, FM handles strategic planning that provides efficient and effective services starting from top management in any organization to deliver enhancements to the relevant economy and better corporate competing capabilities (Alexander 1996 p. 7).

Comprising a broad range of facility services, FM is considered to be a factor seriously contributing to the success or failure of an organization in running its business effectively and

achieving its goals (Chotipanich 2004). Teicholz (2001) states the 41 responsibilities set by the International Facilities Management Association (IFMA) which are grouped into 8 categories whereby the scope of FM is deemed to cover real estate, planning, budgeting, space management, interior planning, interior installation, architecture/engineering services, and building maintenance and operations.

The model generated by the Facilities Management Institute (FMI) showing FM as "People, Process, and Place" reflects the contribution of FM in relating employees to working procedures and workplaces through an efficient and integrated system, says Teicholz (2001). He therefore continues that FM practically links the work type and nature to the work location and consequently handles issues such as human resources, process engineering, ergonomics, architecture, and interior design.

FM supports organisations' businesses through managing both the physical resources and the workplace in two aspects, operational and strategic (Barrett 1995; Nutt 2002; quoted in Chotipanich 2004). The former, which is the more visible aspect, deals with matters which run on a daily basis to ensure an optimal workplace that is safe and efficient. The latter covers more issues related to planning, decision making, and facility development strategies. Based on Schindler (1998, quoted in Chotipanich 2004), FM practices are influenced by business objectives and nature in addition to the prevailing culture.

Chotipanich (2004) discusses internal and external factors that directly influence the type of relevant services provided by FM. Internal factors deal with the characteristics of a facility and the type of business, while external factors include socio-economical matters, culture and context, legal issues, and the environment.

Due to the varying types of businesses where facilities management operates, FM should acquire knowledge on how to measure its performance within a specific business sector in order to link business strategy to operational management (Price, 2001).

Facilities Management Components

According to Pitt and Tucker (2008), FM components are physical, functional and financial. FM concerns to be addressed and later considered in the design process are mainly the physical and functional components. The financial component comes as a consequence of the other two. As described by Pitt & Tucker (2008), physical properties include structural integrity, lighting,

heating, energy efficiency, maintainability and durability; while functional aspects incorporate space, layout, ergonomics, image, ambience, communication, health, safety, flexibility and all concerns relevant to the link between the building and its occupants.

FACILITIES DESIGN PROCESSES

It is essential to introduce facilities management and design, as well as their various processes and activities, to be able later on to assess their relationship and present the problem. Approaching the problem as presented afterwards, will facilitate the intervention of FM professionals in design processes, arriving at design decisions that better suit FM operations.

Design Objectives

Wong et al. (2009) discuss that designers are responsible for producing drawings and specifications whenever provided with the client's requirements and preferences. Therefore, Wong et al. state that design aims should be set and further divided into objectives in order to accurately define design concepts in a well understood representation. Main design objectives are: Accessibility, aesthetics, cost effectiveness, functionality/operability, historic preservation, productivity, security/safety, and sustainability (Project Guidance 2009).

Project Design Stages

The design phase of a project is divided into four main stages: Pre-design, schematic design, design development, and contract documents as presented subsequently (Facilities Manual 2007). Demonstrating the various design phases provides a picture of where FM intervention would be most efficient to take place, in order to attain altered design decisions.

Pre-design Phases

Pre-design comprises four phases as follows:
- Design Professional Services
- Project Program
- Review of Conceptual Design
- Preliminary Evaluation

Schematic Design

Considered as the first phase of basic services for design, schematic design is a stage where design professionals present the project in three dimensions. Alternative design concepts are investigated in order to set the nature and spirit of the project at completion, reaching an optimal project program understanding.

Design Development

At this stage, the project design goes through further refinement. This includes plan preparations

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and construction details, specific space adjustments and allocations, equipment and furnishings selection, building design (sections and elevations), materials and colours selection, and the development of the full and complete definitions of all systems serving the project.

Construction Documents

Preparation of drawings and specifications which establish the requirements for project construction, characterize this stage. Construction documents define the relationship between all project components as well as their corresponding quality, configuration, and size.

The Importance of Design's Front End

Understanding the design front-end has been proven to be important for project success. Project design front-end is considered critical, whereby applying improvements at this end will result in benefits which will most probably surpass improvements performed later on in the design process (Cooper and Kleinschmidt 1997; CRISP 2001; Quoted in Tzortzopoulos et al. 2006).

Tzortzopoulos et al. (2006) emphasise the communication gaps between users, clients, owners, and designers through quoting Barrett and Stanley (1999), LEAF (2001) and Kaya (2004). Green et al. (2004; Quoted in Tzortzopoulos et al. 2006) state that the reason behind this gap in communication is due to the absence of a common language leading to the designers being criticised for not being able to interpret business needs of clients.

The Briefing Process

A construction brief forms the basis for design and is considered as a document showing the background and requirements for a building project (Ryd 2004).

Problems faced during the briefing process include (Kamara et al. 2000):

- Poor involvement of all project related parties
- Inconsiderable time allocation for briefing
- Insufficient deliberation of client perspectives
- Dissatisfactory communication between personnel involved in preparing the brief
- Incomplete handling of changes to requirements

The abovementioned limitations at briefing stage, a stage belonging to design's front end, hint to problems of communication between client and designer as well as problems of involvement of relevant stakeholders. Whenever such involvement

is hindered, information related to user needs/satisfaction in addition to all facilities management issues are missed out rendering a problematic design affecting the occupancy stage.

PROBLEM ENCOUNTERED

During the design process, Tzortzopoulos et al. (2006) reveal that problems in decision making within the client organisation may end up in delayed requirements' definition or unnecessary and avoidable design changes. In order to prevent such problems, necessary support to clients must be provided in order for them to effectively contribute at the various design stages. Tzortzopoulos et al. (2006 p. 679), as a result, pose a question for further research which states: "Who would be the most appropriate stakeholder to provide such support and what specific skills should he/she have?"

One appropriate answer to such a question would be: the facilities management body starting at earliest stages of design and extending throughout the whole design process, using FM best practice knowledge and post occupancy evaluation results, and communicating the same through a defined mechanism into the design process as early as possible.

Problem Statement

Based on the above, and as discussed by Ercoskun and Kanoglu (2003), facilities management and architectural design are seen as two different processes whereby the former starts on with the commencement of the construction process and the latter engages in post construction practices. Such a view definitely creates a gap between both abovementioned procedures affecting the design process which will in turn influence facilities management practices and building performance.

Hien et al. (2003) state that most cases of current practices in conventional building delivery processes have shown limited integration among the various concerned parties, and the process is highly fragmented from design to construction phase. The approach, according to Hien et al., is usually a one direction process which focuses most on the design procedures without any further input from outside professionals.

Therefore, "the real needs of the different user groups are not adequately satisfied, because they are not identified accurately" (Fianchini 2007 p. 139). This statement constitutes the essence of the problem in question, being the lack of integrating FM concerns in design decisions. It is evident that since user needs are not properly addressed and reflected in the design and construction, the

resulting building would not be "fit for purpose", an expression used by Fianchini (2007).

<u>Reasons behind FM/Design Remoteness</u>

Limited communication existing between designers and facilities managers and the resulting weak relationship and lack of collaboration found between the two parties, are all issues caused by both sides.

Design Side

The reasons found to negatively affect the FM/Design relationship from the design side are mainly attributed to designers' lack of interest in occupancy phase, ignoring the FM role within the design process and projects' time and budget restrictions.

Way (2005) mentions that designers are not usually interested in gaining any knowledge of building performance at occupancy stage. A simple truth that explains why designers and FM professionals do not usually collaborate throughout the design process, and shows the lack of FM related concerns within the design framework.

In addition, Brown (2001; Quoted in Erdener 2003) states that although the transfer of knowledge from FM to design for enhancing design decisions is fundamental, FM's position within the whole process is still ignored. Erdener (2003) argues that improving facilities design requires feedback from the occupation stage which sheds the light on wrong decisions and assumptions that took place in the design process, as well as reconsidering client/user requirements and expectations from the built facility.

Facilities Management Side

Factors affecting the FM/Design relationship from the FM side are mainly linked to FM's loss of identity, the non-core/supportive role of FM and the perception of FM as being a cost source rather than a central necessity. All these factors affect competence within the FM profession and consequently, prevent the creation of communication channels with other professional stakeholders.

Yiu (2008) reflects on FM's loss of identity stating that the reason behind this loss is mainly based on Nutt's (2000) absence of an exclusive knowledge database comprising best practices and various advancements in the field of facilities management. Nutt (2000) reiterates that the lack of such a database affects FM performance and hinders it from fulfilling its promises.

As for FM's supportive role and non-core considerations, Hamel and Pralahad (1994; Quoted in Waheed and Fernie 2009) in their description of core and non-core organizational capabilities related to customer advantage and company revenue, sorrowfully categorise facilities management as being a non-core capability to gain organisational competiveness! McLennan (2000) also explains that the absence of the feedback loop (from operation back into design) is mainly due to the fact that FM is not often viewed as a core activity but instead, an activity having cost implications.

<u>Purposes behind Finding a Solution</u>

Increased communication between facilities management and designers should be achieved, for the following purposes:

Resolving Complexity in Projects

Facilities management functions vary according to the context where they operate, making an effort to adapt to alterations resulting from differences in organisations of different contexts (Kaya and Alexander 2006). With these differences occurring due to changes in contexts, designers will surely benefit from FM intervention while designing for different environments and clients.

Addressing FM Concerns

Facilities management faces a range of problems while operating a facility, these problems can be eliminated if attended to during the design of new buildings.

Ensuring Proper Client/User Involvement

One of the main FM concerns, client satisfaction also acts as a measurement of FM services' success. Facilities management functions as a broker between clients/users and designers to ensure proper communication and effective identification of requirements.

APPROACHING THE PROBLEM

The suggested approach to tackle the problem presented earlier is to: First, evaluate project outcomes and measure performance/user satisfaction. Second, identify the various FM concerns. Third, communicate the generated information to the design phase.

<u>Measuring Performance and User Satisfaction</u>

One of the most popular tools used to measure building performance and user satisfaction is Post Occupancy Evaluation (POE).

Post-occupancy evaluation or sometimes called post-occupancy assessment is a common expression for a set of various activities performed in order to acquire required knowledge about buildings performance as soon as they are completed and ready for operation (Hewitt et al.

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2005). The authors say that those aforementioned activities also address building users and question their satisfaction with the surrounding environment that is newly constructed. As defined by Hadjri and Crozier (2009), POE is a "systematic process guided by research covering human needs, building performance and facility management".

Facilities managers are professionals concerned with planning for a new facility, its performance, and user satisfaction. Knowing beyond why users dislike certain issues such as layouts which are unsuitable for the style of work for instance, would generate a valuable piece of information which can be transferred to other situations where similar problems may arise (Ellis 1987). The same can also be fed into the design process in order to avoid facing similar problems in cases where users are known prior to commencing with works of construction. Therefore, FM personnel should at first conduct POEs in order to identify the various areas of concern, for them to later on transfer the same to the design side.

Identifying Areas of Concern

Conducting post occupancy evaluation to measure facility performance and user satisfaction, would be indirectly hinting to the identification of various facilities management concerns. Due to the fact that FM's role is to provide supporting services to the organisation, it is therefore concerned with how buildings perform and how much are users satisfied with such performance.

Consequently, FM professionals shall have to evaluate and point out problems from within their scope of work, which is related and/or caused by design decisions. Such information would then form the knowledge portion of a transfer process which would illustrate the FM/design engagement. Design-related FM concerns extracted from performance and user satisfaction measurement include the following:

1. Client Satisfaction
2. Operation and Maintenance
3. Space Layout and Flexibility
4. Sustainability
5. Energy Efficiency
6. Ergonomics

Communicating FM Knowledge

It is insufficient to only work on improving FM processes during occupancy phase in order to achieve better services to support organisations. As stated by Horgen et al. (1998; Quoted in Bröchner 2003), the aim is to reach beyond maintainability and efficiency considerations through getting FM managers to organize future building user participation in the design phase. The argument

here is to convey FM concerns and promote effective user interference at the design phase, a process that should be directed by FM professionals.

This leads us to deduce that there needs to be a proper system of communication between FM and design, so that knowledge could be effectively transferred and experiences exchanged between the two disciplines. Jensen (2009) discusses a typology of four mechanisms for the knowledge transfer as explained below:

1. Utilizing building operation experiences to create codified knowledge, increasing designers' awareness as a result

2. Boosting the skills and capabilities of facilities managers, increasing designers' awareness as a result

3. Using power to guarantee that designers seriously take into consideration building operation issues through FM participation

4. Using power to guarantee that design teams seriously utilize codified knowledge

Such a typology could serve as a guideline for establishing a communication system that involves producing codified knowledge from FM experiences and using this knowledge to increase designers' awareness about issues related to post occupancy operations.

Jensen (2009) explains that knowledge transfer from facility operation to facility design could be perceived as a knowledge push from the operation side (senders) and a knowledge pull from the design side (receivers).

CONTRIBUTIONS TO INCREASED COMMUNICATION

Already proposed solutions to get the FM experts and designers closer to each other are:

Participating in Brief Preparation

The Brief is prepared based on client/designer interaction (interviewing end-users, talking to facilities managers, etc…) to unveil client requirements and expectations which form a vital input into the design process (Bogers et al. 2008).

Enriching Facility Programming

Erdener (2003) brings out the definition and description of the term "programming" as set by the AIA (American Institute of Architects), being the method of determining the concerns and setbacks which should be addressed and solved by the design.

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The process begins by gathering facts related to the project site, economic status as well as the legal issues. FM managers in this step can provide practical information concerning space constraints, project duration and budget, and the client requirements.

Considering Usability Issues

When discussing building performance, it is significant to shed the light on an often ignored term, usability that is. Alexander (2006) affirms that considering usability information when designing, constructing, and managing buildings is still immature. Alexander describes usability as approaching users and concentrating on their views regarding facility use.

Combining Facilities and Project Management

Brown, Hinks and Sneddon (2001) propose examining the chances of enhancing the project management (PM) process through making use of FM competence rather than assigning consultant project managers. This idea originates behind the reason that almost all project-related parties are only temporarily interested in a given project with the absence of such interest as soon as the building starts operation. For facilities management, this situation is not true.

Process Design

Involving FM in a design process can be performed through Van Aken's (2005) process design. Process design, or in other words, designing the design process whereby various tasks of design processes and the roles of different participants are defined. As described by Van Aken (2005), the role of process design is to identify the tasks carried throughout the design process in addition to the different personnel participating to achieve those tasks.

Soft Landings

The Soft Landings approach described by Way (2005) promotes improved design and construction expertise interference throughout project handing over and beyond to ease the commencement of occupancy phase and aid clients in gaining the most from their newly constructed facility. Soft Landings stresses the requirement of having more designer participation after the project finishes, an issue which is almost missing in conventional procurement strategies.

CONCLUSION

In view of what has been discussed, there is major farness between client/user needs and the facility's ability to accomplish those needs, a limitation attributed to inadequate/insufficient communication between all parties involved in designing, building and operating facilities. One approach to minimizing design errors that lead to unsatisfactory results during facility operation phase is achieved through providing designers with relevant information in possession of facilities managers.

REFERENCES

Alexander, K. 2006. The application of usability concepts in the built environment. *Journal of Facilities Management* 4(4):262-270.

Alexander, K. ed. 1996. *Facilities Management: Theory and Practice.* London & New York: E & FN Spon.

Bogers, T., Van Meel, J. and Van der Voordt, T. 2008. Architects about briefing: Recommendations to improve communication between clients and architects. *Facilities* 26(3/4):109-116.

Bröchner, J. 2003. Integrated development of facilities design and services. *Journal of Performance of Constructed Facilities* February:19-23.

Brown, A., Hinks, J. and Sneddon, J. 2001. The facilities management role in new building procurement. *Facilities* 19(3/4):119-130.

Chotipanich, S. 2004. Positioning facility management. *Facilities* 22(13/14):364-372.

Ellis, P. 1987. Post-occupancy evaluation. *Facilities* 5(11):12-14.

Erdener, E. 2003. Linking programming and design with facilities management. *Journal of Performance in Constructed Facilities* February:4-8.

Ercoskun, K. & Kanoglu, A. 2003. Bridging the gap between design and use processes: Sector-based problems of a CRM oriented approach. *Proceedings of the 9th EuropIA International Conference, Istanbul.*

Fianchini, M. 2007. Fitness for purpose: A performance evaluation methodology for the management of university buildings. *Facilities* 25(3/4):137-146.

Hadjri, K. and Crozier, C. 2009. Post-occupancy evaluation: purpose, benefits and barriers. *Facilities* 27(1/2):21-33.

Hewitt, D., Higgins, C., Heatherly, P. and

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Turner, C. 2005. *A Market-friendly post-occupancy evaluation: Building performance report*. Portland, Oregon: New Buildings Institute, Inc.

Hien, W., Poh, L. and Feriadi, H. 2003. Computer-based performance simulation for building design and evaluation: The Singapore perspective. *Simulation & Gaming* 34(3):457-477.

Jensen, P. A. 2009. Design integration of facilities management: A challenge of knowledge transfer. *Architectural, Engineering and Design Management* 5:124-135.

Kamara, J. M., Anumba C. J. and Evbuomwan, N. F. O. 2000. Process model for client requirements processing in construction. *Business Process Management Journal* 6(3):251-279.

Kaya, S. and Alexander, K. 2006. Classifying client side FM organisations in the United Kingdom. *Journal of Facilities Management* 4(2):86-98.

McLennan, P. 2000. Intellectual capital: future competitive advantage for facility management. *Facilities* 18(3/4):168-171.

Pitt, M. & Tucker, M. 2008. Performance measurement in facilities management: driving innovation? *Property Management* 26(4):241-254.

Price, I. 2001. Research Papers: Can FM evolve? If not, what future? *Journal of Facilities Management* 1(1):56-69.

Ryd, N. 2004. The design brief as carrier of client information during the construction process. *Design Studies* 25:231–249.

Teicholz, E. ed. 2001. *Facilities Design and Management Handbook*. New York: McGRAW-HILL.

Tzortzopoulos, P., Cooper, R., Chan, P. and Kagioglou, M. 2006. Clients' activities at the design front-end. *Design Studies* 27(6):657-683.

University of California Office of the President. 2007. *Facilities Manual* [Internet]. Facilities Administration. Available from: http://www.ucop.edu/facil/fmc/facilman/ [Accessed 11 July 2009].

Van Aken, J. E. 2005. Valid knowledge for the professional design of large and complex design processes. *Design Studies* 26:379-404.

Waheed, Z. and Fernie, S. 2009. Knowledge based facilities management. *Facilities* 27(7/8):258-266.

Way, M. 2005. Soft landings: A fresh scope of service that ensures users and clients get the best out of a new building. *Journal of Facilities Management* 4(1):23-39.

WBDG. 2009. *Project Guidance* [Internet]. National Institute of Building Science. Available from: http://www.wbdg.org/design/index.php [Accessed 11 July 2009].

Wong, F., Lam, P., Chan, E. and Hom, H. 2009. Optimising design objectives using the balanced scorecard approach. *Design Studies* 30:369-392.

Yiu, C. Y. 2008. A conceptual link among facilities management, strategic management and project management. *Facilities* 26(13/14):501-511.

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