DESIGNING FOR OPERATIONAL EFFICIENCY: HOW TO BETTER INTEGRATE FACILITY MANAGEMENT PERSPECTIVES IN DESIGN

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By the time that FMs become involved in managing a building, the designers have almost always moved on to their next project(s).

FMs and designers do not communicate well, the result is waste and error, which can lead to higher operating costs as well as decreased building performance and lower levels of satisfaction among building occupants.

Communication difficulties between designers and facility managers due to a lack of mutual interest.
This research assessed the collaboration process in several different countries and institutional settings. The research thus provided new knowledge about improving the architectural design process. While previous studies have emphasized the importance of including FMs’ knowledge in design, this study went further in its goal of detecting specific problems in the current state of communication between FMs and architectural firms, and using this evaluation to generate specific recommendations for more effective communication practices.

SIGNIFICANCE OF THE PROJECT

Aim Two: Provide Recommendations for Effective Communication between Facility Managers and Designers with the Goal of Enhancing the Quality of Design.
HIGH PERFORMANCE DESIGN PROCESS

• Design Process
• Performance-based Design Process
• Design Process and POE
• Lean Thinking in Design Process

BUILDING PERFORMANCE AND POE

• POE Definition
• POE Benefits and Barriers
• Theoretical Approaches
• POE And Facility Management
Arditi and Nawakorawit (1999)
Dunston and Williamson (1999)
Meier and Russell (2000)
Erdener (2003) in the United States

Bröchner (2003) in Sweden
Jensen (2009) in Denmark

Duffy (2000), Jaunzens (2001), and Meng (2013) in the United Kingdom

Mohammed and Hassanain (2010) in Saudi Arabia

Silva and colleagues (2004) in Singapore
• Facility Management
• History of Facility Management Integration in Design Process
• The Benefits of Facility Managers’ Involvement in the Design Process
• Problems that Arise When Facility Managers Are Not Involved in the Design Process
• At What Point in the Design Process Should Facility Managers Become Involved?
• Models of Collaboration
• Barriers Against Facility Managers’ Involvement in the Design Process
• Knowledge Management in the Design Process
• Use of BIM and Integration of Facility Managers in Design Process
• Many previous studies, such as Arditi and Nawakorawit (1999), Dunston and Williamson (1999), Meier and Russell (2000), Chew et al. (2004), and Silva et al. (2004), are biased toward maintainability.

• Many previous studies have only limited empirical data support. (e.g. Bröchner, 2003; Edum- Fotwe et al., 2003; Mohammed and Hassanain, 2010).
• Unlike previous studies, this research explores early FM involvement in the design process by BOTH interview and survey.

• Unlike the previous study that just focuses on one country, this research compares the early FM involvement in the design process between the U.S., the U.K., and the Middle East.
Unlike previous studies, this research explores communication problems between designers and facility managers.
The use of both quantitative and qualitative approaches allowed for the triangulation of data, revealing a more nuanced outlook on the phenomenon being investigated.

Unlike previous studies, this investigation of collaborations between designers and FMs took an international approach, so that populations in three different countries could be compared.
• In the qualitative part of the study, 20 semi-structured interviews were conducted with prominent facility management professionals.

• Nine face-to-face interviews and one Skype interview in London, three face-to-face interviews and two Skype interviews in College Station and Houston in Texas, and two face-to-face interviews and three Skype interviews in Doha, Qatar.

• Each interview lasted between 30 and 45 minutes.
Quantitative survey

• In the quantitative part of the study, an online survey questionnaire was generated in Qualtrics and widely distributed to the members of the primary international facility management organizations.

• The survey consisted of 32 short-answer and narrative questions. Seven of the questions asked about the respondent’s background, 10 questions addressed organizational protocols, and 15 questions addressed the FM’s experience in collaborations with architectural designers.
International Facility Management Association (IFMA)
United States
40,000 Members
International Facility Management Association (IFMA)  
United States  
40,000 Members

British Facility Management Institute  
United Kingdom  
30,000 Members
International Facility Management Association (IFMA)
United States
40,000 Members

British Facility Management Institute (BIFM)
United Kingdom
30,000 Members

Middle Eastern Facility Management Association (MEFMA)
Middle East
7,000 Members
International Facility Management Association (IFMA)  
United States  
40,000 Members

British Facility Management Institute (BIFM)  
United Kingdom  
30,000 Members

Middle Eastern Facility Management Association (MEFMA)  
Middle East  
7,000 Members

Other Organizations/Firms:  
Qatar Green Building Council (QGBC)  
SSC Services at Texas A&M University  
FIATECH group
22 Interviews Completed

- 11 interviews in the U.K.
- 6 interviews in the U.S.
- 5 interviews in the Middle East
• Three Interviews with FMs of Channel 4 Building
• The Winner of Best British FM Team
• World Winning Award Building
Demographic Information of Participants: Level of Education

Distribution of Interviewees’ Roles
I guess the challenges are, there’s variety of challenges in FM in higher ed. And in higher ed is a systemic problem and in general they tend to build new buildings instead of take care of the ones they already have and renovate them on time and there always issues that allow the option of building new buildings instead of repairing or upgrading what you already have so I think that’s a challenge in FM./

Pg. 2
Category

1. **Background**
2. **Facility Management in the United Kingdom**
3. **Facility Management in the United States**
4. **Facility Management in the Middle East**
5. **Comparison of Facility Management Cultures: The United Kingdom vs. the United States**
6. **Comparison of Facility Management Cultures: The United Kingdom and the United States vs. the Middle East**
7. **Facility Management Meetings**
8. **Feedback Loops Within Facility Management Firms**
9. **Facility Managers’ Vision of Their Industry**
10. **Facility Managers’ Vision of Designers**
11. **Communication Issues**
12. **Relationships between Designers and Facility Managers after Building Occupancy**
13. **The Need for Better Training**
14. **Knowledge Management**
15. **Motivators and De-motivators of Facility Managers for Collaboration in Design**
16. **Benefits of FM Integration in Design Process**
17. **Other Factors Affecting the Likelihood of Collaboration**
18. **The Benefits of Collaboration**
19. **When Should Collaboration Begin?**
20. **Solutions for Integrating Facility Managers into the Design Process**
<table>
<thead>
<tr>
<th>Category</th>
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<tbody>
<tr>
<td>1. Background</td>
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<td>2. Facility Management in the United Kingdom</td>
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<td>3. Facility Management in the United States</td>
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<td>4. Facility Management in the Middle East</td>
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<tr>
<td>5. Comparison of Facility Management Cultures: The United Kingdom vs.</td>
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<tr>
<td>the United States</td>
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<td>6. Comparison of Facility Management Cultures: The United Kingdom and</td>
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<tr>
<td>the United States vs. the Middle East</td>
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<td>7. Facility Management Meetings</td>
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<td>8. Feedback Loops Within Facility Management Firms</td>
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<td>9. Facility Managers’ Vision of Their Industry</td>
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<td>10. Facility Managers’ Vision of Designers</td>
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<td>11. Communication Issues Issues</td>
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<td>Themes</td>
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<td>Theme I.</td>
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<td>Theme II.</td>
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<td>Theme III.</td>
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<td>Theme IV.</td>
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<td>Theme V.</td>
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The online survey was sent to approximately 8,500 individuals. Out of these recipients, 298 individuals visited the survey site. The estimated response rate for the recruitment e-mail was 298/8500 = 3.50%. The estimated effective response rate is 171/8500 = 2.01%. The respondents took 12 minutes and 23 seconds to fill out the survey.
Locations Where Respondents Have Worked in the Facility Management Industry
DEMOGRAPHIC INFORMATION

Respondents’ Job Titles

- General Manager (GM)
- Head of Operation (HOO)
- Portfolio Manager (PM)
- Senior Assistant Technician (SAT)
- Facility Manager (FM)

Work Experience

- Less than 1 year: 5 Whole Career, 25 Current Position
- 1 to 5 years: 25 Whole Career, 25 Current Position
- 5 to 10 years: 32 Whole Career, 46 Current Position
- More than 10 years: 91 Whole Career, 25 Current Position
FM’s Experience in Working with Designers

On average, the respondents estimated that collaboration with designers happened on around 35% of their projects.
FM's View of the Importance of Having a Relationship with Designers

- Not At All: 1
- Sometimes helpful, but not generally: 13
- Averagely helpful: 22
- Very helpful for most projects: 53
- Crucial for all projects: 60

**GENERAL RESULTS**
FM's View of the Importance of Having a Relationship with Designers

GENERAL RESULTS

- Not At All: 1
- Sometimes helpful, but not generally: 13
- Averagely helpful: 22
- Very helpful for most projects: 53
- Crucial for all projects: 60
FM’s Most Commonly Referenced Consultants

- Architects: 52%
- Mechanical Engineers: 26%
- Interior Designers: 9%
- Civil/Structure Engineers: 8%
- Landscape Designers: 3%
- Other: 2%

Fields That FMs Believe Have the Most Shared Understanding With Facility Management

- Architects: 32%
- Mechanical Engineers: 40%
- Interior Designers: 14%
- Civil/Structure Engineers: 7%
- Other: 5%
- Landscape Designers: 2%
Positivity of Designers about Collaboration with FMs in the Design

About half of the respondents (47%) stated that designers are not positive in regard to collaborating with FMs in the design process.

**GENERAL RESULTS**

- **Not at all**: 9%
- **Sometimes positive, but not generally**: 63%
- **Averagely positive**: 43%
- **Very positive for most of the time**: 30%
- **Positive for all projects**: 7%
Efficiency of Designers’ Proposals in Solving Building Maintenance Problems

54% of the respondents indicated that designers’ proposals are “effective, but need FMs’ input.”
Using the Likert-scale survey questions, 30 statistical hypotheses were tested. Both ANOVA and Chi-squared analyses were performed.

HYPOTHESES TESTING

- The Impact of Training and Role in the Company
- Country of Origin
- Confidence in Sharing Opinions
- Respondents’ View of Designers
- Impact of Occupants
- Lean Principles
- Number of People Supervised
- Rates of Collaboration
<table>
<thead>
<tr>
<th></th>
<th>Questions</th>
<th>Independent Variable</th>
<th>Dependent Variable</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>Questions 1, 2, 3 relative to Question 10</td>
<td>Role in the company</td>
<td>Share their opinion in the company</td>
<td>0.3769 0.5774</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Highest level of training/education</td>
<td></td>
<td>0.0700 0.3327</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Length of work experience</td>
<td></td>
<td>0.0043 0.0141</td>
</tr>
<tr>
<td>H2</td>
<td>Questions 1, 2, 3 relative to Question 24</td>
<td>Role in the company</td>
<td>Relationship with designers is a necessary step to achieve a good building performance</td>
<td>0.1167 0.0109</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Highest level of training/education</td>
<td></td>
<td>0.7267 0.8601</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Length of work experience</td>
<td></td>
<td>0.0118 0.0195</td>
</tr>
<tr>
<td>H3</td>
<td>Questions 1, 2, 3 relative to Question 27</td>
<td>Role in the company</td>
<td>Respondents feel that their ideas can affect decision-making in the design process</td>
<td>0.7878 0.5630</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Highest level of training/education</td>
<td></td>
<td>0.6239 0.0357</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Length of work experience</td>
<td></td>
<td>0.2617 0.3630</td>
</tr>
</tbody>
</table>
FMs’ Early Involvement in the Design Process: The U.S., the U.K., and the Middle East

The results show that the rate of involvement in the U.S. is higher than in both the U.K. (p-value = 0.0355) and the Middle East (p-value = 0.0087).
Rate of Collaboration with Designers for Solving Problem after Occupancy: The U.S., the U.K., and the Middle East

The findings illustrate that the chance of a relationship between FMs and designers after occupation is higher in the U.S. than in the Middle East (p-value = 0.0189).
Perceived Positivity of Designers about Collaborating with FMs: The U.S., the U.K., and the Middle East

The results show that the perceived positivity of designers toward collaboration is higher in the U.S. than in the U.K. (p-value=0.0001) and the Middle East (p-value=0.0002).
Respondents’ Positive Feelings about Their Ability Influence Decision-Making in the Design Process vs. Their Rate of Collaboration

The findings suggest that FMs who are more positive about the impact of their ideas on decision making process are more likely to have collaborated in the design process (ANOVA p-value = 0.0125; Chi-square p-value = 0.0107).
Respondents’ Positive Feelings about Their Ability Influence Decision-Making in the Design Process vs. Their Rate of Collaboration

The findings suggest that FMs who are more positive about the impact of their ideas on decision making process are more likely to have collaborated in the design process (ANOVA p-value=0.0125; Chi-square p-value=0.0107).
Positive Perceptions toward Designers vs. Collaboration with Designers

The findings show that when FMs perceived designers to be more enthusiastic about collaboration, the FMs were more likely to have been involved in the design process (ANOVA p-value = 0.0001; Chi-square p-value = 0.0025).
A higher number of people who are supervised by respondents is associated with a higher rate of collaboration in the design process (ANOVA p-value = 0.0679)
Length of Experience in Current Position vs. Rate of Collaboration in the Design Process

Greater work experience as an FM is associated with a higher rate of collaboration in the design process (ANOVA p-value= 0.0103)
OUT OF 30 HYPOTHESIS
16 WERE SUPPORTED
1. INTRODUCTION
2. LITERATURE REVIEW
3. METHODOLOGY
4. INTERVIEW ANALYSIS
5. SURVEY ANALYSIS
6. CONCLUSION
• Collaboration Between Facility Managers and Designers: Comparing the United Kingdom, the United States, and the Middle East

• The Early Involvement of Facility Managers in the Design Process

• Communication between FMs and Designers

• How to Better Integrate FMs into the Design Process
## The current State of the FM Industry in the United Kingdom, the United States, and the Middle East

<table>
<thead>
<tr>
<th>United Kingdom</th>
<th>United States</th>
<th>Middle East</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Beginning to mature</td>
<td>• Beginning to mature</td>
<td>• A new but rapidly expanding field</td>
</tr>
<tr>
<td>• Fully integrated into the business model</td>
<td>• Training as the biggest current concerns for the facility management industry</td>
<td>• Immature industry</td>
</tr>
<tr>
<td>• An aging work population</td>
<td>• Difficulty in finding qualified employees</td>
<td>• Absence of formal training systems</td>
</tr>
<tr>
<td>• A distinct generational shift occurring in the nature of the profession</td>
<td>• Less interest in the field among the younger generation</td>
<td>• Communication barriers</td>
</tr>
<tr>
<td>• Larger number of educational programs giving degrees or certificates in facility management</td>
<td>• Lack of understanding among the public about what exactly FMs do</td>
<td>• Low quality of workmanship</td>
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<tr>
<td>• Little incentive for FMs to strive for really good building performance</td>
<td></td>
<td>• Lack of consistent production standards</td>
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<tr>
<td></td>
<td></td>
<td>• Conflicts of interest and cultural barriers between different levels of management</td>
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<tr>
<td></td>
<td></td>
<td>• Lack of understanding among the public about what exactly FMs do</td>
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<td></td>
<td></td>
<td>• Poor integration process</td>
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<tr>
<td>Benefits</td>
<td>Region in Which the Benefit Was Identified</td>
<td></td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Improve Performance of Design</td>
<td>U.K., U.S., Middle East</td>
<td></td>
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<tr>
<td>Shorter Design Process for a Project</td>
<td>U.K., U.S.</td>
<td></td>
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<tr>
<td>Safer and Healthier Design</td>
<td>U.K.</td>
<td></td>
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<tr>
<td>More Flexible Designs by Presenting Realistic Knowledge of Building Operations</td>
<td>U.K., U.S.</td>
<td></td>
</tr>
<tr>
<td>More Attractive to Prospective Occupants</td>
<td>U.K., Middle East</td>
<td></td>
</tr>
<tr>
<td>More Energy-Efficient Design</td>
<td>U.K., U.S., Middle East</td>
<td></td>
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<tr>
<td>More Straightforward to Construct</td>
<td>U.S., Middle East</td>
<td></td>
</tr>
<tr>
<td>Provide Lessons Learned from Previous Projects (POE)</td>
<td>U.K., U.S.</td>
<td></td>
</tr>
<tr>
<td>Provide the Evaluation of Design Innovation from Previous Projects (POE)</td>
<td>U.K.</td>
<td></td>
</tr>
<tr>
<td>Greater Satisfaction for Both Clients and Occupants</td>
<td>U.K., U.S., Middle East</td>
<td></td>
</tr>
<tr>
<td>Improving Design for Future Buildings</td>
<td>U.K., Middle East</td>
<td></td>
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<tr>
<td>Better Relationship Between Designers and Building Users</td>
<td>U.K., U.S.</td>
<td></td>
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<tr>
<td>Emphasize the Functionality and Productivity of the Design</td>
<td>U.K., U.S.</td>
<td></td>
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</tbody>
</table>
## Summary of Benefits from FMs’ Early Involvement in Design

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Region in Which the Benefit Was Identified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction in Maintenance Costs</td>
<td>U.K., U.S., Middle East</td>
</tr>
<tr>
<td>Reduction in the Long-Term Expenses of the Building</td>
<td>U.K., U.S., Middle East</td>
</tr>
<tr>
<td>Provide the Ability to Remain Competitive in Their Field</td>
<td>U.K.</td>
</tr>
<tr>
<td>Efficient Solution For Commission and Maintenance of the Building</td>
<td>U.K., U.S., Middle East</td>
</tr>
<tr>
<td>Reduce The Later Need For FMs to Enact Inefficient Operational Practices and/or Expensive Infrastructure Alterations</td>
<td>U.K., U.S.</td>
</tr>
<tr>
<td>More Focused on Minimizing the Building’s Whole-Life Expenditures Rather Than Just the Initial Capital Costs</td>
<td>U.K., U.S.</td>
</tr>
<tr>
<td>Easier to Control and Manage</td>
<td>U.K., U.S., Middle East</td>
</tr>
<tr>
<td>Provide the Ability to Minimize or Avoid Maintenance Risks</td>
<td>U.K., U.S.</td>
</tr>
<tr>
<td>Barriers</td>
<td>Percentage of Interviewees who Mentioned the Barrier</td>
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<td>------------------------------------------------------------------------</td>
<td>---------------------------------------------------</td>
</tr>
<tr>
<td>Communication problems between FM and designers</td>
<td>85%</td>
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<tr>
<td>Underestimation of FM’s ability to contribute</td>
<td>55%</td>
</tr>
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<td>Concerns about the cost of involving more people in design</td>
<td>40%</td>
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<tr>
<td>Difficulties in explaining to clients what exactly the FMs can contribute to design</td>
<td>35%</td>
</tr>
<tr>
<td>Cultural differences between FMs, designers, and clients</td>
<td>30%</td>
</tr>
<tr>
<td>Resistance on the part of clients/owners to fund the process</td>
<td>30%</td>
</tr>
<tr>
<td>Lack of knowledge of clients about the prospect of collaboration</td>
<td>30%</td>
</tr>
<tr>
<td>Geographical distance between designers and FMs</td>
<td>20%</td>
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</tbody>
</table>

**CONCLUSION**

Summary of Identified Barriers against the Involvement of FMs in Design
Factors Associated with Greater or Lesser Likelihood of Collaboration between FMs and Designers

- Private Finance Initiative Projects
- Refurbishment Projects
- In-House FMs
- End-Users Clients
- Larger Projects
- Complexity of Projects
- Less Cultural Difference between FMs, Designers, and Clients
- Larger FM Company
- Number of People Supervised by the FM
- Previous Experience of Working with Designers
- Length of FMs’ Work Experience
- FMs’ Confidence for Collaboration in Design
- Non-Private Finance Initiative Projects
- New Construction
- Outsourced FMs
Model for Overcoming Barriers and Better Integrating Facilities Managers into the Design Process

CONCLUSION
- Recognize benefits from collaboration between FMs and designers
- Emphasize financial savings over the whole life of the building
- Encourage greater attention to the role of the FM industry

Training

- Academic Facility Management Programs
- Interdisciplinary Conferences and Workshops
- Facilities Management Certificate
- Software Training in FM Organizations
Using Knowledge Management Tools

- Emphasize the integrated design process
- Share lessons learned through the use of current technology

Building Information Modeling Software (BIM)

Robust Survey Tools and Databases for POE Feedback

Making Connections Between FM Software and Design Software
• Promote effective communication
• Prepare the context for post-occupancy relationships

Professional Setting for the Collaboration Meeting

Use FM Input as a 3D-Operation Tool

Arrange Meetings Based on Individuals' Areas of Expertise

Prove Guidelines for Cost-effective Solutions for Each Project Prior to the Collaboration Meetings
The Proposed Model of Collaboration to Better Integrate the Knowledge from Facilities Managers in Design Process

- Real estate strategies
- Cost-effective evaluation for FMs' collaboration
- Information on space needs

Meeting with FMs

- Determining how much space needs to be allocated for various maintenance activities
- Helping to clarify the best possible solutions to design problems

Feasibility Studies

- Helping to create flexible-use areas, and identifying the maintenance requirements for such areas
- Formulation of considerations for operation and sustainability

Scheme Design

- Analyzing a building's productivity, maintainability, and sustainability
- Identifying requirements for automation systems that might be used in a building

Detail Design

- Estimating the cost of FM based on design plans
- Formulating operational practices that would work most effectively with a particular design
- Reviewing final design proposals from an operational point of view

Construction Information

- User needs
- Post-Occupancy evaluation results
- Lessons learned
- Clients' requirements
- FM satisfaction survey results

Building Operation

Occupancy

Construction
The Proposed Model of Collaboration to Better Integrate the Knowledge from Facilities Managers in Design Process

Meeting with FMs

Evaluating how much space to be allocated for various maintenance activities
Clarifying the possible solutions to problems

Meeting with FMs

Creating flexibility in spaces, and identifying maintenance requirements for such spaces
Identification of considerations for operation and maintenance

Meeting with FMs

Scheme Design

Feasibility Studies

The Brief

The Client

Intention

Mechanical Engineer

Interior Designer

Architect

Electrical Engineer

Civil/Structure Engineer

Landscape Architect

Cost Consultant

Sustainability Consultant

Detail Design

Construction Information

Meeting with FMs

Meeting with FMs
• User Needs
• Post-Occupancy Evaluation Results
• Lessons Learned
• Clients Requirements
• FM Satisfaction Survey Results

Facility Managers

Client

Intention

Building Operation

Occupancy

Interior Designer
Architect
Civil/Structure Engineer
Cost Consultant
Sustainability Consultant
Meeting with FMs

- Determining how much space needs to be allocated for various maintenance activities
- Helping to clarify the best possible solutions to design problems

Meeting with FMs

- Real estate Strategies
- Cost-effective evaluation for FMs' collaboration
- Information on space needs

Meeting with FMs

- The Brief
- The Client
- Feasibility Studies
- Mechanical Engineer
- Interior Designer
- Architect
- Electrical Engineer
- Civil/Structural Engineer
- Landscape Architect
- Cost Consultant
- Sustainability Consultant
Meeting with FMs

- Helping to create flexible-use areas, and identifying the maintenance requirements for such areas
- Formulation of considerations for operation and sustainability

Meeting with FMs

- Analyzing a building’s productivity, maintainability, and sustainability
- Identifying requirement for automation systems that might be used in a building

Meeting with FMs

- Estimating the cost of FM based on design plans
- Formulating operational practices that would work most effectively with a particular design
- Reviewing final design proposals from an operational point of view
The Proposed Model of Collaboration to Better Integrate the Knowledge from Facilities Managers in Design Process

- Meeting with FMs
  - Determining how much space needs to be allocated for various maintenance activities
  - Helping to clarify the best possible solutions to design problems

- Feasibility Studies
  - Helping to create flexible-use areas, and identifying the maintenance requirements for such areas
  - Formulation of considerations for operation and sustainability

- Scheme Design
- Detail Design
- Construction Information

- The Brief
- The Client
- Intention

- Building Operation
  - Occupancy
  - Construction

- Real estate Strategies
  - Cost-effective evaluation for FMs' collaboration
  - Information on space needs

- User Needs
  - Post-Occupancy Evaluation Results
  - Lessons Learned
  - Clients Requirements
  - FM Satisfaction Survey Results

- Analyzing a building’s productivity, maintainability, and sustainability
- Identifying requirement for automation systems that might be used in a building
- Estimating the cost of FM based on design plans
- Formulating operational practices that would work most effectively with a particular design
- Reviewing final design proposals from an operational point of view
This study found that there is an increasing recognition of the importance of early FM involvement and an increasing use of early FM involvement in today’s practice.
This study compared the FM Industry, and FMs’ early involvement in design in the U.K., the U.S., and the Middle East.
Early FM involvement not only benefits FM providers but also benefits other key stakeholders, such as clients, designers, and end users.
This study found barriers for the FM-designers collaboration. The majority of these barriers are listed as the communication barriers.
This research analyzed the factors associated with greater or lesser likelihood of collaboration between FMs and designers.
CONCLUSION

To overcome the barriers, this research suggested a model for overcoming barriers based on enhancing the training, professional setting for the collaborating meeting, and knowledge management tools.
This study present a model of collaboration to better integration the knowledge from facilities managers in design process which could be served as the guideline for collaboration meeting in design process.
Collaboration between designers and facility managers

Comparing the United Kingdom, the United States, and the Middle East

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Abstract

Purpose – The aim of this study is to focus on the perspectives of facility managers in each region and the different challenges impacting collaboration in each geographical context. This research analyzed obstacles to collaboration between facility managers and architectural designers in three international regions.

Design/methodology/approach – A multi-method approach was used, allowing the researchers to triangulate data from in-depth interviews and a widely distributed survey instrument. The participants included a large cross-section of facility management professionals in each of the regions under study. The interview data were paired to identify recurring themes, while the survey data were analyzed statistically to test specific hypotheses.

Findings – Significant differences were found in the culture of the facility management profession in each region. These differences created unique challenges for collaboration, especially in the context of a non-local design team. While the facility management profession was perceived as most established and professional in the UK, rates of collaboration between facility managers and designers were actually much higher in the USA. Collaborations between facility managers and designers were almost non-existent in the Middle East.

Originality/value – While the importance of collaboration between facility managers and designers is increasingly recognized for improving the efficiency of building operations, crucial obstacles continue to limit the scope of this engagement. There has been limited previous research analyzing obstacles to collaboration that are specific to international contexts and on local design teams. This study helps to fill an important gap in the literature by providing a comparative analysis of collaboration challenges in three international contexts.

Keywords Facility management, Collaboration, Effectiveness, Design process, Designers, Early involvement

Paper type Research paper

Introduction

For large, multi-use buildings to operate at their maximum efficiency, it is vital that there should be good communication between designers and the facility management professionals who will oversee the daily operations of the building. Facility managers (FMs) need to understand the designers’ intent in order for the building to operate as planned, and designers can greatly benefit from the accumulated practical knowledge of FMs when

REFERENCES

• Automation in Construction, 19(5), 522–530.
• McAuley, B. (2016). Identification of key performance tasks to demonstrate the benefit of introducing the facilities manager at an early stage in the Building Information Modeling process on public sector projects in Ireland (Doctoral dissertation). Dublin Institute of Technology, Dublin.
DESIGNING FOR OPERATIONAL EFFICIENCY: HOW TO BETTER INTEGRATE FACILITY MANAGEMENT PERSPECTIVES IN DESIGN

THANK YOU

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