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

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**2 LITERATURE REVIEW**

**3 METHODOLOGY**

**4 INTERVIEW ANALYSIS**

**5 SURVEY ANALYSIS**

**CONCLUSION**



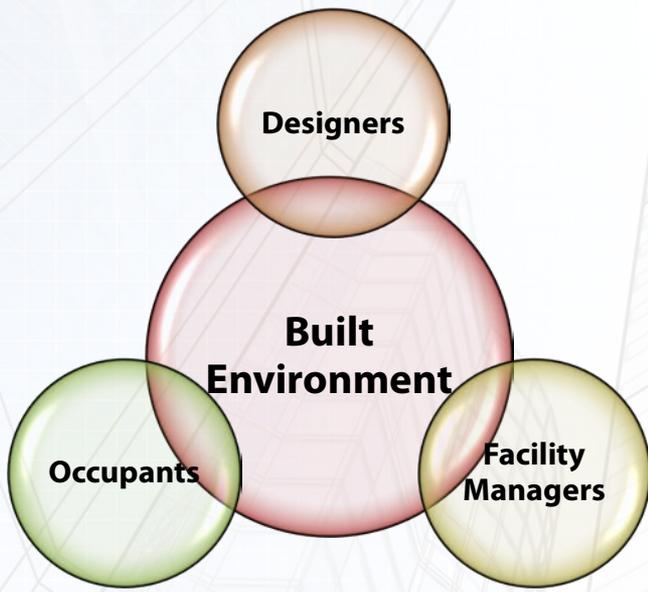
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# INTRODUCTION

## PROBLEM AND SETTING



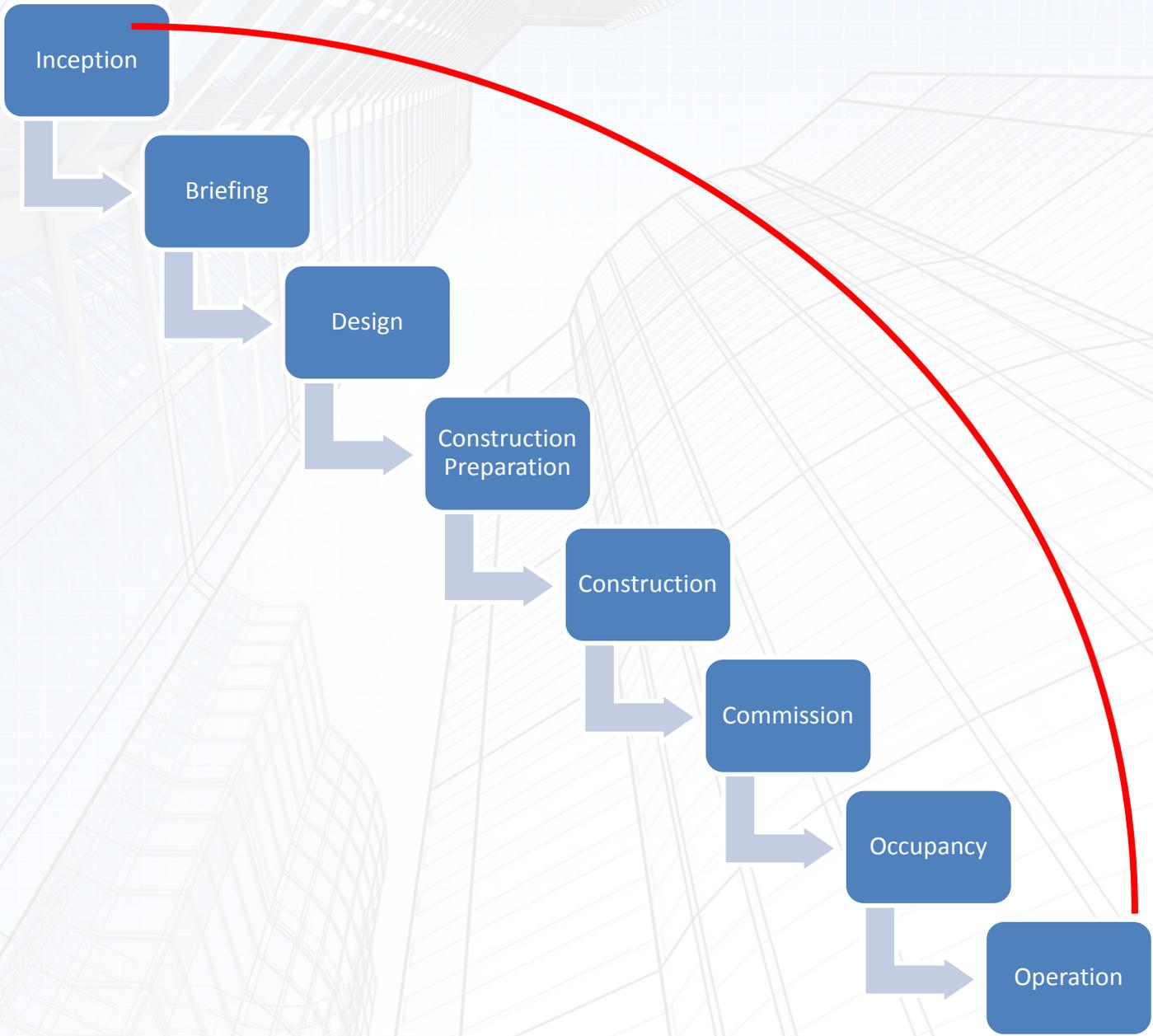
- By the time that FMs become involved in managing a building, the designers have almost always moved on to their next project(s).
- FMs and designers do not communicate well, the result is waste and error, which can lead to higher operating costs as well as decreased building performance and lower levels of satisfaction among building occupants.
- Communication difficulties between designers and facility managers due to a lack of mutual interest



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## INTRODUCTION

# SIGNIFICANCE OF THE PROJECT

- 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.



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## INTRODUCTION

### RESEARCH AIMS

**Aim One: Understand International Facility Management Challenges and Their Potential Impact on Building Performance.**

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



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# HIGH PERFORMANCE DESIGN PROCESS

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



**LITERATURE REVIEW**

# BUILDING PERFORMANCE AND POE

- POE Definition
- POE Benefits and Barriers
- Theoretical Approaches
- POE And Facility Management



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**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**

**Silva and colleagues (2004) in Singapore**

**Bu Jawdeh (2013) in the Persian Gulf countries.  
Mohammed and Hassanain (2010) in Saudi Arabia**



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- **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?**

**LITERATURE REVIEW**

**FACILITY  
MANAGEMENT  
INVOLVEMENT IN  
DESIGN PROCESS**



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- **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**

**LITERATURE REVIEW**

**FACILITY  
MANAGEMENT  
INVOLVEMENT IN  
DESIGN PROCESS**



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- **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).**



**GAP IN LITERATURE**



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- **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.**



**GAP IN LITERATURE**

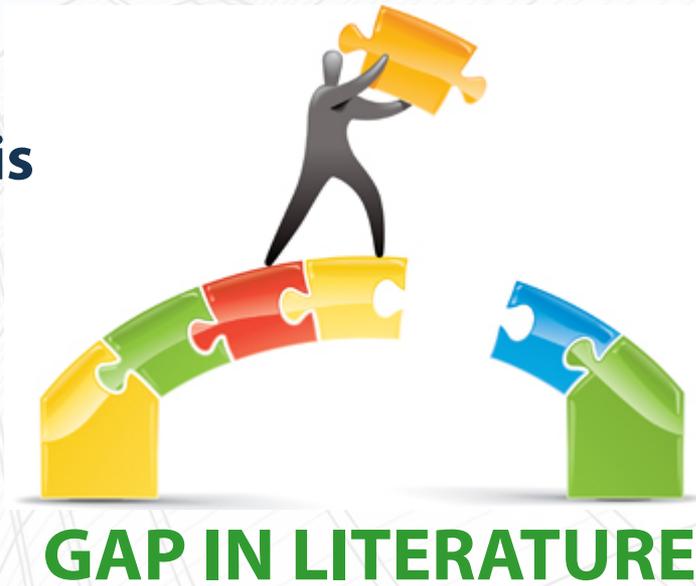


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- **Unlike previous studies, this research explores communication problems between designers and facility managers.**





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- **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.**

## **METHODOLOGY**

### **Multi-Methodology Approach:**

**Qualitative interviews  
with experts in the field**

**Quantitative survey**



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- **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.**

## **METHODOLOGY**

### **Qualitative Interviews with Experts in the Field**



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# 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.

Texas A&M University Human Subjects Protection Program

## Information Sheet

### Toward an Economic Design Process: Enhancing Building Performance through Better Integration of Facility Management in the Design Process

You are invited to take part in a research study being conducted by Dr. Marijella Shanley and Mr. Saaved Salas Kalantari Hematabadi, a researcher you decide whether or not to participate, and you will not lose any...

**Why Is This Study Being Done?**  
The purpose of this study is to enhance energy efficiency.

**Why Am I Being Asked To Participate?**  
You are being asked to be in facility management.

**How Many People Will Be Participating?**  
Overall, a total of 500 people.

**What Are the Alternatives?**  
The alternative to being in the study is not participating.

**What Will I Be Asked To Do?**  
You will be asked to complete a group interview as well.

**Are There Any Risks To Me?**  
The things that you will be doing are not stressful or up.

**Will There Be Any Costs To Me?**  
Aside from your time, there are no costs.

**Will I Be Paid To Be In This Study?**  
You will not be paid for being in the study.

**Will Information From This Study Be Released?**  
The records of this study will report that might be published access to the records. People research study personnel. Research Protections (DHRP) and entities access your records to make properly. Information about you required by law.

**Who may I Contact for More Information?**  
You may contact the Principal Investigator, Kalantari Hematabadi to tell them (979) 845-7009. For questions or concerns about the research office at +1 (979) 458-4087.

**What if I Change My Mind?**  
This research is voluntary and you can stop participating at any time.

## BACKGROUND

1. What is your role in the company?

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

2. What is your highest level of training/education?

- Technical certificate/license:
- Some college/university classes
- Some college/university
- Some graduate school classes
- Completed graduate school

3. How long have you worked in facility maintenance over your whole career?

- Less than 1 year
- 1 to 5 years
- 5 to 10 years
- More than 10 years

4. How long have you worked in your current position?

- Less than 1 year
- 1 to 5 years
- 5 to 10 years
- More than 10 years

5. How many people do you supervise as a regular part of your job?

- None
- 2-10
- 11-20
- More than 20

6. In which countries/areas of world have you worked in facility management?

- |                          |                          |                          |                          |                          |                          |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| USA                      | UK                       | China                    | Middle East              | India                    | Europe                   | North America            | South America            | Canada                   |
| <input type="checkbox"/> |

7. Please check your area of specialization in your company (Check as many as apply)

- Electrical wiring and power distribution
- Carpentry
- Plumbing
- Operation and maintenance of HVAC
- Spatial Planning

**International Facility Management  
Association (IFMA)  
United States  
40,000 Members**



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(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**





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## **INTERVIEW ANALYSIS**

### **22 Interviews Completed**

- **11 interviews in the U.K.**
- **6 interviews in the U.S.**
- **5 interviews in the Middle East**

**Julie Kortens**  
**UK**  
**Director of BIFM**

**Bill Bordass**  
**UK**  
**Researcher and Creator of Soft Landing**

**Bob Wible**  
**USA**  
**Director of FIATECH**

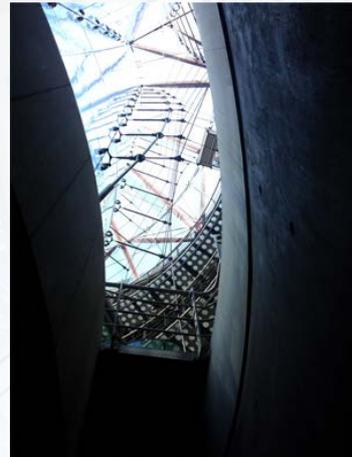


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- **Three Interviews with FMs of Channel 4 Building**
- **The Winner of Best British FM Team**
- **World Winning Award Building**



**Channel 4, Designed by Richard Rogers**

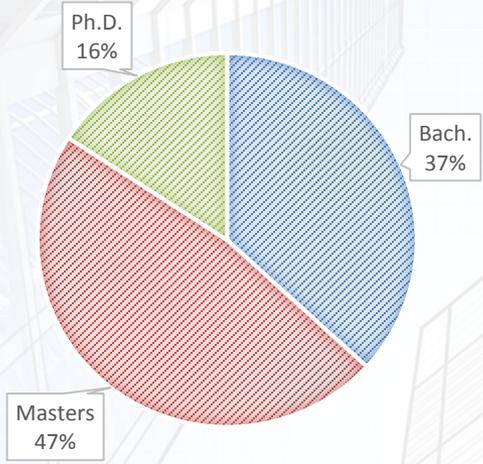


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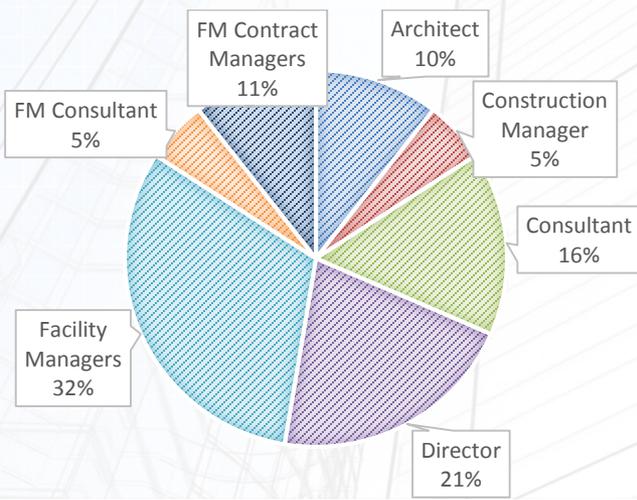
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## Demographic Information of Participants: Level of Education



## INTERVIEW ANALYSIS

## Distribution of Interviewees' Roles





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8

*FM-TAMU-Interview*

031514

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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

## INTERVIEW ANALYSIS

- **Card number**
- **Interview Code**
- **Date of the interview**
- **Line numbers**
- **Unit**
- **Page number in the original transcript**



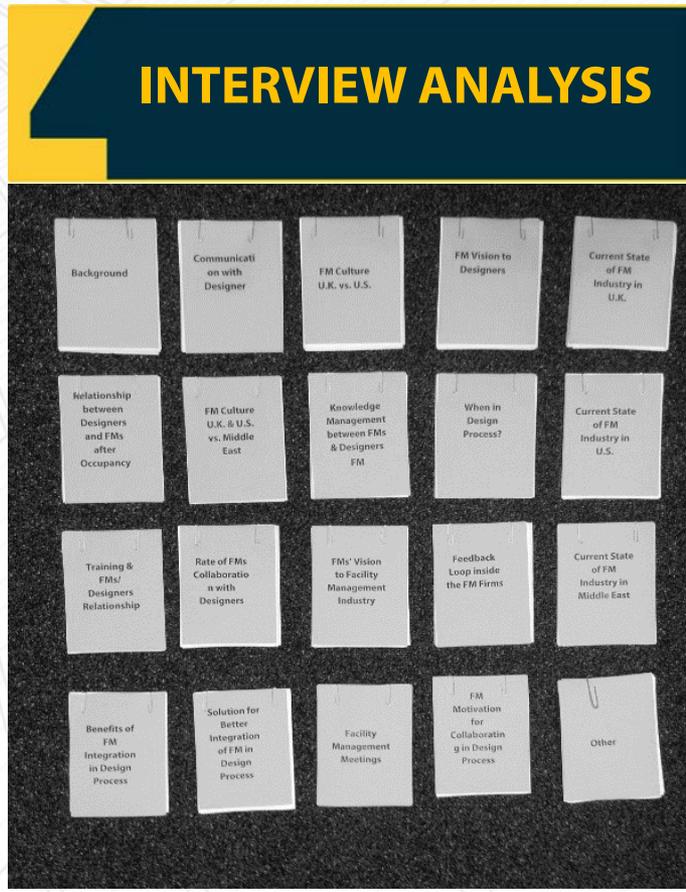
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Category

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





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## Category

<b>1.</b>	Background
<b>2.</b>	Facility Management in the United Kingdom
<b>3.</b>	Facility Management in the United States
<b>4.</b>	Facility Management in the Middle East
<b>5.</b>	Comparison of Facility Management Cultures: The United Kingdom vs. the United States
<b>6.</b>	Comparison of Facility Management Cultures: The United Kingdom and the United States vs. the Middle East
<b>7.</b>	Facility Management Meetings
<b>8.</b>	Feedback Loops Within Facility Management Firms
<b>9.</b>	Facility Managers' Vision of Their Industry
<b>10.</b>	Facility Managers' Vision of Designers
<b>11.</b>	Communication Issues



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- |            |  |
|------------|--|
| <b>12.</b> | Relationships between Designers and Facility Managers after Building Occupancy |
| <b>13.</b> | The Need for Better Training   |
| <b>14.</b> | Knowledge Management   |
| <b>15.</b> | Motivators and De-motivators of Facility Managers for Collaboration in Design  |
| <b>16.</b> | Benefits of FM Integration in Design Process                                   |
| <b>17.</b> | Other Factors Affecting the Likelihood of Collaboration                        |
| <b>18.</b> | The Benefits of Collaboration  |
| <b>19.</b> | When Should Collaboration Begin?   |
| <b>20.</b> | Solutions for Integrating Facility Managers into the Design Process            |



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## Themes

<b>Theme I.</b>	Context
<b>Theme II.</b>	The Current State of Facility Management in the United Kingdom, the United States, and the Middle East
<b>Theme III.</b>	Communication Within Facility Management Firms
<b>Theme IV.</b>	Relationships between Designers and Facility Managers
<b>Theme V.</b>	Facility Managers' Involvement in the Design Process

## INTERVIEW ANALYSIS



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- The estimated response rate for the recruitment e-mail was  $298/8500=3.50\%$
- The estimated effective response rate  $171/8500=2.01\%$
- The respondents took **12 minutes and 23 seconds** to fill out the survey

## SURVEY DISTRIBUTION

- The online survey was sent to approximately **8,500** individuals
- Out of these recipients, **298** individuals visited the survey site





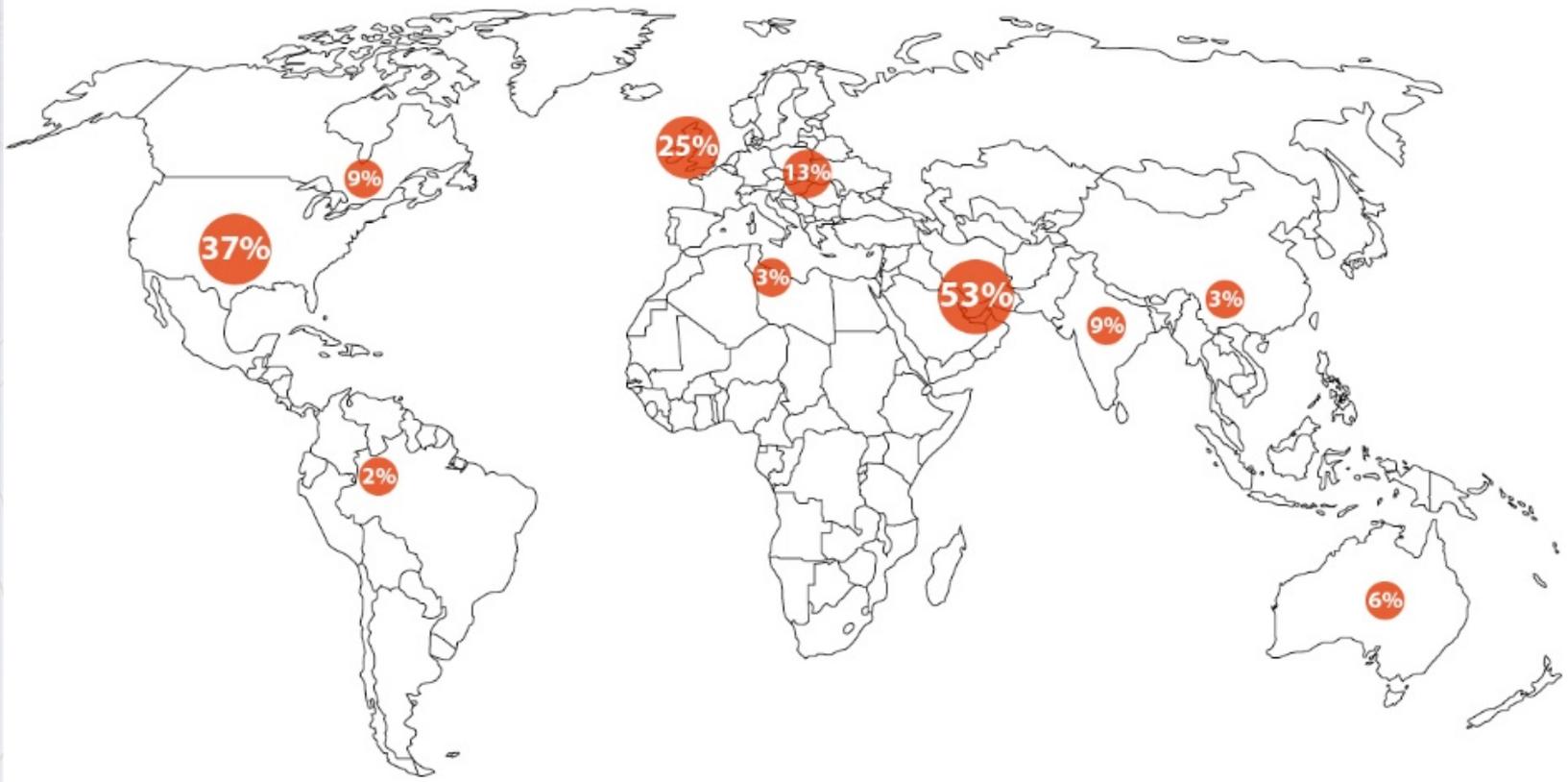
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# Locations Where Respondents Have Worked in the Facility Management Industry

## DEMOGRAPHIC INFORMATION



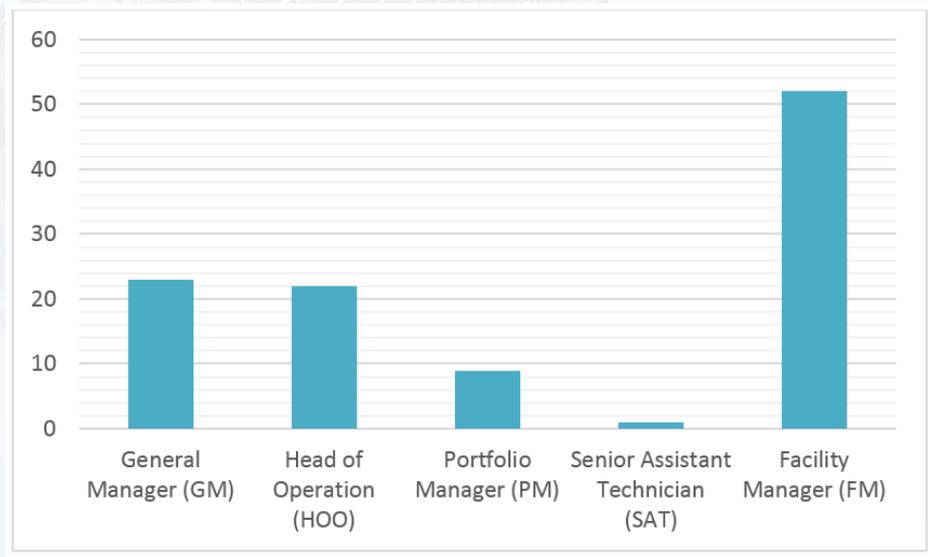


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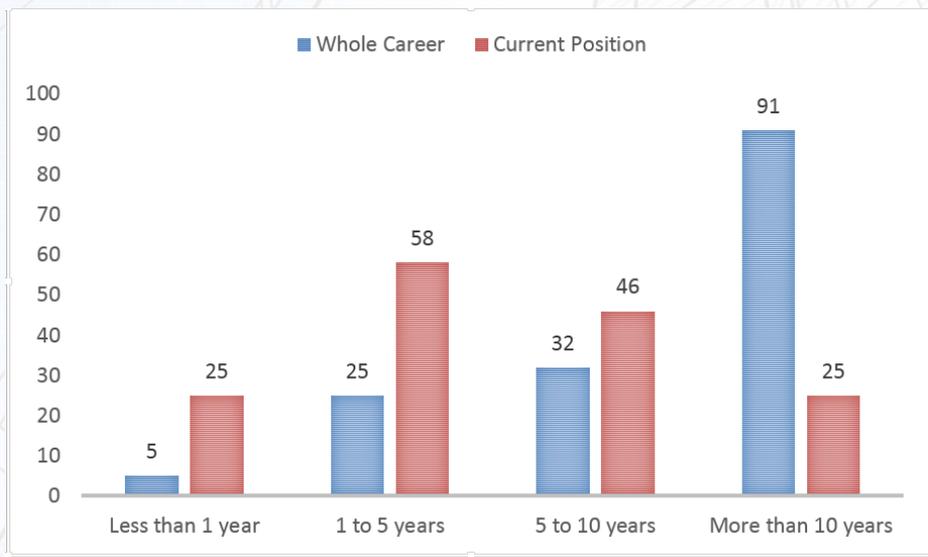
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# DEMOGRAPHIC INFORMATION



Respondents' Job Titles



Work Experience



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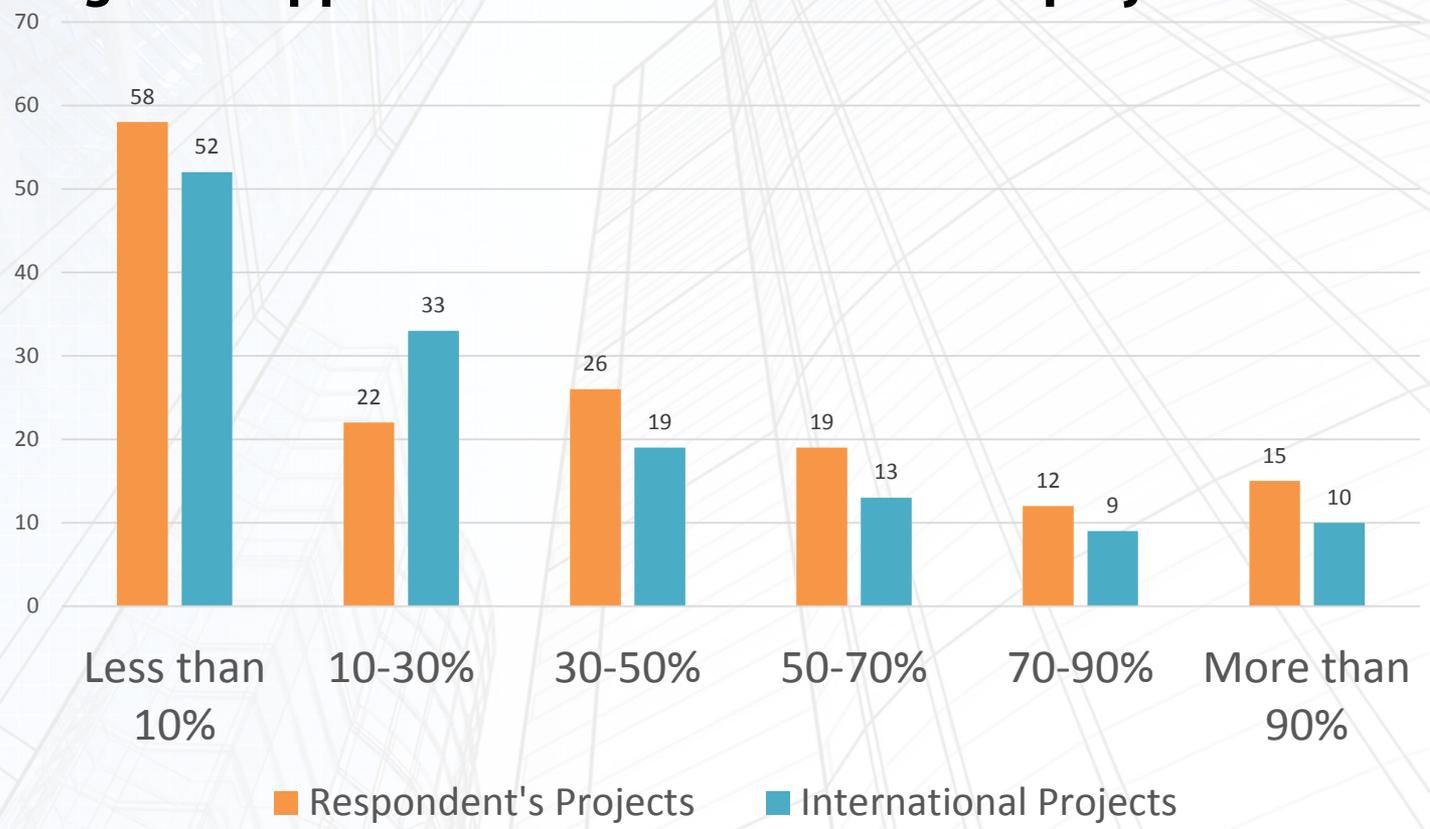
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# GENERAL RESULTS

## FM's Experience in Working with Designers

**On average, the respondents estimated that collaboration with designers happened on around 35% of their projects**





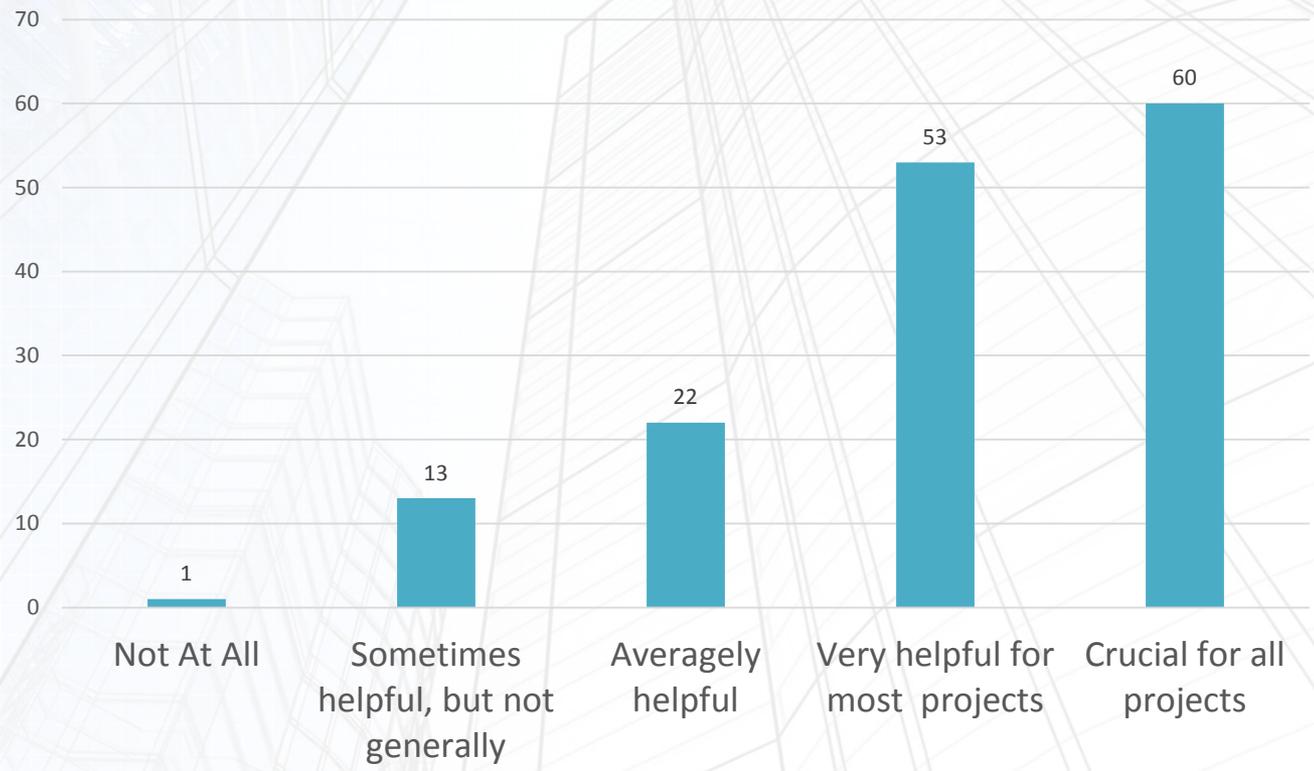
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## GENERAL RESULTS

# FMs' View of the Importance of Having a Relationship with Designers





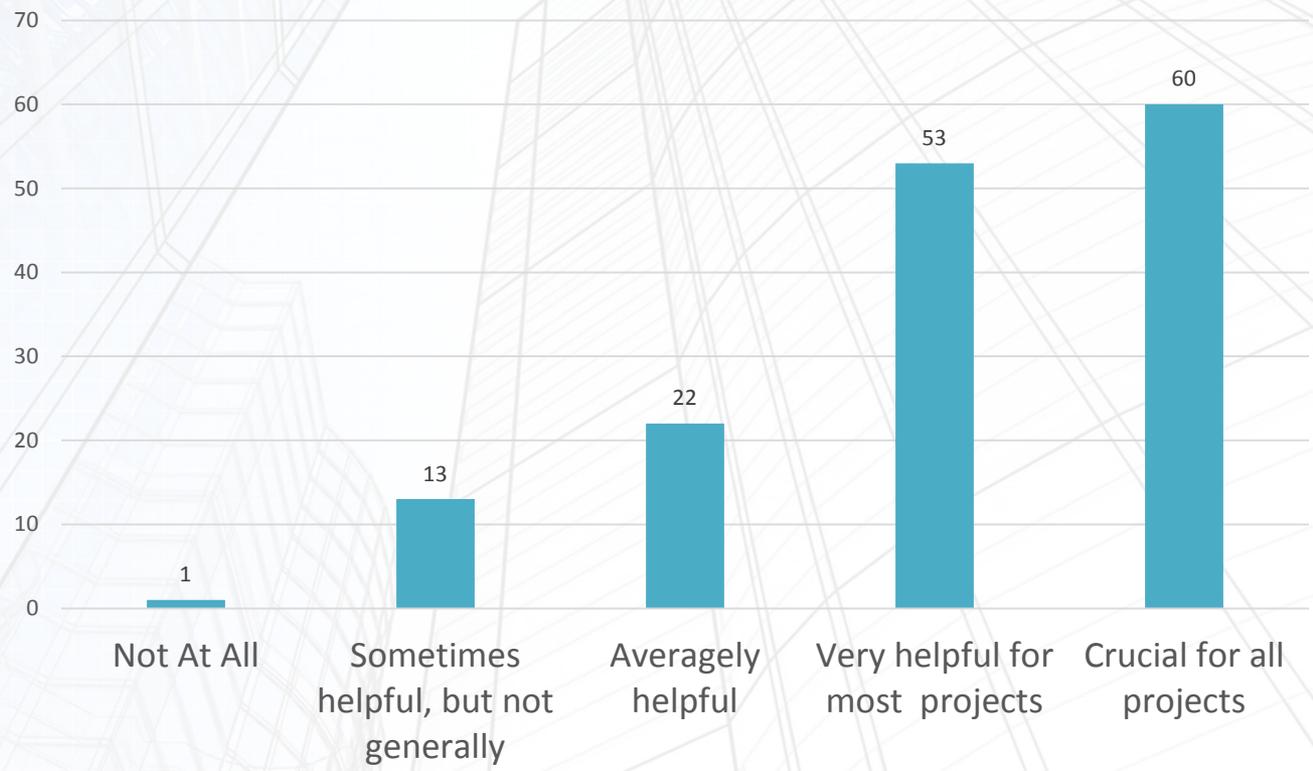
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## GENERAL RESULTS

# FMs' View of the Importance of Having a Relationship with Designers



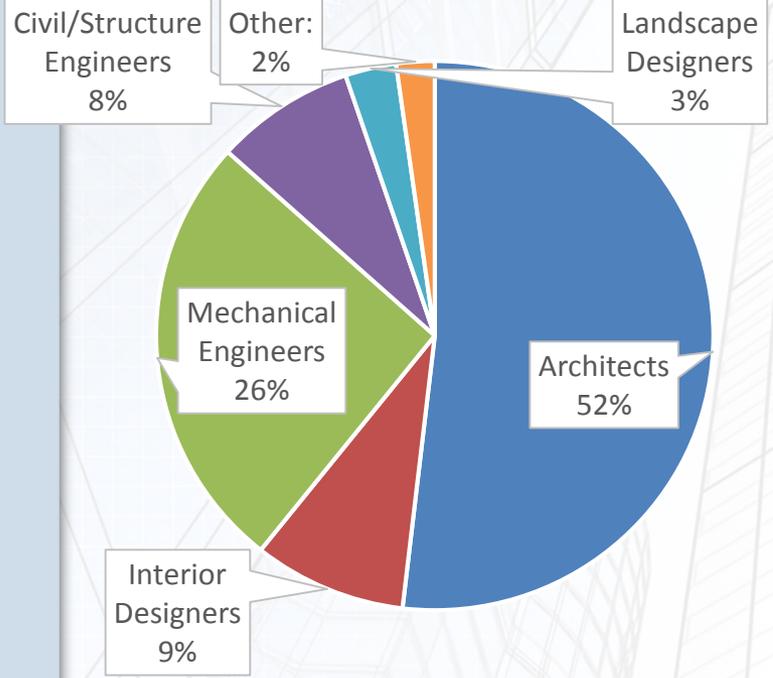


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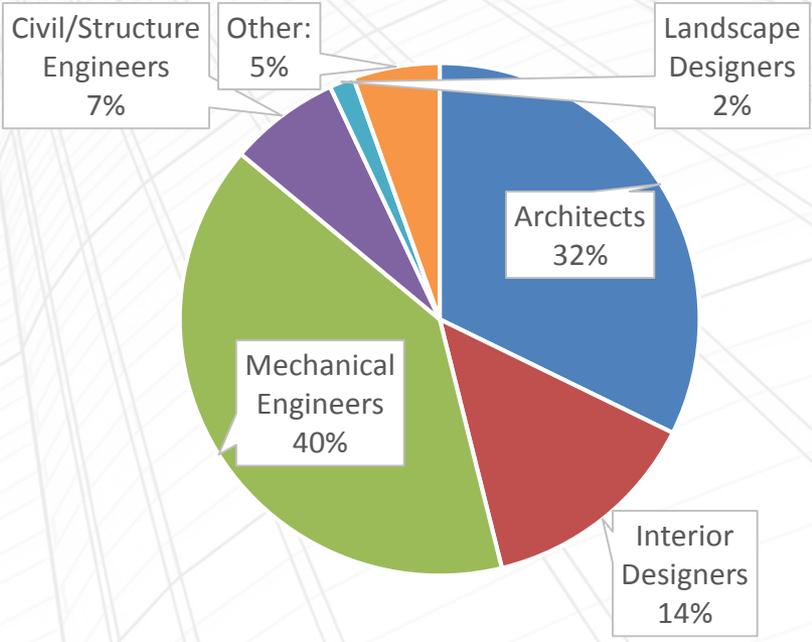
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## FM's Most Commonly Referenced Consultants



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





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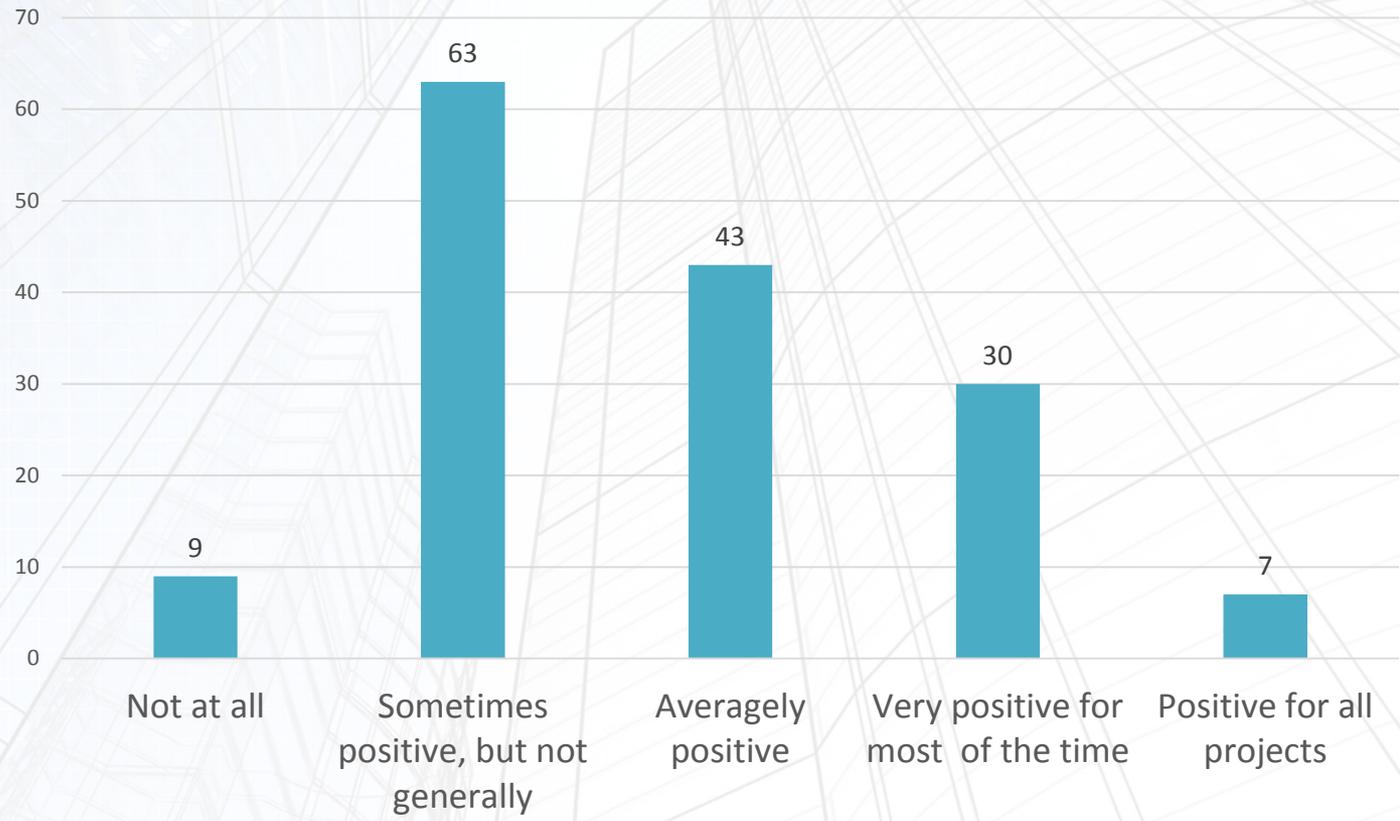
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## GENERAL RESULTS

### 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





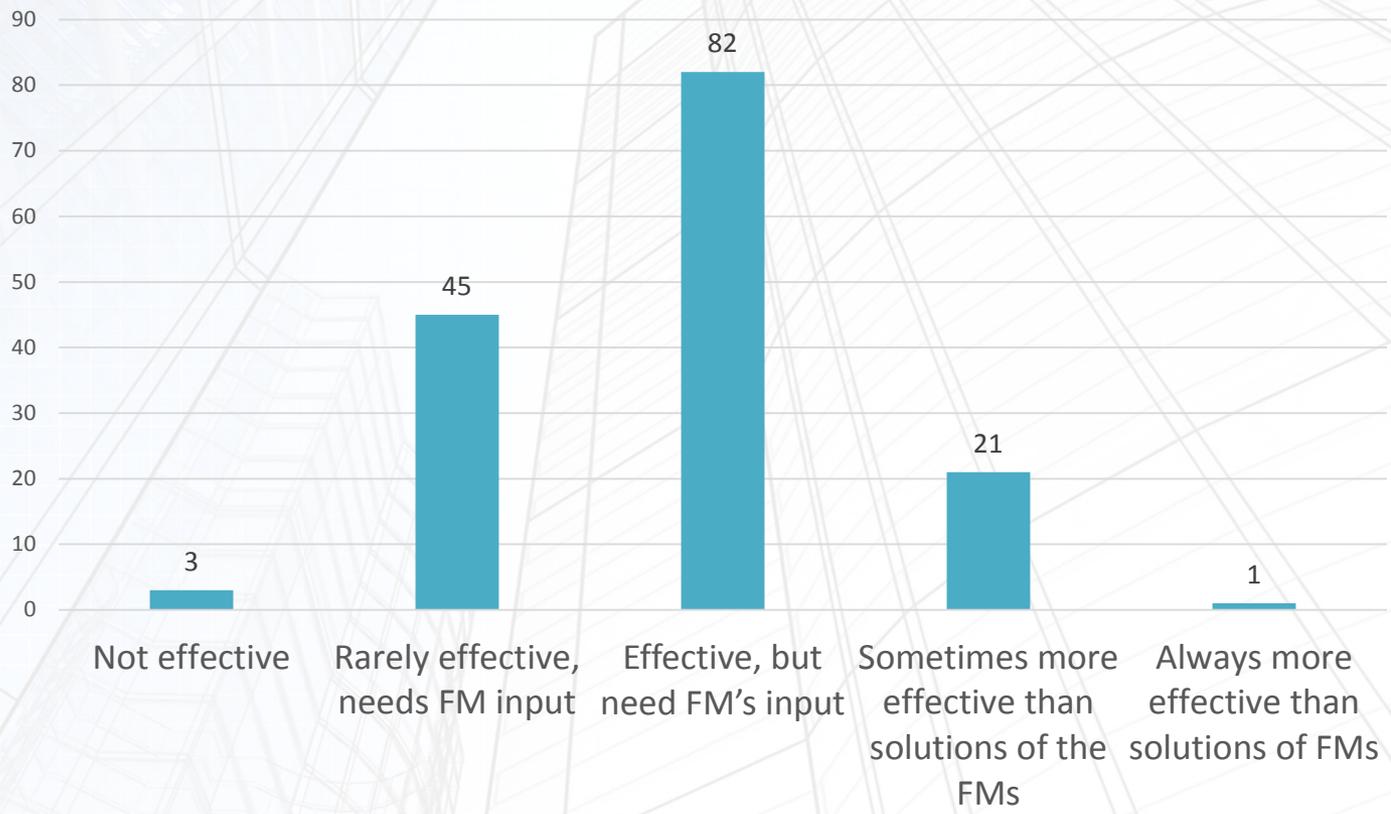
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## Efficiency of Designers' Proposals in Solving Building Maintenance Problems

**54% of the respondents indicated that designers' proposals are "effective, but need FM's input."**







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**Analysis of Hypotheses 1 to 3 (p-value<0.01 is marked in green; p-value<0.05 is marked in red; p-value<0.10 is marked in purple)**

NO.	Questions	Independent Variable	Dependent Variable	P-value	
				ANOVA	Chi-Square
H1	Questions 1, 2, 3 relative to Question 10	Role in the company	Share their opinion in the company	0.3769	0.5774
		Highest level of training/education		0.0700	0.3327
		Length of work experience		0.0043	0.0141
H2	Questions 1, 2, 3 relative to Question 24	Role in the company	Relationship with designers is a necessary step to achieve a good building performance	0.1167	0.0109
		Highest level of training/education		0.7267	0.8601
		Length of work experience		0.0118	0.0195
H3	Questions 1, 2, 3 relative to Question 27	Role in the company	Respondents feel that their ideas can affect decision-making in the design process	0.7878	0.5630
		Highest level of training/education		0.6239	0.0357
		Length of work experience		0.2617	0.3630



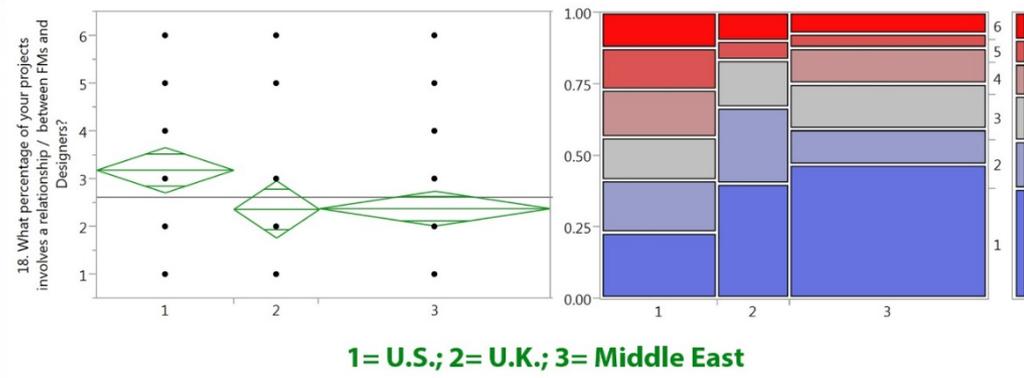
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# FMs' Early Involvement in the Design Process: The U.S., the U.K., and the Middle East

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).



**Ordered Differences Report**

Level	- Level	Difference	Std Err Dif	Lower CL	Upper CL	p-Value
1	2	0.8208333	0.3870360	0.056326	1.585341	0.0355*
1	3	0.8047840	0.3029124	0.206445	1.403123	0.0087*
3	2	0.0160494	0.3554215	-0.686010	0.718109	0.9640



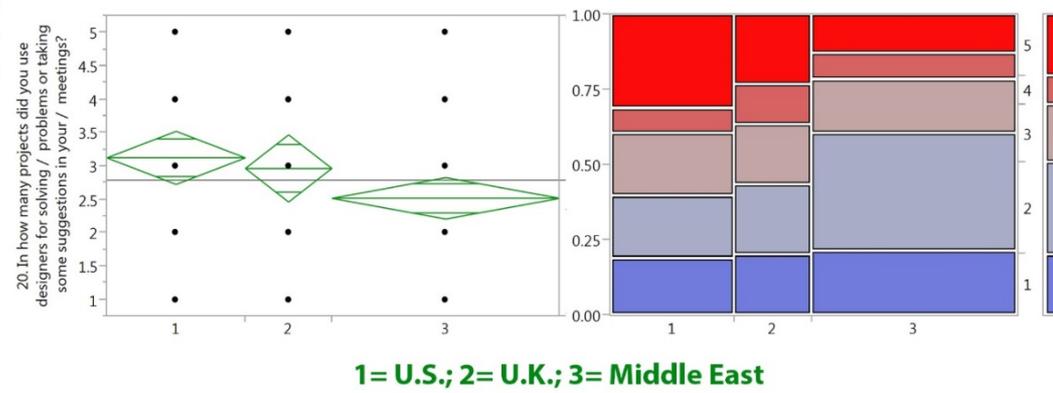
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# Rate of Collaboration with Designers for Solving Problem after Occupancy: The U.S., the U.K., and the Middle East

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).



**Ordered Differences Report**

Level	- Level	Difference	Std Err Dif	Lower CL	Upper CL	p-Value
1	3	0.6060127	0.2554014	0.101470	1.110555	0.0189*
2	3	0.4476793	0.2992916	-0.143568	1.038926	0.1368
1	2	0.1583333	0.3248042	-0.483313	0.799980	0.6266



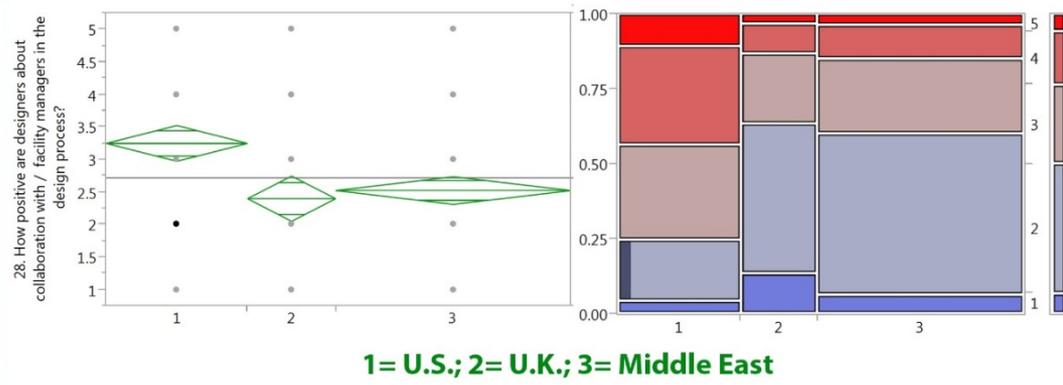
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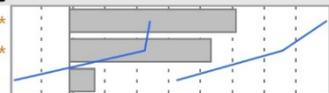
# Perceived Positivity of Designers about Collaborating with FMs: The U.S., the U.K., and the Middle East

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).



### Ordered Differences Report

Level	- Level	Difference	Std Err Dif	Lower CL	Upper CL	p-Value
1	2	0.8500000	0.2244438	0.406637	1.293363	0.0002*
1	3	0.7250000	0.1760682	0.377197	1.072803	<.0001*
3	2	0.1250000	0.2064582	-0.282835	0.532835	0.5458





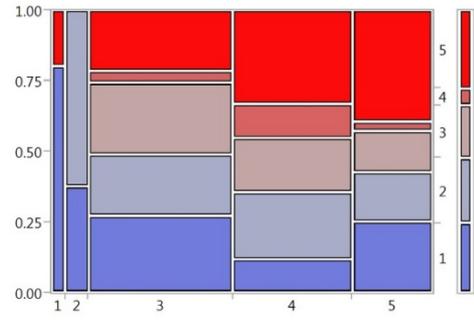
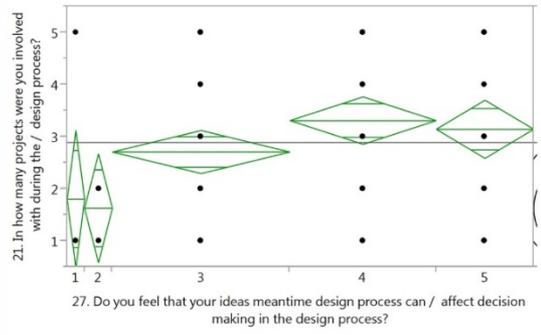
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# Respondents' Positive Feelings about Their Ability Influence Decision-Making in the Design Process vs. Their Rate of Collaboration

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).





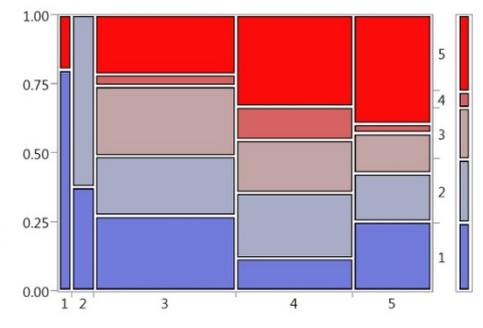
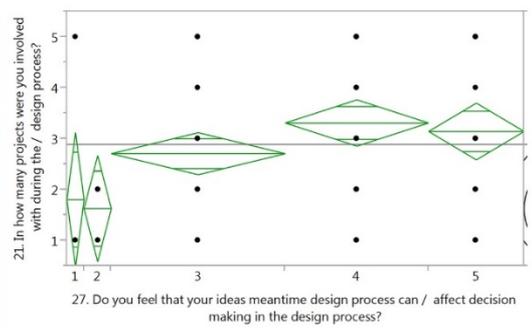
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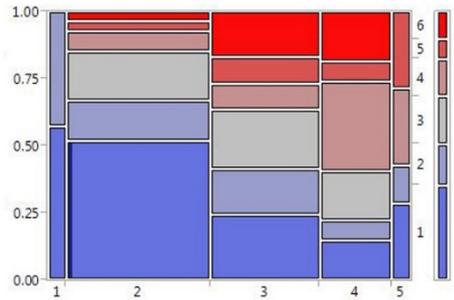
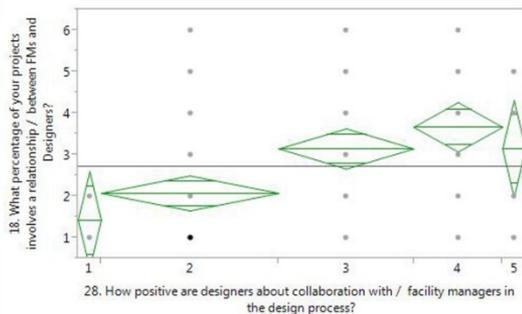
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## Positive Perceptions toward Designers vs. Collaboration with Designers

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).





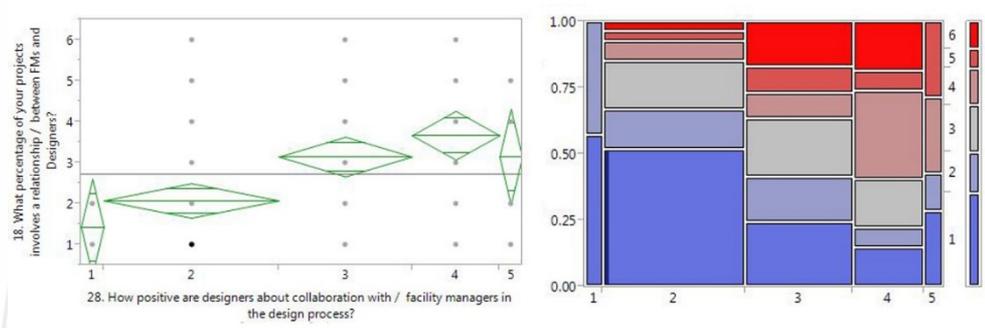
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## Number of Employees Supervised By Respondents vs. Collaboration with Designers

**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)**





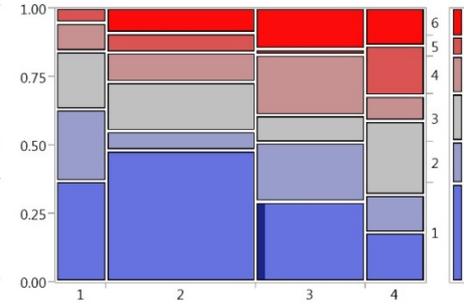
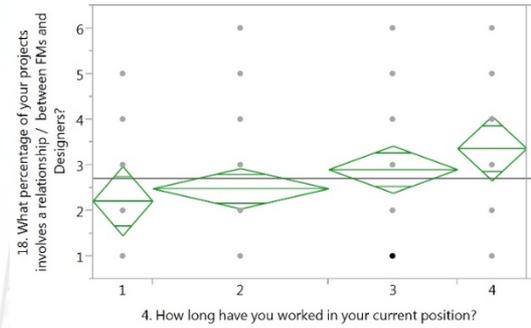
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# Length of Experience in Current Position vs. Rate of Collaboration in the Design Process

**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**



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**1 INTRODUCTION**

**2 LITERATURE REVIEW**

**3 METHODOLOGY**

**4 INTERVIEW ANALYSIS**

**5 SURVEY ANALYSIS**

**CONCLUSION**



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- **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**

**CONCLUSION**



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# The current State of the FM Industry in the United Kingdom, the United States, and the Middle East

United Kingdom	United States	Middle East
<ul style="list-style-type: none"><li>• Beginning to mature</li><li>• Fully integrated into the business model</li><li>• An aging work population</li><li>• A distinct generational shift occurring in the nature of the profession</li><li>• Larger number of educational programs giving degrees or certificates in facility management</li><li>• Little incentive for FMs to strive for really good building performance</li></ul>	<ul style="list-style-type: none"><li>• Beginning to mature</li><li>• Training as the biggest current concerns for the facility management industry</li><li>• Difficulty in finding qualified employees</li><li>• Less interest in the field among the younger generation</li><li>• Lack of understanding among the public about what exactly FMs do</li></ul>	<ul style="list-style-type: none"><li>• A new but rapidly expanding field</li><li>• Immature industry</li><li>• Absence of formal training systems</li><li>• Communication barriers</li><li>• Low quality of workmanship</li><li>• Lack of consistent production standards</li><li>• Conflicts of interest and cultural barriers between different levels of management</li><li>• Lack of understanding among the public about what exactly FMs do</li><li>• Poor integration process</li></ul>



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## Summary of Benefits from FMs' Early Involvement in Design

	<b>Benefits</b>	<b>Region in Which the Benefit Was Identified</b>
<b>Design</b>	Improve Performance of Design	U.K., U.S., Middle East
	Shorter Design Process for a Project	U.K., U.S.
	Safer and Healthier Design	U.K.
	More Flexible Designs by Presenting Realistic Knowledge of Building Operations	U.K., U.S.
	More Attractive to Prospective Occupants	U.K., Middle East
	More Energy-Efficient Design	U.K., U.S., Middle East
	More Straightforward to Construct	U.S., Middle East
	Provide Lessons Learned from Previous Projects (POE)	U.K., U.S.
	Provide the Evaluation of Design Innovation from Previous Projects (POE)	U.K.
	Greater Satisfaction for Both Clients and Occupants	U.K., U.S., Middle East
	Improving Design for Future Buildings	U.K., Middle East
	Better Relationship Between Designers and Building Users	U.K., U.S.
	Emphasize the Functionality and Productivity of the Design	U.K., U.S.



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## Summary of Benefits from FMs' Early Involvement in Design

	<b>Benefits</b>	<b>Region in Which the Benefit Was Identified</b>
<b>Facilities Management</b>	Reduction in Maintenance Costs	U.K., U.S., Middle East
	Reduction in the Long-Term Expenses of the Building	U.K., U.S., Middle East
	Provide the Ability to Remain Competitive in Their Field	U.K.
	Efficient Solution For Commission and Maintenance of the Building	U.K., U.S., Middle East
	Reduce The Later Need For FMs to Enact Inefficient Operational Practices and/or Expensive Infrastructure Alterations	U.K., U.S.
	More Focused on Minimizing the Building's Whole-Life Expenditures Rather Than Just the Initial Capital Costs	U.K., U.S.
	Easier to Control and Manage	U.K., U.S., Middle East
	Provide the Ability to Minimize or Avoid Maintenance Risks	U.K., U.S.



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Barriers	Percentage of Interviewees who Mentioned the Barrier
Communication problems between FMs and designers	85%
Underestimation of FMs' ability to contribute	55%
Concerns about the cost of involving more people in design	40%
Difficulties in explaining to clients what exactly the FMs can contribute to design	35%
Cultural differences between FMs, designers, and clients	30%
Resistance on the part of clients/owners to fund the process	30%
Lack of knowledge of clients about the prospect of collaboration	30%
Geographical distance between designers and FMs	20%

## CONCLUSION

**Summary of Identified Barriers against the Involvement of FMs in Design**

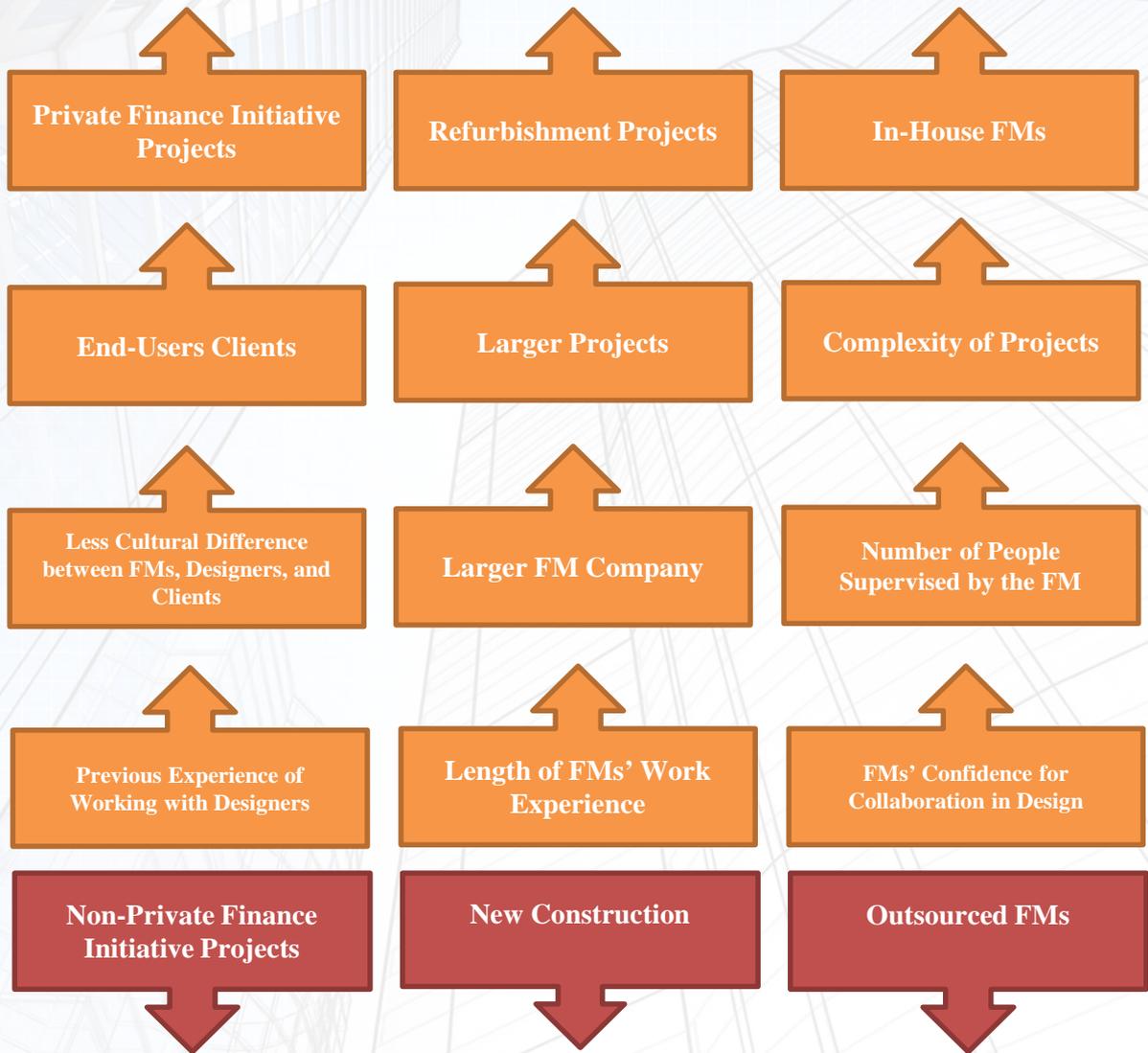


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# Factors Associated with Greater or Lesser Likelihood of Collaboration between FMs and Designers





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- 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

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

**Using Knowledge Management Tools**

- 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
- Provide Guidelines for Cost-effective Solutions for Each Project Prior to the Collaboration Meetings

# CONCLUSION

## Model for Overcoming Barriers and Better Integrating Facilities Managers into the Design Process



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## Using Knowledge Management Tools

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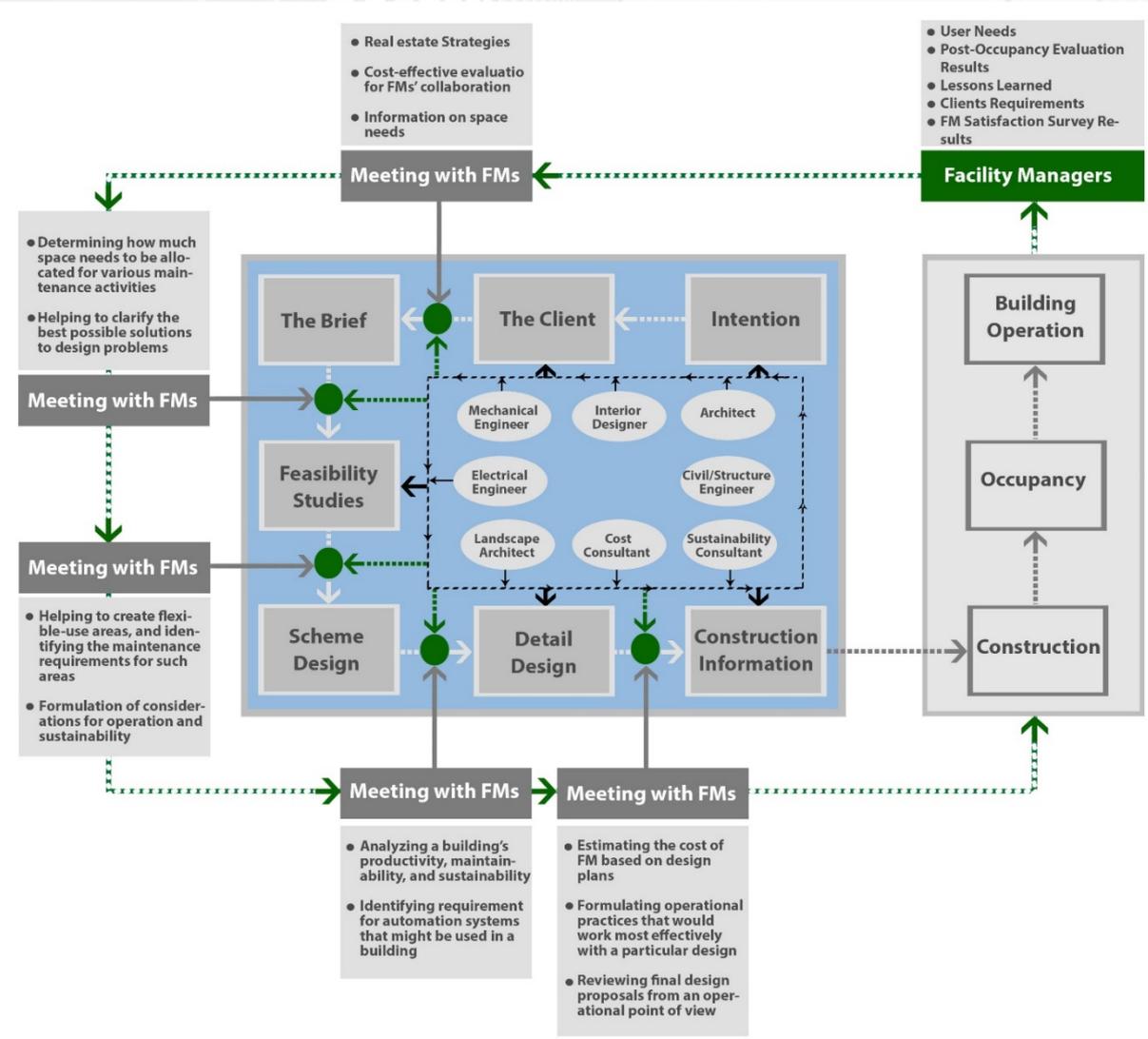


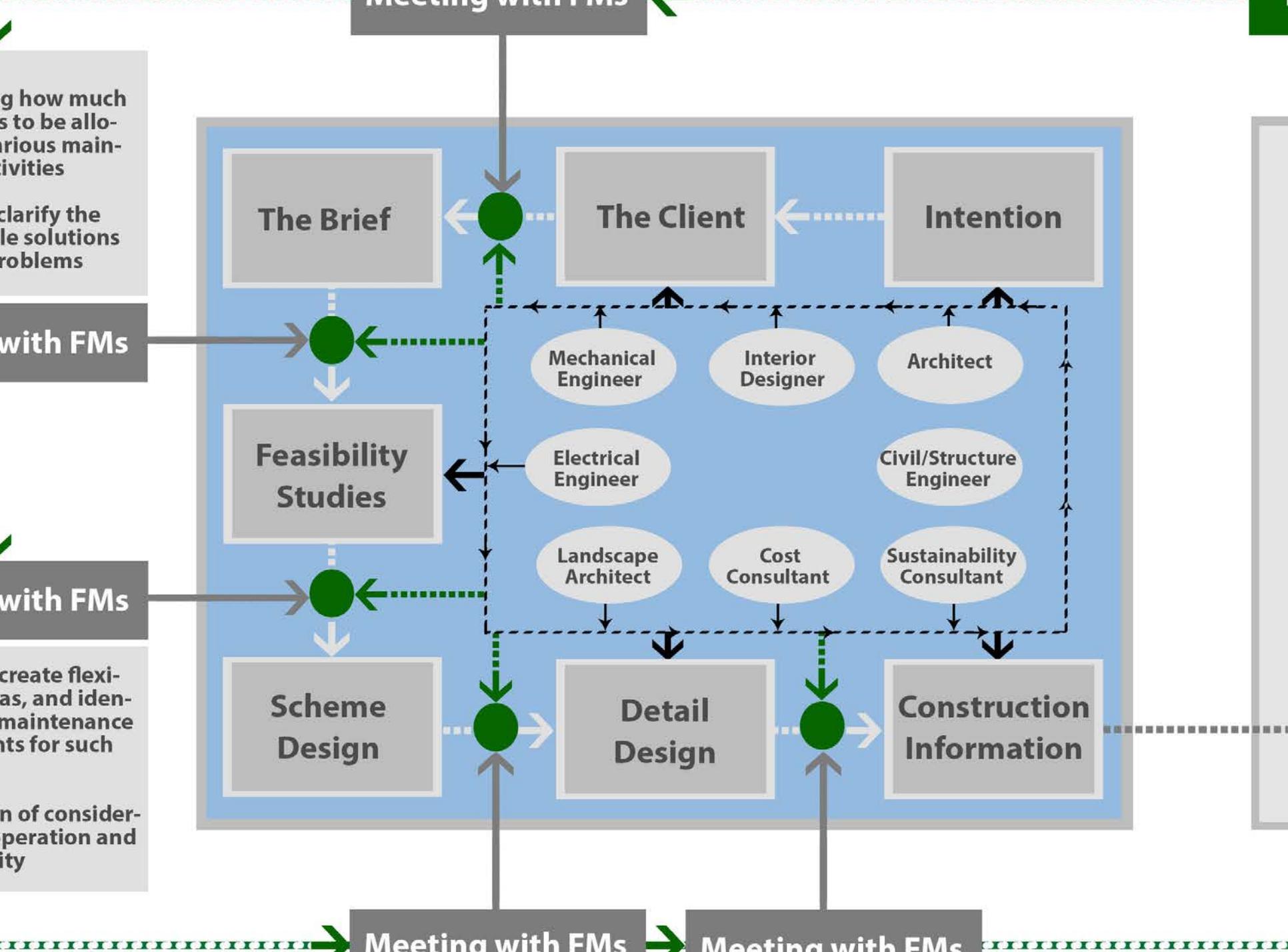
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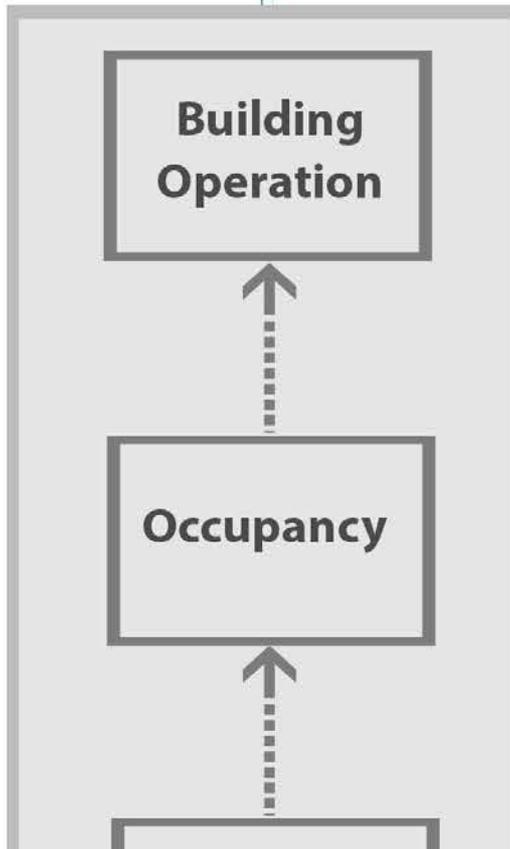
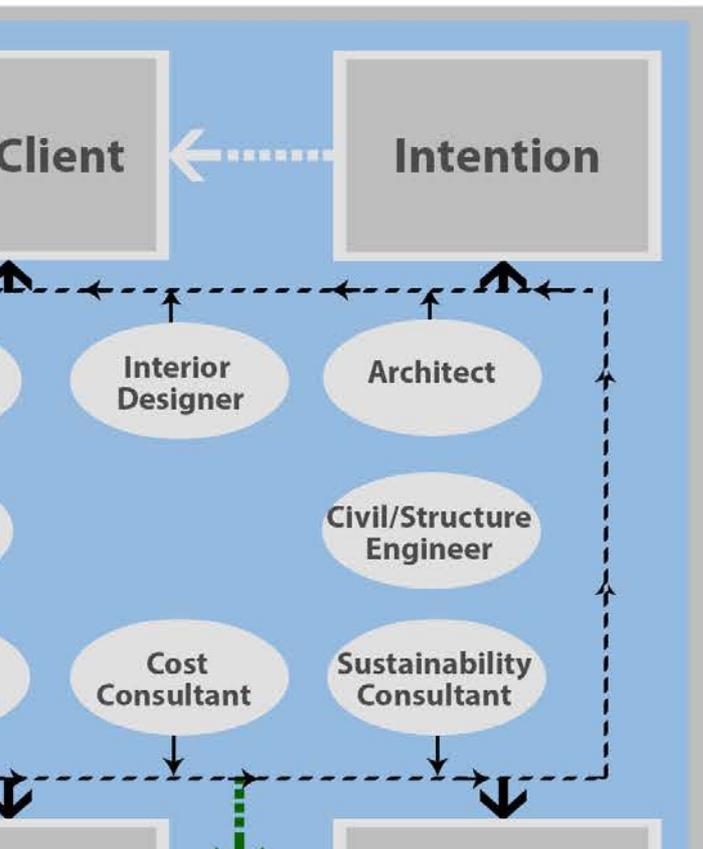
# The Proposed Model of Collaboration to Better Integrate the Knowledge from Facilities Managers in Design Process

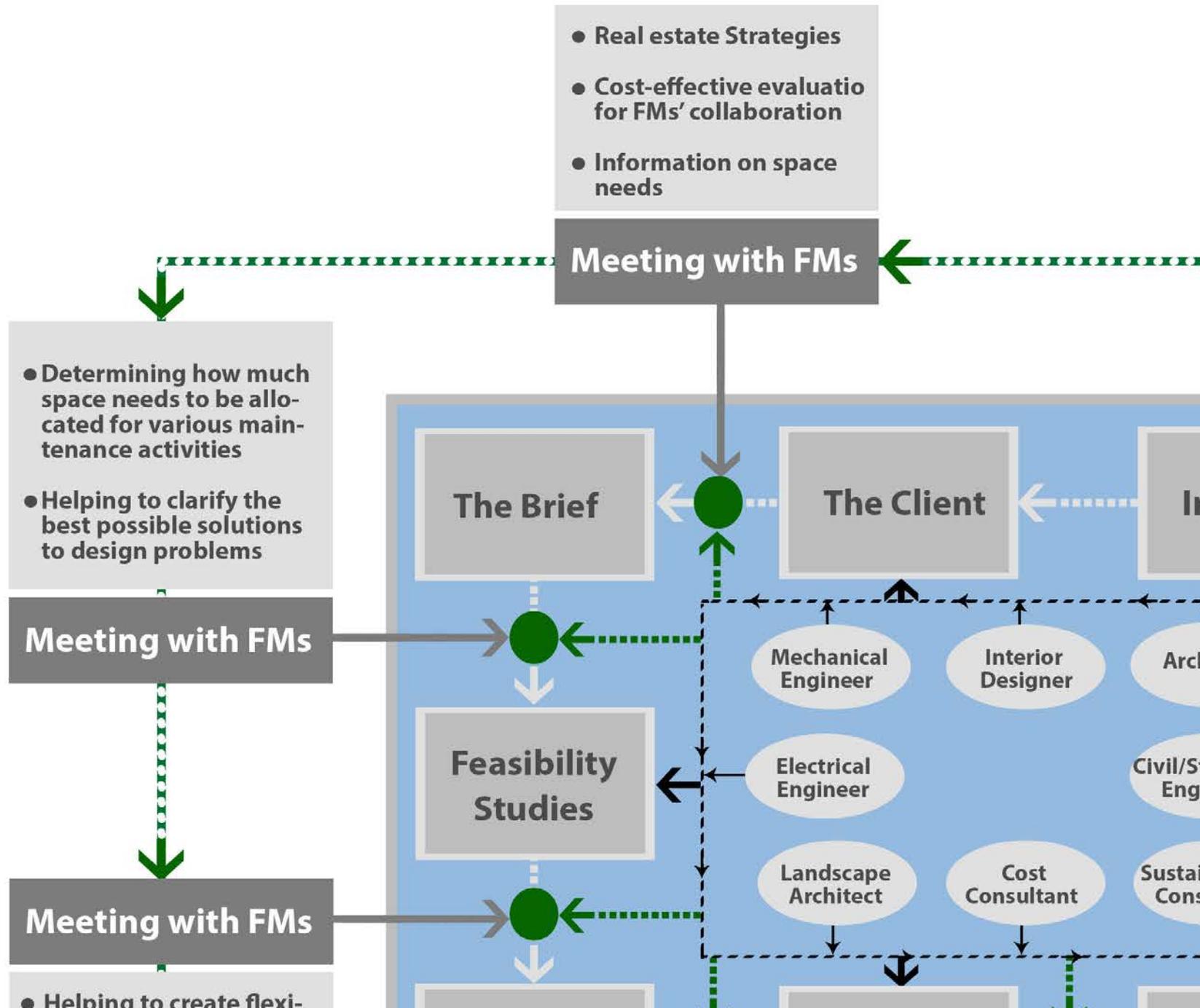


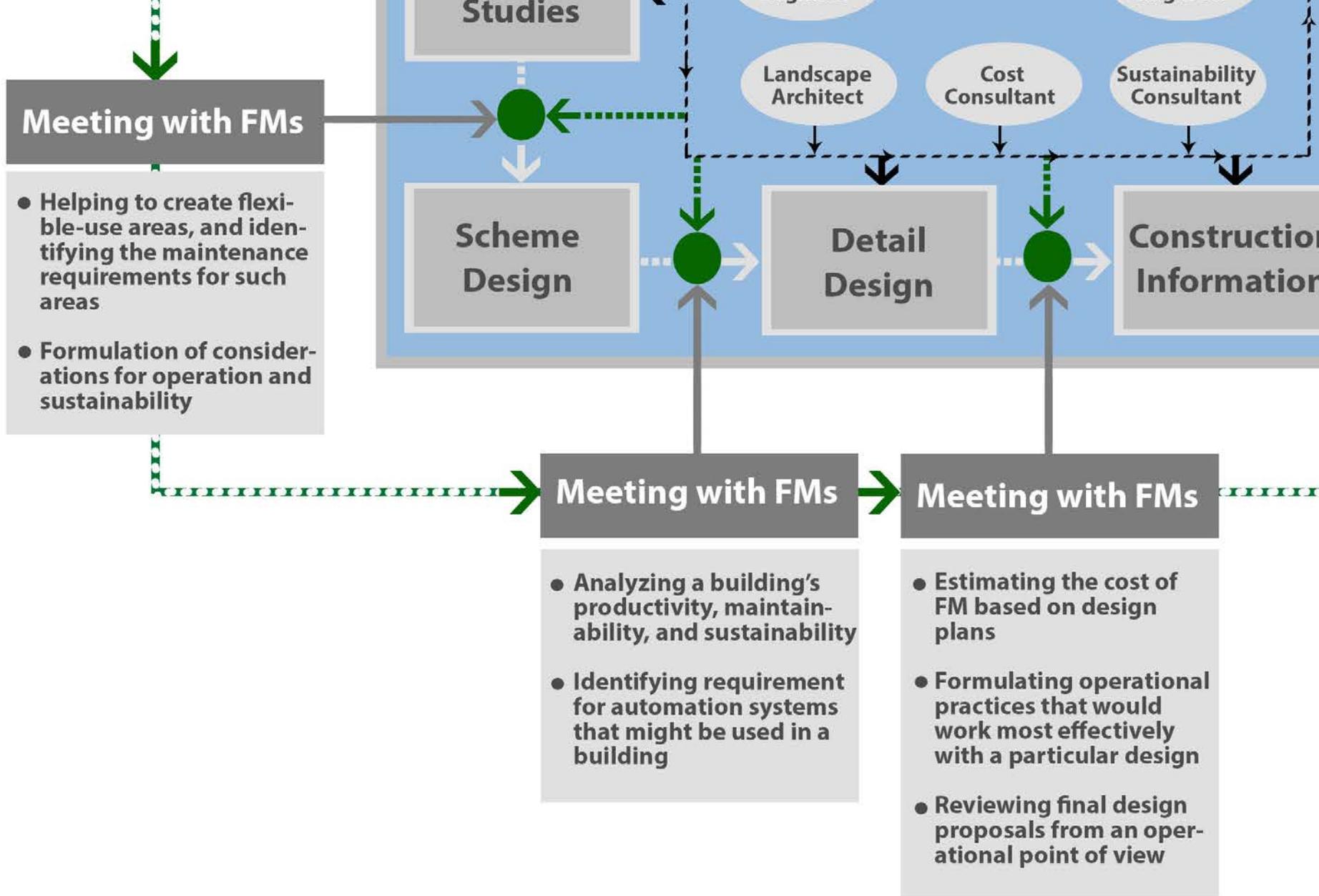


- User Needs
- Post-Occupancy Evaluation Results
- Lessons Learned
- Clients Requirements
- FM Satisfaction Survey Results

**Facility Managers**







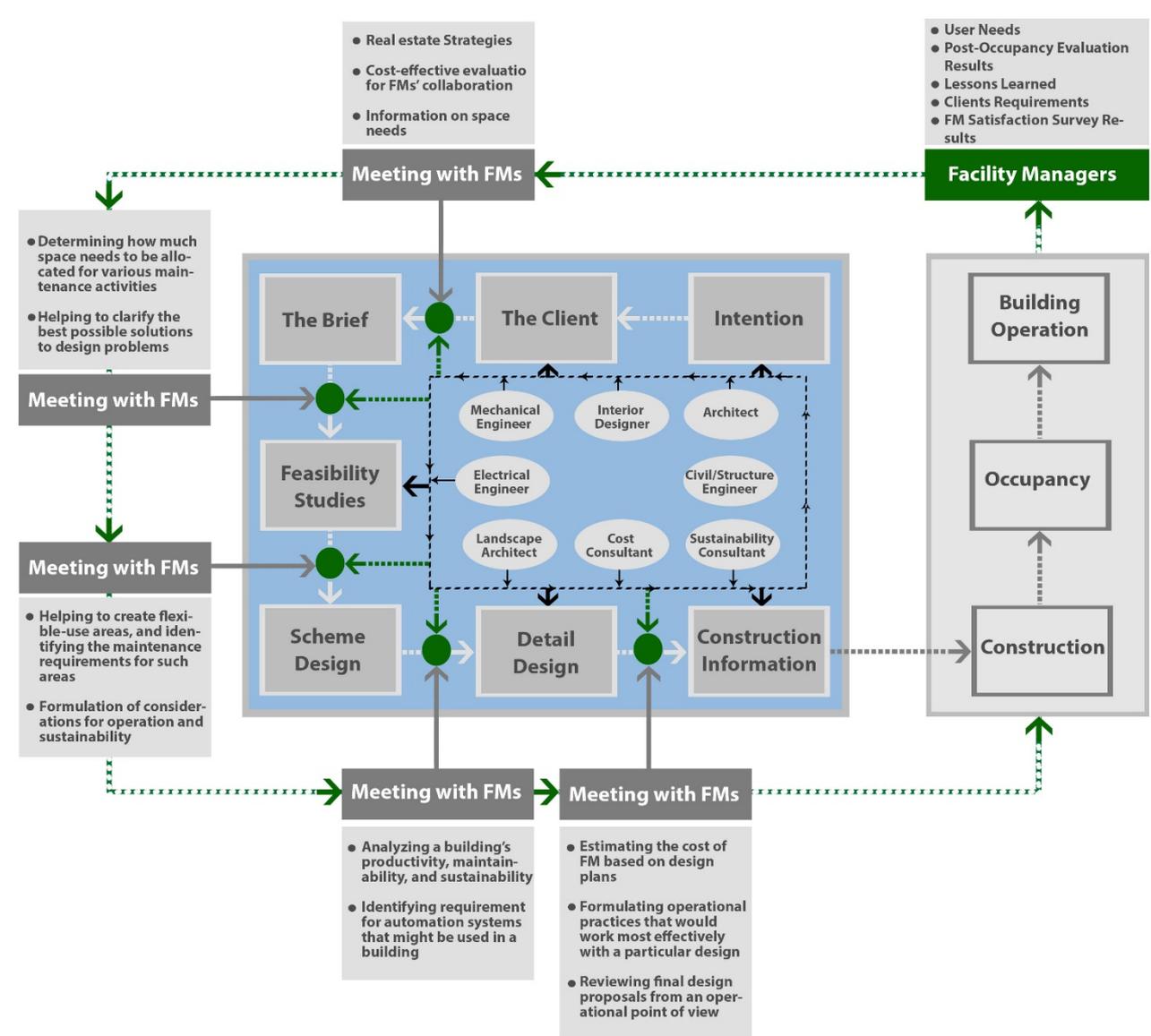


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# The Proposed Model of Collaboration to Better Integrate the Knowledge from Facilities Managers in Design Process



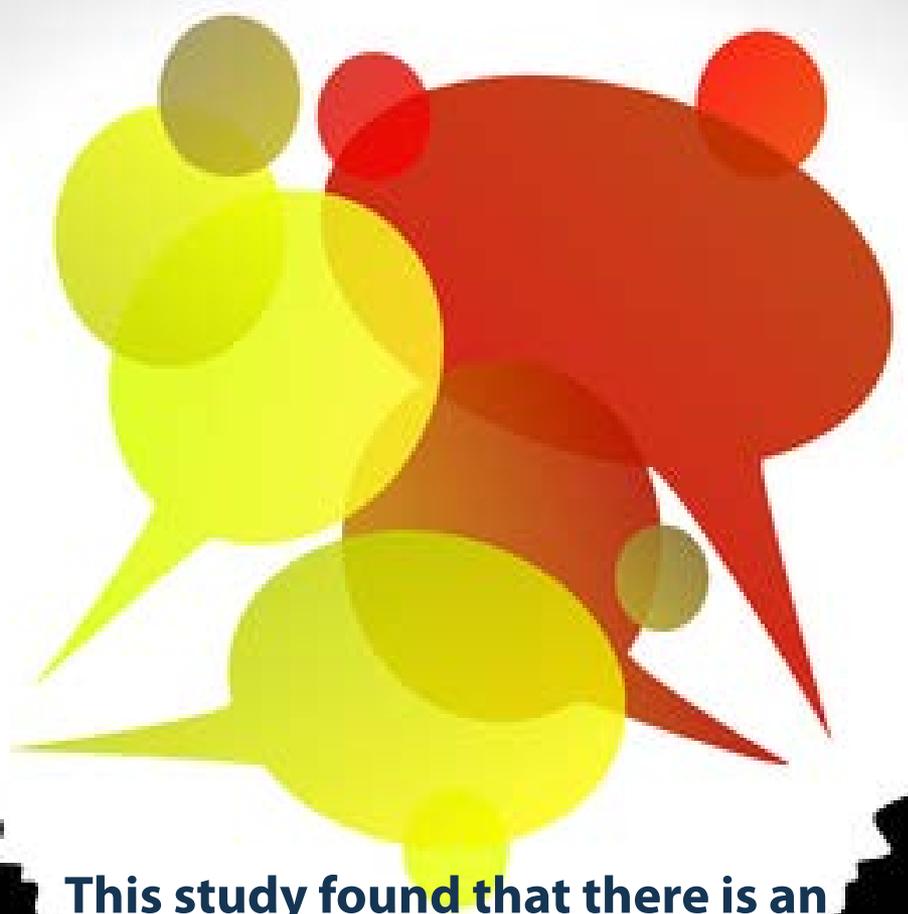


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## CONCLUSION



**Designer**

**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.**



**Facility Manager**

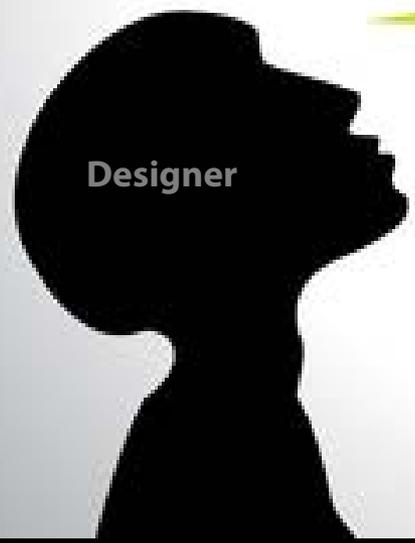


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## CONCLUSION



**Designer**



**Facility Manager**

**This study compared the FM Industry, and FMs' early involvement in design in the U.K., the U.S., and the Middle East.**



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## CONCLUSION



**Designer**



**Facility Manager**

**Early FM involvement not only benefits FM providers but also benefits other key stakeholders, such as clients, designers, and end users.**



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## CONCLUSION



Designer



Facility Manager

**This study found barriers for the FM-designers collaboration. The majority of these barriers are listed as the communication barriers.**



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## CONCLUSION



**Designer**



**Facility Manager**

**This research analyzed the factors associated with greater or lesser likelihood of collaboration between FMs and designers.**



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## CONCLUSION



Designer

**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.**



Facility Manager



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## CONCLUSION



Designer



Facility Manager

**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.**



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# Collaboration between designers and facility managers

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

Saleh Kalantari

*Washington State University, Pullman, Washington, DC, USA*

Mardelle M. Shepley

*Cornell University, Ithaca, New York, USA, and*

Zofia K. Rybkowski and John A. Bryant

*Department of Construction Science, Texas A&M University,  
College Station, Texas, USA*

Designers and  
facility  
managers

557

Received 4 August 2016  
Revised 8 December 2016  
Accepted 14 January 2017

### 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-selection of facility management professionals in each of the regions under study. The interview data were parsed 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 non-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

Kalantari, S., Shepley, M. M., Rybkowski, Z. K., & Bryant, J. A. (2017). Collaboration between designers and facility managers: comparing the United Kingdom, the United States, and the Middle East. *Facilities*, 35(9/10), 557-572.



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## Designing for operational efficiency: facility managers' perspectives on how their knowledge can be better incorporated during design

Saleh Kalantari<sup>a\*</sup>, Mardelle M. Shepley<sup>b</sup>, Zofia K. Rybkowski<sup>c</sup> and John Bryant<sup>c</sup>

<sup>a</sup>School of Design and Construction, Washington State University, Pullman, WA, USA; <sup>b</sup>Design and Environmental Analysis, Cornell University, Ithaca, NY, USA; <sup>c</sup>Construction Science, Texas A&M University, College station, TX, USA

### ABSTRACT

There is a growing agreement among researchers and practitioners that the input of facility managers (FMs) can be a vital resource during the architectural design process. FMs are responsible for the everyday operations of buildings, and are therefore aware of many practical details of maintenance and efficiency that designers may overlook. However, despite the recognized benefits of collaboration between designers and FMs, there are significant obstacles that have so far prevented the widespread implementation of this partnership. The current study used data from 30 in-depth interviews and a widely distributed survey of FMs in three international regions to identify some of the obstacles that prevent collaboration between FMs and designers. Based on these data, the authors also developed specific recommendations for better incorporating the knowledge of FMs into the design process. Difficulties in communication and cultural barriers between the two fields were found to be the most pervasively reported obstacles, closely followed by the perception that designers are unaware or uninterested in the contributions that FMs can offer. Educational initiatives, technology training, and structural incentives were among the proposed solutions. The study resulted in a simple visual model of best practices for promoting collaboration, as well as a separate model for organizing the contributions of FMs during design.

### ARTICLE HISTORY

Received 9 December 2016  
Accepted 26 June 2017

### KEYWORDS

Designer; facility management; building performance; design process; collaboration

### Introduction

Facility management is a growing field of professionals who administrate the operational aspects of large, multiuse buildings. It is critically important for architectural designers to understand the role that facility managers (FMs) play in implementing designers' intended patterns of building use (Duffy, 2000; Jensen, 2012). When there is good communication between designers and FMs, the final architectural product will operate to its maximum efficiency (Erdener, 2003). However, when 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 (Meng, 2013). Buildings do not always perform as their designers intended, and poor communication between the design team, the building occupants, and the facility managers may be one of the central reasons for this problem (Tzortzopoulos & Sexton, 2007).

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Kalantari, S., Shepley, M. M., Rybkowski, Z. K., & Bryant, J. (2017). Designing for operational efficiency: facility managers' perspectives on how their knowledge can be better incorporated during design. *Architectural Engineering and Design Management*, 1-22.



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

## THANK YOU

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