Sustainable Facilities Management
- a way to smart city goals

DTU_BCA Executive development program

Associate professor, Ph.D.
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Technical University of Denmark
Centre for Facilities Management (CFM)

- First FM research group in Denmark
- Since 2008
- Realdania sponsorship

- Center leader: Per Anker Jensen
- Deputy: Susanne Balslev Nielsen

Learn more – people, projects, publications:
- [www.cfm.dtu.dk](http://www.cfm.dtu.dk)
- LinkedIn group: Center for Facilities Management - Realdania Research
- Twitter: Center for Facilities Management - Realdania Research

How to design, operate and develop buildings and infrastructures so that this constantly is adjusted to user needs?
Who am I?

**FM:**
- Since 2004
- Deputy at Centre for Facilities Management-Technical University of Denmark, 2008-
- Professor at HiOA, Norway, 2014-
- Speciality: sustainability in build environment, 1992-

**Education:**
- Civil engineer 1993: urban planning
- Ph.D. 1998: Transformation of technical infrastructure towards sustainable urban development

**EuroFM association:**
- Chair of the Research Network Group 2014-
- European FM-researcher of the year 2010

**Current projects:**
- Sustainable Facilities Management
- Organizing Public FM centres
- Shared space in the knowledge city (Ph.d.)
- ISGAN – Annex 7: institutionalisation
- Dynamic optimisation of building performance (Ph.D.)
Supporting sustainability in the build environment

Better understanding of:
- Buildings and use of buildings
- Decision making processes
  - Planning tools and processes
  - Change management
- Decision makers perspective

How supporting sustainability with means of:
- New technologies
- New processes
- New forms of organisations

Specialisation:
- Strategy and leadership
The Climate Change and Sustainable Development Group (CCSD) at DTU Management Engineering

The CSSD Smart City definition:

- Cities are large, complex, dynamic and nature-dependent artefacts that represent the living environment for a large and increasing number of people worldwide.
- A Smart City collects, processes and analyzes data, allowing urban systems to learn, adapt and strategically self-optimize towards a detailed vision.
- Smart City can contribute to a vision for a desirable future city, such as the sustainable city, the efficient city, or the equal city, comprising a set of values. These values are often framed in terms of economic, environmental, and social sustainability, diversity, participatory governance, and quality of life.

A technical system without a clear vision is meaningless. Likewise, a vision without a strategy for how to achieve it easily becomes a wish list. Therefore, our definition includes both the visionary aspect of the Smart City and the technical means to achieve it.
Content

1. The potential role of sustainable FM
2. Leadership in the build environment
3. Stakeholder collaboration

⇒ Collaboration is essential for success. Together we can achieve more than we can on individual basis.
Existing buildings:  
- Operation and maintenance  
- A new discipline in DK, now with ISO standard
Facilities Management:
- a management disciplin and profession

Facilities management is defined as:

• Integration of processes within an organisation to maintain and develop the agreed services which support and improve the effectiveness of its primary activities.

  (DS/EN 1522-1, 2008))

• Organizational function which integrates people, place and process within the built environment with the purpose of improving the quality of life of people and the productivity of the core business.

  (ISO 41000, 2016))

Examples:
- Airports, universities, hotels

A facility is a “thing” that facilitates something.
It makes life easier....
Sustainable Facilities Management

Ecology: Knowledge about the relation between everything living and its surroundings.

FM: knowledge about the relation between people, places and processes.

If we do not understand these relations, we will neither understand why it is important that FM is contributing to local and global sustainability.
Sustainability opportunities in the lifetime of a building...
The time perspective on a building

<table>
<thead>
<tr>
<th>Pre-project</th>
<th>Project</th>
<th>Post-project</th>
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<tbody>
<tr>
<td>4. Technical design</td>
<td>5. Construction</td>
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0  25  50  75  100 Years
The use phase matters: Total costs – total value

Evolution of Life Cycle Costs – building types

Source: Bayrische Staatsbauverwaltung nach GEFMA
The full FM circle:
- is the ideal situation for holistic thinking

Plan
(need, prognoses, scenarios)

Decide
(buy, rent, build)

Operate
(utility, administration, maintenance, service)

Build
(new, retrofit, extend)
Typical tasks in an FM function

- Asset management
  - Objective
  - Strategies
  - Real-state

- Administration
  - Funding
  - Budgets
  - Accounts
  - Taxes
  - Benchmarking
  - Insurance
  - Contracts
  - Personnel

- Space-management
  - Space management
  - Us of areal
  - Decor
  - Moving
  - Inventory

- Operations
  - Maintenance
  - Supplies
  - Cleaning
  - Joint operations
  - Environment

- Services
  - Projects/contracts
  - IT
  - Security
  - Work Environment
  - Canteen
  - Reception
  - Office service

Potential contributors to a smart city agenda
How can smart city technology help Facilities Managers to success?

- Smart infrastructures on city scale

- Collect, processes and analyse data, allowing the FM function to learn, adapt and strategically self-optimize towards a detailed vision:

  - Some key performance indicators:
    - Use (who, when, what, how)
    - Environmental resources consumption
    - Quality
    - Customer satisfaction
    - Compliance to regulations
    - Cost
    - Timeliness

Eg. smart hotels
When FM is not fulfilling its full potential! - how to become smarter?
Leadership in the build environment

• is all about collaboration!

• The lifetime of a building: phases
• Stakeholders with influence

• Sustainable Building Management as strategic tool for cities and organizations
Leading sustainability

Supplier management

Staff management

Sustainability strategy

Marketing

Innovation

Dialog with stakeholders

DTU Management Engineering, Technical University of Denmark
4 strategic positions in SFM
(Nielsen 2011, Claims of SFM)

- Clean Technology
- Pollution prevention
- Sustainability vision
- Product stewardship
Who are your collaboration partners?
3 models for municipal FM organisations

<table>
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<tr>
<th>Model 1:</th>
<th>Independent FM centre with the full authority (and political leadership) to manage the municipal facilities.</th>
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<td><strong>31%</strong></td>
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<th>Model 2:</th>
<th>A FM centre which manages the municipal facilities on behalf of the owners, which are various administrative departments and institutions.</th>
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<td><strong>43%</strong></td>
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<th>Model 3:</th>
<th>Decentral organisation where the ownership and the operation is assigned to the various administrative departments and institutions.</th>
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Stakeholder collaborations

- Investors
- Authorities
- Operators
- Users
- Innovators
- Suppliers
- Universities

InnoCity solutions
Smart and sustainable

“Sustainability is a quest# rather than an absolute.
Is a goal that we, as facility managers, should be striving toward for the good of the planet”

John P. Fennimore 2013

# a journey towards a goal
Conclusion:

Professionals that owns, operate and administrate existing buildings are keys to sustainable smart cities.

For more information: www.CFM.DTU.DK

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Join Centre for Facilities Management-Realdania Research via LinkedIn group and Twitter

Articles via DTU phonebook/Orbit