Project Manager’s role in Sustainable Building Projects: A case study in Canada

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Construction Industry in Canada

6% GDP
7.3% of employment

X

25% of waste generation
40% of energy consumption
35% greenhouse gas (GHG) emissions
Fragmented nature of the construction industry

- Design project fragmentation
- Procurement fragmentation
- Construction industry (CI) supplier chain fragmentation
- Labor fragmentation at construction site

Source: Evbuomwan and Anumba (1998)
Integrated Design (ID)

Source: Roadmap for the IDP
### Project management challenges in sustainable building

#### Project management role in a building process (traditional vs. sustainable buildings)

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<td>Documentation</td>
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<td>Site preparation to completion</td>
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Adapted from Delnavaz (2012)
### Project management challenges in sustainable building

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*(traditional vs. sustainable buildings)*

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Project management challenges in sustainable building

LEED project expectations (design phase)

X

The actual performance

- Achieve: 90%
- Fail: 10%
- Worst: 62%

Newsham et al., (2009)
Case Study:
Centre for sustainable development

Source: MSDL architects
Research results

1) Stakeholders’ collective engagement with common values

2) Increase in task complexity

3) Increase in time required in the designing phase

4) The operation is a key phase
Research results

1) Stakeholders’ collective engagement with common values
   • ID process needs a “green champion”.
   • Facilitator’s role and legitimacy during the project charrettes.
2) Increase in task complexity

- CSD involved all stakeholders in ID “charrettes” since the early phases of the project.
- Decision not only based on cost, but environmental impacts and energy consumption.
- Client as an environmental NGO organisation.
3) Increase in time required in the designing phase

- No consensus on how to operationalize charrettes.
- Waste of time can inhibits innovation and collaboration.
- Mere participation vs. effective decisions.
4) The operation is a key phase

- Commissioning phase is vital for optimizing the building's overall energy performance but not sufficient to transfer knowledge to the building’s new stewards.

- Targets defined during ID charrettes vs. actual performance.
Research results

Impact scores for LEED simulation and actual consumption in CSD

Comparative between LEED Energy simulation and real consumption (last four years).

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<th>Reference Building</th>
<th>LEED simulation</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
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<tr>
<td>Electricity (Kwh)</td>
<td>1,121,928</td>
<td>721,954</td>
<td>1,390,333</td>
<td>1,391,386</td>
<td>1,512,092</td>
<td>1,323,251</td>
</tr>
<tr>
<td>Gas (m3)</td>
<td>113,645</td>
<td>4,206</td>
<td>10,644</td>
<td>29,046</td>
<td>25,223</td>
<td>3,084</td>
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ID promise to reduce fragmentation in the design and consecutive phases.

- In reality, even if fragmentation in the design phase is reduced, it still occurs during the construction and the operation phase.

- Adopting ID in the design phase alone is not able to reduce fragmentation in following phases (notably without changes in the role of the project manager).
Discussion and conclusion

1) The PM needs to be hired earlier, before project’s feasibility stage.

2) The PM needs to assist the client by organizing project design “charrettes” (new tools and techniques).

3) Led by PM, the project team needs to follow the operation phase of the building.
1) The PM needs to be hired earlier, before project’s feasibility stage.

• The PM has the responsibility for building **teamwork** by the same values.

• The early development of a **sense of common goal** can increase the willingness of the parties to **collaborate** and achieve sustainability goals.

• An opportunity for the PM to **build links between phases and professionals**.
Discussion and conclusion

2) The PM needs to assist the client by organizing project design “charrettes” (new tools and techniques).

- Life Cycle Analysis (LCA) to measure the **impacts of design** approaches, technical solutions, and materials.

- **New challenges and complexity** facing sustainable buildings projects.

- Helping better preparing ID design “charrettes” can improve the design process and **diminish** the team members' **impression** that they are “**wasting their time.**”
3) Led by PM, the project team needs to follow the operation phase of the building.

- Documentation and the commissioning phases was not able to successfully transfer project knowledge.

- The PM can collaborate in overcoming this weakness by extending its participation in the project during the operation of the building (3 to 4 years).

- By reducing the four levels of fragmentation (previously identified), the PM can help construction sector have a more positive impact on society and the environment.
Thank you

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