Trends and Keys to Success in Owner-driven BIM Adoption
Owners Complain about…

- Marketing vs. Actual
- A Team vs. C Team
- Too Many Systems
- Too Many “Sources”
- Missing Data
- Frequent Changes
- Fumbled Handoffs
- Cost
- Versions
- Delay
Evidence-based Firm and Project Evaluations

Owner Types

Commercial/Retail | Biotechnology | Resort/Theme Park

Firms Evaluated

25 firms (Architecture, Engineering and Construction)
10 teams, 15 projects (Domestic and International)
GPS for Success & Satisfaction

Advisory
Benchmark
Evaluation
- bimSCORE
- facilitySCORE
- meetingSCORE
- teamingSCORE
Speakers

Calvin Kam  
**Founder**  
Strategic Building Innovation • bimSCORE

Tony Rinella  
**Senior Director**  
Strategic Building Innovation • bimSCORE
Establish Objectives and Protocols

Use the Right People and Processes

Provide the Right Tools

Track Impact and Progress
Models and Physical Mockup

Head-mounted VR Device

“Full-Tour”

“Full-Wave”

C.A.V.E.

Individual photo sources:
[1] ps.hket.com/project/184/gallery/4 ; stproperty.sg/articles-property

#bimSCORE
# Collaboration Software Comparison

## Technology Maturity

<table>
<thead>
<tr>
<th>Technology</th>
<th>Conventional Practice</th>
<th>Typical Practice</th>
<th>Advanced Practice</th>
<th>Best Practice</th>
<th>Innovative Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Software A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Software B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Software C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Software D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Software E</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Technology Functions

<table>
<thead>
<tr>
<th>Function</th>
<th>Software A</th>
<th>Software B</th>
<th>Software C</th>
<th>Software D</th>
<th>Software E</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.11 Measure Distances, Angles, Areas &amp; Volumes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.12 Comment on 3D Model</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.13 Redline on 3D Model</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.14 Clip Plane (3D Section)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.14 Manage Markup</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.15 Assign Attributes to Markups</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.16 Finding &amp; Grouping Objects from Model</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.17 Move model elements for “what ifs” Scenarios</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: SBI.bimSCORE
Owner-driven BIM: Cloud-based Design Objects Library (DOL)

Disseminate Requirements through Databases and Web Services Instead of Documents

Over 280 Design Objects
On Stage: apparent alignment during the team meeting

Behind the Scenes: Private interview with subs

#bimSCORE
Project Teams Complain about…

Meetings
Late Changes
Unrealistic Wants
Too Many Voices
What gets done? What’s left?

Meeting Timeline – Issue Resolution Quality

- **Issues**
  - SW Knuckle plan study
  - Drainage layout
  - Retail interior layout update

- Timeline:
  - 8:05 to 9:50

- Colors:
  - Green: Closed: Reached agreement with confidence
  - Yellow: Open: Reached agreement but pending for validation
  - Orange: Open: No direction reached but group understand issues
  - Red: Open: Lack of Information for Decision Making

Source: SBI.bimSCORE
Compare the outcomes...

**Traditional Practice**
- 50 person hours / issue
- Per Issue = $7,500

**Best practice**
- 29 person hours / issue
- Per Issue = $4,370

**Time Reduction** ≥ 81%

Source: SBI.bimSCORE
1 Score

4 Areas

Establish Objectives and Protocols

Use the Right People and Processes

Provide the Right Tools

Track Impact and Progress

#bimSCORE
PROJECT TEAM A

Plus:
- Committed in turning BIM as a communication, collaboration, and validation tools throughout the project at a bi-weekly or as needed basis per CLIENT’s expectations.
- Although COMPANY A does not have previous BIM project experience, they are committed to learn and be trained by COMPANY C (BIM Consultant) and adopting BIM as their internal workflow.
- Addressed to all queries with reasonable answers with a “best for project” open-minded attitude.

Delta:
- Not able to clearly illustrate the intended strategies and outcomes of certain required BIM uses, e.g. Building Services Analysis, School Operations, and Circulation Analysis, which may due to lack of understanding of BIM uses’ end goals.
- COMPANY D’s proposed approaches and expected outcomes mainly focused on coordination to avoid system clashes, but have not illustrated how the BS engineers will identify and resolve system clashes COMPAHNY A, and CLIENT involved.
Feasibility

BIMForumED

Resource Management

Design & Construction

Optima Center
Chicago
200 E Illinois, Chicago
55-story residential tower

Model-based Quantity & Schedule

Asset Facility Management

Search for model number in Fan Coil Unit spec & acquire the needed motor

Adjusted the thermostat, but Room 3216 is still too warm

Control panel functions properly

A ladder is needed to inspect the Fan Coil Unit

Inspection of Fan Coil Unit confirms the blower motor must be replaced

Trip 5
Replace the blower motor and mark the issue resolved

Proactive Management

Reactive Management

#BIMForumED

#bimSCORE
Budget & Program Management

**Time/Scenario**
- 14 days
- Improved to Just 2 days

**Accuracy**
- +/- 350% crew size
- Improved to +/- 5%

**#Alternatives**
- 30 in 30 years
- Simulated 13 in ½ day
Optima Center Chicago
200 E Illinois, Chicago
55-story residential tower

Search for model number in Fan Coil Unit spec & acquire the needed motor

Adjusted the thermostat, but Room 3216 is still too warm

Control panel functions properly

A ladder is needed to inspect the Fan Coil Unit

Inspection of Fan Coil Unit confirms the blower motor must be replaced

Trip 5
Replace the blower motor and mark the issue resolved

#BIMForumED
#bimSCORE
FACILITY SUPPLY CHAIN

OWNER

Establish Requirements

Receive Data

Verify

OK

Update Databases

Requirements

Design

BIM Data

Initial Data

Refine (iterative)

Deliverables

Design

BIM Data

Comments

2-3 weeks (Manual)
1 day (AUTOMATED)

∆

FACILITY SUPPLY CHAIN

#bimSCORE
National 3D-4D-BIM Program

- 2003: Program founded
- 2006: First project requirements
  - Spatial program validation for final concepts
- 2014: Updated project requirements
  - Open-standard spatial and facility management data throughout the project & facility lifecycle
Provide significant automated feedback for early stage concept design.
Adjusted the thermostat, but Room 3216 is still too warm.

Control panel functions properly. A ladder is needed to inspect the Fan Coil Unit.

Inspection of Fan Coil Unit confirms the blower motor must be replaced.

Replace the blower motor and mark the issue resolved.


A ladder is needed to inspect the Fan Coil Unit.

Inspection of Fan Coil Unit confirms the blower motor must be replaced.

Trip 5
Replace the blower motor and mark the issue resolved.


Optima Center
200 E Illinois, Chicago
55-story residential tower

Resource Management

PROFORMA ANALYSIS

<table>
<thead>
<tr>
<th>Unit Cost</th>
<th>Low (RMB)</th>
<th>High (RMB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land Cost</td>
<td>25,000</td>
<td>27,000</td>
</tr>
<tr>
<td>Construction</td>
<td>5,500</td>
<td>6,000</td>
</tr>
<tr>
<td>Utility</td>
<td>40</td>
<td>50</td>
</tr>
<tr>
<td>Inspection</td>
<td>340</td>
<td>480</td>
</tr>
<tr>
<td>HVAC</td>
<td>50,000</td>
<td>52,000</td>
</tr>
<tr>
<td>Blower Motor</td>
<td>5,900</td>
<td>6,500</td>
</tr>
<tr>
<td>Inspection</td>
<td>80</td>
<td>100</td>
</tr>
<tr>
<td>Labour</td>
<td>90,000</td>
<td>96,000</td>
</tr>
<tr>
<td>Operation</td>
<td>45</td>
<td>70</td>
</tr>
</tbody>
</table>

Model-based Quantity & Schedule

Proactive Management

Reactive Management
Asset & Property Management

**Accuracy**
As-built Drawings

- Improved to 3mm

**Time to Search**
2-3 hours

- Improved to minutes

**Management**
Reactive

- Proactive & Informed
Owner-driven Firm Evaluation

#bimSCORE

Source: SBI.bimSCORE
Scorecard Framework

4 Areas
- PLANNING
- ADOPTION
- TECHNOLOGY
- PERFORMANCE

10 Divisions
- OBJECTIVES
- STANDARDS
- PREPARATION
- ORGANIZATION
- PROCESS
- APPLICATION
- COVERAGE
- INTEGRATION
- QUANTITY
- QUALITY

21 Economies

8 Countries

Dozens of Firms
Evaluated for Specific Region Benchmarking

Hundreds of Evaluations
Recorded in Global Databases
Overview

The 2016 Hong Kong BIM Awards witness a diversity of projects that champion a great variety of creative, yet cost-effective, BIM applications. My Strategic Building Innovation team has applied our bimSCORE evaluation framework and benchmarked the 5 winners between “Typical” and “Advanced” Practices against 230+ global projects from 18 countries. The winners’ 3 new construction projects, 1 renovation project, and 1 operations & maintenance project were further analyzed with respect to the 4 bimSCORE evaluation areas of Planning, Adoption, Technology, and Performance.

The following figures illustrate the Overall bimSCORE of the 5 winning projects.

Planning & Performance

Adoption & Technology

We are delighted to see some practical and innovative use cases of BIM among this year’s award winners. CLP harnessed the power of BIM to yield accurate cost planning and early risk identifications for their facade renovation. The Lam Ing Services Department piloted an extremely cost-effective programme with a very controlled budget, where they established an asset management pipeline that bridges frontline asset observations and backend calculations for asset performance analysis. Meanwhile, the Eastern District Cultural Services leveraged BIM to minimize the noise procession of the amphitheater design while ensuring a quality acoustic performance within the site.

These innovative adoption of BIM place the award winners in the “Typical” to upper “Advanced” Practices in the Adoption bimSCORE and between “Typical” and “Advanced” Practices in the Technology bimSCORE.

Source: Autodesk
Speakers

Calvin Kam
Founder
Strategic Building Innovation • bimSCORE
Calvin.Kam@sbi.International

Tony Rinella
Senior Director
Strategic Building Innovation • bimSCORE
Tony.Rinella@sbi.International
Trends and Keys to Success in Owner-driven BIM Adoption