The soft side of BIM

— Current practice of BIM talent acquisition in the AEC industry

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Agenda

• Introduction
• Background
• Research Question
• Methods
• Results and Discussion
Introduction

• BIM competency is being incorporated in procurement process as a desired qualification

• Dual challenges faced by AEC firms in exploring BIM business opportunities:
  ➢ Technology: “hard”
  ➢ Human Resource: “soft”
A CRITICAL MISSION FOR HR:

To align human resources with organizational development challenges and understand the need for BIM talent, finding it and placing properly within the existing system.
Background - BIM Uptake

North America industry wide adoption rates

<table>
<thead>
<tr>
<th>Year</th>
<th>2007</th>
<th>2009</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate</td>
<td>28%</td>
<td>49%</td>
<td>71%</td>
</tr>
</tbody>
</table>

UK industry-wide actual utilization rates

<table>
<thead>
<tr>
<th>Year</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate</td>
<td>13%</td>
<td>31%</td>
<td>39%</td>
</tr>
</tbody>
</table>

Source: McGraw-Hill Construction 2012a  
Source: NBS 2012
BIM Market
(Source: Building Design + Construction, 2013)

TOP BIM CONSTRUCTION FIRMS

2012 BIM Revenue ($)
1. Turner Corporation, The $5,924,000,000
2. Clark Group $2,224,508,127
3. DPR Construction $2,175,000,000
4. Hoffman Construction $2,155,377,276
5. Hensel Phelps $2,089,180,000
6. Mortenson Construction $1,992,450,000
7. Balfour Beatty $1,902,988,332
8. McCarthy Holdings $1,879,000,000
9. JE Dunn Construction $1,513,283,005
10. Walsh Group, The $1,313,656,333

SEE FULL LIST

TOP BIM ENGINEERING FIRMS

2012 BIM Revenue ($)
1. Jacobs Engineering Group $4,465,746,000
2. URS Corp. $292,864,749
3. Science Applications International Corp. $131,066,235
4. Arup $123,364,028
5. Merrick & Co. $106,000,000
6. SSOE Group $99,560,561
7. Thornton Tomasetti $93,431,545
8. Buro Happold Consulting Engineers $78,006,000
9. Middough $60,000,000
9. KPFF Consulting Engineers $60,000,000

SEE FULL LIST

TOP BIM ARCHITECTURE FIRMS

2012 BIM Revenue ($)
1. Gensler $484,286,130
2. HOK $385,700,000
3. HDR Architecture $299,828,000
4. Perkins+Will $270,225,000
5. Skidmore, Owings & Merrill $267,601,700
6. HKS $216,000,000
7. Stantec $197,000,000
8. Cannon Design $165,000,000
9. RTKL $131,834,950
10. SmithGroupJJR $105,598,000
11. EYP $85,381,169

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Human Factors in BIM market transformation

- Two major obstacles: workforce shortage and organizational resistance
  - “Crisis of skilled workforce shortages” (McGraw-Hill Construction 2012b)
  - “Changing mindsets is the biggest challenge” (LeFevre 2011)
- BIM talent cultivation and acquisition can attenuate such resistance and facilitate the transformation
Impacts of BIM on skillset requirements

• BIM is transformative and necessitates a new set of KSAs (knowledge, skills and abilities)

• Emerging division units and job titles
  - BIM/VDC department
  - BIM managers/coordinator

• Issue: no established consensus on BIM job description and KSAs requirements
Impacts of BIM on education

• BIM is being taught in various formats in college curricula

• Difference between teaching and training
  ➢ Teaching is for education
  ➢ Training is for skillsets

• Issue: in the short term, colleges are unable to satisfy the workforce demand of BIM
Research Question

• RQ1
  ➢ What is the market demand for BIM talent?
• RQ2
  ➢ What are the characteristics of BIM talent?
• RQ3
  ➢ What are the current practices of acquiring BIM talent in AEC firms?
• RQ4
  ➢ What are the issues and desired initiatives in BIM workforce development?
Methods

• Online survey with focus on various aspects of BIM talent acquisition:
  – Demand
  – Job profile & qualification
  – Talent pool
  – Recruiting
  – Talent retention and management
  – Reflection

• 840 email invitations, 99 completed questionnaires:
  – Response rates: 11.8% (limitation)
  – +/- 6.4% margin of error at 95% confidence level
Results - Demographics

- Owner: 22.5%
- Architectural Firm: 12.5%
- Engineering (Civil, Environmental, Geotechnical, MEP, Structural): 13.3%
- Consulting Firm: 6.7%
- Contractor (CM, GC, and Specialty): 11.7%
- Software Developer/Vendor: 2.5%
- Building Product Manufacturer/Distributor: 2.5%
- Other: 2.5%
Role in Talent Acquisition

- I’m a Final Decision-maker: 22.5%
- I’m a Leading Recruiter: 4.2%
- I’m a Supporting Recruiter: 9.2%
- I’m a Facilitator - High Influence: 20.8%
- I’m a Facilitator - Medium Influence: 22.5%
- I’m a Facilitator - Low Influence: 5.8%
- I’m Not Involved in Talent Acquisition: 15.0%
Identify BIM talent demand

• How often companies participate in projects that mandate use of BIM? – Challenge
• How much BIM contributes to the annual revenue? – Incentive
• How many dedicated BIM positions to recruit in a 5-year time frame? – Outlook
% of BIM-mandated projects

- Less than 10%
- Between 10% and <25%
- Between 25% and <50%
- Between 50% and <75%
- More than 75%
- Expon. (Less than 10%)
- Expon. (More than 75%)
% of BIM related revenue

- Less than 10%
- Between 10% and <25%
- Between 25% and <50%
- Between 50% and <75%
- Expon. (Less than 10%)
- Expon. (More than 75%)
### Workforce Planning Style

- **Reactive - We Hire When BIM Talent Is Needed**
  - 27.20%
- **Proactive - We Plan for BIM Talent Acquisition Based on Projection of BIM Business**
  - 12.30%
- **We Don't Do Any Workforce Planning**
  - 3.70%
- **Other**
  - 56.80%

### Incentives for Hiring

- **Most Clients Mandate BIM**
  - 15.50%
- **A Particular Project Demands BIM**
  - 4.10%
- **Explore New Business Opportunity in BIM**
  - 16.50%
- **Competitors Are Using BIM**
  - 18.60%
- **Perceived Internal Business Benefits of BIM**
  - 36.10%
- **We Are Not Planning to Acquire BIM Talent**
  - 3.10%
- **Other**
  - 6.20%
Historical Hiring Statistics – Positions with BIM as Qualification

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Historical Hiring Statistics – Positions Dedicated to BIM

- Less than 10%
- Between 10% and <25%
- Between 25% and <50%
- Between 50% and <75%
- More than 75%
- Expon. (Less than 10%)
- Expon. (More than 75%)

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Dedicated BIM Positions to Recruit

Next Fiscal Year?

In 1 to 2 Years

In 3 to 4 Years

In 5 Years?

0

1 to 5

5 to 10

10 to 20

20+

Expon. (0)

Expon. (20+)
BIM Job Profile & Qualification Definition

- Job titles
- Desired qualifications
- Metrics
Common BIM Job titles

- BIM Coordinator: 45.1%
- CAD/BIM/VDC Manager: 43.9%
- BIM Director: 31.7%
- BIM Modeler: 30.5%
- We Don't Use “BIM” in Job: 28.0%
- BIM Consultant: 14.6%
- BIM Detailer: 13.4%
- BIM Engineer: 13.4%
- BIM Drafter: 11.0%
- Other: 6.1%
- BIM Specifier: 4.9%

Defined BIM Job Description?
- Yes: 58.5%
- No: 41.5%

Defined BIM Job Qualifications?
- Yes: 54.3%
- No: 45.7%
Key BIM Knowledge & Skills

- Knowledge of BIM Workflow, Strategic Plan and Execution: 58.5%
- Knowledge of Multidisciplinary BIM Model Management: 54.9%
- Knowledge of BIM Standards and Interoperability: 42.7%
- Knowledge of BIM Concepts and Literature: 31.7%
- Knowledge of BIM Business Benefits: 28.0%
- Knowledge of Network/Cloud Based BIM Worksharing/Collaboration: 28.0%
- BIM Technical/Functional Skills: 74.4%
- BIM Communication and Collaboration Skills: 52.4%
- BIM Implementation/Operation Skills: 41.5%
- BIM Research and Development Skills: 31.7%
- BIM Administration/Managerial Skills: 26.8%
Metrics, Standards or Credentials for Competency Assessment

- Applicants’ Previous Experience and Reference Check, 61.0%
- Internal Metrics/Standards, 26.8%
- Industry Certification/Credential (e.g. AGC Certificate of Management - BIM, Autodesk Certified Professionals), 6.1%
- None, 4.9%
- Other, 1.2%
Recruiting BIM Talent

• Talent pool
• Investment
• Approach
• College recruiting
Distribution of Recruiting Talent Pool

- College Students - Undergraduate
- College Students - Graduate
- College Students - Doctoral
- Professionals - Beginning BIM Competency
- Professionals - Intermediate BIM Competency
- Professionals - Advanced BIM Competency
- Professionals - Expert BIM Competency
- Transfer Internal CAD Managers
- Train and Educate Internal Employees

Legend:
- Less Than 5%
- 5% to <10%
- 10% to
- 20% to <40%
- 40% to <60%
- 60% to <80%
- More than 80%
### Dedicated Personnel & Budget for BIM Recruiting?

<table>
<thead>
<tr>
<th>Yes - Routinely</th>
<th>Yes - Need-Based</th>
<th>No - But Is Considering about It</th>
<th>No - Don’t Think It’s Necessary</th>
</tr>
</thead>
<tbody>
<tr>
<td>24.7%</td>
<td>42.9%</td>
<td>10.4%</td>
<td>22.1%</td>
</tr>
</tbody>
</table>

### Major BIM Recruiting Approaches?

<table>
<thead>
<tr>
<th>Recruiting Approach</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional Web Based Job Posting</td>
<td>62.3%</td>
</tr>
<tr>
<td>Other</td>
<td>33.8%</td>
</tr>
<tr>
<td>Conventional Job Fair</td>
<td>32.5%</td>
</tr>
<tr>
<td>New Generation Social Media</td>
<td>26.0%</td>
</tr>
<tr>
<td>Conventional News Paper/Trade Magazine</td>
<td>15.6%</td>
</tr>
<tr>
<td>Search Engine Optimization</td>
<td>7.8%</td>
</tr>
</tbody>
</table>
Major College Recruiting Practices

- We Don’t Do Any College BIM Recruiting: 38.2%
- Hire Students for Permanent BIM Positions: 34.2%
- Hire Students for BIM Internships: 32.9%
- Offer BIM Workshops/Guest Lectures: 19.7%
- Offer Students BIM Co-op Opportunities: 15.8%
- Conduct BIM Information Sessions: 9.2%
- Other: 6.6%
Talent Retention & Management

• Recruiting is only the starting-point of workforce development
  ➢ Retention efforts
  ➢ Management strategy
Is a BIM Career Path established?

BIM Talent Retention Efforts

- Encourage Organizational Learning and Knowledge Management: 56.6%
- Cultivate BIM Culture and Celebrate BIM Champions and Success: 43.4%
- Encourage BIM Career Development: 40.8%
- Create Clear Vision and Goal for BIM Business: 38.2%
- Top-Management Commitment to Effective Recruiting: 32.9%
- Create Sound Metrics and Continuous Improvement Plan for BIM Success: 22.4%
- Other: 14.5%
Manage BIM Talent

- We put them in a "BIM Department" and handle only BIM business
- We assign them into existing departments and assemble them for project-based BIM tasks
- Our BIM talent assumes both conventional and BIM specific responsibilities
- Other

Size of BIM Department

- With Less than 5 Employees
- With 5 to <10 Employees
- With 10 to <20 Employees
- With 20 or More Employees
Reflection

- Effectiveness of BIM talent acquisition was only rated at **2.8** out of the 5-point Liker Scale
- Top 3 obstacles:
  - Lack of competent BIM talent pool
  - Tight budget vs. increasing recruiting costs
  - Lack of evidence of internal business benefits of BIM
- Top 3 facilitators:
  - Continue growth of BIM market
  - Enhanced college BIM education and professional training
  - BIM standards development and enforcement
Conclusion

- More projects are mandating use of BIM which confirms the market demand for BIM talent.
- BIM is written as a standard qualification in job descriptions
- There are obscurities in clearly defining KSAs of BIM workforce and lack of metrics to evaluate BIM competencies
- College students are yet to be the major BIM talent pool
- Companies are making investment in BIM talent acquisition, but not very effective yet
Future Research

• Looking at BIM workforce as a special niche in the AEC industry
• Conduct case studies on regional practices
• Conduct focus group research to preliminarily define desired KSAs for BIM workforce through collective academia-industry inputs
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Questions and Comments?

THANK YOU!