Application of Data Science in Corporate Real Estate and Workplace Design

Chris Jerde
Bio

**BA:** Brown University, International Relations  
**MS Applied Economics:** UC Santa Cruz  
**Masters Real Estate Development:** USC

**Strategy Director:** Gensler (2005 – 2018)

**Areas of Focus:**  
Workplace Analytics (discipline)  
Quantitative Impacts of Design/Architecture
Project Cadence vs. Research Cadence

Increase the value of Information Over Time

We need consistency in research to reflect the oscillations of project work.
Definitions

Data Analysis / Business Intelligence

Data Science
Data Types

Active

Passive
Corporate Real Estate & Workplace Design

Supply / Demand Optimization

User Experience Optimization

Work Style Optimization

Building for Agility
Fundamental Question

“How do we know?”

-Taylor Hawes
Former GM,
Microsoft RE&F
Informed Response

“All decisions on space are to be made from data.”

-Satya Nadella, Microsoft CEO
Axioms of work

People  Process  Space  Technology  Culture
Data Sources & Uses

1. SURVEY DATA
2. BADGE READER & OBSERVATION DATA
3. WORKPLACE ANALYTICS DATA
FRAMESWORK

Learning Spectrum

Point-in-time
Ad Hoc Research: User Research

Real Estate
Strategy: Current

Fixed Asset

Workplace AI: Learning

Strategy: Future

High Frequency

Low Frequency

Deep Insight

Narrow Insight
Data Themes:
1. Satisfaction
2. Behavior
3. Space
4. Individuals
5. Team Perf
6. Business Perf

Point-in-time
Ad Hoc Research
- Business Group Research (2, 4, 5, 6)
- POE (1, 2, 3, 4, 5)
- TUS (2, 3, 4, 5)

Outcome Variable
Explanatory Variable
Both

Fixed Asset: Workplace
- Annual Survey (1, 3, 5)
- Events Bookings (3, 6)
- As-builts (3)

Deep Insight
- WpA (2, 5, 6)

Low Frequency
High Frequency
Narrow Insight

Workplace AI: Learning
- “Pulse” (1, 2, 4)
- Badge (2, 5, 6)
- Sensors
1. SURVEY DATA
What’s really wrong with the open plan?

Null Hypothesis:
Workers are agnostic to private offices and open seating.
SURVEY DATA | What’s really wrong with the open plan?
SURVEY DATA | What’s really wrong with the open plan?

Approach:

Analyze survey data through partition model

Data:

- long-form workplace survey
- badge data analysis
- WIFI triangulation data
- motion sensor data
- seat sensors
- on-site observational data
SURVEY DATA | What’s really wrong with the open plan?
Informed Response Strategy

THEN

All about the private space

NOW

More collaborative spaces, planning for each work mode, balancing “me” space and “we” space

FUTURE

Focus on the individual workspace to ensure the system works
What is the right balance?
Prior Findings:

Team area compression drives personal effectiveness
Priorities?
Do your own research

No Relationship Found Between Software Engineers' Code Authoring Time and Working in Open Offices

What is the relationship between working in open offices and software engineering productivity within the Cosine division at Microsoft?

Published: May 23, 2019
Researchers: Spencer Buja; Tom Zimmermann; Tenny Cho; Brian Houck
More
# Text mining and topic modeling

## Survey Data

### Topic Modeling

<table>
<thead>
<tr>
<th>Topic</th>
<th>% Text</th>
<th>Wordcloud</th>
<th>Sample Text</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Balanced Workplace</strong></td>
<td>29.5%</td>
<td></td>
<td>1. I like that I have my own office to have the time and space to work on projects and to meditate during the day, as well as to take care of personal matters. I can also access my colleagues for questions and advice whenever necessary. 2. I like that it feels like my space. It’s open enough to allow others to approach me when they need help. And it gives me the ability to work in a comfortable manner. 3. I have a space of my own and it’s not a communicable office space. I have the ability to have a private conversation I need to. I am also able to see my program area from my office which is helpful. 4. The ability to get away from my co-workers. The ability to make own decisions since I am the only employee doing my job in my satellite office. Not having anyone there all the time. 5. It’s convenient to get to and like to be able to see my co-workers. I work from home 2 days a week and in the office 3 days. 6. A lot of my coworkers are very nice. Open door policy, if you have questions the team is open to answer. 7. The ability to close my door if I need privacy but otherwise keep it open most of the time for social reasons. 8. Easier of being able to ask co-workers questions, collaboration to get work done. 9. I have my own office but still can collaborate with others and they have great benefits and pay. Also I like the flexibility. 10. The benefits are wonderful and they allow paid holiday time off around Christmas in the amount of a full week.</td>
</tr>
<tr>
<td><strong>Team Culture</strong></td>
<td>15.2%</td>
<td></td>
<td>1. Great company with wonderful people. A company that cares about our customers and employees. I also work within 1 mile of my office. Easy commute. 2. Everyone wants to do the most they can for the customer, you feel that coworkers have your back and genuinely care about each other’s welfare, and the departmental leadership acts the “right” people. 3. I like that I get along with all of my coworkers and I am able to feel like I am contributing to the main goal of the company with really great friends. 4. I like the environment. I like that it is a relaxed office and everybody gets along. I like that my boss really cares about his employees and it is a great leader. 5. I like that I work with an amazing team who are all open, creative, supportive of one another and allow one another to be themselves and let their strengths shine. 6. The brand/product - the company is growing like crazy. Also the fact that they want everyone to grow within the company. 7. What I like most about my primary workplace is that all coworkers work together for a common goal, and all coworkers feel like family. 8. I have loved my job since the first day. They are extremely family oriented and truly show that they care about you as a person. 9. My team members and the strong valuation of teamwork and open communication through our company and with the people we service. 10. How fun and exciting it is. They really take you under their wing. Plus they always have fun office parties.</td>
</tr>
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2.

BADGE READER & OBSERVATION DATA
Peak Average Attendance & Correlation:

Big savings from using behavioral data for portfolio planning

Major Research Impact

Estimated net real estate savings of $250 million.

A fundamental shift in how one of the world’s largest corporations approaches real estate planning.
From
YOUR JOB DEFINES YOU…

To
YOU DEFINE YOUR JOB.
**Approach:**

From diagnosing the problem to devising a solution

**STEP 1**

We assessed 10 representative sites around the world. Through interviews, surveys, and badge data analysis, we found a significant misalignment of supply and demand, suggesting current assumptions were not aligned with actual worker behaviors.
Approach

STEP 2

To devise a new space programming model, we analyzed badge data (for external mobility information) and conducted workplace activity analysis for specific sites (for internal mobility data).

Activity analysis was conducted to understand how sales groups used their workspace.
Approach

**STEP 3**
We then used statistical techniques (regression models) to test if there were a relationship between levels of external mobility and internal mobility.

Daily badge swipes show strong relationship to peak space type use each day.

**STEP 4**
We found a strong, statistically significant relationship. We developed algorithms to determine the amount of required space based on the daily attendance patterns for a site.

The data is then converted into algorithm to be automated in a tool to program any site.
The Result

- A more accurate space programming tool
- Estimated lease rate savings of $270 million annually
- Strengthened client relationship
- Innovative, new methodology and tool

$31/SF global lease rate + 16% reduction of administrative space = Annual global base rent savings $270 M
Is badge data a good proxy for seat demand across site types?

• How confident are you in the results?

• Take a segmented approach prior to using data to make formal strategic changes
The future of space demand is not linear
Use all information embedded in your data
Personas

Objective:
Inform (not determine) the provision of choice-based workplace elements specific to end user population

PERSONA: mobility classification based on analysis of behavioral data, determined by machine learning

WSR: workpoint sharing ratio expressed as worker per seat (e.g., 1.2 workers per seat)
Approach
Measure external & internal mobility to the individual

Attendance: Daily badge reader data

Occupancy: Hourly on-site observation
**Process**

1. Collect behavioral data on the workforce
2. Leverage machine learning algorithms to determine attributes correlated with mobility
3. Define “mobility personas” based on explanatory attributes
4. Calculate the provision of workplace elements based on mobility persona profile of end user population
Results

**External Personas:**
Likelihood of going to their assigned workplace each day (1 least likely - 6 most likely)

**Internal Personas:**
Likelihood of being at one’s desk while at work (1 least likely - 5 most likely)
Business Unit A

1.4 WSR

12,698 employees

Majority external mobility of 3-5 days per week

38% internal mobility
3. WORKPLACE ANALYTICS DATA
What is Workplace Analytics?

Convert digital exhaust to analytical insights...

**Exchange data**
Metadata from emails and meetings within your organization are sourced from servers and securely processed.

**Org attributes**
Org descriptive data and outcome data is uploaded into the system and combined with the collaboration metadata.

**Metrics**
Metrics related to collaboration patterns are calculated and housed in a query table and configurable platform.

**Insights**
Insights into your business that can create capacity, grow mastery and orchestrate networks to drive business value.
Program summary

- 10+ completed projects with CVP sponsors
- 10 active projects, spanning the globe
- >75% of Microsoft’s headcount included in at least one project
- Created 2 Centers of Excellence to expand impact across Microsoft
- A growing list of EVP and CVP evangelists illustrating the power of Workplace Analytics through internal success stories
- Growing backlog of projects, prioritized based on potential for business impact
Impact Study: Microsoft 2019 (4 Puget Sound buildings)

Measure Impact

I want to understand how workspace planning decisions impact our teams

What collaboration habits have changed as a result of workspace changes?

- How much do we collaborate?
- Do we discuss issues live or by email?
- How many long and short meetings?
- How do meetings vary by number of attendees?
- Can we leverage large, diverse internal networks?
- What relationships are most critical to our success?

Explore

- Week in the life
- Meetings overview
- Networks and collaboration
- Group hours query

Total collaboration hours
Meeting hours versus email hours
Meeting duration
Meeting size
Network size
Collaboration hours between key groups: Total Meetings Emails

Measure impact scenario: Suggested Workplace Analytics metrics
Proximity analysis

**Workspace lever**

**Proximity**

**Business opportunity**
Moving specific teams closer together would increase their collaboration and improve productivity

What is the optimal space allocation across our regions, sites, and buildings?

- How much do we collaborate?
- Do we discuss issues live or by email?
- Can we leverage large, diverse internal networks?
- What relationships are most critical to our success?

**Metrics**

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Optimize proximity scenario: Suggested Workplace Analytics metrics
Process improvement: building stack

Current (10 days)

New (2 hours)
Final Takeaways

✧ Take ownership of your proprietary data (do your own research)
✧ It’s ok start with data to identify problems and hypotheses.
✧ Leverage your internal data scientists (they love it).
✧ Minimize disruption to end users (most just want a more supportive environment)
✧ Risk-adjust space forecasts
✧ Correlate Correlate Correlate
✧ Always be skeptical.
Thank you