DATA-DRIVEN SERVICES FOR SMART BUILDINGS
SEARCHING FOR THE NEW EXPERIENCES AND VALUE-ADDED

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KTH Live-in Lab is a platform of multiple testbeds for accelerating innovation rates in the construction and real-estate sectors.
DATA-DRIVEN SERVICES FOR SMART BUILDINGS
Part 1

DATA-DRIVEN SERVICES FOR SMART BUILDINGS
RESEARCH FOCUS: BIG DATA

Sensor data from a cross-country flight

20 TB \times 2 \times 6 \times 28,537 \times 365

= 2,499,841,200 TB
SOME EXAMPLES OF BUILDING’S BIG DATA

- Heat maps
- Face-recognition
- Predictive data
Big data value potential index:

The index consists of five metrics that are designed as proxies to indicate:
1. The amount of data available for use and analysis
2. Variability in performance
3. Number of stakeholders
4. Transaction intensity
5. Turbulence inherent in the sector

Construction industry:
< Low level of IT intensity
< Low level of Data driven mindset
< Low level of Data utilization
DATA IN SMART BUILDINGS: OVERVIEW

1. Traditional Building System Data
   - HVAC
   - Lifts & Elevators
   - Access control
   - Fire detection
   - Intranet
   - Disaster recovery

2. External Data
   - GPS coordinates
   - Weather
   - Smart Grid
   - Demographic
   - ERP
   - Financial
   - Forecasts
   - BREEM
   - Sustainability Data
   - Health
   - Navigation
   - Wearable devices
   - Social media
   - Productivity
   - HVAC
   - Lighting
   - Occupancy control
   - HVAC
   - Smart meters
   - Access control
   - Fire detection
   - Intranet
   - Disaster recovery

3. Business System Data
   - ERP
   - Financial
   - Forecasts
   - CRM
   - MRP
   - HR
   - Demand respond
   - Carbon reporting
   - Waste treatment & recycling
   - BREEM
   - Sustainability Data
   - Health
   - Navigation
   - Wearable devices
   - Social media
   - Productivity
   - HVAC
   - Lighting
   - Occupancy control
   - HVAC
   - Smart meters
   - Access control
   - Fire detection
   - Intranet
   - Disaster recovery

4. Sustainability Data
   - Carbon reporting
   - Waste treatment & recycling
   - Demand respond
   - BREEM
   - Sustainability Data
   - Health
   - Navigation
   - Wearable devices
   - Social media
   - Productivity
   - HVAC
   - Lighting
   - Occupancy control
   - HVAC
   - Smart meters
   - Access control
   - Fire detection
   - Intranet
   - Disaster recovery

5. Users Data
   - BREEM
   - Sustainability Data
   - Health
   - Navigation
   - Wearable devices
   - Social media
   - Productivity
   - HVAC
   - Lighting
   - Occupancy control
   - HVAC
   - Smart meters
   - Access control
   - Fire detection
   - Intranet
   - Disaster recovery
DATA UTILIZATION VS VOLUME IN SMART BUILDINGS

Utilization

Volume

Building System Data 60%

Business System Data 15%

Users Data 12%

Sust. Data 8%

External Data 5%

Users Data 50%

Building System Data 20%

External Data 15%

Business Data 15%

Sust. Data 5%

DARK DATA 70-90 %
BIG DATA UTILIZATION: INTEGRATION BARRIERS

1. Data quality issue
2. Lack of knowledge of algorithms
3. Lack of knowledge of analytics workflows
4. Lack of knowledge of how data is related
5. Lack of knowledge of organizational context
6. Lack of knowledge of semantic information of available data
BIG DATA ARCHITECTURE: DATA STRATEGY

**User experience (UX)**

> Highest Big Data value index!

**Business modeling**
Part 2

DATA-DRIVEN SERVICES FOR SMART BUILDINGS
BIG DATA ARCHITECTURE FOR DATA-DRIVEN SERVICES

**Data-driven services exploration**

1. Analyze available data
2. Determine data-driven services we can potentially test at KTH Live-in-Lab
3. Clusterize services
4. Make clustering network analysis
DATA-DRIVEN SERVICES: CLUSTERING

- Lifestyle services
- Productivity services
- Health services
- Resource-efficiency services
- Mobility services
- Virtual services
- BMS services
- B2C
- B2B
- B2C2B

KTH Live-in-lab

Data-driven services
DATA-DRIVEN SERVICES: BUILDING RELATED / B2B2C

BMS services

Virtual services

Resource-efficiency

Mobility services

Interactive BMS (B2B + B2C)

Virtual Twin for products & services pre-testing

Smart building metabolism

EV + Blockchain CPO
DATA-DRIVEN SERVICES: HUMAN-RELATED / B2C

Lifestyle services

- OneTonneFuture

Productivity services

- Personalized lighting with MOUM

Health services

- Allergen-free air
SUMMARY

1. **BIG DATA FOCUS:** INCREASE DATA UTILIZATION

2. **UX & BUSINESS MODELING FOCUS:** BIG DATA INDEX POTENTIAL

3. **B2C / B2B2C STRATEGY:** USER-CENTRIC APPROACH

4. **DATA-DRIVE SERVICES DESIGN:** BOOTH DYNAMIC & FLEXIBILITY OF YOUR DATA
THAT’S IT FOR NOW > THANKS