Purpose Case Smart Campus Woudestein

Exploring the power of data and AI to optimize campus facilities, enhance sustainability and improve wellbeing at campus

Dr. Marcel van Oosterhout – Kivi webinar 5 April 2023

1. Facilities operations excellence

Efficient use of available space & campus facilities

2.Sustainability

Sustainable Campus

Adaptation & regeneration
Maximize reuse & recycle
Extending lifespan
Reducing raw materials
Reducing quantity
Reducing carbon emissions

3. Wellbeing

pleasant place to stay, work and learn for students, employees, and visitors
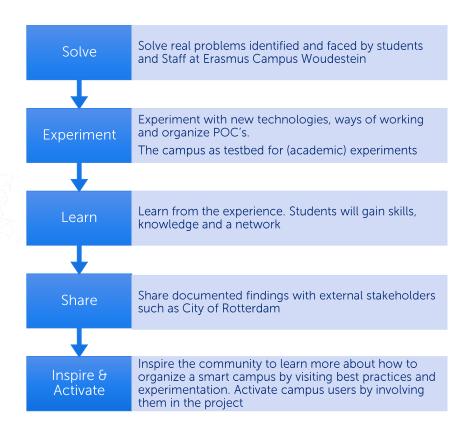
Ambitions Purpose Case Smart Campus project

Three key ambitions:

1. Bringing campus facilities to the next level by providing clear insights via a data driven approach

2. Improve campus environment well-being for students and employees, and create ownership and a feeling of contribution by all stakeholders

3. Showing the commitment of EUR, REF and ECDA to sustainability of its campus

These ambitions are supported through data-driven decision-making and visualization and development towards a digital twin campus Woudestein of Erasmus University Rotterdam

Solve	Solve real problems identified and faced by students and Staff at Erasmus Campus Woudestein
Experiment	Experiment with new technologies, ways of working and organize POC's. The campus as testbed for (academic) experiments
Learn	Learn from the experience. Students will gain skills, knowledge and a network
Share	Share documented findings with external stakeholders such as City of Rotterdam
Inspire & Activate	Inspire the community to learn more about how to organize a smart campus by visiting best practices and experimentation. Activate campus users by involving them in the project

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Components of Purpose Case Smart Campus project

(1) Vision development

(2) Inspiration & Capability Building

    a) Knowledge exchange (convergence, City of Rotterdam)

    b) Skills development REF team Support among stakeholders

(3) Clarifying preconditions and developing initial basis

    a) Data infrastructure / sandbox for innovation

    b) Data governance, privacy & security

    c) Ethics and accountability

(4) Experiments and research

    a) Proof of concept development in collaboration with student engagement

    b) Creating a testbed for research projects that create insights

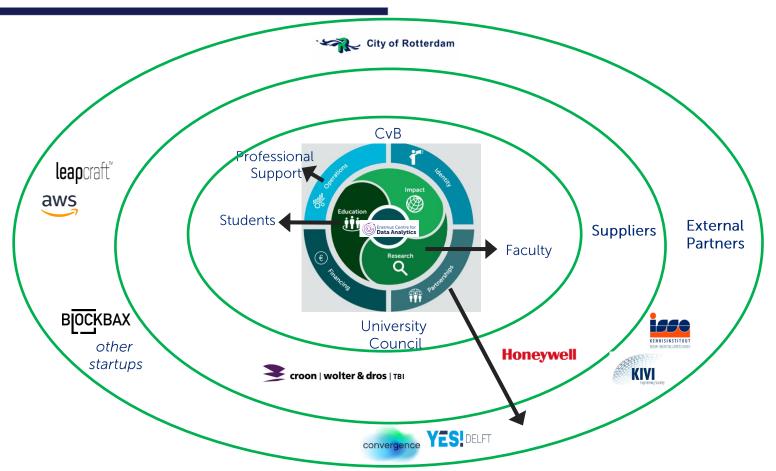   c) Pilot projects with different technologies and external partners

THE ERASMIAN WAY

With budget from
EUR CvB
Step up professional
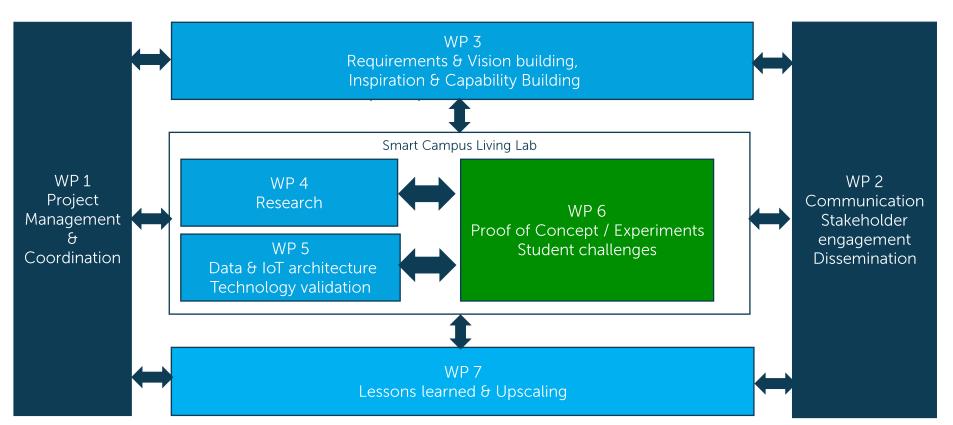services programme

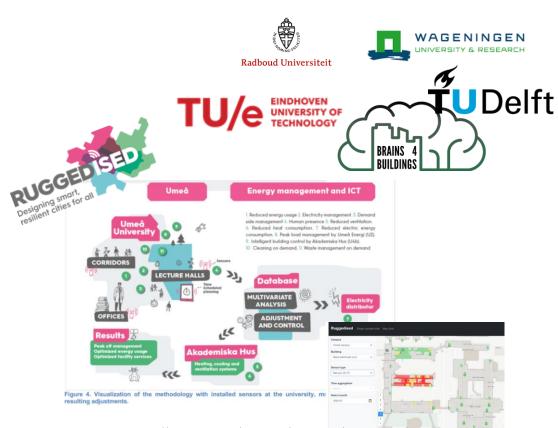Project duration 2 years
(2022-2024)

Erasmus Centre for
Data Analytics

Smart Campus project WPs

Erasmus Centre for **Data Analytics**

WP 3
Requirements & Vision building,
Inspiration & Capability Building

WP 1
Project
Management
&
Coordination

Smart Campus Living Lab

WP 4
Research

WP 5
Data & IoT architecture
Technology validation

WP 6
Proof of Concept / Experiments
Student challenges

WP 2
Communication
Stakeholder
engagement
Dissemination

WP 7
Lessons learned & Upscaling

Find external Inspiration and exchange best practices

Figure 4. Visualization of the methodology with installed sensors at the university, m… resulting adjustments.

Results - Visualization— 3D maquette of campus

A 3D printed campus is developed (first version ready by June 2022), where data can be visualized
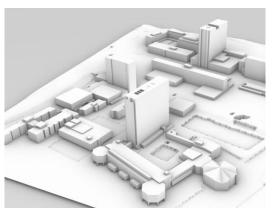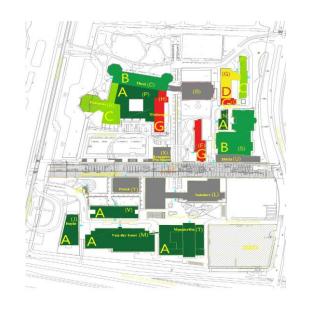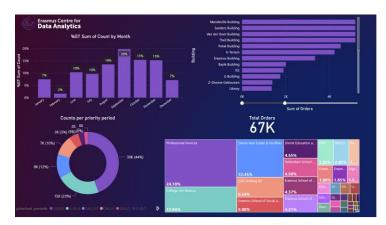The maquette is hosted at the **Erasmus Data Collaboratory** at Polak Y1.12

- Student team from EUR and TU Delft
- See also
https://www.media.mit.edu/projects/cityscope/overview/

Projection

UI

Table

Erasmus Centre for
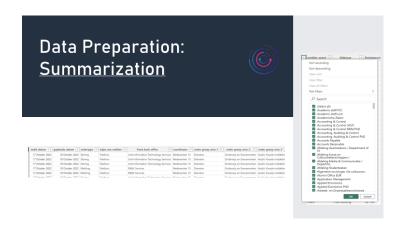Data Analytics

Example: Energy transition
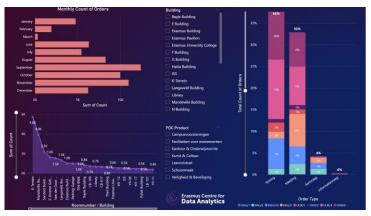
Data coming to live ....

Development proof of concepts – Power BI Dashboards on Planon data

Experiments
Assessing impact of air quality on student performance

Building measurements
ventilation , temperature Honeywell

interventions

Air Quality

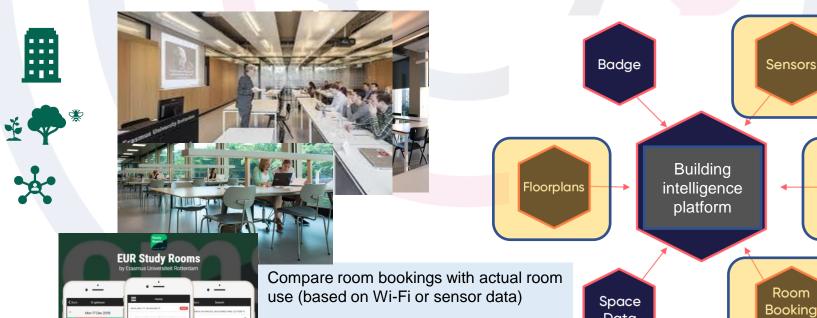*Sensor data Leapcraft*

Wellbeing
Student performance EER database RISBO

Is there a relationship between a more sustainable environment (air quality) and student performance
What interventions can help?

Involved researchers:
- *Dr. Max Coveney (ESE)*
- *Dr. Alexander Los, IHS)*
- *Prof. Pilar Gomez (ESE)*
- *Dr. Anna Bornioli (ESE / Erasmus UPT)*

Erasmus
University
Rotterdam

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Data Analytics

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Experiments
Optimize use of lecture room facilities

Compare room bookings with actual room use (based on Wi-Fi or sensor data)

Improve planning and optimize use of space

Reduce energy use

Badge

Sensors

Floorplans

Building intelligence platform

WiFi

Space Data

Room Booking Data

Experiments
Tailored Behavioral Interventions

Tailored Behavioral Interventions

Data
identify moderators of
behavioral interventions

Targeted Interventions
leverage moderators to increase the
efficiency of behavioral interventions

Behaviors
Identify behaviors that need
improvement

Involved researchers:
- *Dr. Antonia Krefeld-Schwalb (RSM)*
- *Dr. Sebastian Gabel (RSM)*
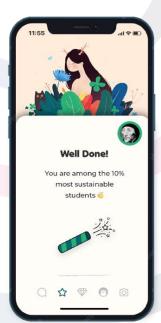- *Ari Semprun*
- *Chelsea Blijlevens)*

Experiments
Tailored Behavioral Interventions

Online Platform

Uses behavioral interventions to incentivize sustainable behavior in **students**

Prompts

Feedback

Rewards

Gamification

Workshop May 11 – 1500-1700

Focus areas:
Built environment / energy
Waste management
Food and catering
Procurement
Mobility
Green campus / Bio Diversity

What are your ideas to create a more sustainable campus (data driven) ?

Points of attention:

1. Do we have the right skills and capabilities?

2. Connecting and optimizing across siloed solutions can be challenging

3. Data privacy & security challenges

   ....

Discussion: How to move from silos to future ready?

Image source: https://cisr.mit.edu/publication/2017_0901_DigitalPathways_WeillWoerner

Challenges – Changing practice requires more than data and insights

- Data provides insights and insights support decision making

- Points of attention:
  1. needs to incorporate existing behavioral patterns and strategic behavior *[e.g this is my office space]*
  2. Sometimes nudges (carrots or sticks) are needed to change behavior
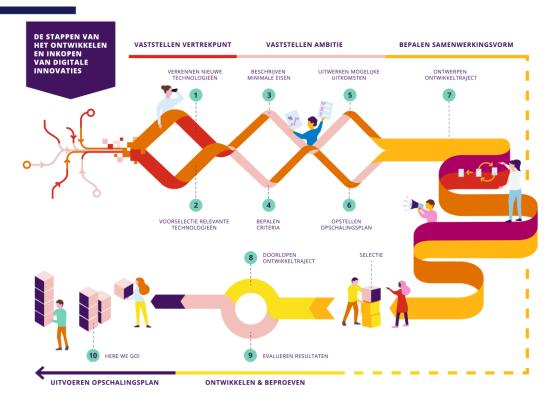 3. Business case is not always clear (upfront)

Discussion: Can data insights be a vehicle for change in human behavior?

Image source: https://www.vogsy.com/blog/data-driven-team-culture/

Challenges – Developing and procuring digital innovations

- How to move from experiments to practice *(in collab with external partners)*

- Pilot versus upscaling & procurement

Discussion: how to move from pilot to upscaling while complying with procurement regulations?

Image source: https://www.pianoo.nl/sites/default/files/media/documents/2020-11/299.003_pianoo_stappenplan_innovatieproces_infographic_wt_met_titel.png

Passion provides purpose, but data drives decisions

Andy Dunn

More information: https://ecda.eur.nl/smart-campus-project/