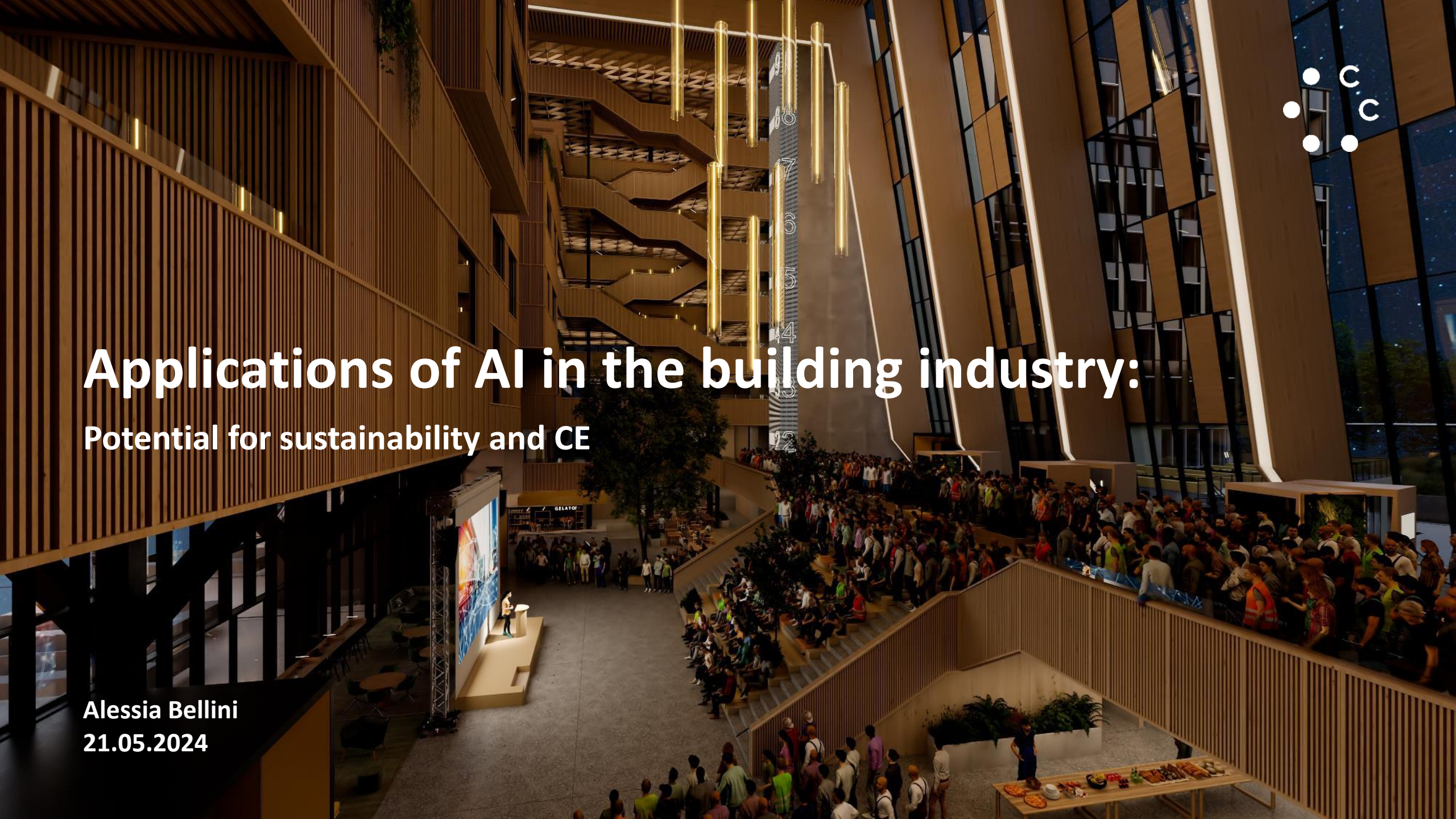


Applications of AI in the building industry:

Potential for sustainability and CE

Alessia Bellini

21.05.2024

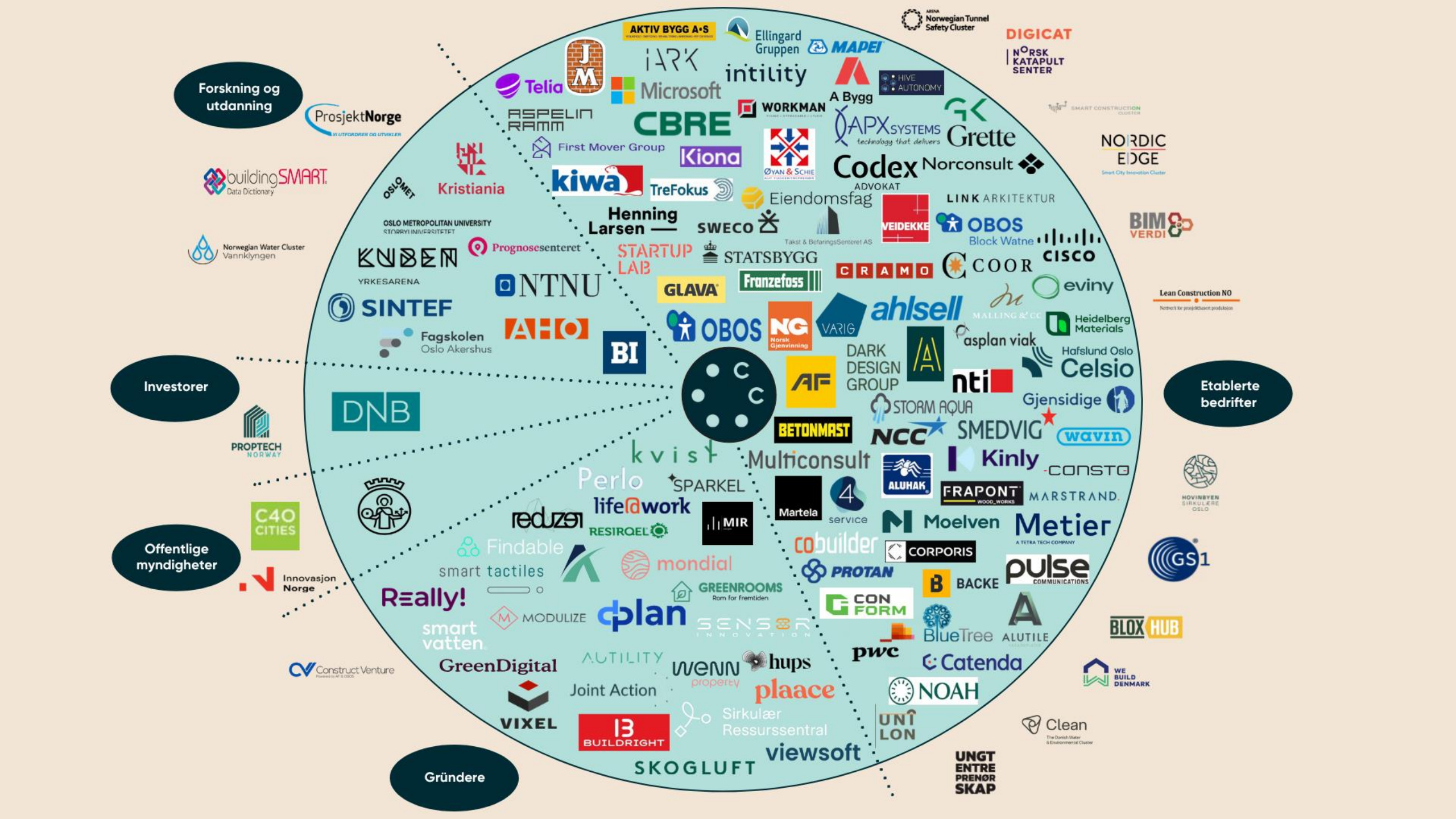
- Presentation
- AI in the building industry
- Opportunities with AI
- AI implementation and challenges
- Importance of data for sustainability and circular economy (PhD)
- Projects in Construction City Cluster
- Final remarks

Construction City Cluster

Background: In 2018 OBOS, AF Gruppen, and Betonmast took the initiative to establish Construction City Cluster (CCC).

Who we are: CCC is a national industry-cluster that facilitate the development of innovative and sustainable solutions within the building, construction, and real-estate industry. We cover the entire value chain from start-ups to large contractors/property companies and academia. We aim for a greener, more efficient and attractive industry.

What is in it for me: CCC is a place to share insights, establish collaborative and innovative projects and build networks.


Forskning og utdanning
Investorer
Offentlige myndigheter
Gründere
Etablerte bedrifter
ProsjektNorge
buildingSMART Data Dictionary
Norwegian Water Cluster Vannklyngen
PROPTECH NORWAY
C40 CITIES
Innovasjon Norge
Construct Venture
Norwegian Tunnel Safety Cluster
DIGICAT
NORSK KATAPULT SENTER
SMART CONSTRUCTION CLUSTER
NORDIC EDGE
Smart City Innovation Cluster
BIM VERDI
Lean Construction NO
Nettverk for prosjektbasert produksjon
HOVINBYEN SIRKULÆRE OSLO
GS1
BLOX HUB
WE BUILD DENMARK
Clean
The Danish Water & Environmental Cluster
UNGT ENTREPRENØRSKAP
AKTIV BYGG A·S
Ellingard Gruppen
MAPEI
iARK
intility
JM
Telia
Microsoft
A Bygg
HIVE AUTONOMY
WORKMAN
ASPELIN RAMM
CBRE
APX SYSTEMS technology that delivers
Grette
First Mover Group
Kiona
ØYAN & SCHIE
Codex ADVOKAT
Norconsult
Kristiania
OSLOMET
kiwa
TreFokus
Eiendomsfag
LINK ARKITEKTUR
Henning Larsen
SWECO
Takst & BefaringsSenteret AS
VEIDEKKE
OBOS Block Watne
OSLO METROPOLITAN UNIVERSITY STORBYUNIVERSITETET
Prognosesenteret
STARTUP LAB
STATSBYGG
cisco
KUBEN YRKESARENA
CRAMO
COOR
NTNU
GLAVA
Franzefoss
eviny
SINTEF
OBOS
NG Norsk Gjenvinning
VARIG
ahlsell
MALLING & CO
Heidelberg Materials
AHO
asplan viak
Fagskolen Oslo Akershus
BI
DARK DESIGN GROUP
Hafslund Oslo Celsio
AF
nti
DNB
STORM AQUA
Gjensidige
BETONMAST
NCC
SMEDVIG
wavin
kvist
Multiconsult
Kinly
CONSTO
Perlo
SPARKEL
ALUHAK
FRAPONT WOOD_WORKS
MARSTRAND
Martela
service
lifeatwork
reduzer
MIR
RESIRQEL
Moelven
Metier A TETRA TECH COMPANY
cobuilder
CORPORIS
Findable
smart tactiles
mondial
PROTAN
pulse COMMUNICATIONS
BACKE
Really!
GREENROOMS Rom for fremtiden
CON FORM
MODULIZE
dplan
SENSOR INNOVATION
BlueTree
ALUTILE
smart vatten
pwc
Catenda
GreenDigital
AUTILITY
wenn property
hups
plaace
NOAH
Joint Action
VIXEL
BUILDRIGHT
Sirkulær Ressurssentral
UNTILON
viewsoft
SKOGLUFT

AI in the building industry

There is potential in the use of AI in the building industry, but how?

- AI is a system with the "*ability to perform tasks in the complex environment without constant guidance by a user*" (University of Helsinki 2018, in Bang 2023).
- Four categories for AI in the construction context: machine learning techniques; knowledge-based techniques, evolutionary algorithms, and hybrid systems (Akinade 2017, Bang 2023).

Opportunity with AI

There is potential in the use of AI in the building industry, but how?

AI is about increasing productivity throughout a building life cycle and contribute to improve sustainability:

- Acquisition and storing of data for existing building.
- Optimization of building design and planning.
- Optimization of construction sites and work routines (robotization and automation).
- Improve information flow and connect to BIM.
- Condition monitoring and predictive maintenance

AI implementation and challenges

- Understand “why”.
- How the AI systems are integrated into existing procedures and workflow within an organization or a project.
- Technological, legal, business, and people challenges.

Construction City

EN

PhD om kunstig intelligens i byggebransjen

Forsker Sofie Bang tror kunstig intelligens kan bidra på mange felt innen byggebransjen. Nå har hun startet på en PhD om kunstig intelligens, eller AI, ved Construction City i Oslo.

PUBLISHED 01. JULI 2020

[Construction City]

Byggeindustrien
bygg.no

Les Byggeindustrien digit

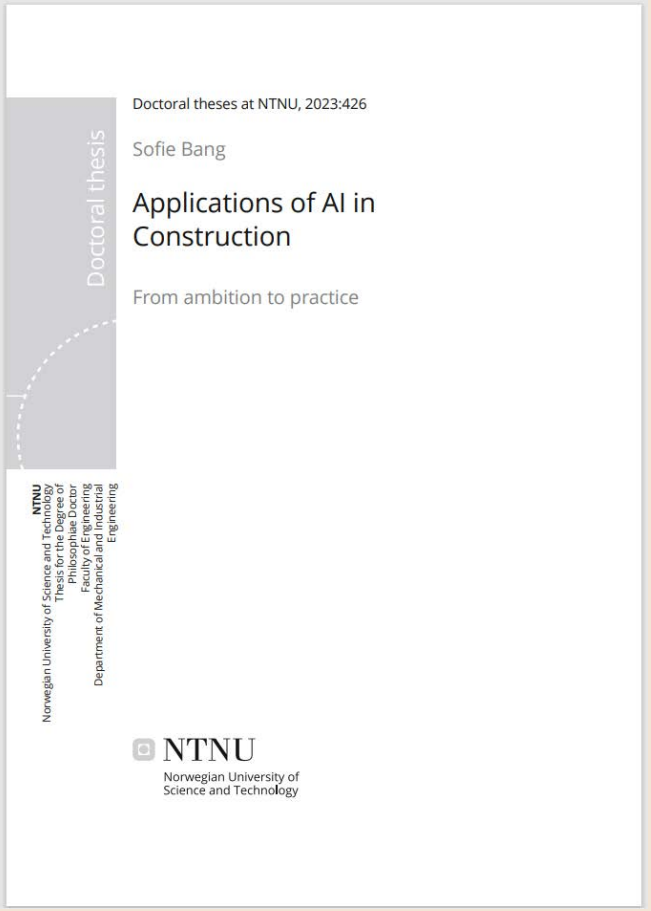
Sofie Bang har forsket på kunstig intelligens i den norske byggenæringen. Foto: Thomas Østrem/Holte Consulting

Flere muligheter og fallgruver med KI i byggenæringen

Publisert 20.09.2023 13:26

En ny doktorgradsavhandling ved NTNU ser nå konkret på hvordan byggenæringen skal gå fra ambisjon til praksis når det kommer til kunstig intelligens.

[Flere muligheter og fallgruver med KI i byggenæringen • Byggeindustrien]



Doctoral theses at NTNU, 2023:426

Sofie Bang

Applications of AI in Construction

From ambition to practice

Doctoral thesis

NTNU
Norwegian University of Science and Technology
Thesis for the Degree of Philosophiae Doctor
Faculty of Engineering
Department of Mechanical and Industrial Engineering

NTNU
Norwegian University of Science and Technology

[PhD-thesis]

Data for sustainability and circular economy

1. Four thematic group
2. Barriers for data management as an enabler of circular economy: an exploratory study of the Norwegian AEC-industry (Bellini and Bang 2022).

    1. Lack of data availability.
    2. Lack of data interoperability.
    3. Lack of competences.
    4. Unwillingness to share data.
    5. Lack of financial incentives.
    6. Lack of harmonization across the value chain.

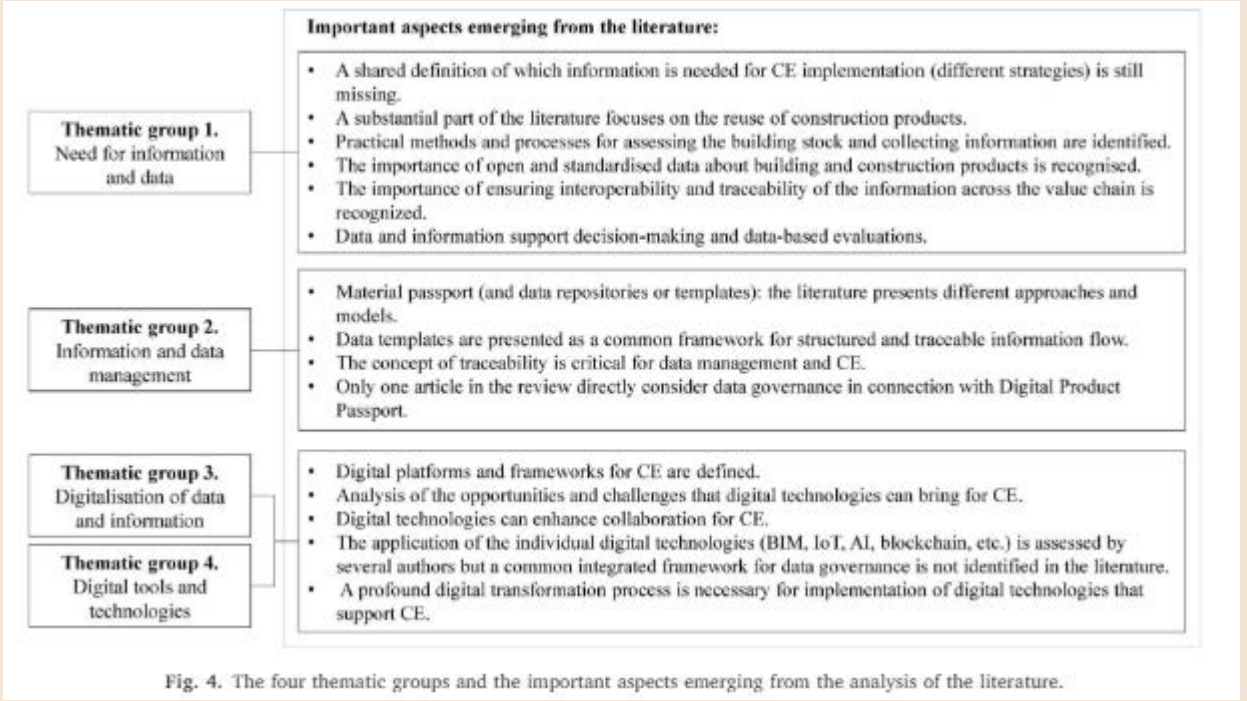


Fig. 4. The four thematic groups and the important aspects emerging from the analysis of the literature.

Bellini et al. 2024

Projects in CCC

Et problem/ide du har som best løses i et samarbeid

Identifisere utfordringer, åpen dialog, møte likesinnede

Konkretisere utfordringer og avdekke prosjektideer

Utvikling av idéer og finne samarbeidspartnere

Gjennomføre samarbeidet for å løse problemet

En løsning som endrer bransjen!

On-going

Cyber security collaboration: How to reduce digital threats together

Problem

Individual companies cannot prevent and combat a cyber attack alone.

Solution

A common Information and Analysis center (ISAC) for the industry

Results

A preliminary project was conducted in collaboration with SINTEF. A team of consultants has now established a cyber security collaboration forum.

Participants

OBOS, AF, Statsbygg, SINTEF, Veidekke og Multiconsult

Completed

Optimized use of materials: How to reduce emissions and costs on raw construction?

Problem

The use of materials in apartment blocks today is excessive. In a market with increasing material prices and requirements for emission reduction, it is desired to investigate whether there is potential to save emissions and costs.

Solution

Experts' assessment and evaluation of greenhouse gas emissions; functions; and adaptability.

Results

Final report shows which materials and construction types should be considered in the future based on the analyzed parameters: greenhouse gas emissions, costs, functions.

Participants

Norconsult, Veidekke, Moelven, OBOS & Betonmast.

Under development

3D-print and AI for design optimalisation

Problem

Improve design through 3D print and AI

Solution

??

Results

??

Participants

Statsbygg, NTNU, Veidekke, and hopefully more.

Under development

Design for disassembly: sustainable resource use

Problem

??

Solution

??

Results

??

Participants

??

Contact us!

Are there any AI-related challenges that should be solved in collaboration with the industry?

Contact information:
Alessia Bellini
alessia.bellini@constructioncity.no
+47 94430417

Resources

Sofie Bang – PhD thesis
Nasjonal strategi for kunstig intelligens
SINTEF Fagområde
KI kurset utviklet av SINTEF og Digital Norway
Journal article: The role of data when implementing circular strategies in the built environment: a literature review. Bellini et al. 2024
Conference paper: Barriers for data management as an enabler of circular economy: an exploratory study of the Norwegian AEC-industry
AI in AEC | AEC AI Hub (addpotion.com)


Construction
City Cluster