The City of Knowledge – A Triple Helix Organization

Methods for an alternative value chain

Thanks to all colleagues from
CITIES Research Centre
EnergyLab Nordhavn
City of Knowledge
and many more …

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DTU Civil Engineering
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Caroline Arends, CEO
September 2018
THE VISION FOR 2020

- To be one of Europe’s leading scientific centres and university towns with a world-class level of research and education
- To be a centre for the development of knowledge-intensive business clusters
- To be an international hub for work, culture, trade and urban life
- To be a living laboratory for a sustainable urban and business development

TRIPLE HELIX MODEL

More than 40 member organisations.
Cities (demand, size, opportunities)

Companies, Financing, ...

Universities, Knowledge Industry

Experiments in full-scale

Data collection

Economical frames that are not possible else
Methodologies that work

VISIONARY DEVELOPMENT IN THE CITY OF KNOWLEDGE

- Climate and Green Technology
- Communication
- Entrepreneurship and Innovation
- Internationalization
- School and Education
- SMEs and Employment
- Urban Development and Trade

Innovation District

Geographic area where anchor institutions and companies cluster and connect with small firms, start-ups, business incubators and accelerators.

Physically compact, transit-accessible, and technically wired, they offer mixed-use housing, office and retail.
Actors and involvement

LOCAL ENGAGEMENT IN DEVELOPING THE CITY OF KNOWLEDGE

- By engaging local businesses, the university and local government, we work together creating a vibrant university town that can attract and retain the talents we need to drive business and research.

CLIMATE AND GREEN TECHNOLOGY

- PhD-projekt "Sharing City" - Facility Management
- Smart Data Hub working with Big Data and Data Management

ENTREPRENEURSHIP

- Vidensby innovation Camp - 400 pupils/students working on innovation

UNIVERSITY AND ECONOMIC LIFE

Research collaborations • Student projects and -internships • Innovation • Recruitment
Results – Infrastructure Developments

DTU EXPANDS FOR 4 BILLION DKK

MICROSOFT
NEW DOMICILE IN LYNGBY

20,000 m² • 400 apartments • 1,000 workplaces • 800 parking spaces • 1.2 bn. DKK investment

CAMPUS ADJACENT AREAS

STUDENT AND PHD HOUSING

34,500 m² housing • student and PhD apartments • housing • recreational spaces

LYNGBY COMPANY HOUSE – DTU NORD

Office and meeting facilities • student housing • 40 parking spaces

NOVOZYMES INNOVATION CAMPUS

75,000 m² • 2,500 workplaces • research and development facilities • learning centre • park and nature trail
AREA DEVELOPMENT AND INFRASTRUCTURE
Results – Solutions

Partner innovation and solutions

EXAMPLE
GROWING FROM A SMALL DEMAND

Spin-off companies

FAQ Om Sunmapper

12 år
Med den besparelse vil anlægget være betalt tilbage inden 12 år

Sådan er bygningen eksponeret for solen

Billedet viser potentialt for solceller på bygningens tag, jo lyser farverdestørerelelectricitet vil solceller producer.

Ud fra farvekoden kan du, eller din installør, bestemme hvilke solcellemål skal placeres for at producere mest el fra solens energi.

Skygge Sol

Find leverandører

3.800 kWh/år
Soleller vil producere 3.800 kWh om året

3.700 - 5.700 kr/år
3.700 kr om året til 5.700 kr

DTU
Municipality
Learning organization
Company
Hacking
Students
Spin-off
Consultant
Company
(Demand)
University
(Building)
Municipality
(Learning organization)

Min adresse er...
Methodology – Lab Value Chain
Research Labs at universities

Controlled experiments
Consequences covered

Source: http://www.asmt.dtu.dk/
Living Lab: Smart Campus DTU

- Smart Buildings Lab
- Smart Transportation Lab
- Smart Lighting Lab
- Innovation Lab for Students

- Controlled experiments
- Consequences limited
- Test persons informed
Living Lab: Lyngby (City of Knowledge)

- Triple Helix Network
- Big Data Projects: Building data
- Real world testing
- Consequences
- Persons not informed
- Large-scale infrastructures
Innovation for the world
EnergyLab Nordhavn (Copenhagen, Denmark)

- Facts
  - 50 years of development
  - 40,000 citizens
  - 40,000 working places
  - Living Lab for Copenhagen
    - = Aiming at CO₂-free from 2025
  - Building Code +1 (< 20 kWh/m²/anno)

Source: Google Search images
EnergyLab Nordhavn
Large Size Living Lab

- Power grid operation
- Storage flexibility
- Fuel-shift components
- Flexibility from heat and cooling grids
- Showroom and visualisation
- Measurements and data warehouse
- Integrated markets and control centers
- Smart charging infrastructure
- Flexible buildings and users
- EnergyLab Nordhavn Large Size Living Lab
EnergyLab Nordhavn – Smart Energy Systems

- Measurements
  - 17 mil. €
  - Ca 50 buildings monitored in detail, 2 offices, ...
    - Measuring density pr. building e.g. 10,000 points
    - Frequency e.g. 1 pr. minute
  - All energy flows, water ... - mesh monitoring
  - Special energy sources/sinks monitored individually
    - Cruise ship terminal, solar, wind power ...

Source: http://www.byoghavn.dk/byudvikling/bydele/nordhavnen/landvindingsprojektet+i+nordhavnen.aspx
Thank you for listening

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