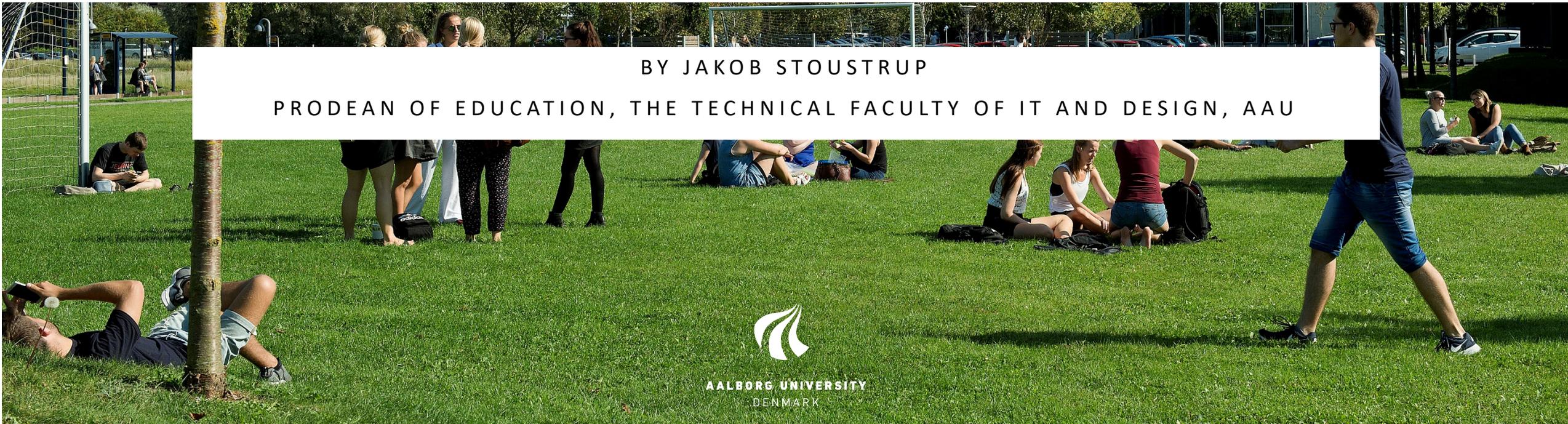




AAU MEGAPROJECTS



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From regular PBL projects to megaprojects

Regular PBL project	Megaproject
<ul style="list-style-type: none">• team of students• single discipline• same level• project period of one semester• limited scope of real-world problem	<ul style="list-style-type: none">• team of teams of students• multiple disciplines• (possibly) different levels• project period of several semesters including many teams• significant societal challenge; preferably SDG related

Megaproject characteristics

- A highly ambitious umbrella project addressing a significant societal challenge
- Addresses one or more of the United Nations' 17 sustainable development goals
- Entails several smaller (i.e., regular semester) projects all contributing to solving part of the main problem
- Characterized by being interdisciplinary and extending over several years
- Involves student interaction and knowledge sharing amongst the participating groups – i.e., cross departmental/cross institutional
- Must include participants from at least two departments
- Open to collaborations with students/researchers from other universities

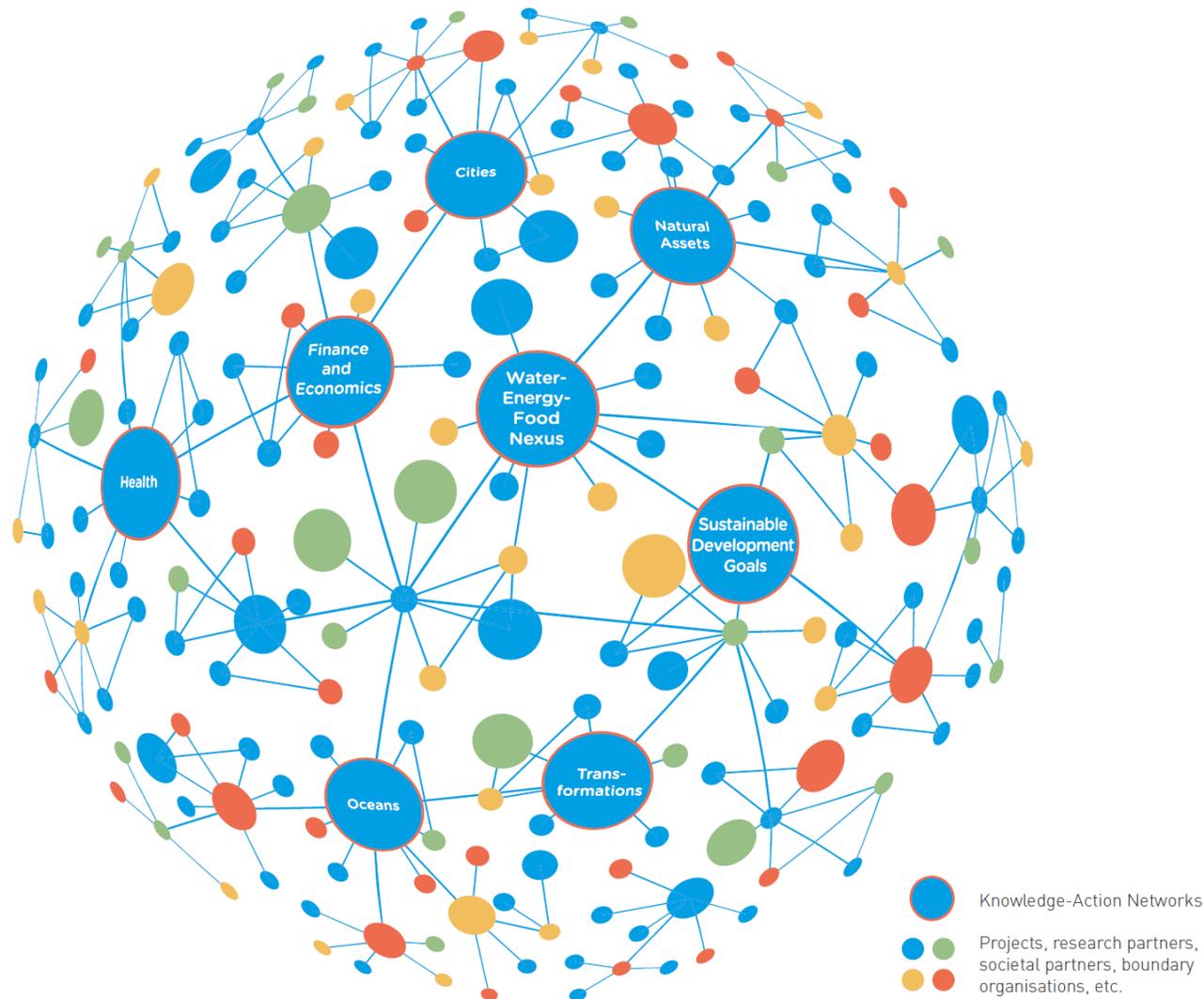


Why megaprojects?

- Increase the motivation among the students
- Increase their cross-disciplinary competences
- Increase their cooperation competences
- Contribute to the students employability
- Support the implementation of every one of the SDGs as well as the implementation of the SDG Framework itself
- Teach the students how their education can contribute to tackle large (societal) challenges
- Support the development of PBL



Megaprojects as Knowledge-Action Networks



Megaprojects – as Knowledge-Action Networks – are collaborative communities in which the best minds can develop and engage in research for themes critical to local and global sustainability

The first two Megaproject themes are:

- **The Circular Region**
- **Simplifying Sustainable Living**

Both megaprojects have been commissioned by Aalborg Municipality

The first semester projects within these megaprojects will be initiated in the fall semester of 2019

Two other megaprojects are in the pipeline, but topics are yet to be decided

Simplifying Sustainable Living (2019-2021)

Aim: To make it easier for Aalborg municipality's citizens to live sustainably

End product: May take different shapes. It might include analyses, recommendations, prototypes, design suggestions or apps. The common denominator is that they must all help make green living easier in Aalborg.

The municipality has broken the megaproject down into three challenges (focus areas):

- Waste
 - how residents of Aalborg as well as visitors can produce less waste
 - identify and propose solutions that aim at ensuring a larger proportion of waste being systematically sorted and recycled
 - focus on articulating waste management/sorting among teenagers and young adults
- Green consumption
 - support consumers in making green, sustainable choices in an easy and apparent way
- Transport
 - how to ensure and enable sustainable mobility; e.g., aspects such as individual transportation needs, how and when a choice of transport mode is made and what influences this, and how certain transport modes will be preferred over others



The Circular Region (2019-2021)

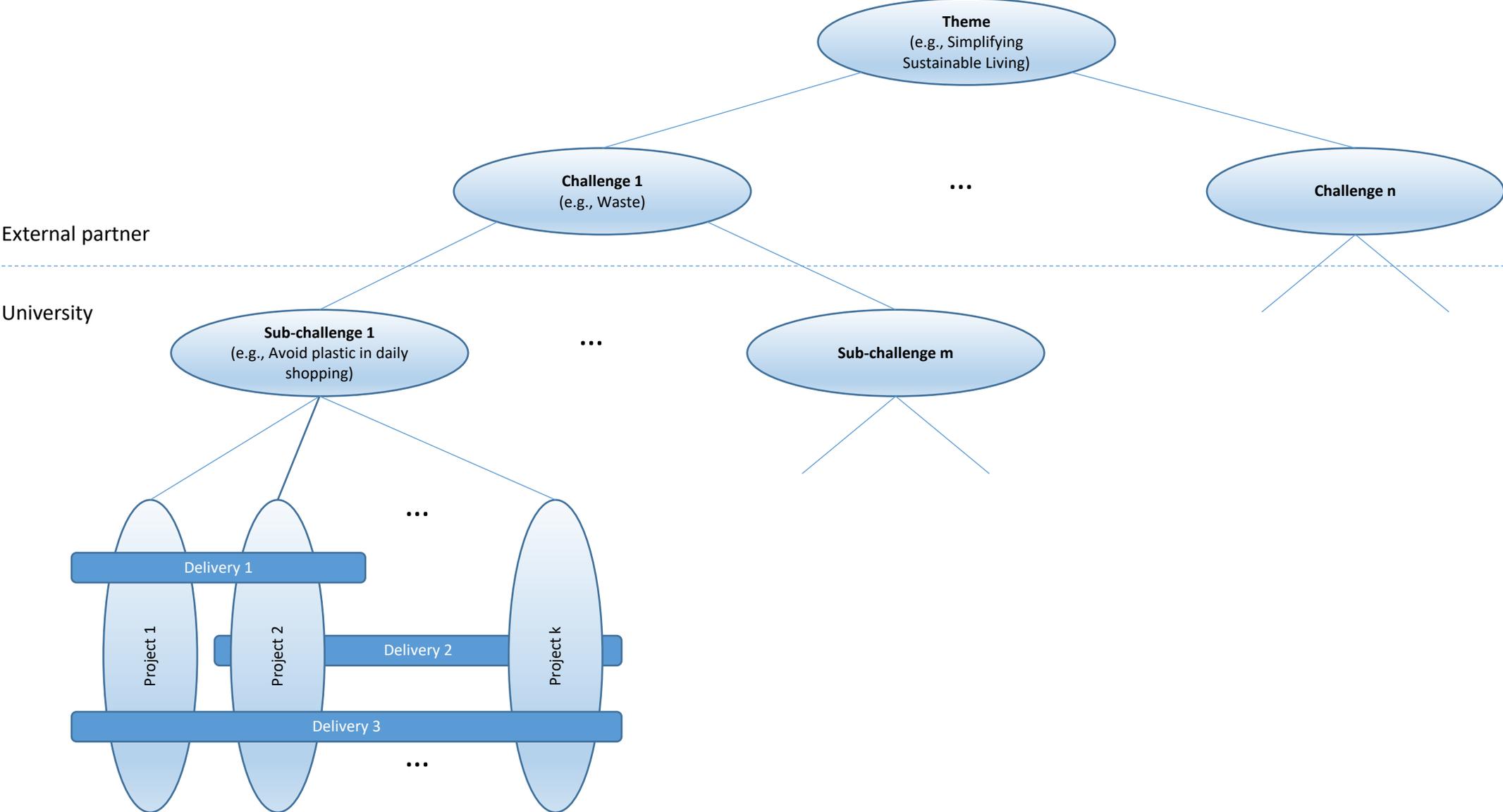
- Aim: To lay the foundation for North Denmark to become the first circular region in the world
- End product: May take different shapes. It might include analyses, recommendations, design suggestions, prototypes, campaigns, manuals

The municipality has broken the megaproject down into three challenges (focus areas):

- Systemic changes
 - address questions of which aspects at a systemic level act as driving forces, which provide hindrances, and what role may regulation play now and in the future
- Co-design and co-production of knowledge
 - identifying opportunities for cross-sector and cross-disciplinary collaboration in respect to developing and sharing knowledge and learning within the circular economy; e.g., how different sectors of society can better work together, produce and share data, and test solutions jointly
 - how to ease the transferability and applicability of research results to the private sector or public bodies
- Circular economy in practice
 - concretizing activities to be undertaken in the municipality and in the region
 - identify actual opportunities and solutions for slowing, closing and narrowing resource loops; e.g., how to design for reuse, disassembly and recycling, or how to ensure collaboration between different stakeholders, sectors, and disciplines



The Structure of Megaprojects



Example: Study of Electric Vehicle Driving and Charging Behavior for Cost-effective Demand-Side Participation

Electric vehicle charging possesses a large degree of spatial, temporal and behavioural diversity. So, it's very relevant to understand the different driving and charging patterns of the users to design and develop economic and efficient local charging systems. This will further enable flexible management of electric vehicle battery to utilise local renewable electricity and minimize local electricity grid reinforcements.

Sociology: Electric vehicle driving preferences by the user, EV charging inclinations (at charging stations or home or office or combination) and user needs, willingness to shift the car charging to hours with low price electricity hours (to utilize synergy between green electricity, willingness to allow data/monitoring of the car by utilities/retailer/third parties).

Computer Science: EV data processing and management, data hub systems, aggregation and disaggregation of charging data, forecasting of charging patterns for scheduling of charging power and rates.

Electronics: Selection of appropriate systems and technology for electric vehicle aggregators in neighbourhood/area for data communication, location of fleets and interaction. Cyber security aspects of processed vehicle data, fault management and resilience.

Planning: Short-term and long-term planning scenarios for electric vehicles and electrified transportation roadmaps, Policies and incentives promoting EVs, Transportation data/statistics - driving patterns of light motor vehicles (LMV): different days and seasons.