

# Chapter 14

## Utilize the Green Transition to Redefine Business Models in Large-Scale Projects: Upgrading Inland Ferries With Batteries – A Case Study

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### ABSTRACT

*This case study addresses some of the opportunities to redefine business models in large-scale projects in the green transition (i.e., going from fossil fuels to sustainable energy). This case study is made from a technical perspective and will present multiple scenarios where new business models can be developed. Even though it is based on ferry operations, it is comparable with many other significant complex assets with long service life. The shift in energy sources disrupts current products in many domains and will introduce new market opportunities. The operation of the ferries is a multi-objective optimization problem, and this leads to a gap as business cases and models normally only have one goal. To reveal the full potential, the development of multi-objective models is needed.*

### ORGANIZATION BACKGROUND

This section will start with a short introduction on how this case study relates to the theme “Business Model Innovation Through Disruption and Digitalization” of the book. From a technical perspective in large-scale projects, business model innovation can often be neglected when implementing new technologies as all effort is used to bring the new product, service, or technology into a well-known market. The complexity is often high, and the uncertainties are many, so to mitigate risks, some tend to stick to old business models and not utilize the opportunity to disrupt the market.

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Figure 1. Digital radar with enablers and applications

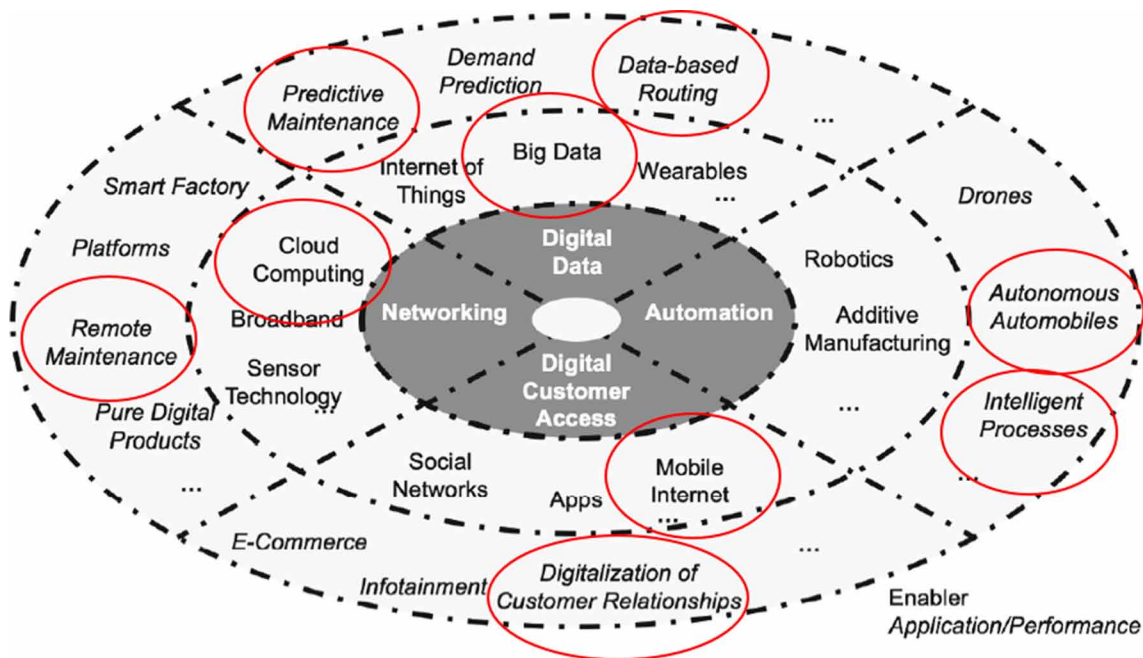


Figure 1 shows the “Digital radar with enablers and applications” by (Schallmo et. al, 2020), and the red circles indicate just some of the digitalization technologies needed for the ferry shifting to battery operation. The use of many digitalization technologies in the green transition is not unique to this project, so digitalization is a key factor for success.

The disruption here is exemplified by the ferry company which could extend their business into the electrical energy market.

The goal of this chapter is not to develop new business models but aims to give inspiration on how to map, explore, and identify stakeholders in a domain. This includes a search for disrupting options in the green transition, and hopefully create new ambitious business models. The operation of the ferries is a multi-objective optimization problem, and this leads to a gap as business cases and models normally only have one goal e.g. the widely used Business Model Canvas. To reveal the full potential development of multi-objective models is needed.

Denmark consists of the peninsula of Jutland and 1,419 islands, 443 of which have been named, and 78 are inhabited (2013 numbers) (UM, 2022). Many of these islands are only connected with ferries, making these ferries a critical part of the infrastructure. The ferries are operated all year round. It is a mix of publicly and privately operated crossings. Domestic ferries in Denmark contribute to a CO2 emission of 72.000 tons per year.

In Denmark, there is a broad political agreement on achieving a 70% reduction in CO2 emissions by 2030, and by 2050 Denmark should be climate neutral. The 2030 goal is described in the “Danish Ministry of Climate, Energy and Utilities” climate program (KEFM, 2021). One of many areas in the 2030 program is the electrification of ferry operations. There are multiple examples of fully battery-powered ferries in shorter services with great success. In 2019 the newly built M/F Ellen (Ellen, 2020) was put into operation on a 22 nautical miles (40 km) route. The longest ever seen. Ferries are often in operation

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