Thesis Title:	Requirements for material logistics in a circular hospital – a design
	science research in academic hospitals EMC and LUMC

## Introduction of the topic

Around 7% of CO2 emissions in developed economies come from the healthcare sector. A big part of these and other negative environmental impacts are created by hospitals that have become increasingly dependent on linear value chains. Single-use disposable consumables, devices, and equipment are generating lots of waste, of which most is incinerated. Hospitals need to find solutions to move away from these unsustainable linear value chains and towards circular value chains, where products last longer and the waste hierarchy is respected. This requires a "logistical" rethink of how a hospital is designed and materials are handled. Automation, robotization and mechanization will probably be essential parts of the solution concepts. Solution concepts should improve environmental impact, be safe, cost-effective and space-efficient while not compromising health outcomes or the workload of healthcare workers. With my thesis, I aim to provide hospital managers with a structured overview of viable options they could implement in their hospital to move towards circular material use.

## **Research Methodology**

The <u>objective</u> of this study is to design solution concepts that can be implemented by hospital managers to improve the environmental impact their hospital is creating through the use of its materials. Both academic and management literature will be combined with expert knowledge and archival documentation to design the solution concepts.

Research Question : What are viable solution concepts to move towards circular material use inside a hospital?

Sub-question 1: What are the different (linear) material/product streams inside a hospital? Sub-question 2: What are the underlying causes for the identified (linear) material/product streams? Sub-question 3: What are the design criteria for solution concepts?

To reach the research objective, the <u>research strategy</u> I will be using is a design study with a focus on the first three phases of the problem-solving cycle: problem identification, diagnosis and design of solutions. The last two phases intervention and evaluation will be a bit shorter. As mentioned in the research objective statement, the methods and data I expect to be using are threefold:

- First, I will use literature research of both academic and management literature (including consultancy, government and healthcare community documents).
- Second, I will use semi-structured interviews with different stakeholders (doctors, hospital managers, hospital procurement department, hospital logistics department, suppliers and waste handling partners) to gain expert knowledge.
- Thirdly, I will use archival data like policy documents or process descriptions, that explain how products/materials are being bought, used, and discarded inside a hospital.