Lucerne University of
Applied Sciences and Arts

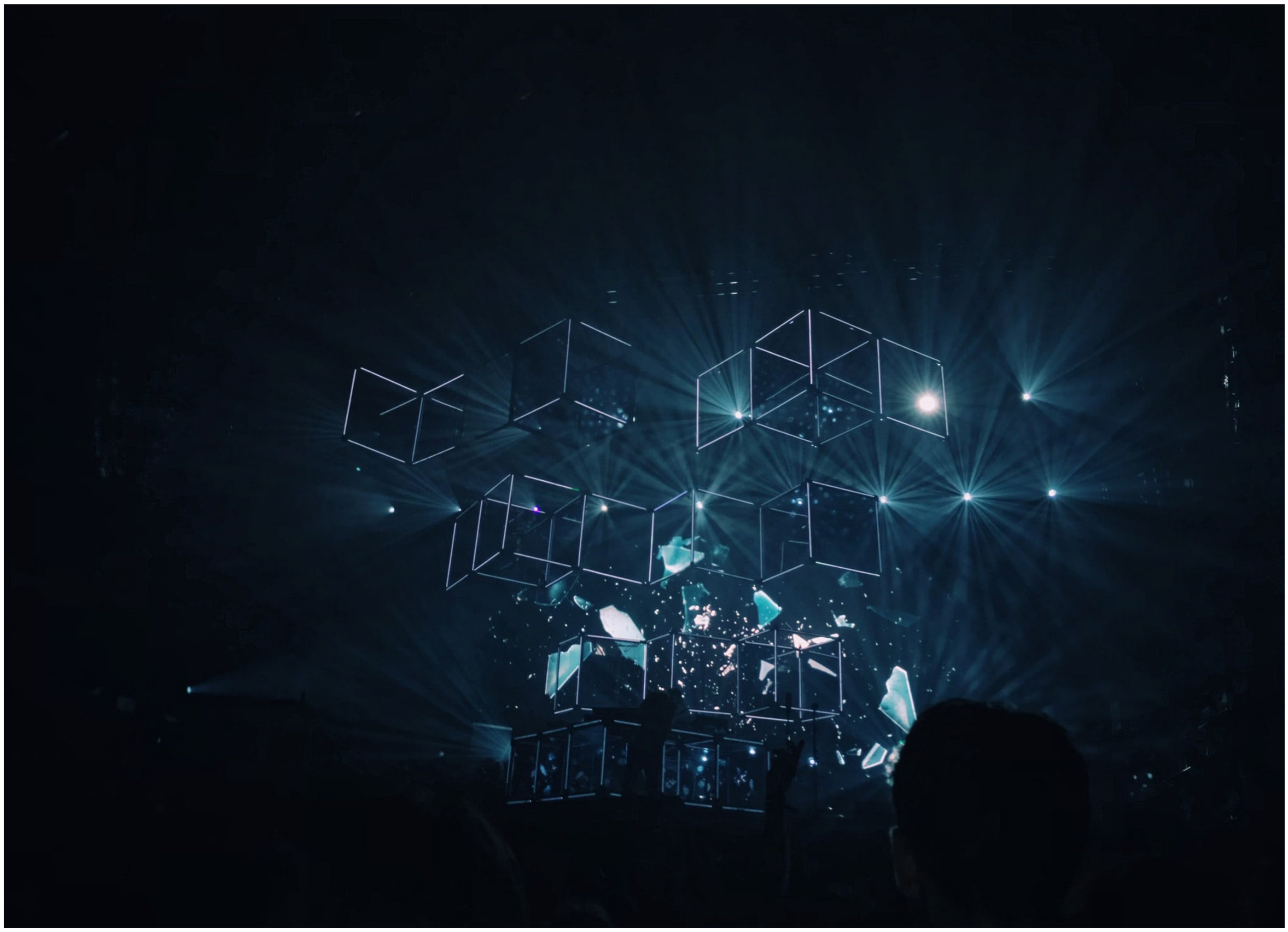
HOCHSCHULE
LUZERN

Technik & Architektur

FH Zentralschweiz

Bachelor's thesis in Energy Systems Engineering

Digital Twins in Retail



With the industrial revolutions, there has been rapid growth in many areas in the last years. The two key areas of focus on this research project are the Digital Twin (DT) concept and sustainability. In a globalized world, organizations face tough competition. Leaner and faster processes equip organizations with a competitive advantage. In the current Industry 4.0 era, the need is to also be digitized and connected. Digital Twins, Artificial Intelligence (AI) and Internet of Things (IoT) technologies play a critical role here. This report aims at identifying and analysing the potential and impact of digital twin applications in retail outlets with focus on energy management, cost efficiencies and sustainability. Using literature research and discussions with experts, the current footprint of key retail players in Switzerland and the implications of implementing digital twin solutions are analysed. Error logs and data sets of key parameters from critical energy equipment have been analysed from a sample of 15 retail stores across Switzerland. Additionally, PESTEL and SWOT analysis have been performed to do an analysis of macro- and micro-level influencing factors. Findings indicate that considerable potential of savings and optimizations exist across the total cost of ownership (TCO) covering energy management, asset lifecycle management, quality control and sustainability. Application of these technologies can reduce the retailer's carbon footprint and enhance customer experience. Considering the levels of energy consumption and carbon footprint today, even modest improvements in abovementioned areas will lead to immense benefits.

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