# GreenLane IBM – enhanced value tracking in supply chain simulation
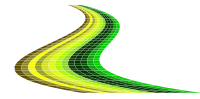
How to enable digital twins for value-tracking with cloud data sources?

Intensified forest disturbances across the globe challenge the forest sector. In 2019, salvage cut volumes (due to bark beetle infestation and abiotic disturbance such as windthrow) reached 62 % of the annual cut in Austria. Extended transport lead times (time spent in road-side stocks) lead to wood value losses from staining and decay fungi, insects or changing mechanical/chemical properties. To meet these challenges the GreenLane project developed an integrated weather-driven framework for wood quality prediction based on the main drivers of wood quality development; Insects (I), Blue stain (B) and Moisture content (M).

Together with threshold tables, The IBM value-tracking model enables prediction of downgrading for each of the three drivers and provides the opportunity to establish digital log twins for integration into simulation models. Specifications and model prototypes were developed using results of experimental trials for validation of existing models. The I and M models selected from existing literature have been evaluated in field trials. Data analysis of the partially published B model has been reconstructed, rebuilt, and tested against new data collected in 2020. All three models use weather parameters such as temperature and humidity as input to the estimated day of insect infestation (I), area of blue stain (B) and loss of wood moisture content (M). To support implementation, the model functions are provided in R language. The procedure for creating a lookup table for risk of downgrade is developed for easier integration into virtual supply chain laboratory environments.
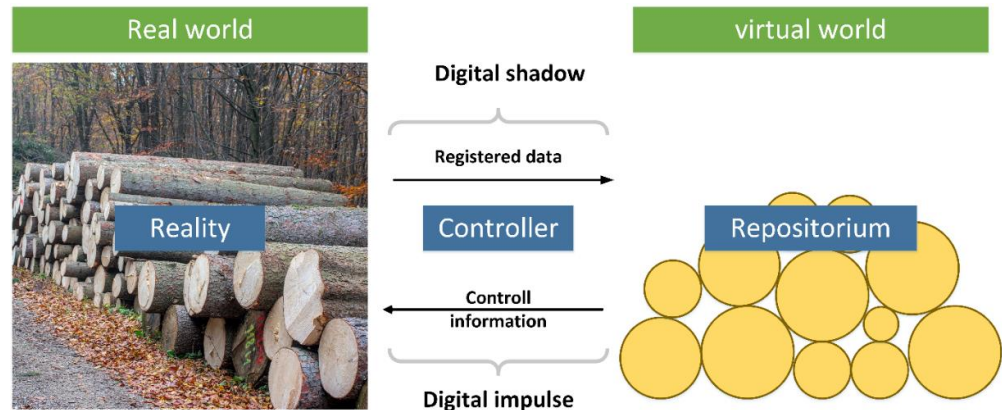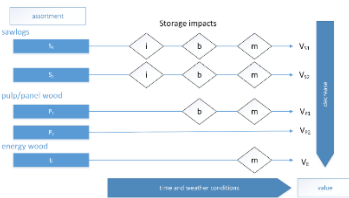
Christian Kanzian Thomas Holzfeind, Stephan Böhm, Lone Ross Gobakken, Peter Baier, Thomas Kirisits

In the wood supply chain environment, weather conditions typically represent unwelcome surprises. Based on the IBM-model, The GreenLane project proposes an initial information and data concept for the Digital Log Twin. The concept encompasses data from different sources such as harvest, weather, and contract data containing assortments and possible thresholds for the different assortment categories.

The goal of Forest value GreenLane is to develop virtual supply chain laboratory environments enabling value-tracking and interactive testing of harvesting and transport responses to challenging climate scenarios. Its focus is on implementing weather-driven models for wood quality and availability.