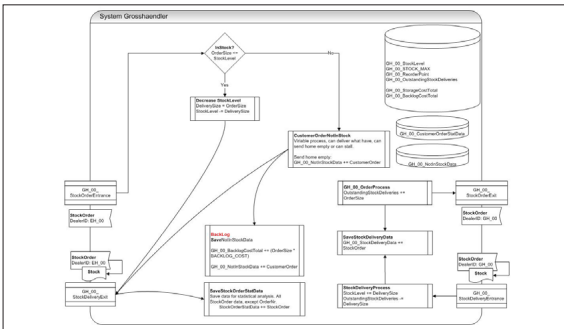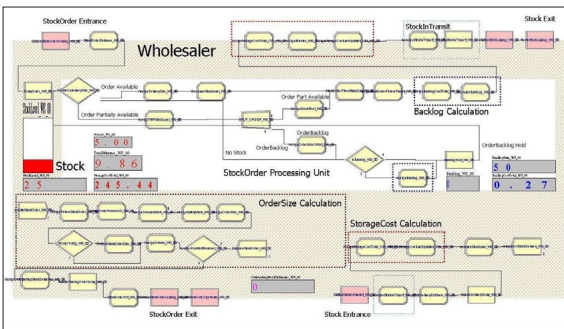|	
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Analysis and Simulation of a Supply Chain with ARENA

A suitable model is designed for the supply and examined for its suitability. Here is a single site.

ARENA enables supply chain simulation and gives the possibility to test different strategies with the same input data.

Simulation report shows strategy performance.

Introduction: Global supply and manufacturing networks need driving strategies to manage the product, information and financial flows on which these businesses run. Discovery through computational modelling and simulation has become the third pillar of science, alongside theory and experimentation. As computational power increases and highly parallel computation is utilised, simulation has gained in importance. Science turns to simulation when the valid models become too complicated or exact mathematical solutions are not available. To demonstrate some of the key principles of supply chain management, a group of professors at the MIT developed a simulation game called "The Beer Distribution Game". The game's design is readily simplistic, but does not forfeit the necessary complexity, as is met in reality. Logically, the choice would be to choose the game for the introduction of simulation of supply chains. The game offers the opportunity to demonstrate the Bullwhip Effect, an observed phenomenon in forecast-driven distribution channels, where stock levels spiral out of control and great difficulty is experienced in trying to restore control as changes in order amounts are amplified through the system.

Approach/Technologies: ARENA from Rockwell Software has been chosen to simulate the supply chain.

Result: The Bullwhip can be the effect of rational behaviour and could be caused by a lack of understanding of the functionality of the supply chain. Consequently, the causes and their role in the system have been examined in detail. The main causes: "Demand Forecast Updating", "Order Batching", "Price Fluctuation" and "Rationing and Shortage Gaming". An in-depth understanding of how the variability is caused helps understand remedies. Strategies suitable to a supply chain can consequently be developed to mitigate the different causes: Victory by comprehension... Simulation enables the evaluation of strategies. The process of simulation development is looked at by sample of the game. The development steps and their interaction are explained: "Modelling", "Modelling Suitability", "Implementation", "Model validation", "Model Verification" and "Strategy Optimisation". ARENA, a simulation tool, is used. Though not compared, the experience shows where complexity lies and what one should additionally consider when developing a simulation. Finally, the developed solution is optimised with the help of ARENA, whereby the process, simulating a supply chain, is completed.