

## Systems Dynamics in Reverse Logistics Processes

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### Abstract

This paper/poster explores the role and contribution of dynamic models in reverse logistics processes. The purpose of reverse logistics processes within a manufacturing supply chain is to disassemble or reutilize products, or their components, in order to generate value. The first part of the paper describes the general process involved in reverse logistics as found in the supply chain management literature. The second part of the paper presents three dynamic models that represent the main factors driving product returns: The “green” factor or consumer sensitivity towards environmental issues; the regulatory factor or governmental requirements; and the profit factor or business opportunities. The third part of the paper combines the three factors behind products returns in order to create a general dynamic model of reverse logistics. Emphasis is placed on two major issues: The non-linear relationships involved in reverse logistic processes and business opportunities as the main driver of reverse logistics. The last section of the paper centers on the similarities and differences of dynamic models that aim to simulate “forward” logistics and “reverse” logistics. While “forward” logistics are centered in concepts such as assembly and bullwhip effect, reverse logistics models emphasize disassembly and funnel-like behavior.