Simulation in the Supply Chain

Executive Briefing Synopsis

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Supply Chain success rarely is achieved as the result of a single brilliant move. Instead, it comes from the slow and patient accumulation of many small improvements, usually made over a long period of time. The first improvements come easily, but management usually finds that as time passes, they become harder and harder to locate, demanding more of the staff and requiring more and more sophisticated tools. Simulation is one such tool.

This executive briefing is intended as an introduction to the technology of computer simulation for senior management in the logistics, distribution and warehousing industries. It outlines capabilities and potentials at several levels and may also be of use to sales and marketing personnel.

Simulation is most effective as a tool when relationships between process elements are complex and hard to express as mathematical formulae, when some or all relationships are nonlinear, when randomness is inherent in some aspects of the process, when processes occur over a span of time, and when time can be made available so that models can be constructed, operated and validated. Simulation is much less effective when objectives and/or process element interrelationships are unclear, data is unavailable or unreliable, instantaneous solutions are required, the opportunity to validate a model is lacking, or the objective is to model the performance of a single entity or a small number of personal entities.

Simulation technology is defined and explained. Hardware and software requirements are reviewed and a brief history is presented along with examples of successful simulation outside of the logistics supply chain. Then, with reference to the supply chain and the warehousing industry, possible uses of simulation are detailed in several modalities (purposes) and at several levels.

The benefits of simulation as an analytical tool are reviewed, followed by a section that describes industrial lessons learned from failed simulation projects and the picture of requirements for success that emerges from those lessons. The briefing concludes with a brief foray into the possible future of the technology.