

# Using discrete-event-simulation for improving operational efficiency in laboratories: a case study in pharmaceutical industry

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## Abstract

Just-in-time delivery has become a key aspect of pharmaceutical industry when loyalizing customers and competing internationally. Additionally, prolonged lead times may lead to increased work-in-process inventory, penalties for non-compliance and cost overrun. The problem is more complex upon considering a wide variety of products as often noted in pharmaceutical companies. It is then relevant to design strategies focusing on improving the delivery performance. Therefore, this paper proposes the use of Discrete-event simulation (DES) to identify inefficiencies and define solutions for the delivery problem. First, input data were gathered and analyzed. Then, a DES model was developed and validated. Finally, potential improvement scenarios were simulated and analyzed regarding productivity rate and proportion of tardy jobs. A case study in a pharmaceutical laboratory is presented to validate the proposed methodology. The results evidenced that, by implementing the best scenario, the productivity may be augmented by 44.83% which would generate zero tardy jobs. © 2018, Springer International Publishing AG, part of Springer Nature

Keywords:

Discrete-event simulation (DES), Pharmaceutical industry, Productivity rate, Proportion of tardy jobs