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How do Digital Twin models support intralogistics within pharma industries?

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One of the critical functions within pharma industries is intralogistics. Intralogistics is the process of automating, optimizing and managing the physical flows of materials inside warehouse and to/from warehouse across Active Pharmaceutical Ingredients (API) production, Aseptic Production (AP), assembly and packaging facilities within pharma industries. Simulating the materials flow help the users to make sure that the design requirements and needs of material for operating different working stations is fulfilled. It is very difficult and, in some case, impossible to produce products, manufacture or expand pharma facilities without using simulations and digital models. Digital twins (DTs) enable the utilization of these models in operations and leveraging both simulated and operational data simultaneously. The digital journey towards DTs usually starts with 3D-modeling of physical assets. This will be followed by visualization – e.g., through VR, simulation, emulation (shadow digital twin) and finally closed-loop DT. Simulation tools have been extensively used in pharma and non-pharma industries to support decision makers regarding project planning, scheduling, and budget forecast for decades. However, simulation is an imitation of reality typically under ideal conditions and usually limited to the design phase. In Novo Nordisk, we are looking into how to combine the advantageous of simulation and operational data to develop more accurate emulation of processes to achieve accurate detailed live insight and validate the digital models. This paves the way towards closed-loop DTs. The emulation phase, in particular, is where statistician and data analyst play a key role to help further development of the digital models, e.g., by implementing advanced statistical models, designing DoEs, analysis of big data, and potentially self-learning algorithms.

Presenters: FARAHANI, Saeed (Novo Nordisk); PETERSEN, Svend Skovgaard (Novo Nordisk)

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