

## **Advanced Value Stream Mapping: Development of a Conceptual Model Considering Variability in Production Processes**

### **Abstract**

Recently, lean manufacturing (LM) practices are being combined with tools and techniques that belong to other areas of knowledge such as risk management (RM). Value stream mapping (VSM) is a well-known tool in showing the value, the value stream, and the flow, which represents the three lean principles. VSM and RM, when used in tandem with one another, are more advantageous in covering VSM issues such as the variability of production processes. In this article, a conceptual model that integrates the two is shown and explained. The model helps to generate scenarios of current state map (CSM) and future state map (FSM) in a dynamic way by identifying current and potential risks. These risks might happen in the future, bringing with it negative ramifications including not reaching the main objectives within the defined time. The model has been tested in a coffee production company belonging to health and food sector. The proposed model specified the ranges of variability through the drawing of CSM and FSM. This is quite a milestone because one of the challenges of VSM is that it is a static tool, and, as such, process variability cannot be captured appropriately. This new model is expected to overcome this drawback. © 2023 SAE International. All rights reserved.

### **Keywords**

Lean manufacturing; Monte Carlo simulation; Risk management; Value stream mapping