

**AN APPROACH TO INTEGRATING SUSTAINABILITY
MANAGEMENT PARAMETERS AND INDICATORS
INTO VALUE STREAM MAPPING**

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ABSTRACT

Sustainability is addressed in many ways in production research, and it is often coupled with Value Stream Mapping (VSM), a widely used technique for optimizing production systems utilizing lean concepts. The majority of writers in scientific literature offer systems for rating manufacturing processes (e.g. ratios, benchmarks). These methods are designed to decrease the quantity of (material) input required to produce a given number of products. As a result, better value stream goal conditions may be created to boost ecological efficiency and, as a result, lower costs. The primary goal of this work, however, is to provide a method for combining widely recognized sustainability metrics and indicators with VSM. Process-oriented accounting of resource consumption through buffers, transports, and processes along value streams underpins this method. This approach of incorporating sustainability into VSM adheres to internationally recognized standards for preventing input resource disposal via reuse, recycling, and recovery. On the one hand, this approach can be used for sustainability reporting by following international guidelines and frameworks, such as calculating emitted solvents per produced part, kilogram carbon dioxide equivalents per produced part (with units [kgCDE] or [kgCO₂eq]), kilogram disposals per produced part, and so on. Companies, on the other side, will be able to assess the expenses and profits of sustainable value streams, allowing them to monetize their efforts and benefits. As a result, it is essential to get immersed in material flows in the value stream, material consumptions at processes, transportation energy consumption, buffers and processes in the value stream, process linkage with scrap rates, waste generation, and so on. To express the characteristics and indicators of sustainability, new data lines in VSM must be established. A use case from the automobile sector will be used to demonstrate the study results.

KEYWORDS: *Manufacturing, Sustainable Development, Value Stream Mapping.*

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