# A Framework To Evaluate The Realization Of Smart Manufacturing Agendas: Focus On Agility & Sustainability In Production Level

## Abstract

Smart Manufacturing (SM) is defined as a manufacturing system with real-time and pervasive integration, customization capability and active management of all aspects in manufacturing and supply-chain with a horizon beyond the traditional objectives such as purely production maximization and cost minimization. In this paper we attempt to figure out the actual value added by adopting SM for a small to medium-sized plant in three steps.

In the first step, we outline SM scope and goals on the heels of technologies emerged over the past few years. Related programs running around the word is reviewed and a transition roadmap is proposed to evolve small to medium-sized plant to SM.

Once the objectives of SM are characterized, there is the need for a shared basis to specify service requirements and capabilities that allow our expectations to be granted. Therefore, our second step includes reviewing the dataflow structures devised to serve smart manufacturing agendas.

In the third step, key performance indicators (KPI) are identified and it will be explained how

The dataflow resulted from SM can bring about improvements to manufacturing systems based on the metrics they are defined in. Our objective is to display the value of SM, so it’s important to come up with a framework to assess the identified metrics. Since it’s not necessarily possible in every case to explain these performance indicators through mathematical formulation, Fuzzy logic is employed to depict the functional dependencies between operational characteristics and the targeted metrics. Sustainability (as the environmental aspect of manufacturing) however, has been dealt with separately from other performance indicators due to the fact that the system impact on environment is more of a measure of locality and proximity rather than system configuration. The proposed scheme then, is applied to a mixed model assembly system (MMAS) to indicate the pragmatic enhancement in system performance brought by adopting SM. We expect this framework to help decision makers have a better understanding of potential values embraced in smart manufacturing