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Editorial

Special Issue on Applied Engineering to Lean Manufacturing Production Systems

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In industrial production processes, different techniques, tools, philosophies, and methodologies are applied to facilitate their management and control. One of the most important philosophies is Lean Manufacturing (LM), which is aimed at minimizing waste and scrap in manufacturing systems while maximizing value creation for the end customer. These wastes can be overproduction, long lead times, transportation, excess inventory, movements, and defects. In other words, LM seeks to use the minimum number of resources to generate high-value products that form the basis for business growth.

To achieve its objective, LM integrates several tools, some of them focused on quality assurance (Total Quality Management (TQM), Kaizen, Gemba, Jidoka, Poka-yoke, Root Cause Analysis, Lean Audits, do it right the first time, six big losses, plan-do-check-act (PDCA) cycle, five whys, among others), agile material flow (Kanban, quick changes, 5S, one-piece flow, Heijunka, just-in-time (JIT), takt-time, bottleneck analysis, value stream analysis (VSM), among others), keeping machinery and equipment running (total productive maintenance, 5S), motivating and self-worker development (Hoshin kanri, intelligent objectives, A3 problem solving, multifunctional teams, decentralization, empowerment), and managing communication across production lines (vertical information systems, visual management, andon), among others.

This Special Issue focuses on collecting the engineering applications of LM methodology in industrial production systems, which have generated a competitive advantage and allowed companies to remain in the market with quality and low-cost products. Eight research articles were collected that report various applications of LM in production processes.

Sánchez-Ramírez, et al. [1] analyze the behavior of the mechanical failures of machines and tools in a production system using system dynamics to reduce idle times and increase machine availability and efficiency rates, as well as to increase order expedition. On the other hand, Pérez-Pucheta, et al. [2] analyze the A3 tool implementation and VSM in an automation company to reduce the delivery time of spare parts with different dealers. In addition, at the end of the implementation, they improved the logistics flow and eliminated non-value-adding activities, reducing the number of product variants.

Wang, et al. [3] report a six-sigma application project to reduce the number of contamination defects in color filters and touch panels to only 0.13%, increasing customer satisfaction and the technical competitiveness of the company. On the other hand, Pérez-Domínguez, et al. [4] use a fuzzy approach in combination with TOPSIS to evaluate the effects of LM implementation from a multi-criteria point of view and facilitate decision-making. Additionally, González-Reséndiz, et al. [5] use discrete simulation and the response surface technique to determine a product distribution cost to wholesale customers, where the inventory level and on-time deliveries are the key variables.

Realyvásquez-Vargas, et al. [6] apply the plan-do-check-act (PDCA) cycle to identify the sources of defects and reduce the proportion of the defects by up to 65%, integrating

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tools such as the Pareto diagram and flow chart. In turn, Jeong, et al. [7] propose a purchase price index model for South Korean nickel smelters integrating variables such as revenue, investment expenses, and material purchase costs, and the findings indicate that the risk of quality fluctuation is mitigated.

Li, et al. [8] propose a preventive maintenance strategy to decrease maintenance costs and low reliability in a production line where they classified machines into critical, secondary critical, and general to focus their efforts and resources. In addition, they report a case study where the proposed strategy identifies maintenance intervals.

Although this Special Issue is closed and no more article submissions can be received, the editors wish to state that the LM applications are many, not only in the industrial sector but also in the service sector where there are possibilities to eliminate waste, being an opportunity for future research.

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