


New Trends in Production and Operations Management

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1. Introduction

Operations Management includes the management of all company activities that support the input–output cycle. Initially, production or manufacturing sections were the only places where the phrase “operations management” was used. The system, nevertheless, has developed over time and is now often used to refer to the administration of daily business operations of all units that ultimately direct toward the final service or product. Operations management seeks to maximize the efficiency of both the manufacturing process and broader corporate operations. Ensuring that a company’s expenses and costs are reflected in its income is one of operations management’s primary responsibilities. Thus, profit maximization and business expansion are ensured by effective operations management.

New trends in production and operations management require every action that aims to boost productivity and maximize profitability. To maintain market competitiveness, businesses continuously adopt new trends and technological breakthroughs (i.e., e-commerce markets, last mile logistics [1], human–machine systems reliability [2], humans and robots systems [3], supply chain management [4], etc.). Therefore, it might take the form of cost-cutting initiatives, the automation of repetitive processes, or the elimination of pointless tasks and extra fees (i.e., reduction in the electricity costs [5], etc.). Current management efficiencies and trends are always evolving with a focus on company efficiency. The most recent trends and advancements in production and operations management are covered in this Special Issue.

2. Strategies for New Trends in Production and Operations Management

The aim of this Special Issue is to collect the latest research on relevant topics, which are related to the interests and concerns of managers who manage the operations, design and supply chains of products and processes. Ten papers have been published in this Special Issue. Na et al. [1] focused on both operational and technological aspects and offered a thorough and organized assessment of current studies related to last mile logistics (LML). Amaya-Toral et al. [2] present a method for assessing and enhancing the man–machine system’s dependability in a workshop for machine tools by taking into account system features, notably those provided by the machine shops of Chihuahua city. This sector of metal mechanics employs a low-volume manufacturing strategy and high-mix batches in their workshops.

In another study, a model for selective harvesting based on fruit maturity was created by Harel et al. [3]. Harvesting may be performed by humans or robots, and each type of harvester has a unique capacity for determining ripeness. Numerical experiments utilizing sweet pepper harvesting as a case study illustrate the model development and analysis. In their research, Zeng and Yang [4] examined a two-echelon closed-loop supply chain (CLSC) that includes a risk-neutral producer, a risk-averse fairness-neutral retailer, and a risk-neutral retailer who is concerned about fairness. A centralized, a decentralized, and three partially allied models are employed in cooperative game analysis to describe equilibrium conditions under five different circumstances. Roth et al. [5] provided a method for deciding which risk treatment approaches to use and how to classify and include the



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most appropriate measures into the production schedule. The decision-making process for choosing the measures is based on a hybrid multi-criteria approach, in which the three pertinent criteria—cost, energy flexibility, and risk reduction—are weighted using both the analytic hierarchy process and entropy, and then prioritized using the multi-attribute utility theory. The strategy was put into practice in MATLAB and validated with a case study in the foundry industry.

For the Hospital Pharmacy of the Centro Hospitalar de Vila Nova de Gaia/Espinho, E.P.E., Lima et al. [6] studied a system that can concurrently scan several Data Matrix codes and autonomously incorporate them into an authentication database. The trial findings were promising, and it is anticipated that the system may be utilized as a true resource for pharmacists with improvements like real-time feedback of the code's validation and greater hardware system stability. Wen [7] made an effort to research the alliance because certain members are frequently in low supply while others are experiencing an overstock. For instance, there is a greater demand than supply for hospitals in rural regions or for the central hospitals in the medical alliance. Large demand (HD) will shift some of their demand to large supply (HS), which might increase HS's effectiveness.

Mateus et al. [8] described evaluations based on many neural network models that were tested to predict global steel output. To generate a prediction for a nine-year period, the primary objective was to identify the best machine learning model that matches the global data on steel output. The study is crucial for comprehending how convolutional LSTM and GRU recurrent neural networks behave and respond to hyperparameters. The outcomes demonstrated that the GRU model performs better and is simpler to train for long-term prediction. Sawicki and Sawicka [9] concentrated on the problem of constructing stacks of at least two stackable pallet load components. In addition, this study focused on the portion of the distribution network's product flow that is prepared at the site of first assembly in the form of palletized loading units intended for the ultimate receiver. Such a unit does not go above the permitted weight or height restrictions. The purpose of the article's single-criteria binary programming model is to reduce the amount of pallet space needed to hold the built units. The savings from using the best design for the stacked palletized cargo units were shown through the tests carried out, and the model generated was tested on a test dataset.

Through a survey of the academic literature, Zhu et al. [10] examined the objectives to comprehend the categorization of idea management tools and their efficacy. A total of 38 journal publications ($n = 38$) from 2010 to 2020 were found after searching electronic databases (Scopus, ACM Digital Library, Web of Science Core Index, Elsevier ScienceDirect, and SpringerLink). The 30 distinct kinds of concept management tools that we found were used by stakeholders, software designers, hardware designers, and digital tool designers ($n = 21$), guidelines ($n = 5$), and frameworks ($n = 4$). The tools mentioned may help with several phases of idea management, including gathering, producing, implementing, monitoring, refining, retrieving, choosing, and sharing. Therefore, it is crucial to provide management tools for ideas that would enable users, designers, and other stakeholders to minimize bias in selecting and prioritizing ideas.

3. Future Trends on Production and Operations Management

Production and operations management are evolving rapidly because of the industrial revolution 4.0: the following are the future trends for this Special Issue that should be explored more in-depth in future research [1–5,8–10]:

- Automating traditional methods (e.g., manual processes).
- Focus on the safety, health, and wellness of employees.
- Improvement in communication (i.e., an integrated communications system is necessary to ensure collaboration across teams and departments).
- Agile organization solutions are required, due to market pressures and quickly changing consumer demand.

- Collection and analysis of data (e.g., failure/repair data of the equipment) are important for the decision made of the system's operations management.
- Focus on customers as referred in Total Quality Management (TQM) principles.

4. Conclusions

In conclusion, production and operations management is the connecting link between many departments. The most recent trends and advancements may support a variety of organizational and company success factors. By incorporating these trends and advances into corporate operations, operations management specialists might significantly contribute to increasing productivity and profit. By automating time-consuming and repetitive tasks, simplifying communication channels, and connecting front-line staff, businesses may make the most of their current personnel. By maintaining a healthy balance between people and technology, these developments will also enhance procedures.

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