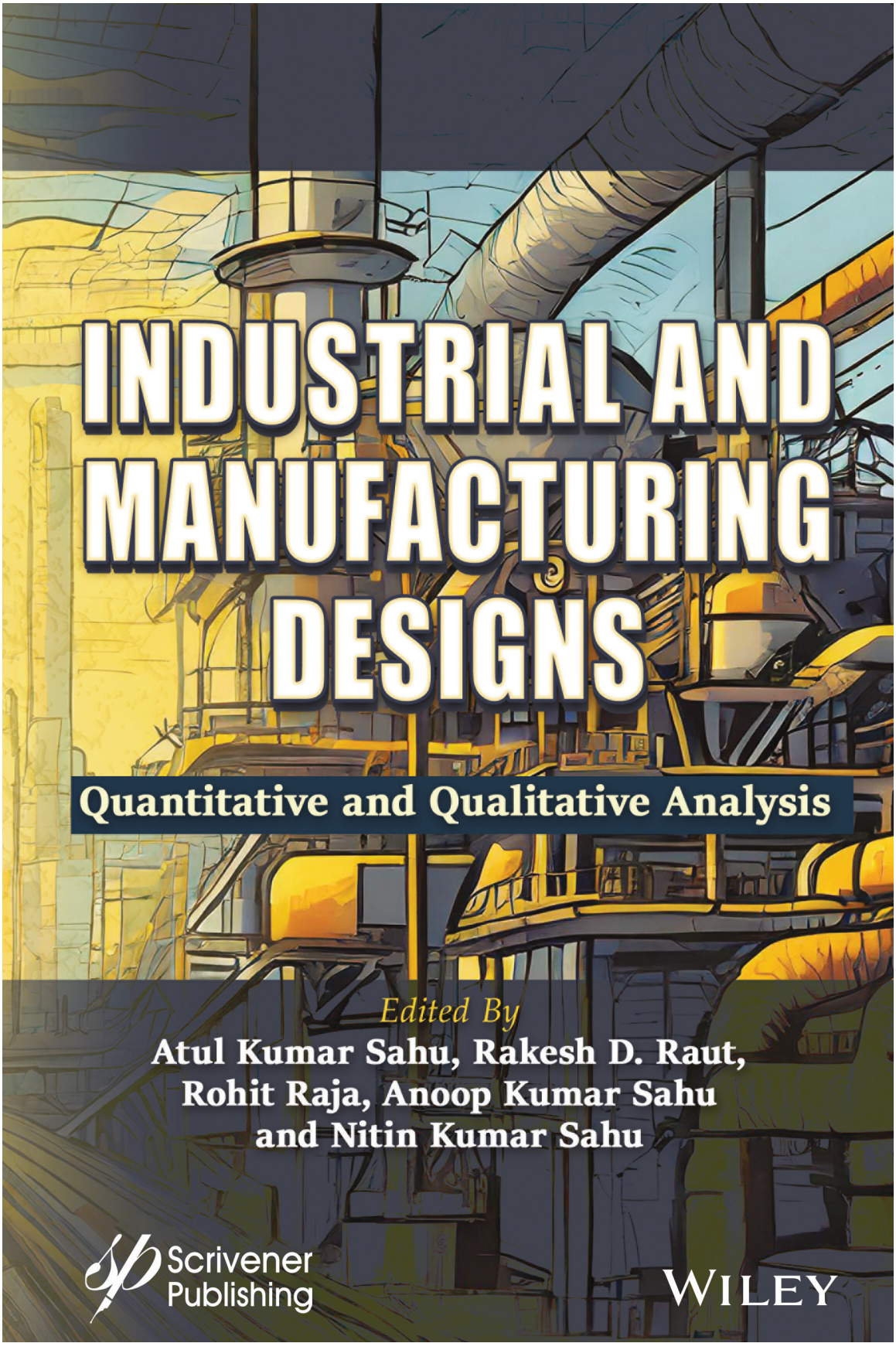
INDUSTRIAL AND MANUFACTURING DESIGNS
Quantitative and Qualitative Analysis
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Demonstrating the Role of Qualitative and Quantitative Information in Industrial and Manufacturing Designs

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Abstract

In the present chapter, the role of qualitative and quantitative (Q&Q) information for evaluating industrial and manufacturing designs is presented, where a group of application cases to reveal the importance of Q&Q analysis is demonstrated. Here, application cases related with the selection of solar panels, evaluation of automatic/robotic welding system, selection of smart alloys, identification of logistic service provider, evaluation of machine tool, and election of industrial robot are presented to represent the utility and importance of aforesaid information in evaluation. Various cases under aforesaid aspects are presented to report the importance of Q&Q information. The chapter will help readers in understanding the worth and values of Q&Q information in analysis. The chapter describes the developed multi-criteria decision-making (MCDM) methods that can be used for reinforcing industrial and manufacturing practices based on the utilization of Q&Q information. The present chapter will assist in creating a learning atmosphere and developing capabilities in effectively evaluating decisions that involve multiple criteria and factors. Additionally, the chapters will assist learners in prioritizing and ranking different alternatives based on their alignment with specific criteria and objectives. The understanding of Q&Q information to quantify and incorporate subjective preferences into decision-making and the ability to analyze complex

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Advocating Lean Practices and Strategies in Decision-Making for Reinforcing Industrial and Manufacturing Designs

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Abstract

In the present chapter, lean practices and strategies are advocated for integration in numerous structures of decision-making (DM) for attaining reinforced industrial and manufacturing (INM) designs. The present chapter is reporting the capabilities of lean thinking and refers that lean enrollment can be attain in organizational model based on the collection of qualitative and quantitative information. The remarkable attainments in terms of waste management, cost management, energy depreciation, and manufacturing efficacy can be attained by the enrollment of lean practices and strategies. Nowadays, numerous assets and resources are associated by the INM chains, and, thus, the sustainable designs are needed to be built by the utilization of various practices like lean, agile, green, and resilient by the organizations. The said practices demands collection of qualitative and qualitative information for making sustainable designs, and, after collection; optimization and synchronization is needed for exploiting the capabilities, contentment, satisfaction, and sustainability. Accordingly, the present chapter is advocating the importance of lean management and lean manufacturing to be inducted in DM and demonstrated the need to exploit lean practices for designing INM environment for better results and utilization. A large number of lean practices are available and the same are discussed in the present chapter. The chapter presents a cluster of lean practices, where; the authors have presented 19 momentous lean practices in the first segment, which are established lean practices, and additionally defined five critical lean practices in the second segment that are radical to be

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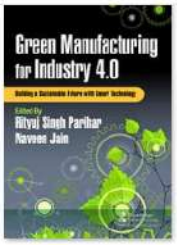

Chapter

Technology-Driven Sustainability

Exploring the Synergy Between Industry 4.0 and Green Manufacturing

By Pranav Gupte, Ganesh Prasad Shukla, Vikas Swarnakar

Book Green Manufacturing for Industry 4.0

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ABSTRACT

Green manufacturing and Industry 4.0 are related concepts in the manufacturing sector that complement each another. Today, the necessity for corporate growth strongly influences the adoption of novel production concepts. Industry 4.0 processes make use of cutting-edge technologies like clean, green energy, automation, the Internet of Things (IoT), and digitization. Green manufacturing is similar in that it uses fewer natural

Chapter 1

Technology-Driven Sustainability: Exploring the Synergy Between Industry 4.0 and Green Manufacturing

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1.1 Introduction

Since the beginning of industrialization, manufacturing has been crucial in growing national economies and generating jobs [1]. The rising demand for commodities from a global population that is expanding at an increasing rate is expected to keep this trend going. However, improvements in the manufacturing industry had a negative impact on the environment, leading to disasters like global warming, the depletion of resources, inadequate handling of waste, and others. The United Nations' Agenda for 2030 enlists 17 goals for sustainable development (SDGs), three of which focus on reducing the severity of issues brought on by manufacturing processes. To achieve these goals and address environmental concerns, businesses must embrace green manufacturing (GM) methods. It addresses every stage of a product's life span, from conception to disposal, and works so in a way that is advantageous and safe, harming the

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