Chapter 6
Asia Pacific Perspectives on Digital Innovation and Integrated Frameworks in Aerospace Manufacturing

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ABSTRACT

As a result of digital transformation, aerospace manufacturing in the Asia Pacific region is changing dramatically. This book chapter examines how digital innovation is being incorporated into aerospace manufacturing through the use of an integrated framework approach. The book chapter emphasizes that successful adoption of digital technologies in manufacturing requires not only advanced technological infrastructure, but also alignment with organizational strategy, the development of workforce skills, and cross-industry collaboration. This book chapter adopts a socioeconomic and technical perspective. This chapter is based on a conceptual framework that highlights the key dimensions of technological development, organizational development, people, and stakeholder communication. A study of current literature, industry trends, and practical applications has been conducted by the author to illustrate how Asia Pacific aerospace manufacturers and policymakers may leverage this integrated framework to enhance performance efficiency, quality, and innovation.

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INTRODUCTION

Digital innovation is driving profound changes in the aerospace manufacturing industry. Modern digital technologies are redefining how aircraft components are designed, produced, and maintained. Aerospace companies around the world use a wide range of technologies, including robotic sensors that facilitate real time monitoring of machines and products, artificial intelligence (AI) data capabilities that maximize complex processes, and machine learning and automation that enhance accuracy and productivity. Manufacturing sector has played an important role in the development of Asia-Pacific countries and has contributed to regional economic growth and sectoral transformation (Guisan & Exposito, 2015). The graph of manufacturing competitiveness in Asia has been quite influenced by both domestic industrial policies and global economic pressures (Jomo, 2003). Digital manufacturing in combination with flexible assembly technologies makes it possible for aerospace production systems to become highly reconfigurable and adaptable (Jackson, Efthymiou, & Borton, 2016). It is expected that these innovations will be of significant benefit to the industry, including the reduction of production costs, the enhancement of quality control, the production of new aircraft models at a faster rate, and the ability to customize products according to customer needs. In recent times the competition for skilled manufacturing talent in Asia has intensified (Zheng, Soosay, & Hyland, 2007). For aerospace manufacturing to maximize the benefits of digital technologies, more than ad hoc adoption of technology and gadgets is required. Asian manufacturing has gone through a significant structural transformation in the late twentieth century, also influenced by rising productivity and technological advancement across several economies (Timmer, 2000). People create new technologies and industries to meet human needs more effectively and at a lower cost. Innovation is a major agent of progress (Frosch & Gallopoulos, 1989). The implementation of a strategy for manufacturing requires a framework that aligns technological capabilities with business strategy, workforce readiness, and supply chain interconnections. Foreign direct investment (FDI) in manufacturing has been a strong driver of economic growth in Asian economies, supporting industrial expansion and technology transfer (Wang, 2009). The future of manufacturing is based on redefining its basic support blocks and raising awareness about how advanced production paradigms will integrate digital, intelligent, and green innovations (Wang, 2018). Organizations invest continually in process improvements because such enhancements support production but also lay the groundwork for future product success (Wheelwright & Hayes, 1985). The aerospace manufacturing industry involves a wide range of material processing technologies that are critical to the production of aircraft components (Saha, 2016). Manufacturing has to an extent increased resource consumption and accelerated technological development

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