Chapter 10
Big Data Analytics for Smart Airport Management

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ABSTRACT

Smart airport management has drawn increasing attention worldwide for improving airport operational efficiency. Big data analytics is an emerging computing paradigm and enabler for smart airport management in the age of big data, analytics, and artificial intelligence (AI). This chapter will explore big data analytics for smart airport management from a perspective of PNG Jackson's International Airport. More specifically, this chapter first provides an overview of big data analytics and smart airport management and then looks at the impact of big data analytics on smart airport management. The chapter discusses how to apply big data analytics and smart airport management to upgrade PNG Jackson's International Airport in terms of safety and security, optimizing operational effectiveness, service enhancements, and customer experience. The approach proposed in this chapter might facilitate research and development of intelligent big data analytics, smart airport management, and customer relationship management.

INTRODUCTION

Smart airport management becomes increasingly important for developing smart airports worldwide. Based on the Grand View Research, the global smart airport market is expected to reach over US$ 25 billion by 2025 growing at a rate of 10% CAGR (Compound Annual Growth Rate) (Aviation Media, 2019). Smart airport management and technology are important for improving airport efficiency from operations facet to passenger experience (Mariani, Zmud, Krimmel, Sen, & Miller, 2019). Smart airport management shares and integrates key information and communication technology (ICT) systems, data,

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and information to optimize performance and capacity, passenger experience, and customer service for the entire aviation ecosystem (Kershaw, 2013). Air traffic is at its busiest of all time (except the period of the worldwide COVID-19 pandemic), as there is an increasing demand for air travel over the world (Lee, Ng, Lv, & Taezoon, 2014). Smart airport management, therefore, not only helps provide a platform where not all processes can be automated using ICT, but also as an enabler for improving airport operational tasks, security, passenger experience and convenience (TAV Information Technologies, 2019). Smart airport management aims to integrate the currently segmented activities involved in check-in, boarding (Popovic, Kraal, & Kirk, 2009), and from arrival to disembarking and transiting. All airport operators need smart airport management solutions to expedite airport ground handling and passenger processing effectively without delays and long queues (Jaffer & Timbrell, 2014). Bouyakoub, et al, developed a smart airport management system based on the Internet of things (IoT) (Bouyakoub, Belkhir, Bouyakoub, & Guebli, 2017). However, airports are still facing several challenges for example, how to use big data analytics to make airport management smarter and more efficient; how to integrate big data analytics and smart airport management to improve the quality of services and customers' satisfaction. Based on the above brief analysis, the following issues are significant for smart airport management in general and Port Moresby International Airport (PMIA) in specific:

- How can the smart airport management be applied to improve PMIA operations?
- How to integrate big data analytics and smart airport management to improve the quality of Jackson's Airport in PNG?

This chapter will address the above-mentioned issues by exploring big data analytics for smart airport management from a perspective of PNG Jackson's International Airport. More specifically, this chapter first provides an overview of big data analytics and smart airport management, and then looks at the impacts of big data analytics on smart airport management. This chapter also discusses how to integrate big data analytics and smart airport management to improve the quality of services and customers' satisfaction of PMIA.

The remainder of this chapter is organized as follows: Section 2 explores the fundamentals of smart airport management. Section 3 discusses intelligent technologies for smart airport management. Sections 4 and 5 provide an overview of PMIA and its current infrastructure related to smart airport management systems and look at future smart airport systems and technologies for PMIA. Section 6 examines integrating big data analytics and smart airport management to improve the quality of services and customers experience and satisfaction and decision making of PMIA. Section 7 focuses on discussion and implications of this research. The final section provides a summary of the chapter and future research directions for this work.

FUNDAMENTALS OF SMART AIRPORT MANAGEMENT

This section looks at the fundamentals of smart airport management. It covers the following topics: What does smart, smart airport and smart airport management means? It also discusses a smart airport maturity model.