

Chapter 3

Risk Assessment: Knowledge Management Paradigms, Big Data, and Aviation Policy Making

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ABSTRACT

The chapter analyses knowledge management paradigms for the understanding and prioritisation of risks (risk assessment), leading to decision making amongst policymakers. Studies and approaches on knowledge-based risk assessment and, in general, risk management vary depending on perceptions of risk, and these perceptions affect the knowledge scope and, ultimately, affect decisions on policy. Departing from the problems of big data in aviation, the shortcomings of the existing knowledge management paradigms and the problems of data conversion to knowledge in aviation risk management approaches are discussed. The chapter argues that there is a need for transdisciplinarity and interdisciplinarity for greater understanding of context deriving from the challenges in the big data era and in aviation policymaking. In order to address the challenging dynamic context in aviation, the chapter proposes a strength/knowledge-based inquiry that involves public sector and high-power organisations in order to gain holistic knowledge and to aid the decision analysis of policymakers.

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INTRODUCTION

Disasters that affect the public receive a lot of attention about what went wrong, and who is responsible. Such disasters can be financial (e.g. the 2008 economic crisis), physical (e.g. the 2004 and 2011 Tsunamis), or industrial (e.g. the Ethiopian airlines crash in 2019). In aviation, disasters (fatal events) are now considered exceptions, as the safety record has reached its most impressive statistics. Specifically, the safety record has had its zero-accident year in 2013, and industry reports note the developments in the industry as “downward trends” (IATA, 2015). In addition, Airbus’s (2014) statistical analysis shows that fatal accidents chances are 0.07 in one million flights. Moreover, ICAO (2014) notes that, compared to the growth in traffic, there is a decline in accidents, noting a 2.8 accident rate per one million departures. This relatively ‘accident free’ context, however, is not without challenges. Knowledge challenges in aviation safety are noted as information is “hard to calculate” (Allianz, 2014). In addition, recent accidents shifted the attention to sabotage (e.g. Germanwings 2015), conflict zones (e.g. the downing of MH17), the role of satellite tracking (e.g. the disappearance of MH370), and to issues of cyber security (EASA, 2016). Recently, the Federal Aviation Administration (FAA) came into the spotlight of controversy when two Boeing 737 MAX¹ crashed killing all souls on board. The public, experts and other stakeholders of the aviation industry question the role of the FAA in the certification process of the new Boeing, whilst looking for answers to the fatal crashes. In this dynamic environment, the aviation policy makers highlight context as part of the emerging issues in aviation safety (EASA, 2015), which affects knowledge elements (Theocharis & Tsihrizis, 2016). This chapter emphasizes on the changing nature of safety and risk in a big data era, and raises questions for the development of knowledge management in the risk assessment process. In particular, the chapter discusses the conversion of data into knowledge and that this conversion process depends on risk management paradigms. The chapter advocates the need for an alternative knowledge paradigm for risk assessment in aviation, able to assist in strategic planning and decision analysis. The following sections review the literature and the problems in the knowledge management (KM) paradigms, and as these are applied into aviation risk management (RM) methodologies. By doing so, the chapter explains the problems under each paradigm for the conversion of data to knowledge and proposes an alternative, multiparadigm, approach for risk assessment through learning.

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