Optimization Modeling as Method in Sport Management Research

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Method - Quantitative (Other)
20-minute oral presentation (including questions)  
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The application of analytics to sport has influenced decision-making processes both on and off the field. Despite the increased adoption of data-driven strategies to enhance sport business operations, academic scholarship leveraging prescriptive analytics remains a gap in sport management literature. The purpose of this presentation is to highlight the vast uses of a prescriptive method, optimization modeling, and to demonstrate how this modeling technique can impact sport management research. Optimization modeling has been utilized widely across many academic fields. Operations, finance, and marketing disciplines have all harnessed peer-reviewed literature to explore optimization as an advanced analytical technique for effective and efficient decision-making processes (Hillier, 2015). “Optimization is the process of selecting values of decision variables that minimize or maximize some quantity of interest and is the most important tool for prescriptive analytics” (Evans, 2016, p. 416). Although optimization models range in complexity according to the parameters of the problem at hand, the typical optimization model for the full range of business decision-making scenarios encompasses three foundational sets of mathematic expressions: 1) an objective function, 2) decision variables, and 3) constraints. The optimization modeling goal, therefore, is to maximize or minimize the objective function through the manipulation of the set of decision variables, with all constraints met. Researchers publishing in applied operations journals have utilized optimization modeling to investigate sport topics including the establishment and evaluation of ranking procedures (Adler, Erera, Hochbaum, & Olinick, 2002; Raack, Raymond, Schlechte, & Werner, 2014), tournament elimination decisions (Cheng & Steffy, 2008; Kern & Paulusma, 2004; Ribeiro & Urrutia, 2005), player draft strategy (Streib, Young, & Sokol, 2012), the advancement of motorcycle racing (Amoros, Escudero, Monge, Segura, & Reinoso, 2012) and Sunday singles lineup choices for the Ryder Cup (McClure, Cassady, Rainwater, & Chimka, 2012). It is sport scheduling, however, that consumes the bulk of sport optimization modeling literature presented in operations research journals. Kendall, Knust, Ribeiro, and Urrutia (2010) demonstrated a comprehensive annotated bibliography spanning the past 40 years regarding how optimization models apply to complicated tournament scheduling (Bonomo, Cardemil, Duran, Marenco, & Saban, 2012; Duran, Guajardo, & Wolf-Yadlin, 2012; Kostuk & Willoughby, 2012; Ribeiro & Urrutia, 2012), scheduling a sport series (Cone Saur, Starr, Husted, & Newman, 2012; Grabau, 2012), and scheduling umpires (Trick, Yildiz, & Yunes, 2012). This presentation will highlight past uses of optimization modeling as a research method, and will propose broader uses via exemplifying optimization application to two specific sport revenue generation scenarios in professional and collegiate sport. The use of optimization modeling in this manner contributes to the fulfillment of theoretical perspectives that emphasize internal configurations as strategic business advantages (e.g., a resource-based view of the firm; Barney, 1991; 1995). New and original to the sport management discipline, this examination serves as a template for future application across sport management functional areas and demonstrates the appropriateness of optimization modeling as a method for sport management research.