

Evaluation on Risk Factors of Elderly Services From the Perspective of Integrated SCOR Model

Jingshi He, Dongguan Polytechnic, China

Jiali Zhu, Dongguan Polytechnic, China

ABSTRACT

Analysing and identifying the risk factors of elderly services is conducive to improving the risk management capabilities of the elderly care industry and maintaining the safety and stability of the elderly care service industry chain. Based on the integrated supply chain operations reference (SCOR) model, a risk indicator system for elderly services supply chain was established from plan, design, supply, implementation, and customer service. The DEA method with Entropy-AHP mixed constraint was introduced to deal with the weight freedom of traditional DEA method. Taking the likelihood, exposure, and consequence of risk occurrence as decision variables, the risk evaluation and ranking of the indicators were carried out. According to the empirical analysis based on the data of elderly care institutions in the Pearl River Delta of China, the biggest Pareto risk factors in the first-level and second-level indicators, the risk growth and reduction ratios of the first-level indicators were obtained.

KEYWORDS

DEA, Elderly Services Supply Chain, Entropy-AHP, Integrated SCOR, Risk of Elderly Services

1. INTRODUCTION

With the advent of an aging society, elderly services have increasingly become the focus of social attention (Du & Ji, 2020). Currently, the elderly care service industry has developed into a service supply chain structure with a clear structure and a clear subject (Gill et al., 2016). Under the development trend of the service economy, analysing the service industry based on the theory of service supply chain has become a research focus (Baltacioglu et al., 2007; Maull et al., 2012; Govindan & Jepsen, 2016), and it also provides new ideas for analysing the development of the elderly care industry. The target groups of elderly services generally have the characteristics of being old with lots of diseases, having many sudden illnesses and diverse needs for elderly care (Menghi et al., 2019). In the background of frequent accidents, disasters, public safety and health issues, once an emergency occurs, it will cause great personal injury to the objects of elderly services. The research shows that 71.3% of the respondents have low emergency response ability when the elderly care institutions are in emergency (Kim & Bae, 2020). Analysing and researching the risks of elderly services can help identify problems early so as to take preventive measures in time. Supromin & Choonhakhlai (2017) pointed that the public governance model of the elderly care industry focuses on a collaborative partnership and network of all stakeholders. Supply chain innovation has become all the more important in today's competitive world (Mandal, 2016), and from the perspective of supply chain, the elderly care service industry should pay attention to the construction of upstream

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and downstream partner network. From the perspective of operation management, the diverse interest demands of each node organization in the elderly services supply chain, the shortage of raw materials in the upstream and downstream of the elderly services supply chain, sudden changes in service demand, quality problems, and forecast errors may all cause supply chain risks (Sharma et al., 2017; Raghunath & Devi, 2018; Rogers et al., 2015), leading to fluctuations in the operation of elderly care services and affecting the stability of the supply chain. With the increase of global instability factors, enterprises have started to witness the supply chain risks that do not exist traditionally (Singh, 2019). Therefore, whether from the macro or micro point of view, the risk factors of the elderly services supply chain should be concerned by all sectors of society. Analyzing and identifying the risk factors of elderly services from the perspective of supply chain management is conducive to improving the risk management capabilities of the elderly care industry and maintaining the safety and stability of the elderly care service industry chain.

Elderly care risks have been concerned by some scholars, such as the relationship between the risks or diseases faced by the elderly and the facilities management of home-based care (Leung et al., 2013), the risk factors of elder abuse (Alizadeh-Khoei et al., 2014), and the health risk of left-behind elderly in rural China (Luo et al., 2020), The effects of education and age on the risk for cognitive impairment in the elderly migrants (Downer et al., 2018). Existing research literature shows that scholars are aware of the risks of elderly care, but they have not analyzed the risks of elderly services from the perspective of the supply chain. The service supply chain theory has gradually been applied to many service industries, such as the construction of logistics service supply chain (Liu et al., 2018), the evaluation criteria for selecting partners in the tourism service supply chain (Pongsathornwiwa et al., 2017), the dynamic pricing and time-to-market strategy for the service supply chain of online direct sales channels (Jia et al., 2019). The elderly care service industry chain develops rapidly, and a complete supply chain system has been formed. Analyzing the risks of elderly services from the perspective of the supply chain is conducive to guiding the operation of the elderly care industry, and helping government departments and enterprises to correctly understand the risk factors of elderly services and improve risk coping awareness as well as risk management capabilities. It is an important part of the development and construction of the elderly care industry, and a significant link in enhancing the risk management capabilities of the elderly care industry and maintaining the safety and stability of the elderly care service industry chain. The research on the analysis of elderly services from the perspective of supply chain has just started, and there are no scholars analyzing the risks of elderly services from the perspective of supply chain. Therefore, it is innovative to study the risks of elderly services from the perspective of supply chain, which provides a basis for risk management in the elderly care service industry.

Risk assessment and management is one of the key topics of modern service, Brahami & Matta (2018) present GAMETH method to reduce the risk of projects guided by the knowledge management process, Gupta & Lawsirirat (2013) developed a framework for LTSAs risk management is to reduce the risk of long-term service agreements used to maintain capital intensive equipment, Lina et al. (2020) used Bayesian method to analyze the risks of financial services, Dutta (2018) presents an interval valued fuzzy Numbers (TIVFNs) Model to carried out in risk assessment. Methods used for risk identification and evaluation including Fuzzy Synthetic Evaluation method (Wu et al., 2019), Artificial Neural Network (Diaz et al., 2020), Structural Equation Modeling (Munir et al., 2020), Fault Tree Analysis (Li & Xue, 2019), and so on. Data Envelopment Analysis (DEA) combined with BCC, CCR and Malmquist model is widely used in economic efficiency evaluation (Radovanov et al., 2020; Copeland & Cabanda, 2018), DEA can also be used to evaluate the security and risks of complex systems and gradually obtained more attention in recent years. Wang et al. (2008) proposed an integrated AHP-DEA method to evaluate the risks of bridge structures in order to decide the maintenance priorities of the bridge structures. Olson & Wu (2011) used DEA to analyze the international outsourcing risks in the supply chain organizations. Pournader et al. (2016) adopted the fuzzy network DEA model to assess risk resilience of the entire supply chains and their individual

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