Supplier Selection, Risk Identification and Resiliency in the Pharmaceutical Supply Chain of the Department of Defense

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Extended Abstract: The Department of Defense (DoD) contracts tens of thousands of suppliers within the pharmaceutical industry to meet the medical needs of soldiers across the globe. This research aims to aid the DoD in their decision-making process of supplier selection. Choosing the right suppliers can help ensure the efficacy and reliability of their pharmaceutical supply chains. This study begins with an extensive literature review which establishes the structure of the pharmaceutical supply chain (PSC) process both within commercial and military contexts. Formal understanding of these structures then allows for the literature review to expand into identification of the key risks present within pharmaceutical networks. However, there were clear gaps in the literature concerning the structure and risks of defense related PSC's. To gain further understanding, the DELPHI method was used to complement the original literature review. The DELPHI method utilizes surveys and interviews with subject matter experts (SMEs) and can be used to confirm or deny findings from the literature review. This comprehensive approach allows for a deeper understanding of the supply chain, particularly in the defense context, which adds to the literature. Through this hybrid process we were able to assess the criticality and severity of identified risks, ultimately pinpointing key areas of concern such as human resource management, inventory management, overreliance, susceptibility to natural disasters and pandemics, and geopolitical instability. The ramifications of these risks for the DoD are multifaceted, encompassing heightened vulnerability, safety concerns, expiration, quality control issues, as well as potential shortages. We were able to adapt and implement Sanders (2023) supplier selection model to incorporate the unique risks within PSCs and assess supplier riskiness.

After assessing overarching supplier risk, we focused on a few key drugs to understand the unique aspects of production & transportation requirements for each of the main drug types. With pharmaceutical data procured from the Medical Services Branch of the US Army, a sample of critical pharmaceuticals were selected based on volume, cost, safety considerations, and strategic importance with input from SMEs through the DELPHI process. This information was used to build a mapping of the defense PSC using GIS, beginning with active pharmaceutical ingredients (APIs) and ending with consumption, providing valuable insights into the geographical network of pharmaceutical manufacturing and distribution activities. Combining this mapping with additional data allowed for confirmation of exact bottlenecks and risks at various stages of the supply chain for each chosen drug. This novel, detailed, defense PSC mapping and analysis aids in building transparency in risk identification and mitigation, thereby enhancing the resilience and efficiency of the PSC for the DoD.

Keywords: Supply Chain, DELPHI Method, Military, Health, Department of Defense, Pharmaceutical, Risk Assessment

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Sanders, I.T. (2023). Risk Assessment and Identification Methodology for the Defense Industry in Times of Crisis: Decision-Making. In: Balomenos, K.P., Fytopoulos, A., Pardalos, P.M. (eds) Handbook for Management of Threats. Springer Optimization and Its Applications, vol 205. Springer, Cham. https://doi.org/10.1007/978-3-031-39542-0_6