Development of a Lean Six Sigma Model and Resilient Supply Chain Using Modern Fuzzy Inference Approaches and Design of Experiments (Case Study: Asia Factory)

Maryam. Anjom Shoa[1], Mojdeh. Rabbani[2*], Hassan. Dehghan Dehnavi[3], Mohammad Taghi. Honary[3]

[1] PhD Student, Department of Industrial Management, Yazd Branch, Islamic Azad University, Yazd, Iran
[2] Assistant Professor, Department of Industrial Management, Yazd Branch, Islamic Azad University, Yazd, Iran
[3] Associate Professor, Department of Industrial Management, Yazd Branch, Islamic Azad University, Yazd, Iran

* Corresponding author email address: mrabbani@iauyazd.ac.ir

Editor	Reviewers
Rey Segundo Guerrero-Proenza Departamento de Inteligencia Computacional, Facultad 4, Universidad de las Ciencias Informáticas, La Habana, Cuba reysgp@uci.cu	**Reviewer 1:** Ali Choori Assistant Professor of Sports Management, Faculty of Humanities and Sports Sciences, Gonbadkavos University, Gonbadkavos, Iran. Email: choori@gonbad.ac.ir **Reviewer 2:** Mehrdad Bayat Assistant Professor, Department of Management, Payam Noor University, Tehran, Iran .Email: bayatmehrdad60@pnu.ac.ir

1. Round 1

1.1. Reviewer 1

Reviewer:

The sentence "In today's competitive world, one of the main concerns of senior managers is profitability and achieving sustainable results" could benefit from citing recent studies or reports that emphasize the importance of profitability and sustainability in modern management practices. This would strengthen the argument and provide empirical support for the statement.

The description of the research method could benefit from more detail regarding the qualitative and quantitative phases. Specifically, it would be helpful to clarify the sample size, sampling method, and justification for the choice of NVIVO, MATLAB, and MINITAB software. This will enhance the transparency and replicability of the research.

In the explanation of the grounded theory methodology, it would be beneficial to include a justification for choosing this method over others, such as case study or ethnography. Additionally, explaining how the coding process was validated (e.g., through inter-coder reliability) would add rigor to the methodological section.

The design of experiments (DoE) section would benefit from a discussion on why the $3^{(k-p)}$ method was chosen over other DoE approaches. Additionally, explaining how the results were validated or cross-checked (e.g., through simulation or additional trials) would strengthen the methodological rigor.

The presentation of the regression coefficients for flexibility lacks a discussion on the practical implications of these coefficients. It would be beneficial to interpret what these coefficients mean in real-world terms, such as how much flexibility is expected to increase per unit change in Total Quality Management.

The finding that the Data-Driven Improvement Cycle has zero impact on capacity is surprising and warrants further discussion. Consider including a section that hypothesizes why this might be the case, possibly by referencing literature on the limitations of data-driven approaches in certain contexts.

Authors revised the manuscripts.

1.2. Reviewer 2

Reviewer:

The statement "The lack of structured and scientific studies aimed at developing a comprehensive model for the simultaneous application and connection of Lean Six Sigma and resilient supply chain approaches underscores the need for further scientific research in this area" could be made more impactful by including specific examples of the gaps in the literature. This could involve citing recent meta-analyses or reviews that highlight the absence of such integrated models.

The research question "How will the development of a Lean Six Sigma model and a resilient supply chain be?" appears vague. It would be helpful to rephrase it to be more specific, such as "What are the key factors and mechanisms through which Lean Six Sigma can enhance supply chain resilience?" This would provide clearer guidance for the study.

The process of open, axial, and selective coding is described, but it is unclear how the categories were derived. Providing examples of how raw data were transformed into codes and then into categories would help the reader understand the analytical process better.

The description of the fuzzy inference system lacks details about the specific "if-then" rules used. Including an example of these rules and how they were formulated based on expert input would enhance the clarity of this section.

The figure showing the implementation of design of experiments for the adaptability variable is somewhat unclear. Enhancing the figure with more descriptive labels and a brief caption explaining the key findings would make it more accessible to readers.

The statement "Supply chains are no longer just a simple sequence of processes; they are a complex network always at risk of disruption" could be strengthened by providing recent examples or case studies of supply chain disruptions, such as those caused by the COVID-19 pandemic.

The discussion on Total Quality Management (TQM) and its impact on flexibility could be enhanced by contrasting it with other quality management approaches, such as Six Sigma or Kaizen. This comparison could help clarify why TQM was found to be more impactful in this study.

The conclusion that "Quality Function Deployment (QFD) has the most significant impact on capacity" should be supported by a discussion on why QFD might be particularly effective in the context studied. Including a brief review of literature that supports this finding would add depth to the discussion.

Authors revised the manuscripts.

2. Revised

Editor's decision: Accepted.
Editor in Chief's decision: Accepted.