THE IMPACT OF LEAN SIX SIGMA TOOLS ON CUSTOMER SATISFACTION AND RETENTION: EVIDENCE FROM A BEVERAGE MANUFACTURING FIRM IN UZBEKISTAN.

Sardor Kodirov
Professional Development Centre Leading specialist, Management Development Institute of Singapore in Tashkent

Introduction

In highly competitive manufacturing markets, maintaining consistent product quality and customer loyalty has become a strategic priority. In emerging economies such as Uzbekistan, manufacturing firms face increasing pressure to improve operational efficiency while meeting rising customer expectations. Lean Six Sigma (LSS) has emerged globally as an integrated methodology that combines waste reduction and statistical quality control to enhance organizational performance. However, empirical evidence linking specific Lean Six Sigma tools to customer satisfaction and retention in Central Asian manufacturing contexts remains limited.

This study investigates the impact of selected Lean Six Sigma tools on product and service quality, customer satisfaction, and customer retention within the non-alcoholic beverage industry in Tashkent, Uzbekistan. By focusing on a local functional drink brand, the research contributes context-specific insights into how operational excellence practices translate into customer-oriented performance outcomes.

Research Aim and Objectives

The primary aim of this research is to examine the extent to which Lean Six Sigma tools influence customer satisfaction and retention through improvements in product and service quality.

The specific objectives are:

1. To assess the impact of individual Lean Six Sigma tools on product and service quality.
2. To examine the relationship between quality and customer satisfaction.
3. To analyze the effect of customer satisfaction on customer retention.
4. To develop an empirically grounded Lean Six Sigma performance framework applicable to manufacturing firms in Uzbekistan.

Methodology

A deductive, quantitative research design was employed. Primary data were collected through a structured questionnaire survey administered to managers in Tashkent, representing customers and stakeholders of the selected beverage manufacturing firm. From a population of 500 respondents, a sample of 203 valid responses was obtained using simple random sampling at a 95% confidence level.

The questionnaire measured seven Lean Six Sigma tools: Plan-Do-Study-Act (PDSA), Value Stream Mapping (VSM), Poka-Yoke, DMAIC, Statistical Process Control (SPC), Failure Mode and Effects Analysis (FMEA), and Pareto Analysis - alongside

product/service quality, customer satisfaction, and customer retention. Data were analyzed using SPSS, applying descriptive statistics and hierarchical linear regression analysis to test direct and mediated relationships.

Key Findings

The results indicate that several Lean Six Sigma tools significantly influence product and service quality. DMAIC demonstrated the strongest positive effect, followed by PDSA, SPC, Pareto Analysis, and Poka-Yoke. Value Stream Mapping and FMEA were found to have statistically insignificant effects in the studied context.

Product and service quality exhibited a strong positive relationship with customer satisfaction, explaining over 84% of the variance. In turn, customer satisfaction significantly predicted customer retention, accounting for more than 82% of its variance. The findings confirm a mediated model in which Lean Six Sigma tools enhance customer retention primarily through improvements in quality and satisfaction.

Conclusion and Implications

This study provides empirical evidence that targeted application of Lean Six Sigma tools - particularly DMAIC and SPC - can significantly improve customer satisfaction and retention in manufacturing firms operating in Uzbekistan. The findings contribute to the Lean Six Sigma literature by validating a customer-centric performance model in an under-researched emerging market.

From a managerial perspective, the study highlights the importance of investing in structured process improvement training and statistical quality control systems to sustain customer loyalty. For policymakers and industry stakeholders, the results underscore the role of operational excellence in strengthening the competitiveness of Uzbekistan's manufacturing sector. Despite its limitation to a single firm and cross-sectional design, the research offers a robust foundation for future multi-firm and longitudinal studies.

Keywords: Lean Six Sigma, DMAIC, customer satisfaction, customer retention, manufacturing, Uzbekistan