



Lean Six Sigma to Improve Supply Chain Management in Oil and Gas Industry

Azza AL-Riyami ,Buthina AL Jabri , Jihan AL-Jashmi
Supervisor(s): Dr. Mahmoud Al-Kindi & Dr. Emad Summad



Introduction

Oil and Gas industry plays an essential role in Oman economy. Supply chain Oil and Gas industry links between exploration, production, refining, marketing and delivering process. Therefore, continuous improvement is required to strongly rise the income. The first process in managing supply chain activities is the procurement process. There are two Procurement modes which are purchase orders and contracts. They support the company's supply chain and are important to increase the value of supply chain.

Problem Statement

Oil and Gas industry in Oman is considered as the main source of gross national product (GNP). Due to the drop in oil prices, Oil and gas supply chain has challenges in cost, duration, flexibility and cooperation between supplier and the end user. Most of Oil and Gas companies use their own judgment instead using clear strategy. The process now includes non-value added activities that cause lengthy duration and costly process. This project aims to analyze oil and gas supply chain process in various companies and eliminate the generated wastes using Lean and Six Sigma techniques.

Project Constraints

- Administration
- Financing
- Time
- Historical Data

Literature Review

Performance Measures of Supply Chain: Cost, duration, quality and flexibility.
Lean Six Sigma: A combination of two powerful techniques where the results of implementing this combination is higher than what would be resulted from using lean or Six Sigma individually.

- Lean thinking standardizes a strategy of the work, make environment with zero wastes,
- Six Sigma covers the process quality issues, make decisions based on evidences and reduce the variation.

Data Analysis

Supplier

- Contract Holder
- Contract Engineer
- Contract Committee
- Tender Board Committee
- Ministry of Oil and Gas
- Finance Department
- Supply Chain Manager
- Contract Lead Team
- Health Safety Environment Department

Inputs

- Tender Proposal
- Technical Committee Management Approval

Process

Outputs

- Contract with a Successful Bid

Customer

- End User Department

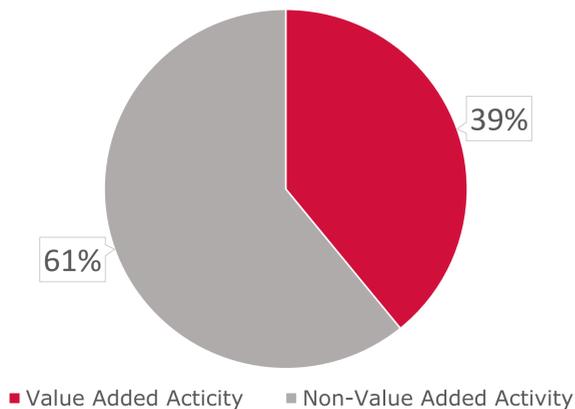
Pre-tender

Tender Period

Evaluation Period

Award and Post Award

Value Stream Mapping Results



5 Major Wastes:

- Defects
- Workers' skills
- Waiting time
- Motion
- Over-processing

Suggested Solutions

- Standardize contracting process strategies and legislate strict laws to comply with time.
- Reduce number of non-value added activities using simulation model for contracting process using Arena program.
- Workshops, training and motivation for employees.
- Use programmable procurement software systems like SAP and Oracle.

Objectives

- Analysing and implementing Lean Six Sigma techniques and their tools to improve supply chain within Oil and Gas environment.
- Understanding Oman Oil and Gas supply chain processes to identify wastes and non-value added activities then redesign a process with ZERO wastes and reduce order fulfillment cycle duration.

Project Impacts

- Community Impact:** Short lead time, high quality and suitable cost for the end-user department in the company.
- Environment Impact:** Safe transportation of equipment.
- Economic Impact:** Increase the profit, decrease the cost and duration can help to increase the country economy.
- Legal Impact:** Rules will be used to enhance the overall supply chain performance and ensuring that no legal issues will be risen between supplier and customer.

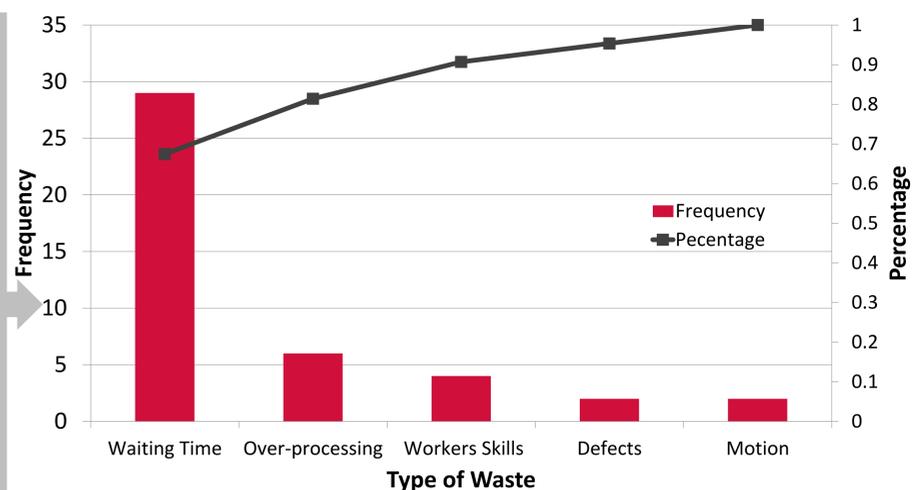
Methodology



Data Collection



Pareto Chart



- Waiting time is 67% of the total generated wastes during contracting process
- The whole contracting process most likely takes 152 days

Future Work

- Meeting with another Oil and Gas company -PDO- to understand their supply chain process.
- Using Lean Six Sigma tools for analyzing PDO supply chain.
- Implementing general simulation model for Oil and Gas supply chain in Oman using the data from different companies.
- Suggesting Solution to modify Petrogas Rima and PDO supply chain process.