

Study				implemented process enhancements.
Improving of the Mechanic Qualification Standard Related with Customer Satisfaction at Leading Heavy Equipment Distributor Company in Indonesia	Baladi	2021	QFD framework, Regression analysis on SEM	Comprehensive qualification standard (TOC, BMC, BC) positively correlated with customer satisfaction. Training programs based on this standard can improve customer satisfaction and business growth.
Innovative Approaches For Effective Supply Chain Invoice-To-Customer Monitoring	Propose Study		Using QFD for evaluate the new program monitoring of Invoice Leadtime monitoring	QFD effectively boosts internal processes where the maturation of initiatives within the program can lead to improvements and process enhancements."

CHAPTER 3 – RESEARCH METHODS

3.1 Scope of Study

This research focuses on the operations of UT Site Tanjung Enim in 2023, which encompasses the improvement of the process related to sending invoice documents to customers, a process that has been perceived as underperforming. Therefore, in order to reduce the lead time of document delivery, each process within the internal procedures and its monitoring functions will be maintained. This aims to enhance cash inflow from customers within the UT Site Tanjung Enim area.

3.2 Time Frame Research

This research conducted 16 Weeks of Works Sequence as detailed in this Figure below:

No	Activity	WORK SEQUENCE (WEEKS)															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Problem Identification																
2	Research Problem & Analysis																
3	Implementation Improvement																
4	Assessment Implementation Improvement																
5	Standardization																

Figure 3.1 Timeline Activity

3.3 Research Flow Process

Analytical Method

The research follows a sequential process, depicted in Figure 3.1 as the Research Flow Process. It outlines a detailed progression starting with the introduction, encompassing the background, problem statement, research objectives, literature review, research methodology, results, conclusions, and recommendations.



Figure 3.2 Research Flow Process

3.4 Research Framework

This research employs a descriptive analysis methodology, emphasizing the collection, compilation, and presentation of data for research objectives. This encompasses data acquisition, classification, evaluation of values and statistics, and the development of graphs and visual representations.

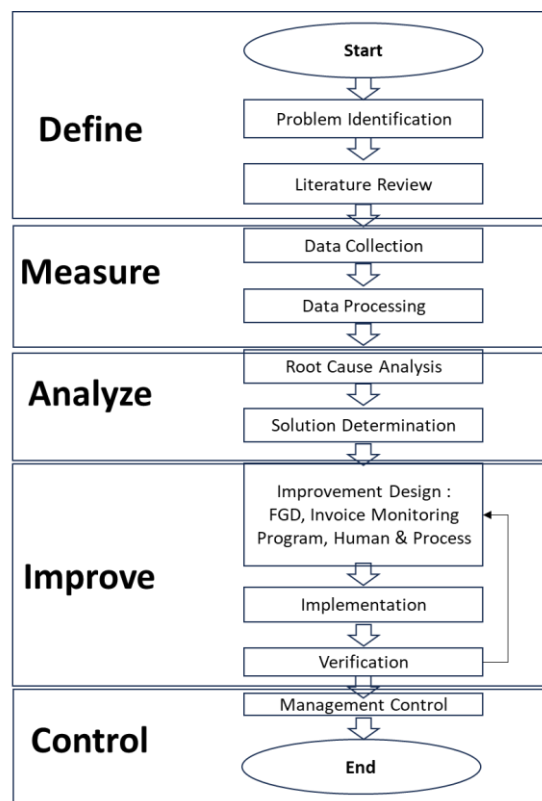


Figure 3.3 Research Methods

3.5 Define

The primary phase within this thesis involves identification, aiming to establish its focal subject. A comprehensive understanding of this subject is pivotal, shaping the analytical approach, proposed solutions, anticipated outcomes, and implementation strategies. This segment necessitates explicit formulation of the core objectives and issues to be tackled throughout the thesis, ensuring a clear and focused trajectory. These objectives will serve as guiding principles, directing the thesis steps for problem-solving while also influencing the choice of resolution strategies, methods of data collection and analysis, process improvement approaches, and oversight mechanisms. This identification section's detailed explanation is segmented into two parts, delineated as follows.

3.5.1 Problem Identification

The first stage of the research process initiates by introduction the emerging issues, encompassing an exploration of their implications and potential risks. Within the scope of this study, the focus of identification is on the gap between document delivery lead times and the maximization of internal processes supported by the Voice of the Customer.

3.5.2 Literature Review

In this point, the author will attempt to search for literature that aligns with this process. This requires further research and study to determine whether this research will draw from existing journals or if the author will create a new method. Because essentially, the author will establish several key points as the foundation of this improvement system research, as follows:

1. Identifying UT Site Tanjung Enim's objectives, including its vision, business needs, business opportunities, and strategies related to the customer payment process and its continuity, as these are typically part of a company's future business strategy.
2. The next step is to analyze the processes involved in the supply of goods and services that may hinder the invoicing document process from disrupting customer operational processes. This involves analyzing operational problems that occur during invoice document creation, both internally (such as human resources, document creation technology, accuracy, and speed of document

creation) and externally (such as transport-related issues in document delivery to ensure documents reach customers within the planned lead time).

3. The data to be used for this research can be extracted from UT Site Tanjung Enim's SAP system and an assessment of the current document aging related to billing document delivery:
 - a. The data used will be captured from transactions occurring from July 2023 to October 2023 from customer transaction data in Tanjung Enim, as mentioned in the Scope of Research.
 - b. Data collected related to the Collection Period will undergo further assessment through Focus Group Discussions (FGD) with the internal team from "UT Site Tanjung Enim." According to Wibowo (2008), the data collection technique can utilize the 5 levels of maturity, as follows:
 1. Level 1 - Initial/Ad Hoc: At this level, there is little to no formalization or consistency in processes. Activities are often performed on an ad hoc basis without clear guidelines or standards. There is a lack of control, predictability, and documentation.
 2. Level 2 - Repeatable: At this stage, organizations begin to establish some level of consistency. Basic processes are defined and followed, although they may not be fully documented. There is a focus on reducing variability and improving efficiency.
 3. Level 3 - Defined/Managed: In this stage, processes are well-defined and documented. There is a clear understanding of roles and responsibilities, and process performance is regularly measured and monitored. Continuous improvement efforts are in place.
 4. Level 4 - Quantitatively Managed: At this level, organizations not only have well-defined processes but also measure them quantitatively. Data-driven decision-making is a key feature. Processes are continuously improved based on data and analysis.
 5. Level 5 - Optimizing: The highest level of maturity involves a focus on continuous optimization and innovation. Processes are not just managed; they are also constantly improved to adapt to changing conditions and deliver superior results. Innovation and creativity are encouraged.

3.6 Measure

Next in this thesis is the problem measurement phase. This step aims to gather all pertinent data concerning the identified issues, to be subsequently processed for comprehensive analysis. The method employed involves a problem-solving approach that delineates the issue based on factual information and existing data. Data collection encompassed interviews, questionnaire completion, field surveys, recording numerical and graphical data, and personal note-taking. The detailed elaboration of this measurement section is segmented into two parts, outlined as follows.

3.6.1 Data Collections

In the data collection section, data is collected before analysis using the SAP software, which serves as the basis for the Invoice Production process of "UT Site Tanjung Enim." Leadtime billing documents Analysis of the process that occurred whether it was good or there is still a bottleneck that occurred that caused the performance of Leadtime delivering Invoice documents is not optimal.

This study utilizes primary data employing a simple linear regression model. Data was collected through survey methods by distributing questionnaires directly to respondents and via online questionnaire platforms such as Google Form. The data used is quantitative, consisting of numerical values that can be calculated and analyzed. According to Sugiyono (2017: 8), quantitative research is based on the philosophy of positivism, involves selecting specific samples or populations, collecting data using research instruments, conducting quantitative or statistical data analysis, and aims to test formulated hypotheses.

3.6.2 Data Processing

Once all the information is gathered, the next step is organizing it for analysis. This means putting the collected information in order so it's easier to study. We'll sort the data into two groups: quantitative and qualitative. Quantitative data covers numbers and specifics about products or projects, like time, cost, how much was produced, and the outcomes achieved. On the other hand, qualitative data comes from interviews with people involved in the situation we're studying.

3.7 Analyse

In this part, we will deeply study organized information to help find solutions to the problems we've found. The goal is to figure out the main reasons for the problems, so our solutions can stop future delays in the project. We will look closely at the data in two sections:

3.7.1 Root Cause Analysis

In this section, structured data will be analyzed using the 5 Whys Analysis method. The purpose of this analysis is to identify the root causes of the encountered issues, for example, in this research, starting from the Voice of Customer. The aim and objective of this analysis are to formulate solutions to prevent failures and create a process improvement that can be applied across various sectors.

3.7.2 Solution Determination

At this stage, this research will employ QFD (Quality Function Deployment) as the solution-finding method. Once the Root Cause is identified and the initial program is established, we will use QFD as a form of revalidation, which will also be connected to the Voice of Customer.

3.7.3 Improving Leadtime Delivery Document Standard

The process of improving the Leadtime Document standard for customers, which involves using Invoice Production Monitoring, will be arranged using QFD. The QFD analysis process involves three parameters: customer requirements, engineering specifications, and prioritization obtained from assessing the company's competitiveness against its competitors (Sulistyo, 2009). Based on the explanation (Abu-Assab, 2011), these three variables need to be organized in the House of Quality (HoQ) to be analyzed to achieve an engineering design that aligns with customer needs and priorities. This adaptation of the HoQ can be seen in **Figure 2.7**, where customer needs are focused on the service provided to maintain the Leadtime Document standard at UT. Therefore, in seeking ways to meet the set targets, the company needs to change or improve processes to meet customer expectations.

3.8 Improve

Improvement in DMAIC (Define, Measure, Analyze, Improve, Control) involves refining processes based on data-driven insights. This phase focuses on