Enhancing Monroney Label Process for Efficient Pre-Delivery Inspections

Michelle I. Pabón Rosado

Advisor: Héctor J. Cruzado

Graduate School

Abstract

Motorambar Inc., a prominent player in Puerto Rico's automotive sector, undertook a comprehensive project to refine its Pre-Delivery Inspection (PDI) process, specifically addressing challenges related to Monroney label errors. Following the DMAIC methodology, the project encompassed detailed interviews, flowchart creation, and meticulous data analysis. Overcoming resource constraints during holidays through alternative communication channels, the initiative identified and implemented four essential checklists, involving multiple departments. The IT department played a pivotal role in scrutinizing SAP Support Tickets. Effective control measures were established, leading to a notable reduction in errors, minimized delays, and an overall enhancement of efficiency in Motorambar Inc.'s PDI operations.

Introduction

Motorambar Inc., established in 1965 as the authorized distributor for Nissan, Infiniti, and Kia in Puerto Rico and the U.S. Virgin Islands, faces challenges in its Pre-Delivery Inspection (PDI) process, particularly concerning Monroney label errors at the Cataño distribution center. The PDI department plays a pivotal role in ensuring vehicle quality, but disruptions in Monroney label creation prompted a focused project utilizing the DMAIC methodology. Successfully completing the Define, Measure, and Analyze phases, the project implemented strategies such as checklists, collaborative efforts, and Kaizen methodologies. Key findings include recommendations to address delays in the Master Data department and streamline Monroney label generation, contributing to continuous improvement in Motorambar's PDI operations.

Problem Statement

The heart of the issue lies in the recurring interruptions caused by errors in Monroney label creation and printing during the PDI process. These disruptions not only affect the technical aspects of label creation but also have broader implications for the efficiency and reliability of the vehicle handover process. The project seeks to investigate and remedy the root causes of these Monroney label errors, enhancing the overall efficiency and reliability of the PDI operations at Motorambar Puerto Rico.

Methodology

In the execution of this project, the DMAIC methodology (Define, Measure, Analyze, Improve, and Control) played a pivotal role by guiding a systematic approach to problem resolution. The Define phase set the foundation by establishing clear project objectives and goals, focusing on disruptions in Monroney label creation during PDI. Moving to the Measure phase, the team systematically gathered and quantified data, using quantitative metrics to assess disruption magnitudes. In the subsequent Analysis phase, analytical tools were employed to scrutinize data, identifying root causes and specific challenges. The Improve phase saw the implementation of strategic measures to enhance PDI process fluidity and address Monroney label creation challenges. Finally, the Control phase ensured sustained improvements through the establishment of monitoring mechanisms and procedural controls. The DMAIC methodology provided a structured framework, guiding the project team through each phase and contributing to the successful resolution of PDI operational challenges at Motorambar Inc.

Use of DMAIC Methodology

DEFINE

In the Define phase of the project, the team encountered a complex process involving interactions among eight distinct business areas. The overall process lacked clarity across these areas, with inconsistent descriptions and no formal, documented procedures to guide users. Data validation mechanisms were identified as insufficient in detecting and alerting omissions.

The process exhibited multiple communication channels, and variations were observed based on brand, though not consistently structured by brand in all business areas. Additionally, a central quality check function to detect label issues before reaching critical points was absent. The problem reporting and tracking methodology did not prioritize types of problems, and there was a limitation in key problem-solving persons with the ability to correct information in SAP. While some areas reported improvements in the form of fewer errors over the last few months, key stakeholders played a crucial role in contributing to the functionality of the process. Notably, a system improvement to address the accessory pricing structure issue was actively being implemented during this phase.

In Figure 1, department-specific segments were utilized to visually articulate Monroney Label Components – Departments and Source of Entry. The blue segment denoted the Products department with Monroney Data, the green segment represented the Parts department with "Hoja de Ruta" information, the yellow segment indicated the Products department with Characteristics, and the red segment was allocated to the Finance department with Price Structures. This color-coded representation effectively conveyed the intricate process, illustrating the departmental origin and the source of entry for each component within the Monroney Label system.

Figure 1
Monroney Label Components – Departments and Source of Entry

MEASURE

In the Measure phase, Motorambar Inc. conducted an exhaustive analysis of its Monroney label creation process, scrutinizing the intricate interactions among eight distinct business areas. This multifaceted process, marked by its complexities and variations, underwent systematic examination to identify and prioritize key issues. A meticulous categorization of voluminous data was instrumental in generating a Pareto chart, offering a strategic lens to discern critical challenges. As illustrated in Table 1, this comprehensive analysis led to the creation of a Pareto chart, visually representing and prioritizing issues based on their significance. Figure 2 depicts the Pareto chart of the SAP Support tickets analysis providing a visual summary of the key problem areas identified during this phase.

Concurrently, a comprehensive flowchart was meticulously developed, providing a visual representation of the nuanced interactions within the process as illustrated in Figure 3. This detailed examination brought to light inconsistencies across departments, emphasizing the lack of a uniform understanding and description of the overall process. The absence of formal, documented procedures hindered users from navigating the process uniformly, and the existing data validation mechanisms proved insufficient in detecting and alerting omissions effectively.

Table 1
Tickets Related Reported

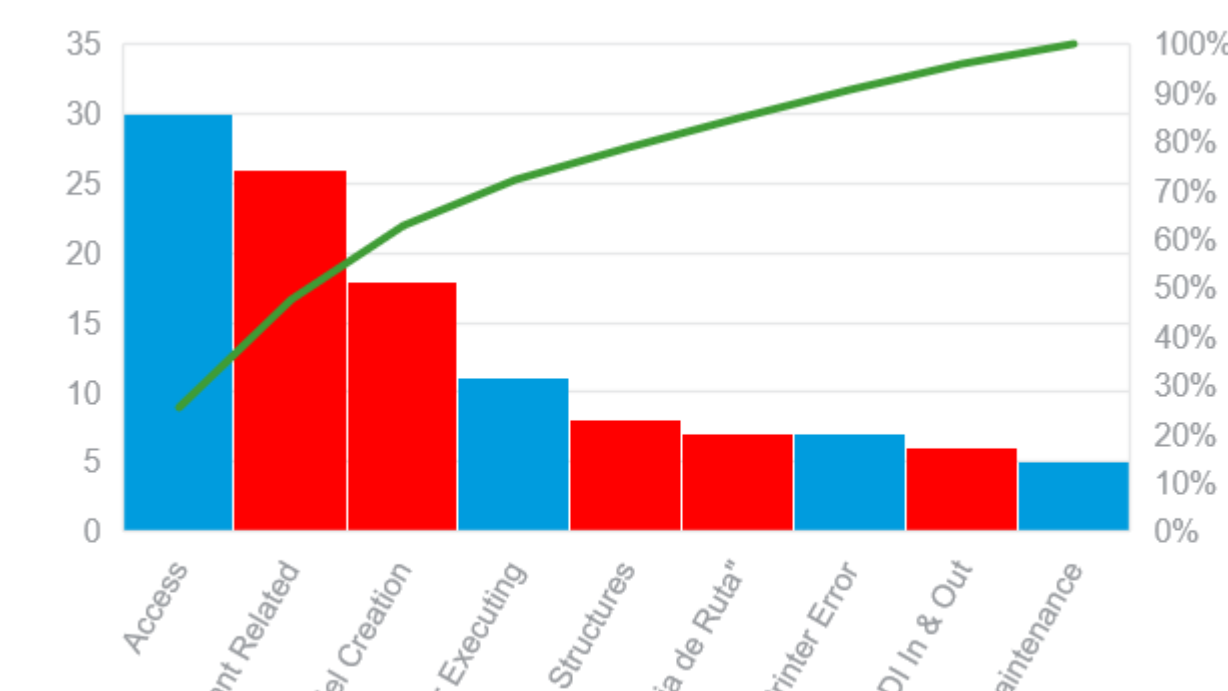| Ticket Related Reason	Incident Count
Access	30
Variant Related	26
Model Creation	18
Error Executing	11
Price Structures	8
"Hoja de Ruta"	7
Printer Error	7
PDI In & Out	6
Maintenance	5
Total	**118**

Figure 2
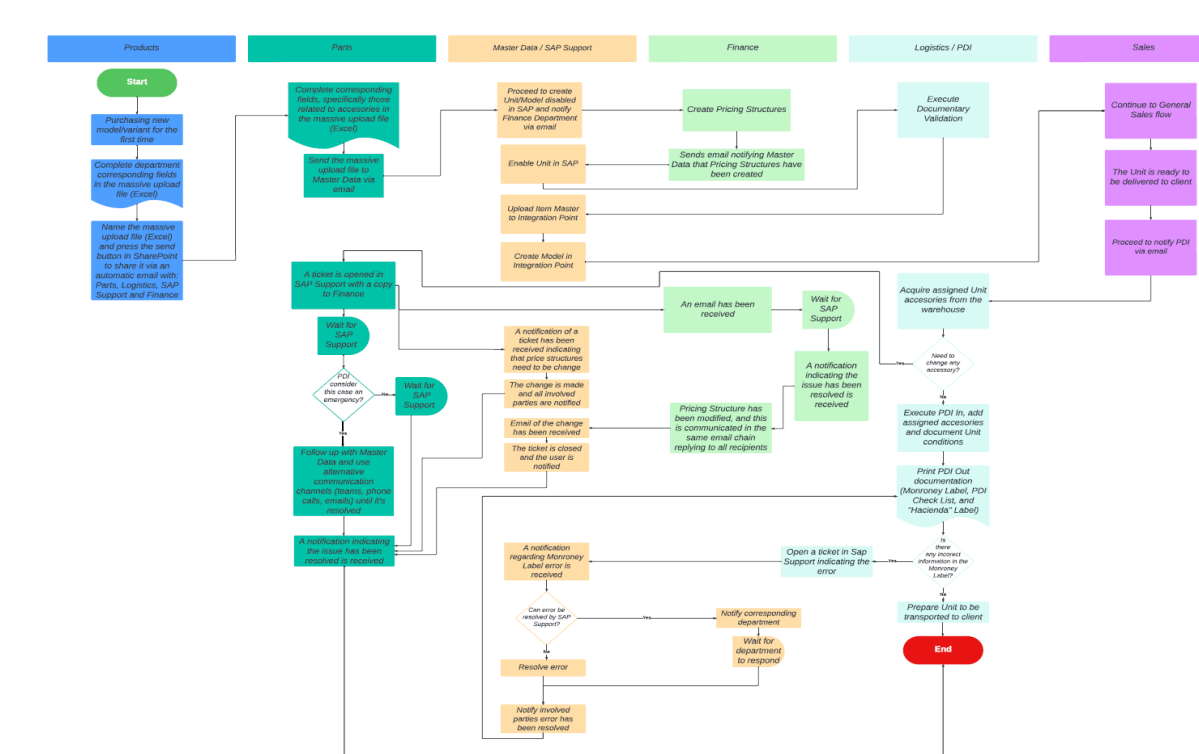**Pareto of SAP Support Tickets Analysis**

Figure 3
Monroney Label Data Upload and Transit Process Flowchart

Additionally, Kaizen sessions gathered data for four essential checklists, enhancing Monroney label creation understanding. Through a data-driven approach and a Pareto chart, stakeholders identified key deficiencies, providing invaluable insights into root causes. This knowledge empowered the organization to progress through subsequent DMAIC phases with targeted improvement measures.

ANALYZE

During the Analyze phase, Motorambar Inc. comprehensively examined its Monroney label creation process, building on insights from the Pareto chart and a detailed flowchart. In-depth data collection generated checklists for critical processes like Model Creation, Shipment Clearance, Integration Point, and Monroney Label across multiple departments. These checklists, crucial for process refinement, systematically addressed identified issues. Pie charts were then employed for graphical representation, succinctly depicting key elements such as entered data, system-generated data, departmental involvement, and process stages. These visuals provided a focused understanding of critical aspects, laying the groundwork for strategic solutions in line with DMAIC's continuous improvement objectives for process enhancement.

Model Creation

In the analysis of Model Creation Data, as illustrated in Figure 4, a detailed checklist comprising 15 data entry elements in an Excel worksheet was meticulously developed, involving active participation from four departments. An interesting observation was made regarding one data entry from the Exports Department, which, despite its availability, went unused by the Master Data department. The crucial task of uploading necessary data into the SAP system was entrusted to the Master Data department, and this process typically spanned a week.

Table 2
Model Creation Minimum Required Fields

| Name in SAP	Description	Department
MS Book Part Number	Schedule-B	Exports
Prod./insp. memo	MID	Logistics
Ind. Std Desc.	HTS Index	Logistics
Document	EPA	Logistics
Components	Components	Parts
Operation	Operation	Parts
Material	Material Code	Product
Division	Division	Product
Description	Description	Product
Material Group	Material Group	Product
Product Hierarchy	Product Hierarchy	Product
ZWEIGHT	Weight	Product
ZPLANT_ORIG	Unit Origin	Product
ZWHEELSIZE	Tire Size	Product
ZMANUFACTURER_PLANT	Manufacturer	Product
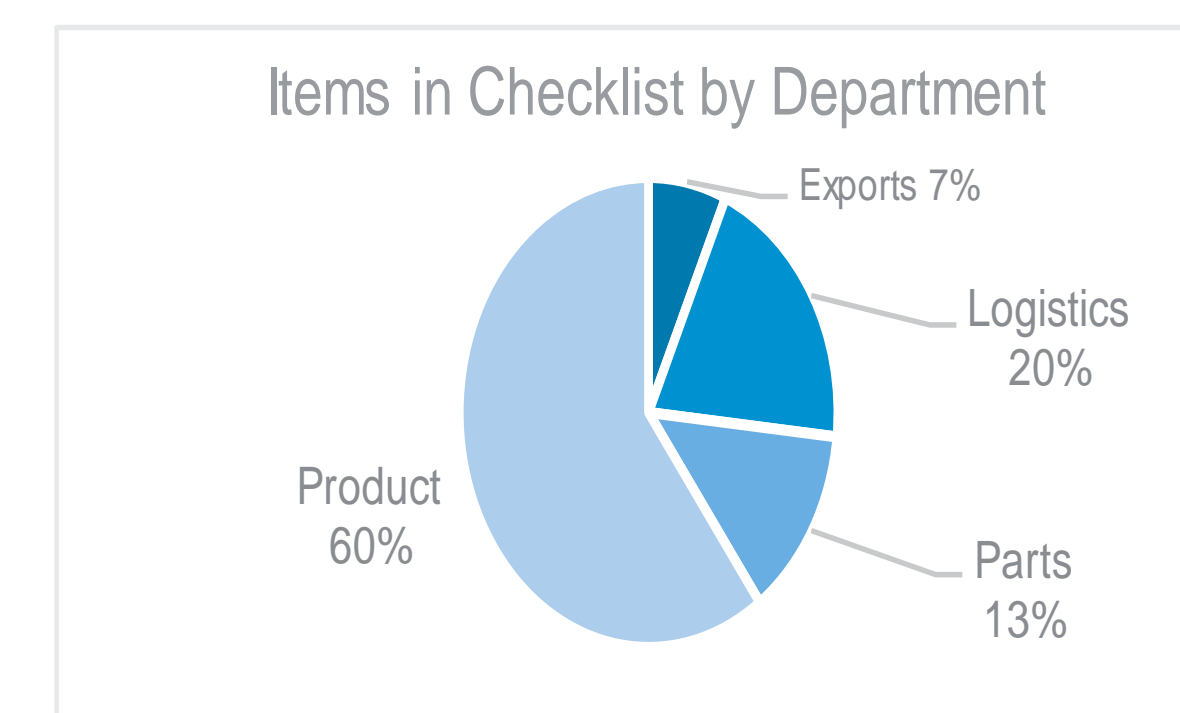
Figure 4
Model Creation Data Pie Chart

Shipment Clearance

As illustrated in Figure 5, the assessment of the Shipment Clearance checklist involved a comprehensive validation process with ten data entries across three departments. Notably, this crucial checklist required validation one week prior to the scheduled shipment clearance, emphasizing the proactive approach to ensure accuracy and efficiency in the process.
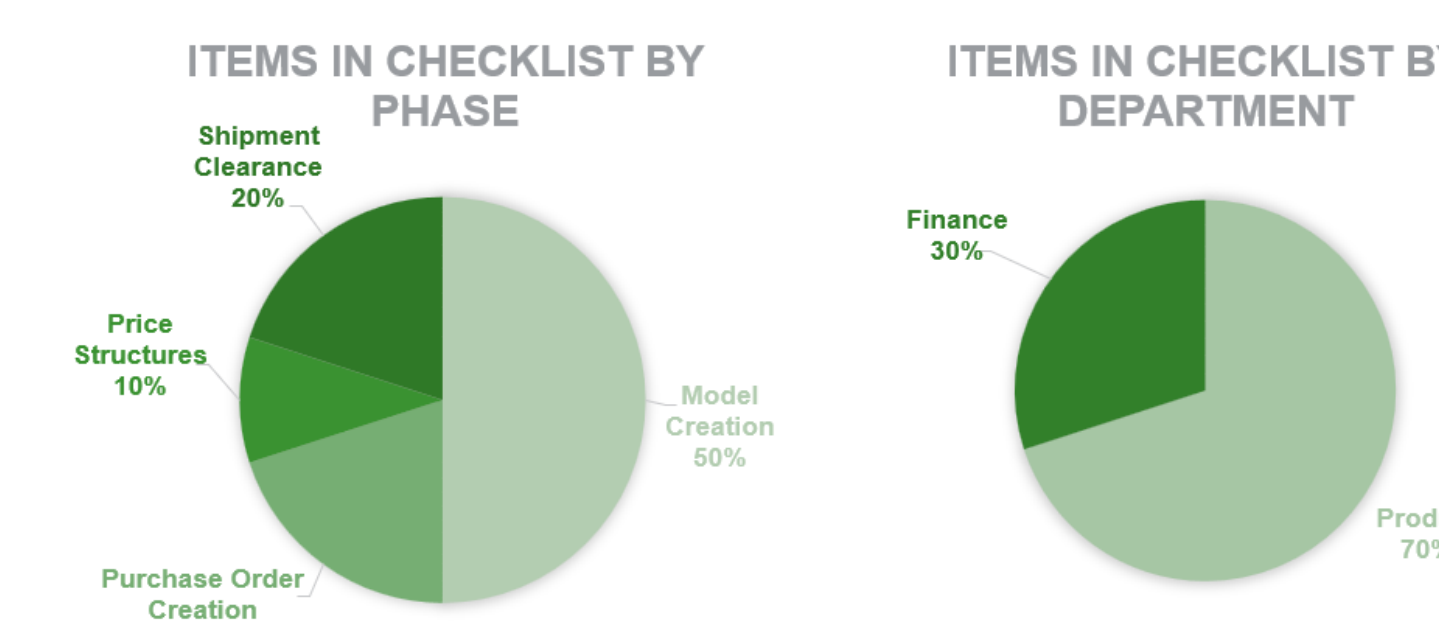

Figure 5
Shipment Clearance Data Pie Charts

Within the checklist, the Product department played a central role, contributing seven data entry elements. Interestingly, two specific elements were identified as falling under the purview of the Sales department, specifically for the Nissan brand. This nuanced division of responsibilities underscored the need for precise categorization and collaboration across departments to facilitate a smooth and error-free Shipment Clearance process.

Integration Point

In Figure 6, a comprehensive checklist is depicted, featuring 139 data elements. Notably, 114 of these data entries, constituting 82%, are classified as hard-coded, automatic, or blank. This signifies that the system either automatically generates or is programmed to provide the corresponding data. Essentially, the majority of these 139 data elements do not necessitate manual data entry.
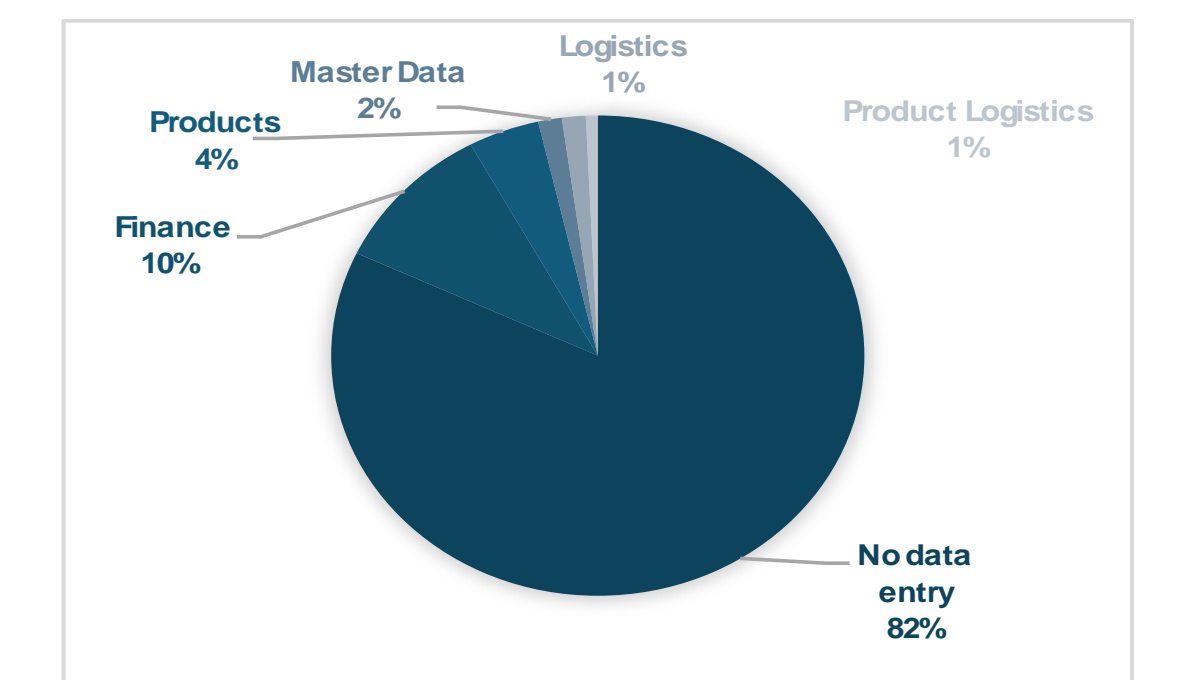

Figure 6
Integration Point Data by Department with Hard Coded, Automatic or Blank Data

The representation of the remaining 18% by department is visually depicted after the removal of the other 82%. The refined checklist now consists of 25 data entry elements and relies on the execution of four distinct operations.

IMPROVE AND CONTROL

In the Improve phase, targeted interventions were executed at Motorambar Inc., featuring a suggested flow chart, as illustrated in Figure 7, and comprehensive checklists. These strategic measures aimed to enhance the fluidity of the Pre-Delivery Inspection (PDI) process. Acknowledging the pivotal role of data management, the company invested in training sessions for SAP usage and the development of user manuals. Furthermore, recognizing the need for additional resources, an expert was recruited to bolster the Master Data department. Transitioning into the Control phase, rigorous monitoring mechanisms were established, with the suggested flow chart and checklists (Figure 8) becoming integral tools for ensuring enduring process improvements. These decisions were rooted in the project's thorough findings and recommendations, exemplifying a comprehensive strategy to optimize and maintain efficiency in PDI operations.
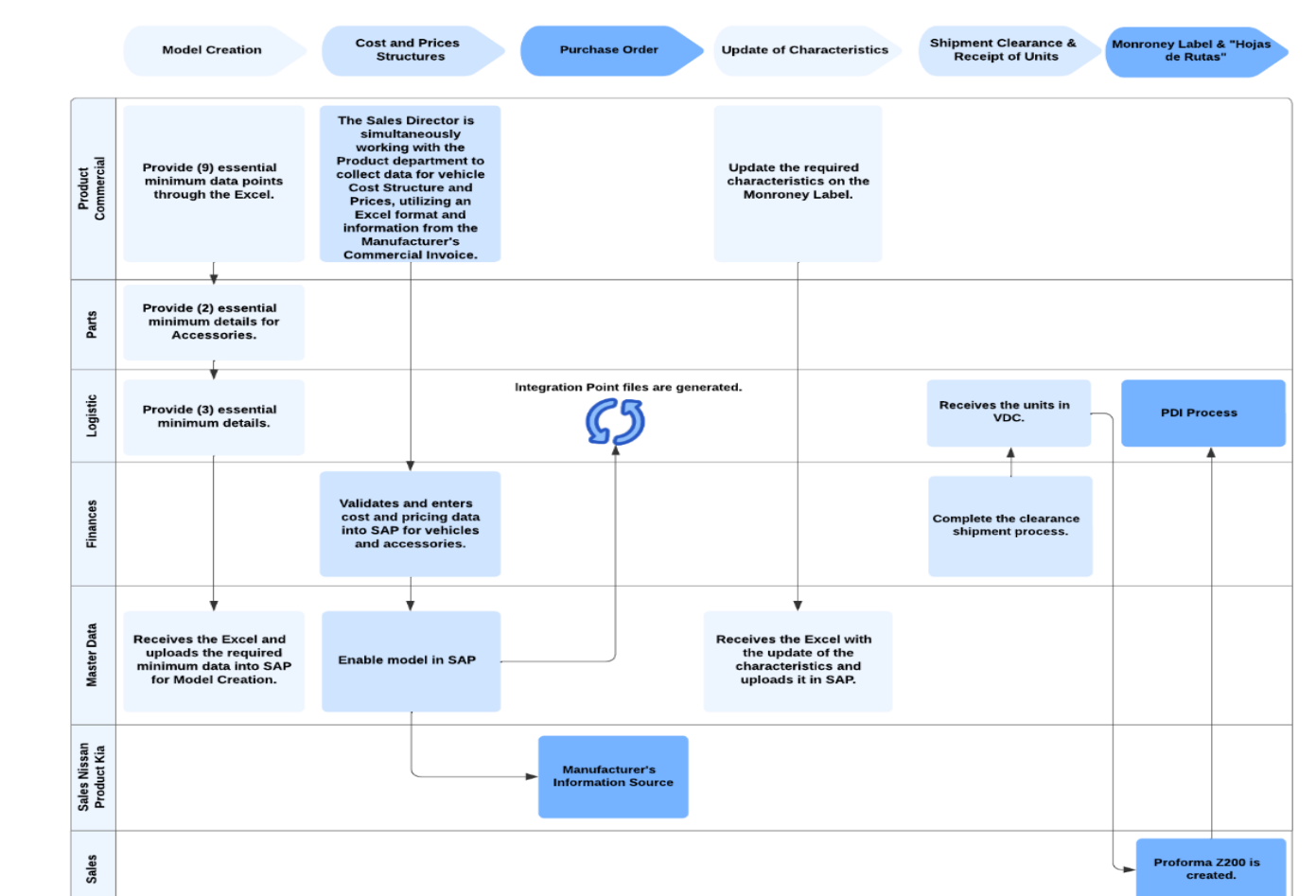

Figure 7
Suggested Flowchart with Checklist

Conclusion

Motorambar Inc. successfully navigated the challenges in its Pre-Delivery Inspection (PDI) process through a rigorous application of the DMAIC methodology. The project, initiated to address disruptions in Monroney label creation, demonstrated the company's commitment to operational efficiency. The Define phase established clear objectives, setting the stage for a comprehensive analysis in the Measure phase. Robust data collection, illustrated in Figure 4 and Figure 5, informed a meticulous analysis, revealing inefficiencies and discrepancies. The subsequent Improve phase saw the implementation of targeted strategies, including a suggested flow chart (Figure 8), checklists, and additional Master Data resources. Training sessions and user manuals for SAP further fortified the data management system. The Control phase solidified these improvements, incorporating monitoring mechanisms for sustained efficiency.