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# USE OF SIX SIGMA TO OPTIMIZE CORDIS SALES ADMINISTRATION AND ORDER AND REVENUE MANAGEMENT PROCESS

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## ABSTRACT

Cordis Corporation, a Johnson and Johnson Company, undertook a project to reduce the sales representatives administrative tasks by 50% and to optimize the Order & Revenue Management Process for its customers. The existing process was complex, consisting of numerous handoffs, non-integrated systems, and duplication of work. Due to these issues, sales representatives and sales administration were spending too much time managing errors and non-value added tasks instead of being able to focus on the business. This resulted in lower than acceptable Customer Satisfaction. Using the DMAIC Methodology and ProcessModel, the Returns Process was streamlined from over 29 main steps to 7 steps to minimize cycle times from 98 days to under 30 days, the Sales Administration Organization was restructured to meet the needs of the customers, and the Sales Representatives Admin Task Time was reduced by 50% to yield a potential $3 to $10 million in increased sales.

## 1 INTRODUCTION

The purpose of this project was to reduce the sales representatives administrative tasks by 50% and to optimize the Order & Revenue Management Process for our customers.

The Cordis Sales Administration and Order and Revenue Management Process are complex, consisting of numerous handoffs, non-integrated systems with Health Care Systems (HCS, a distributor of products produced by Cordis), and duplication of work. Due to these issues, Cordis Sales Representatives, Cordis Sales Administration and HCS are spending too much time managing errors and performing non-value added tasks instead of being able to focus on the business. This results in lower than acceptable Customer Satisfaction. More than 30% of the Sales Representatives' time was spent on managing administrative tasks.

Using the Six Sigma DMAIC Methodology and an advanced simulation tool (ProcessModel software) the project team drilled down the Order & Revenue Management Process into key focus areas affecting our Y variables (Sales Rep Time & Long Cycle Time for customers). The key areas were in:

1. Returns & Credits Process
2. Inquiry Process
3. Consignment Process
4. Sales Administration Organization.

## 2 SIX SIGMA DMAIC METHODOLOGY

There are five fundamental steps or phases in a Six Sigma improvement project:

1. Define
2. Measure
3. Analyze
4. Improve
5. Control.

Each phase is designed to ensure (1) that companies apply the technique in a methodical and disciplined way; (2) that Six Sigma projects are correctly defined and executed; and (3) that the results of these projects are incorporated into running the day-to-day business.

The Define phase is critical in ensuring the success of a Six Sigma project. The project's purpose and scope is defined and background on the process and customer is obtained. A key deliverable of the Define phase is the Project Charter, which among other items contains the Problem Statement, Goal Statement, Constraints, Assumptions, and Project Plan. In addition to the Project Charter, a high level map of the process is generated along with a list of what is important to the customer.

The Measure phase serves to validate and refine the problem and begins the search for root causes. A more focused problem statement can be generated using data that pinpoints problem location and baselines the current process capability (sigma).

In the Analyze phase, statistical methods and tools are used to identify and confirm root causes of defects. Not only must analysis of the data be performed, but also an in-depth analysis of the process to ensure an understanding of how the work is actually being done must be performed to identify inconsistencies or problem areas that might cause or contribute to the problem.

The Improve phase focuses on discovering, refining, and implementing solutions to the root causes of the problems identified in the Analyze phase. Every attempt should be made to maximize the benefits of proposed solutions.

To ensure that the same problems do not reoccur, the processes that create the product or service are monitored continuously in the Control phase.

## 3 USE OF SIMULATION IN THIS PROJECT

Based on past experience, the Black Belt for this project felt that a simulation tool would be one of the best options for meeting the aggressive timeline associated with this project.

### 3.1 Why Use a Simulation Tool?

As manufacturing efficiency and process optimization have evolved from competitive advantages to requirements for mere survival in the marketplace, the benefits and power of simulation tools have flourished. The use of simulation continues to grow as all of the easy answers, the "low hanging fruit," have been found, leaving only the most complex and difficult problems to be solved. Beyond providing what is often the first complete "picture" of a process, simulation allows a user to effectively address problems that were beyond the scope of the tools available to them in the past. Complexity, interdependencies, and variability can be more effectively analyzed using simulation than with other tools. The conflicting views of how processes are currently being performed or should be performed, parallel processes occurring simultaneously, and the shear volume of processes and activities involved caused complexity in this project. Many of the processes and individual activities were affected by interdependencies with other activities outside of their immediate control. Variability was a given with varied input arrivals, processing times, and resource availability.

### 3.2 ProcessModel Software

ProcessModel software was selected for use in the project because it is able to handle the complexity, interdependencies and variability associated with the Order & Revenue Management Process.

ProcessModel not only allows the user to graphically document their processes, but to animate them as well. The objects being processed (telephone call, fax, order, product, customer, etc.) can be viewed as they move through the required activities. Accurate representations of dynamic processes are capable due to ProcessModel's ability to use real-world data for arrival patterns, processing times, and resource availabilities. "What if" analysis can be used to test and optimize proposed solutions. At the conclusion of a project, the simulations provide an effective tool for communicating information to all affected parties.

ProcessModel is unique in its ability to allow a user to begin with a high level diagram of a process and then break it up into detailed models of specific processes and activities. This technique is called hierarchical modeling. Hierarchical modeling allows multiple resources to work on a project simultaneously, and lets the most qualified resource create the model of the process they are responsible for.

ProcessModel's hierarchical modeling feature allows multiple models to be linked together. This means that a high-level process diagram (referred to as a parent chart or main model) can be linked to any number of detailed models of specific processes or activities (referred to as child charts or submodels). When the high-level process model is simulated, all of the models that are linked to it will be simulated as well. Users are able to view all of the models running concurrently, and the output report contains information on the items in all of the models. Objects that enter a process in the high level diagram (the parent chart) that is linked to a detailed diagram (a child chart) will be routed for processing through the child chart and then routed back to the high level diagram when processing is complete. Figure 1 shows how objects from the parent chart are routed to the child chart for processing.

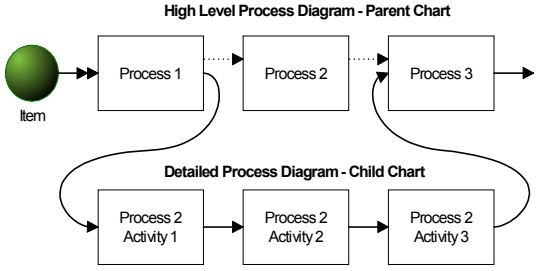



Figure 1: ProcessModel's Hierarchical Modeling Feature allows Multiple Process Models to be Linked Together

Because this was the first project where Cordis had used ProcessModel software, a consultant from ProcessModel Inc. was brought in to act as a mentor to not only help train new users, but also to also help ensure that the project was completed in the time allotted.

## 4 DEFINE PHASE

The decision to use simulation for this project was made in the Define phase.

### 4.1 Define Phase – Tools Used

The tools used in the Define phase consisted of

- Project Charter
- Customer Satisfaction Measurement (CTQs)
- SIPOC diagrams
- Voice of the Customer Analysis.

The Constraints, Assumptions and key success metrics contained in the Project Charter were used later to create the simulation models. The Project Scope became the boundaries of the models.

### 4.2 Define Phase – Use of ProcessModel

ProcessModel was used to create the high-level process diagram used in the SIPOC diagram. This same diagram can be converted into the parent diagram used to link all of the detailed process models created in the later phases.

## 5 MEASURE PHASE

It was in the Measure phase that the project team was able to determine where simulation would be of the greatest benefit.

### 5.1 Measure Phase – Tools Used

The tools used in the Measure phase included

- Data Collection Surveys for All Parties
- Process Maps (Integrated and Functional)
- Data Displays
- Pareto Diagrams
- Histograms
- Check and Tally Tools.

Process diagrams created in the Measure phase not only help the project team to understand the processes they are working to improve, but also many problems along with their root causes can be identified just from mapping out the process. Unfortunately, few companies have actually spent the time to properly and completely document their processes.

### 5.2 Measure Phase – Use of ProcessModel

ProcessModel was used to create all of the integrated and functional process maps. The team took advantage of ProcessModel's ability to animate the process diagrams, and was therefore able to "bring to life" the maps so that the people reviewing the models were more effectively able to ensure their accuracy because they could actually see the objects moving through the various processes.

The models created to this point were not able to provide timing, costing, or resource utilization information, but did serve as useful guides for the team to know what information they still required to ensure that accurate models of the processes in question could be created. The potential for errors or discrepancies in data collection is reduced by having all team members and sources of data referring to the same set of diagrams.

## 6 ANALYZE PHASE

The Analyze phase is where the team was able to take advantage of ProcessModel's ability to look at all aspects of the process: timing, costs, use of resources, areas with excess capacity, and bottlenecks.

### 6.1 Analyze Phase – Tools used

The tools used in the Analyze phase included

- Complete ProcessModel Simulations
- Second and Third Level Pareto Diagrams.

The process models created and simulated in the Analyze phase provide for many people their first real view of not only their own process, but how they interfaced with all of the other processes as well.

It is important to note that the project team had to validate (ensure that the computer models adequately represented the real-world processes) and verify (ensure the computer models produces statistically accurate output data) all the models that were created. Without this step, clients for this project would not have faith that the proposed solutions would achieve the advantages claimed by the project team.

### 6.2 Analyze Phase – Use of ProcessModel

Using real world data, the project team was able to determine arrival rates, processing times at activities, queue times, resource costs, resource availabilities, and routing information and add this information to the process diagrams to convert them into process models that accurately represented what was occurring in the real world.

ProcessModel's ability to handle variable data for items such as arrival routes or processing times meant that much more realistic and accurate models could be created. Instead of being limited to using averages, the models were built to show the effects of variability in the different processes. ProcessModel's ability to link all of the process models together allowed the effect of the interdependencies between different organizations and departments to be observed.

Appendix A shows the high level diagram (parent chart) for this project. Activities highlighted with shadows are links to detailed sub-models (child charts). A total of 13 detailed process models were created for this project.

Appendix B, C, and D are representative of the types of models that were created for this project.

## 7 IMPROVE PHASE

In the Improve phase, the project team concentrated on developing and refining solutions to the problems discovered in the Analyze phase.

### 7.1 Improve Phase – Tools Used

The tools used in the Improve phase included

- ProcessModel Simulations of Proposed Changes
- Challenge Sessions
- Solution Prioritization Matrix
- Cost-Benefit Analysis
- Piloting and Implementation Planning.

The use of a simulation tool allows the user to (1) prototype system changes faster and with greater accuracy, (2) increase the number of improvements each employee can make for the unit of time available, and (3) raise the value of each improvement.

### 7.2 Improve Phase – Use of ProcessModel

Simulation models of proposed solutions were generated using ProcessModel so their potential payoffs could be evaluated. The "what if" analysis performed using these models allowed the project team to test proposed solutions to the root causes discovered in the Analyze phase without risking a disruption to the real world processes.

A streamlined Returns Process, an automated Inquiry Process, and restructured Sales Administration Organization could all be tested and the potential benefits all tested using the computer.

## 8 CONTROL PHASE

The project team used the Control phase to ensure that procedures were initiated to prevent the same problems from reoccurring in the future

### 8.1 Control Phase – Tools used

The tools used in the Control phase included

- Process Documentation
- Process Standardization
- Metrics
- Accountability and Ownership.

### 8.2 Control Phase – Use of ProcessModel

The models created using ProcessModel became the default process documentation for the newly implemented processes. The models of revised and redesigned processes were used to help train affected personnel on the new procedures.

## 9 BENEFITS ACHIEVED

The project team concentrated its efforts in four key areas:

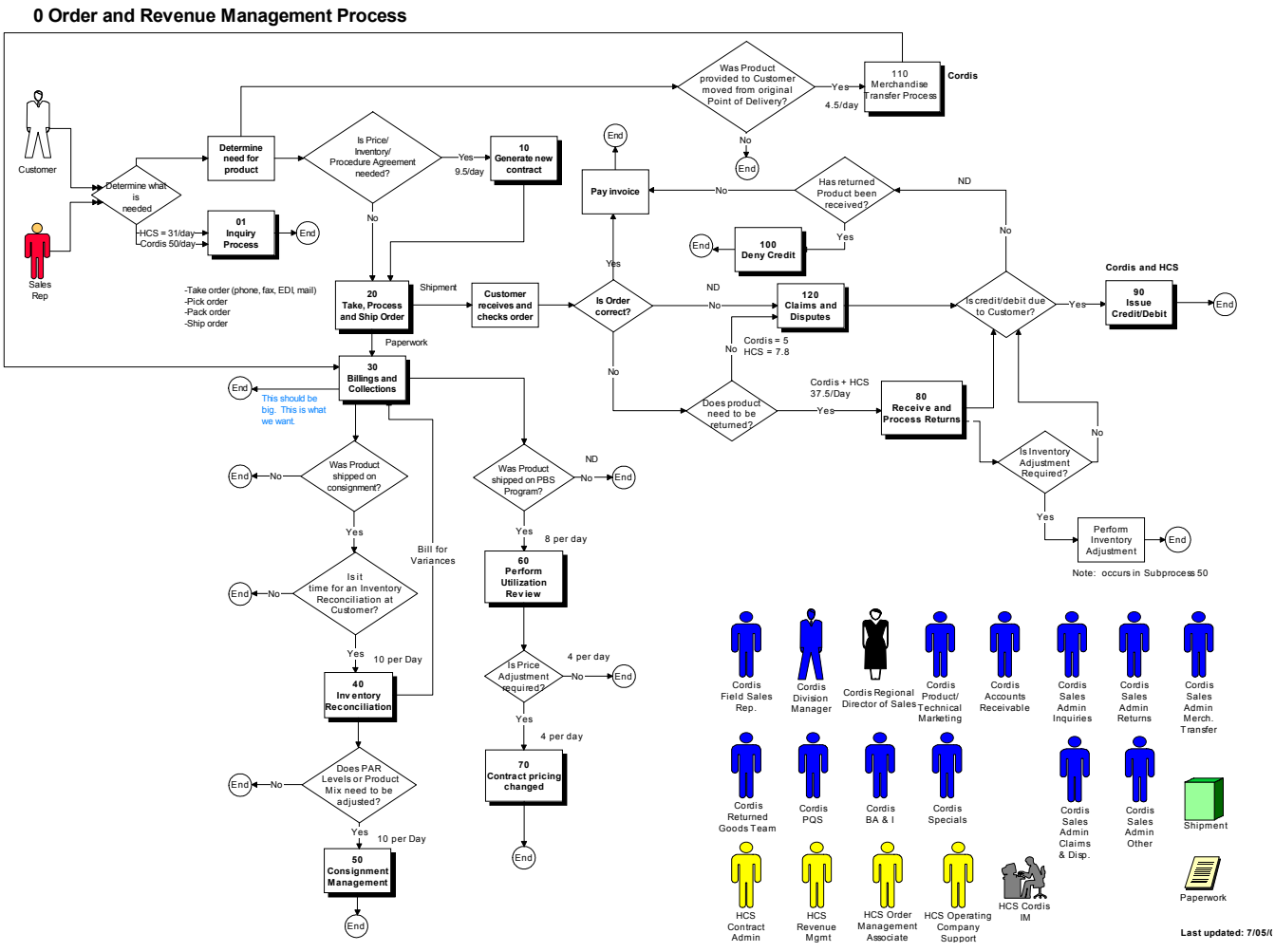
- Returns & Credits Process
- Inquiry Process
- Consignment Process
- Sales Administration Organization.

Within these key areas of focus the following improvements were achieved:

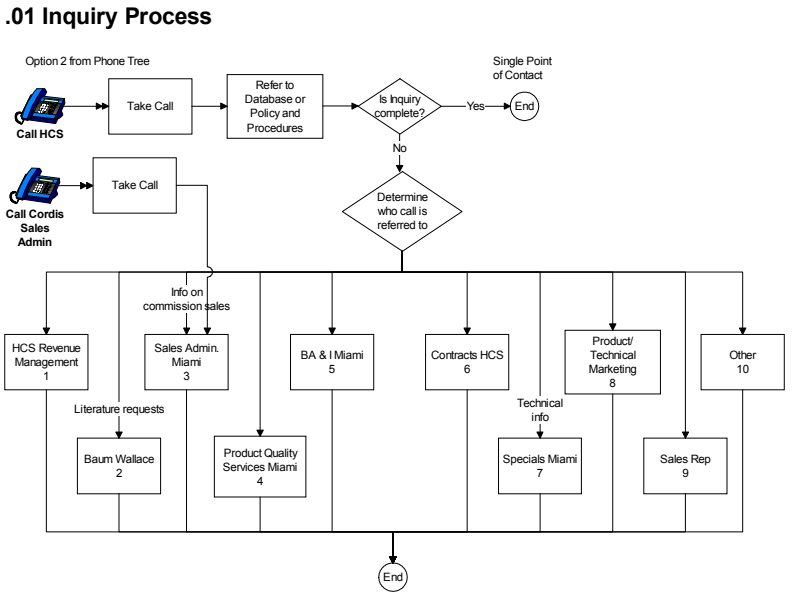
- Returns Process was streamlined from over 29 main steps to 7 steps to minimize cycle times from 98 days to under 30 days
- Inquiry Process was automated using the Web – J&J Gateway system for all Representatives and Key customers
- Improved Sales Administration Organization (Restructured Roles & Responsibilities for the Sales Administration Function to meet the needs of the customers based on the data – focused on Consignment, Returns, Inquires).

The results of the project become even more impressive when it is noted that this project was completed in less than four months!

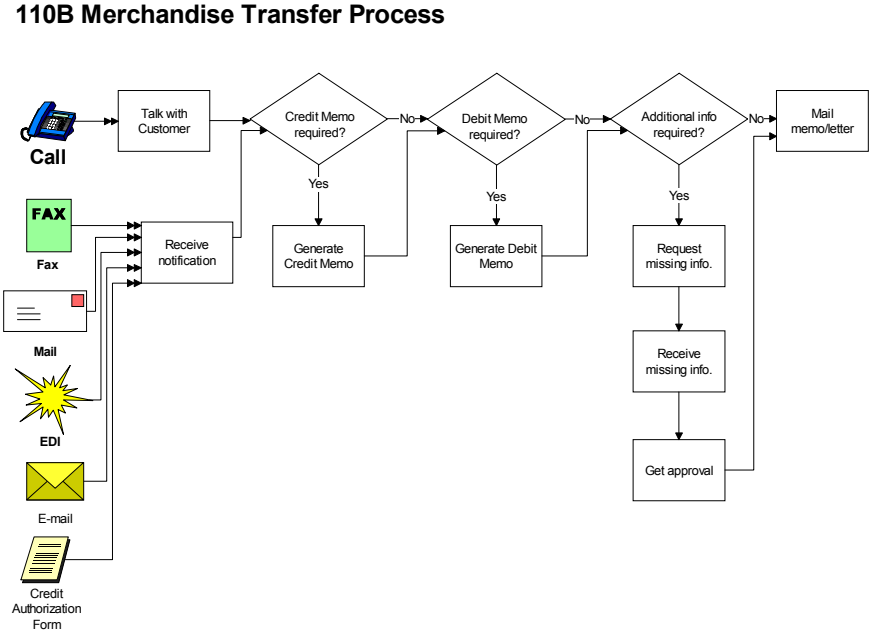
# APPENDIX A: HIGH LEVEL PROCESS DIAGRAM (OVERALL PROCESS)



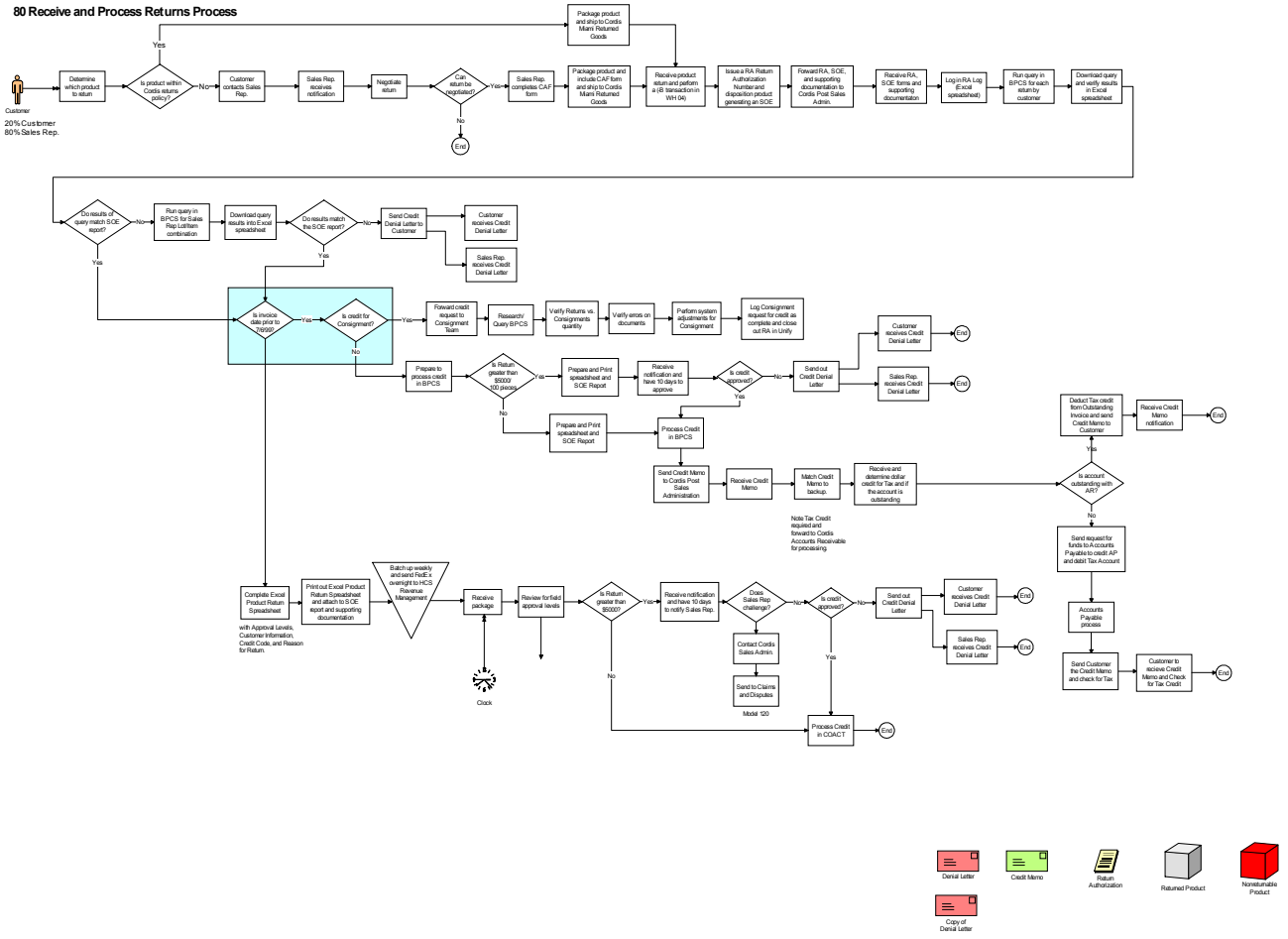
## APPENDIX B: SAMPLE DETAILED MODEL (CHILD CHART)




## APPENDIX C: SAMPLE DETAILED MODEL (CHILD CHART)



## APPENDIX D: SAMPLE DETAILED MODEL (CHILD CHART)

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