Data Mining to Predict Operational Outcome

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Rockwell Collins Avionics Service Center in Singapore provides avionics MRO services for Asia Pacific commercial and military customers in Asia Pacific.

Problem Statement

This project provided an analysis of the On-Time-Delivery (OTD) performance on specific products at Collins Aerospace (Avionics) and **laid** a foundation for an improved Inventory Management System in combination with Operations Planning process to better OTD performance.

The previous OTD performance had an average of 70%, below the target. The data mining analysis **revealed** that the major root causes were the material availability and the supply chain, which means that not all <u>necessary parts were available to</u> begin the repair work of a certain product on time.

Methodology

Data Relevance Finding relevant features and identifying critical points	
Data Preparation Removing redundant fields and identifying anomalies using SQL	
Data Modelling Using SQL, R and Excel to find proportions and correlation	
Data Deployment Evaluate results and ensure model can be used by staff	
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ABC.





The table below shows the decision-making and formal technique **used** to statically separate the data entries into groups based on trends in previous years and current inventory quantity; applicable where many possible courses of action are competing for attention.



Reasons for Product ABC not meeting OTD

% Parts **X** Engineering **X Not Assigned** 💥 Sub Con **X** Others

Focusing on Product ABC, we analyzed the underlying factors of the problem. **Five contributing factors** surfaced which caused Product ABC to not meet the OTD target (as shown in the pie chart).

The table on the right shows **a breakdown** of the equipment based on Pareto analysis.

Туре	Total # of units missed OTD	# of RIH	
RXX	90 (15%)	60	
FXX	39 (7%)	25	
WXX	27 (5%)	131	

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Count of Material I	Column Labels				Inventory Qty
Row Labels	2020	2021	2022	Grand Total	
FXX	15	24	7	46	
XXX-XXXX-XXX	2	1	4		2
XXX-XXXX-XXX	7	12	2		11
XXX-XXXX-XXX	6	11	1		13
RXX	56	52	13	121	
XXX-XXXX-XXX	2	1	1		4
XXX-XXXX-XXX	2	1	2		6
XXX-XXXX-XXX	3	1	1		4
XXX-XXXX-XXX	2	1	3		4
XXX-XXXX-XXX	1	1	2		4
XXX-XXXX-XXX	25	30	1		4
XXX-XXXX-XXX	6	7	1		11
XXX-XXXX-XXX	10	8	1		7
XXX-XXXX-XXX	5	2	1		9
WXX	97	105	27	229	
XXX-XXXX-XXX	30	35	9		2
XXX-XXXX-XXX	20	39	4		5
XXX-XXXX-XXX	14	13	4		3
XXX-XXXX-XXX	1	7	1		3



The mathematical relationship between clocked hours and capacity utilization is shown graphically below. Improving capacity utilization and reducing the speed of completion requires the repair to involve a single processing step supplied by readily available inventory. However, these repairs are a complex web of activities fed by the supply chain.



We can improve the On-Time-Delivery performance via the implementation of the Material Requirements Planning (MRP) system, which analyzes current inventory levels vs operations capacity.

 A master production schedule: A statement of the planning, including orders, forecasts, and capacity. • Bill of materials (BOM): <u>All the materials and components</u> required to make the final product. Inventory status file: <u>Stock records that allows gross</u> requirements to be adjusted to net requirements.

business priorities overall, these may exert great influence on data mining.



