I1.02 - TEL Forecasting Tool

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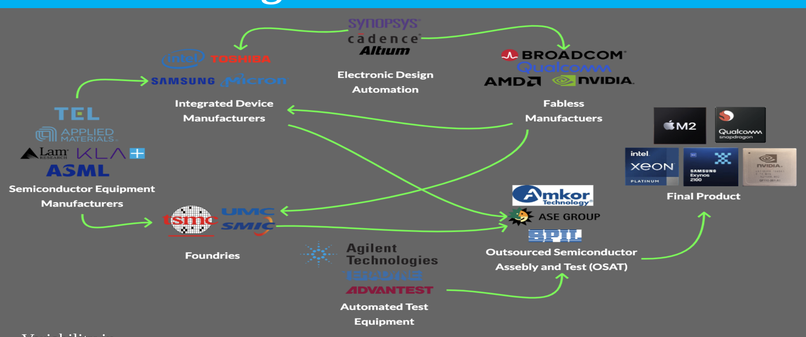
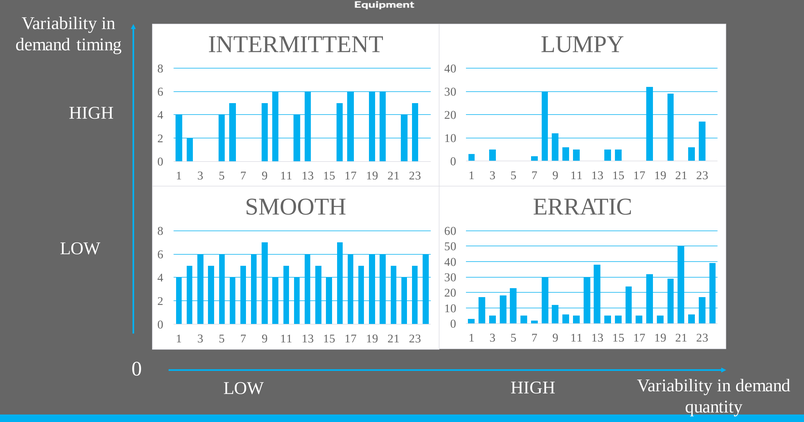
Problem Statement

- There is <u>no dynamic way of retrieving, analyzing and transforming</u> raw spares data to predict demand patterns.
- This becomes a burden on the planning team to produce when needed.
- The inability to frequently update forecasts has led to a lack of agility in responding to changes in demand.

Background Information





Project Objectives

- Develop an agile forecasting model that will provide accurate predictions on customers' spares demand that covers 2 years.
- Create a dashboard that will be informative, self-automated, and accessible for adjustments.

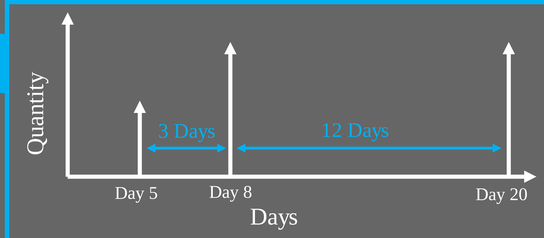
Project Purpose

Creating a dynamic system to forecast spare parts' demand would significantly reduce the burden of manual processing and allow for increased time for valuable decision-making.

Methodology

- Bootstrapping (simulation) Forecasting
- Interarrival + Size Forecasting (Croston's Method)
- Judgmental Forecasting
- Installed Base Forecasting

Simulation



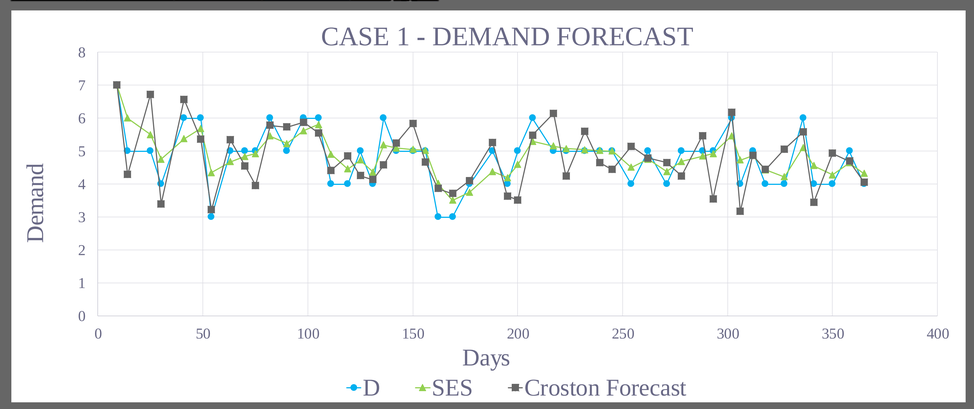
	Case 1	Case 2	Case 3
μ -Demand	5 units	5 units	5 units
σ of Demand	1 units	1 units	6 units
μ -Transaction Cycle	7 days	5 days	7 days
σ of Transaction Cycle	2 days	3 days	2 days

<u>Two Randomly Generated Variables</u>

- $D \sim N(\mu_D, \sigma_D)$
- $T \sim N(\mu_T, \sigma_T)$

MATLAB

```
% randomly generate the transaction cycle
temp2=-999
while round(temp2)<0
% randomly generate the demand size
z_N=sqrt(-2*log(rand()))*sin(2*3.1415926*rand())
temp2=mu_N+z_N*sig_N
```



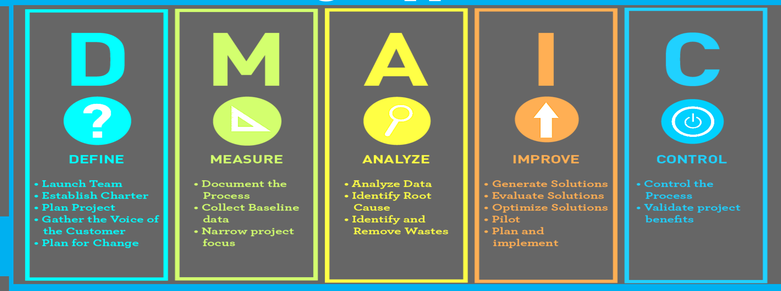
Result Analysis

	alpha α	D (smoothed)	Croston Forecast
Case 1	0.1	0.9	2.0
	0.5	0.2	0.5
	0.9	0.2	0.0
Case 2	0.1	0.3	3.2
	0.5	0.8	14.1
	0.9	0.0	1.0
Case 3	0.1	13.0	13.0
	0.5	9.2	6.9
	0.9	7.0	5.3

Mean Square Error

- **Case 1** : Responds well to a high alpha.
- **Case 2** : A higher transaction cycle variation does not result well in Croston's Method
- **Case 3** : Given the variation in demand the forecast fail to capture the demand.

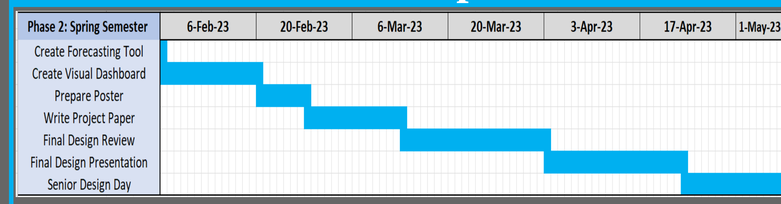
Design Approach



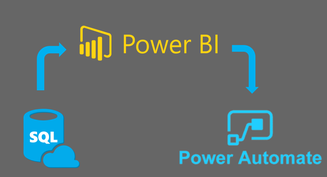
Human Factors

- Forecast tool will eliminate the need for time-consuming calculations while also reducing employee workload.
- Dashboard will include an intuitive user-friendly interface
- This will bring about better customer satisfaction, and supply orders on a timelier basis, helping both TEL and client employees to reduce workload and stress.

Next Steps



- Stream data processing using SQL.
- Improve Forecast performance.
- Develop Power BI Dashboard
- Power Automate



Team Members

Acknowledgements

A Special Thank You to;

- Project Initiator - <u>James Mulhall (TEL)</u>
- Sponsors – <u>Wayne Parent & Ed McMurray (TEL)</u>
- Technical Advisor – <u>Dr. Jin Tongdan (TXST)</u>
- Instructor – <u>Dr. Michelle Londa (TXST)</u>