

Inventory Forecast

Chua Shan Wei Alison

SCTP Data Analytics and Data Visualisation

+65 9159 9393

alisonchua.sw@gmail.com

14 February 2023

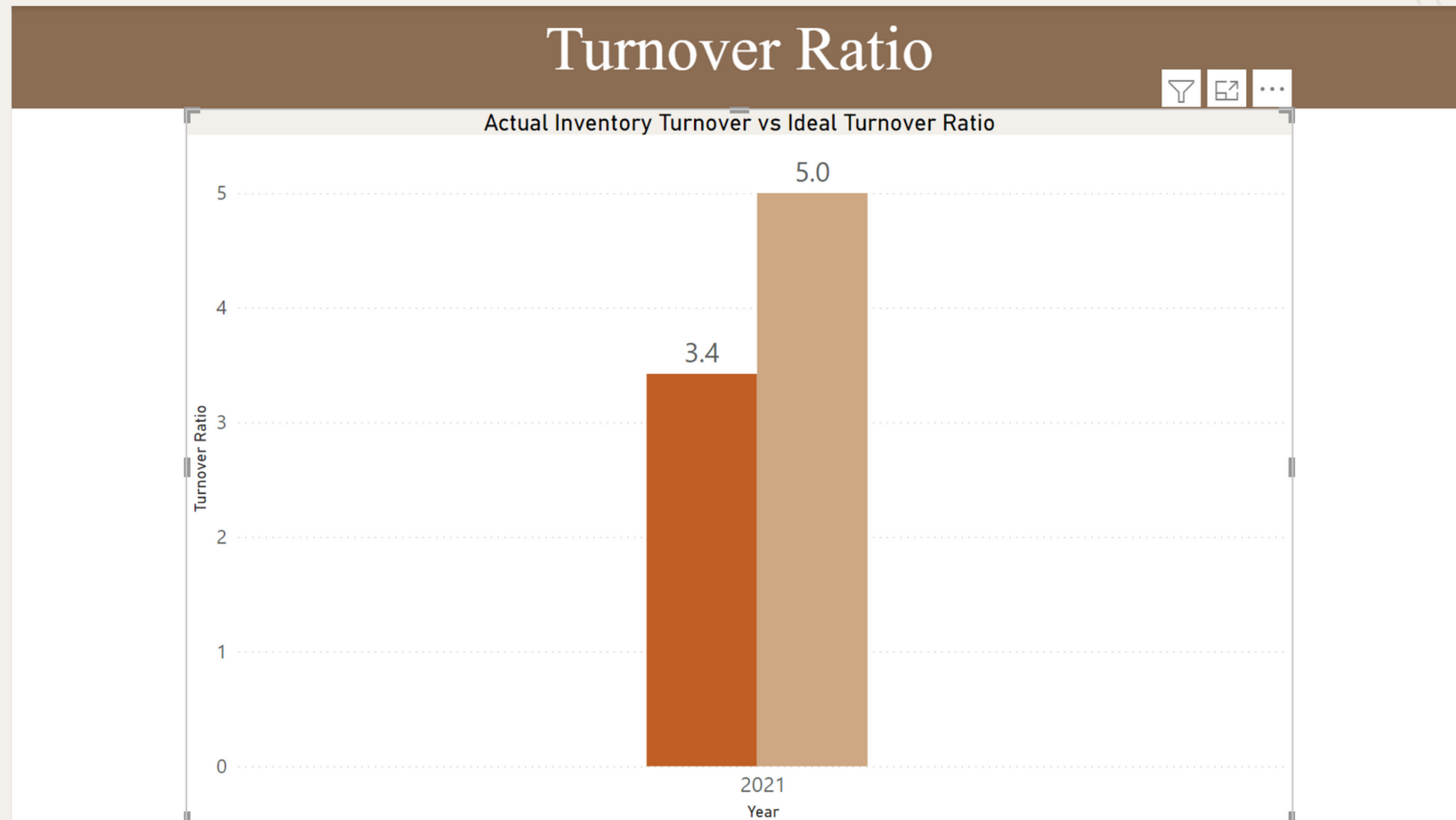
Problem Statement

1. INVENTORY FORECAST IS DONE BASED ON GUT FEEL

overstocking	cash being tied up in holding stocks
impedes growth	business is not able to maximise its cashflow on faster moving stocks, marketing, new product launches
over storage	store not efficiently stocked up, dead stocks taking up expensive real estate
affects reputation negatively	high opportunity cost and increase in customer dissatisfaction when products they want are out of stock

2. TASK CANNOT BE HANDED OVER EASILY


Task cannot be handed over easily- ordering **experience is required**





how many times a product or service was sold and replaced within a given timeframe

Project Objective:

1 **Accurate inventory forecasting:** inventory based on historical sales, trend and leadtime so to **increase sales** and **turnover ratio**

 To **improve cash flow** so that fast moving stocks can be sufficiently procured, new product mix can be explored and marketing dollars can be used to promote products that are instock.

 To better **maximise storage space** with products that have higher turnover (reduce holding cost)

 To increase **customer satisfaction** by having optimal stocks available for purchase

2 To **automate** the current process so that task can be completed based on science, **allowing handover**

Data Required

SKU	MINIMUM COVERAGE
OPENING INVENTORY	MAXIMUM COVERAGE
DEMAND	
SUPPLY	
PERIOD	

Data to obtain from function

CALCULATED COVERAGE IN PERIOD	NUMBER OF MONTHS BEFORE STOCKS RUN OUT, BASED ON UPCOMING DEMAND
PROJECTED INVENTORIES IN QTY	INVENTORY NEEDED TO FULFILL FUTURE ORDERS
SAFETY STOCKS	EXTRA STOCKS THAT PREVENT STOCKOUT
MAXIMUM STOCKS	MAXIMUM STOCKS BEFORE OVERSTOCKING
PI INDEX	OK, ALERT, SHORTAGE, OVERSTOCKS
RATIO PI VS MIN	RATIO [PROJECTED INVENTORIES] VS. [MINIMUM STOCKS TARGET]
RATIO PI VS MAX	RATIO [PROJECTED INVENTORIES] VS. [MAXIMUM STOCKS TARGET]

Data Cleaning Process

RAW DATA TO
PRELIMINARY DATA

EXCEL

PULL OUT THE REQUIRED FIELDS
NEEDED

DATA CLEANING

R

PACKAGE USED:
READR
DPLYR
LUBRIDATE

ENSURE PERIOD IS IN DATE CLASS

CHECK FOR NULL AND REPLACE
WITH 0

EDA

CALCULATE COVERAGE IN PERIODS AND PROJECTED INVENTORIES

R

PACKAGE USED: PLANR
FUNCTION: LIGHT_PROJ_INV

VISUALIZATION: CREATE A REACTABLE TABLE AND HIGH CHART FOR AN OVERALL VIEW OF THE INFO

R

PACKAGE USED:
TIBBLE
REACTABLE
HIGHCHARTER

ANALYSE VALUES OF PROJECTED INVENTORIES AND COVERAGE

R

PACKAGE USED: PLANR
FUNCTION: PROJ_INV

VISUALIZATION: CREATE A REACTABLE TABLE AND HIGH CHART FOR AN OVERALL VIEW OF THE INFO

R

PACKAGE USED:
TIBBLE
REACTABLE
HIGHCHARTER

SKU Analysis



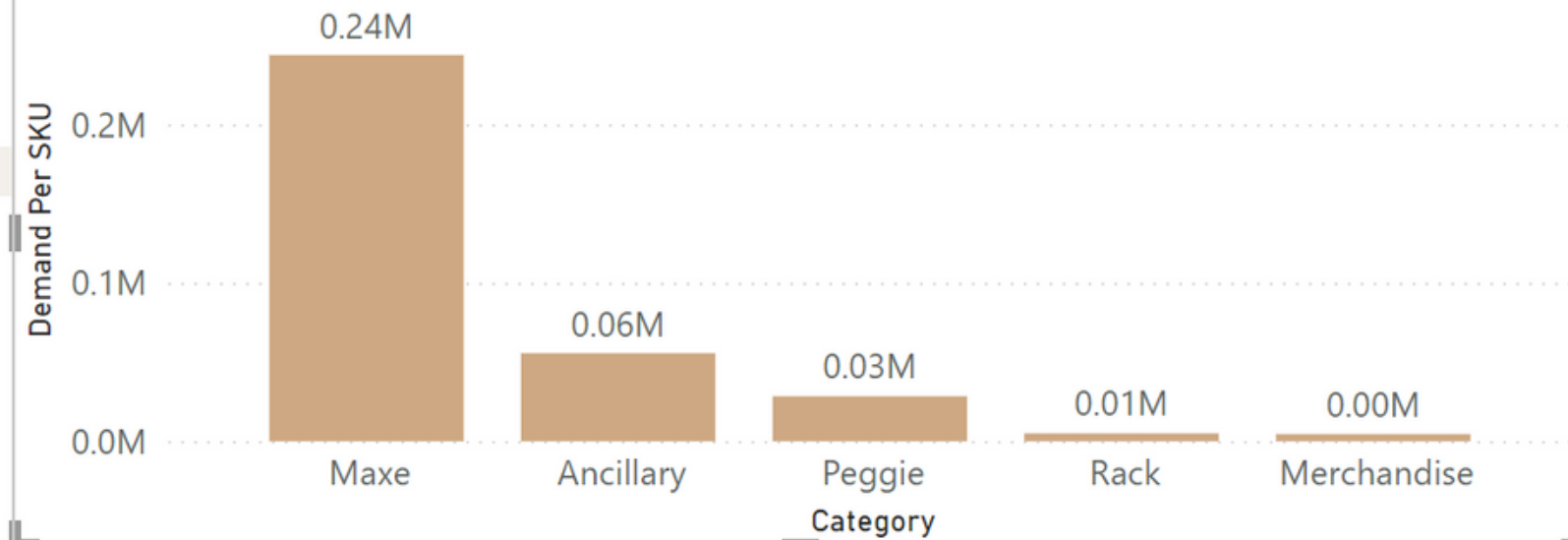
Number of SKU

222

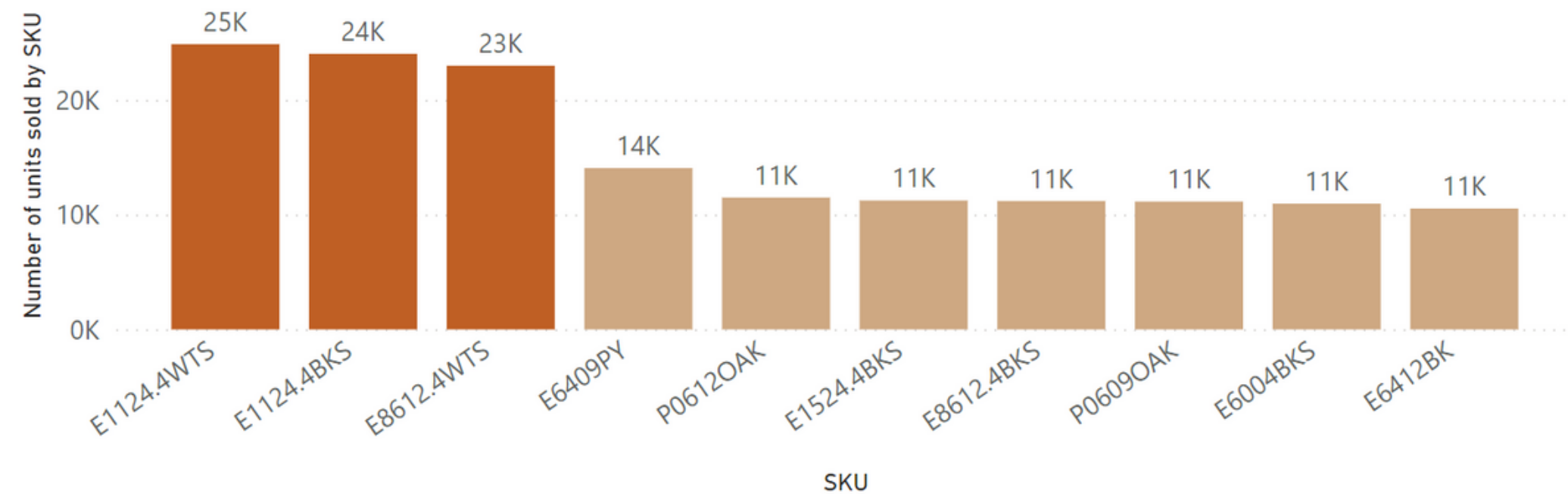
Year

- ☐ Select all
- ☐ 2021
- ☐ 2022

Demand Per SKU by Category



Number of units sold by SKU 2021-2022



Power
BI

R Studio- Apply planr function to E1124.4WTS

The screenshot displays the R Studio interface with the following components:

- Source Editor:** Contains R code for reading a CSV file and exploring data. The code includes comments and function calls like `read_csv`, `head`, `summary`, and `view`.
- Environment Panel:** Lists objects in the Global Environment, including `Calculated_Inv`, `calculated_pr...`, `calculated_pr...`, `Overview_DB`, `p`, `planr`, `projinv`, `RT`, `RT_light`, `RT_lightchart`, and `Sparkline_Dem...`.
- Files Panel:** Shows a directory structure with files like `.RData`, `.Rhistory`, `calculated_proj_analysis.csv`, `calculated_projection_light.csv`, `Inventory Forecast Report 2021 to ...`, `Project Presentation.pdf`, `Projinv.html`, `Projinv.Rmd`, and `Projinv.Rproj`.
- Visual Panel:** Displays a preview of the data frame `tbl_df` with 6 rows and 7 columns. The columns are `DFU`, `Period`, `Demand`, `Opening.Inventories`, and `Supply`.
- R Console:** Shows the output of the code execution, including the column specification for the data frame.

```
37  
38 # Read file into R  
39 {r Read CSV}  
40 planr <- read_csv("C:\\Users\\alisonc\\Documents\\PERSONAL\\SCTP_DataAnalysis\\SCTP Programme\\Final  
41 Project\\ToApplyProjinv_R.csv")  
  
Rows: 3833 Columns: 7  
Column specification  
Delimiter: ","  
chr (1): DFU  
dbl (5): Demand, Opening.Inventories, Supply, Min.Cov, Max.Cov  
date (1): Period  
  
i Use `spec()` to retrieve the full column specification for this data.  
i Specify the column types or set `show_col_types = FALSE` to quiet this message.  
  
42  
43 # Explore data  
44 Make sure that the Period is in date class.  
45 {r Look through data}  
46 head(planr)  
47 summary(planr)  
48 view(planr)  
49
```

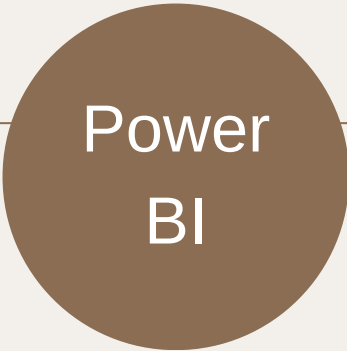
DFU	Period	Demand	Opening.Inventories	Supply
Min.Cov	Min.	Min.	Min.	Min.
Length:3833	:2021-01-01	:-12.000	: 0.000	: 0.000

R Studio

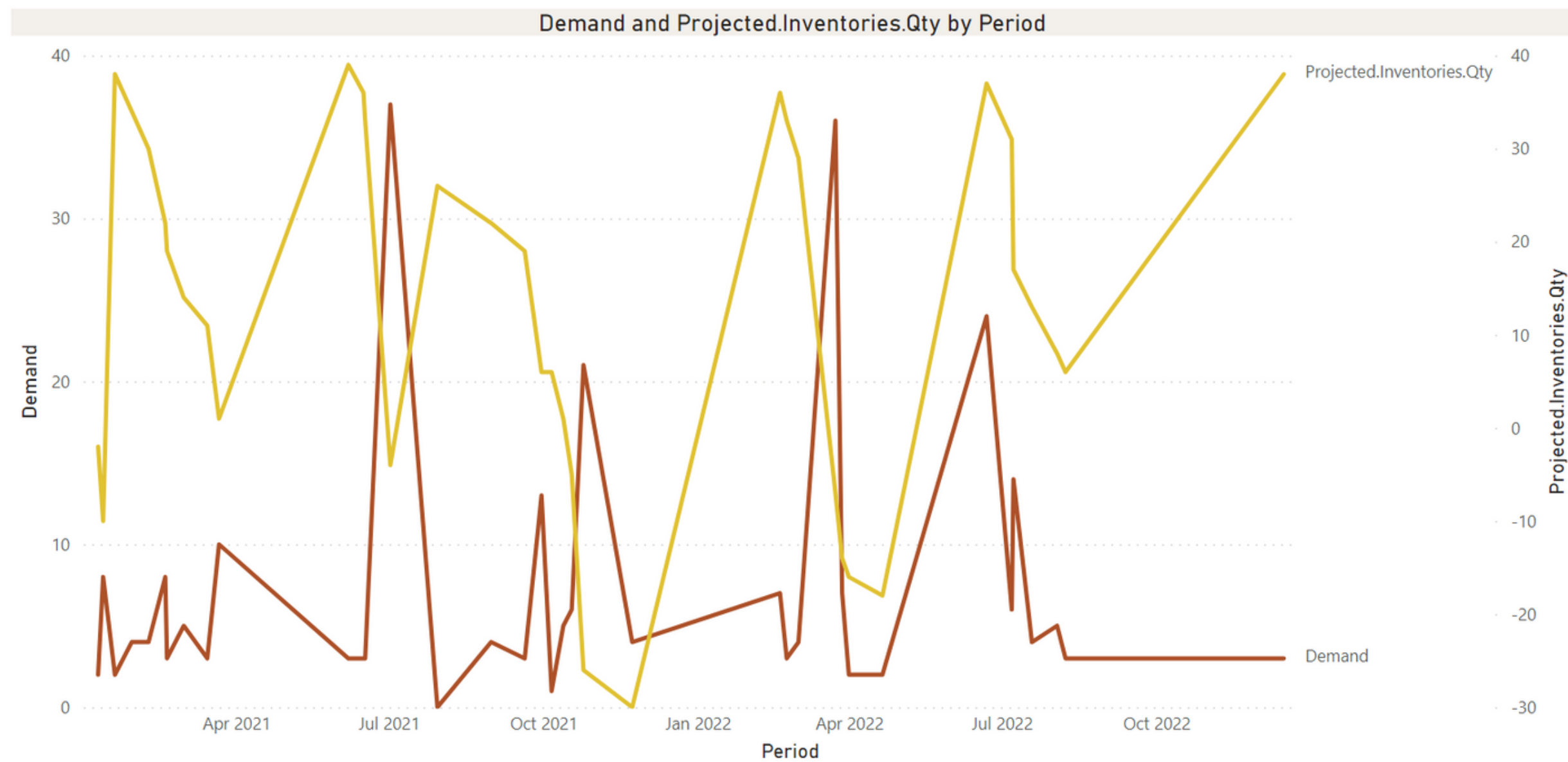
Data Visualisation in Power BI

EXPORT DATA FROM R R FUNCTION: WRITE.CSV

IMPORT CSV INTO POWER BI POWER BI



Projected vs Demand



Conclusion

From the analysis, I can see that the **projected inventory** VS **actual demand fits in certain periods** using the **function planr** in R Studio. With more data and further analysis of the function, we can potentially increase the accuracy of stock order and to increase the turnover ratio.

The function allows the tabulation of safety stocks, maximum stocks, reorder quantities and generates the indexes when the SKU is in the "Alert", "Shortage", "Overstocked" statuses with just a line of code. This **saves us time** and **increases accuracy**. And from there we can make adjustment to the numbers based on gut feel towards the end. This process can then be **handed over to another person** easier and they can get better at it over time.

Q & A

Epilogue

In this project, I wanted to focus on improving inventory forecasting, which is a real problem I encounter on a daily basis. Through research, I was able to apply functions like the planr package, lubridate, reactable and high charts into the project, which are not taught in the programme.

This process has encouraged me to be a self-learner and push myself to experiment different softwares and functions required to reach my end goal.