Business Analytics Practicum (MGT 4803)

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Project goals

- **Machine health assessment:**
  - How should we approach the evaluation and reporting of **Sparck machines' operational health** on **an individual and collective basis** ?

Project goals (cont'd)

- **Q1: Critical performance indicators:**
  - Which **Key Performance Indicators (KPIs)** and metrics are essential for assessing the performance of our machinery?"

KPIs

- **In Dropbox**, navigate to `Sparck Project Files Spring 2024` > `Sparck Project Files Spring 2024-GT` to find the `IBOC Team4 follow up 16022024` document.

Follow up Sparck to Team 4 from meeting Feb 16th 2024

Most important KPIs and their location in the data sets

KPI name	Data set	Identifier
ARL Machine	RDA Trending	ARL_Machine
ARL Operator	RDA Trending	ARL_Operator
ARL All	RDA Trending	ARL_All
Orders retracted	RDA Trending	OrdersRetracted
Orders	RDA trending	Orders
Timekeeping producing	RDA trending	TkProducing
Timekeeping starting	RDA trending	TkStarting
Timekeeping stopping	RDA trending	TkStopping
Timekeeping asleep during production	RDA trending	TkAsleepDuringProduction
Timekeeping idle	RDA trending	TkIdle
Timekeeping operator error	RDA Trending	TkInOperatorError
Timekeeping machine error	RDA Trending	TkInMachineError

(items in grey are not important, yet used in calculations below)

Calculated metrics

Retraction rate (%) = OrdersRetracted / Orders * 100

Commonly accepted value for this calculated metric: <5%

What does the folder structure look like?

```
Sparck Project Files Spring 2024
|
├─ 2-21-24 (Folder)
├─ CSVdaily (Folder)
├─ RDATrending (Folder)
├─ ReportSpecifications (Folder)
├─ Servicedata (Folder)
├─ folder_structure.txt (Text Document)
├─ GA Tech - Let's talk about automated packaging (PowerPoint Presentati
├─ readmecsvdaily (Text Document)
└─ readmemain (Text Document)
```

Project goals (cont'd)

- **Q2: Health assessment benchmarks:**
  - What benchmark thresholds (Red /Yellow/Green)should Sparck establish to evaluate machine health effectively?"
- **Q3: Determining machine performance:**
  - How do we define and distinguish between high-performing and low-performing machines?

The Importance of knowing our numbers

- **Q4: How many machines** have we deployed globally?
- **Q5: Which countries are our biggest markets**, and how many machines are in each?
- **Q6: How do our product lines vary in distribution across these markets?**

- Note: **In Dropbox**, navigate to `Sparck Project Files Spring 2024` > `Sparck Project Files Spring 2024-GT` to find the `Active Customer Assets Systems Total 19_2_2024 15-08-04` document.

Q4: How many machines have we deployed globally?

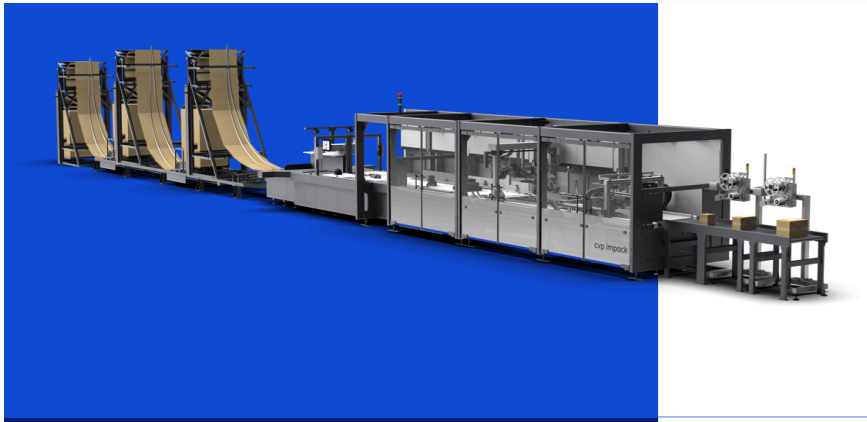
Global machine distribution overview

- **United States**: Strong market presence with **6** machines
- **United Kingdom & Germany**: Solid footholds with **4** and **3** machines respectively
- Emerging Markets: **Netherlands (2)**, Slovakia, Sweden, Poland, France, Canada (**1 each**)

Q5: How do the product line insights break down in terms of market presence for our machine models—**CVP Everest, CVP Impack, and CVP 500**?

Product line insights

- **CVP Everest**: Flagship product with broad acceptance (**10 machines**)
- **CVP Impack**: Significant market traction (**8 machines**)
- **CVP 500**: Emerging product with growth potential (**2 machines**)



CVP Impack

Automated Packaging Power

Max machine rate	500 / hour
Box closure	Tape

CVP Everest

Reliable, Regardless the Peak

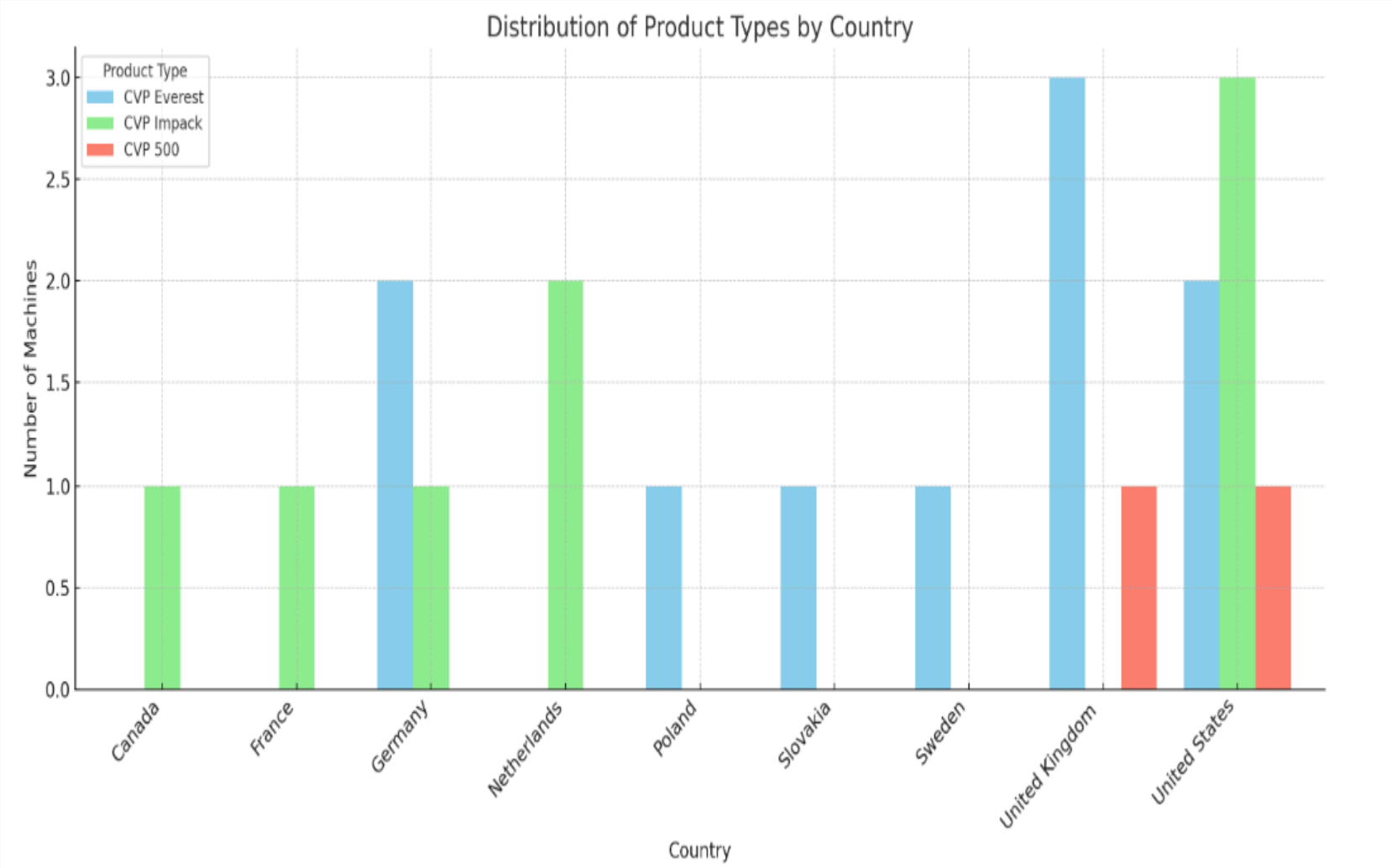
Max machine rate	1,100 / hour
Box closure	Hotmelt

Q6: Which countries are our biggest markets,
and how many machines are in each?

Product distribution: CVP Everest, Impack, and 500 across countries

- Here's the **distribution of the three product types (CVP Everest, CVP Impack, and CVP 500) across the countries**:
  - **United States:**
    - CVP Impack: 3
    - CVP Everest: 2
    - CVP 500: 1
  - **United Kingdom:**
    - CVP Everest: 3
    - CVP 500: 1
    - CVP Impack: 0
- and more...

Product types distribution by country



R Demonstration

- **Load Required Libraries:**
  - Use `library(readxl)` to read Excel files.
  - Use `library(dplyr)` for data manipulation.
  - Use `library(tidyr)` to pivot data.
  - Use `library(ggplot2)` for data visualization.
- **Read the Excel File:**
  - `df ← read_excel("path_to_your_file.xlsx")`

R Demonstration (cont'd)

- **Group the data** by country and product
- **Pivot the data** to widen it, making each product type a separate column
- **Convert the data back** to a long format suitable for ggplot2.
- **Create a bar plot** showing the distribution of product types by country.

R Demonstration(cont'd)

- **Navigate to Course Page > Modules > Week 10 >** `3-12-24.R`

Discussion

- **Machine health assessment:**
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Discussion (cont'd)

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