Where's the science?

Dovile Kliusovaite & Roel van Bommel

McCoy & Partners

Agenda

- Introduction
- AI - What's in a name
  - Facts
  - The Science in science
- To put it in a business process
  - Demand planning process
  - Tooling SAP IBP; where is the science?
  - The right tool for the right science
- Science is everywhere
- Conclusions

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Who are we?

NAW's

Dovile Kliusovaite
31 Years
Lithuanian made

Science Expertise

Neural Networks,
Computer Vision,
Explainability &
Transparency in Deep Neural
Networks

Tech Expertise

Python, SAP HANA Cloud, Azure Data Factory, Azure Synapse Analytics, Databricks

Certifications

AI-900: Azure AI Fundamentals
DP-203: Azure Data Engineering Associate

NAW's

Roel van Bommel
48 years
Herten

Science Expertise

Descriptive
& Predictive analysis,.

Tech Expertise

SAP BW, SAP HANA, PAL, HAP, SAC, IBP, CI-DS

Certifications

BW, HANA, SAC

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Where is the AI?

Bijzonder

Code van Coppens brengt weerman Piet Paulusma weer tot leven met AI

27 mei 2024 14:50 | actualiteiten | Door Tessa Kok

AI

Het was AI die ervoor zorgde dat Piet Paulusma weer even tot leven kwam in de aflevering. Zijn stem werd gekoppeld aan ChatGPT, zodat er realistische antwoorden gegeven konden worden.

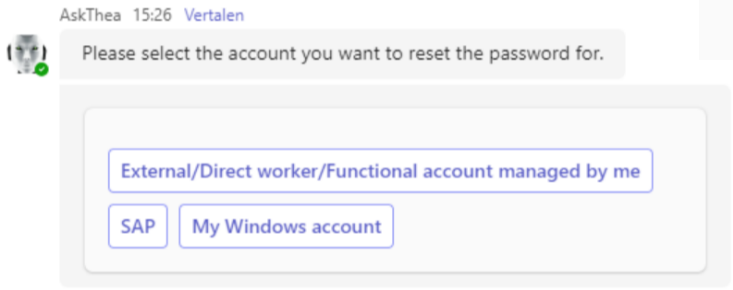
Is Cosine-Similarity of Embeddings Really About Similarity?

Machine Learning

Publication

May 1, 2024 • Harald Steck, Senior Research Scientist; Chaitanya Ekanadham, ML Researcher, Content & Media ML Foundations; Nathan Kallus, Research Advisor at Netflix and Assistant Professor, Cornell University

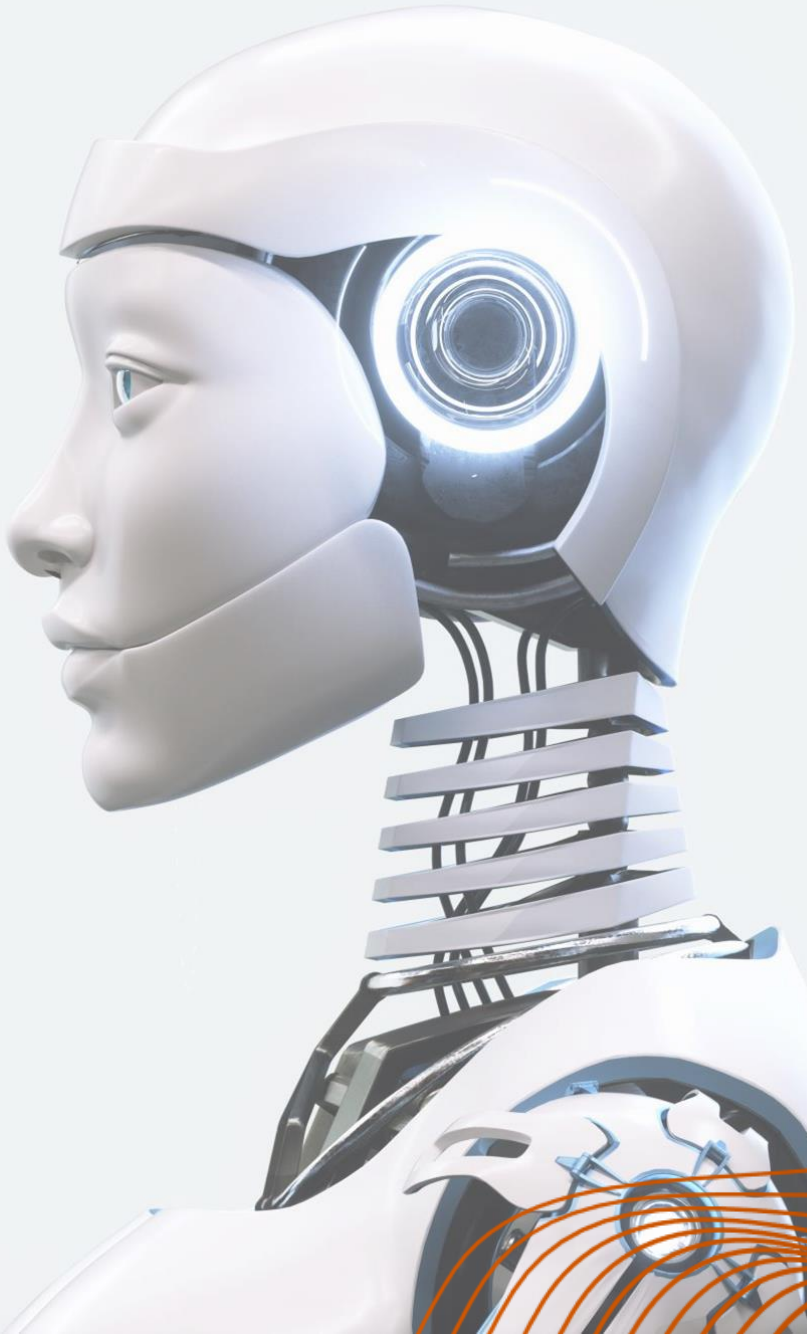
Cosine-similarity is the cosine of the angle between two vectors, or equivalently the dot product between their normalizations. A popular application is to quantify semantic similarity between high-dimensional objects by applying cosine-similarity to a learned...



▲ Een niet-bestaande locatie op Santorini. © Facebook

Iedereen wil naar dit waanzinnige Griekse zwembadpaleis, maar het is fake: 'Begin van groot probleem'

MISLEIDING **Vakantiegangers die hunkeren naar een unieke vakantiebestemming trappen massaal in foto's die met kunstmatige intelligentie zijn gemaakt. Op sociale media zijn pagina's actief die doelbewust valse foto's verspreiden van Griekse locaties die met kunstmatige intelligentie zijn gemaakt. Sunweb Group biedt reizen aan naar de locaties en distantieert zich expliciet van de misleidende foto's.**



Artificial intelligence (AI) refers to computer systems capable of performing complex tasks that historically only a human could do, such as reasoning, making decisions, or solving problems.

Data Science (DS) is an interdisciplinary field that uses scientific methods, processes, algorithms, and systems to extract knowledge and insights from structured and unstructured data.

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Industry Facts

- Businesses that use big data increase their profit by **8%**.
- **35%** of global companies use AI.
- **62%** of retailers are creating a competitive advantage.
- **Half** of businesses plan on incorporating Data Science.
- China has the highest AI adoption around **58%.**
- AI market expected to reach **$1.85** trillion by 2030.
- Insight-driven businesses are growing at an average of **30%** each year.

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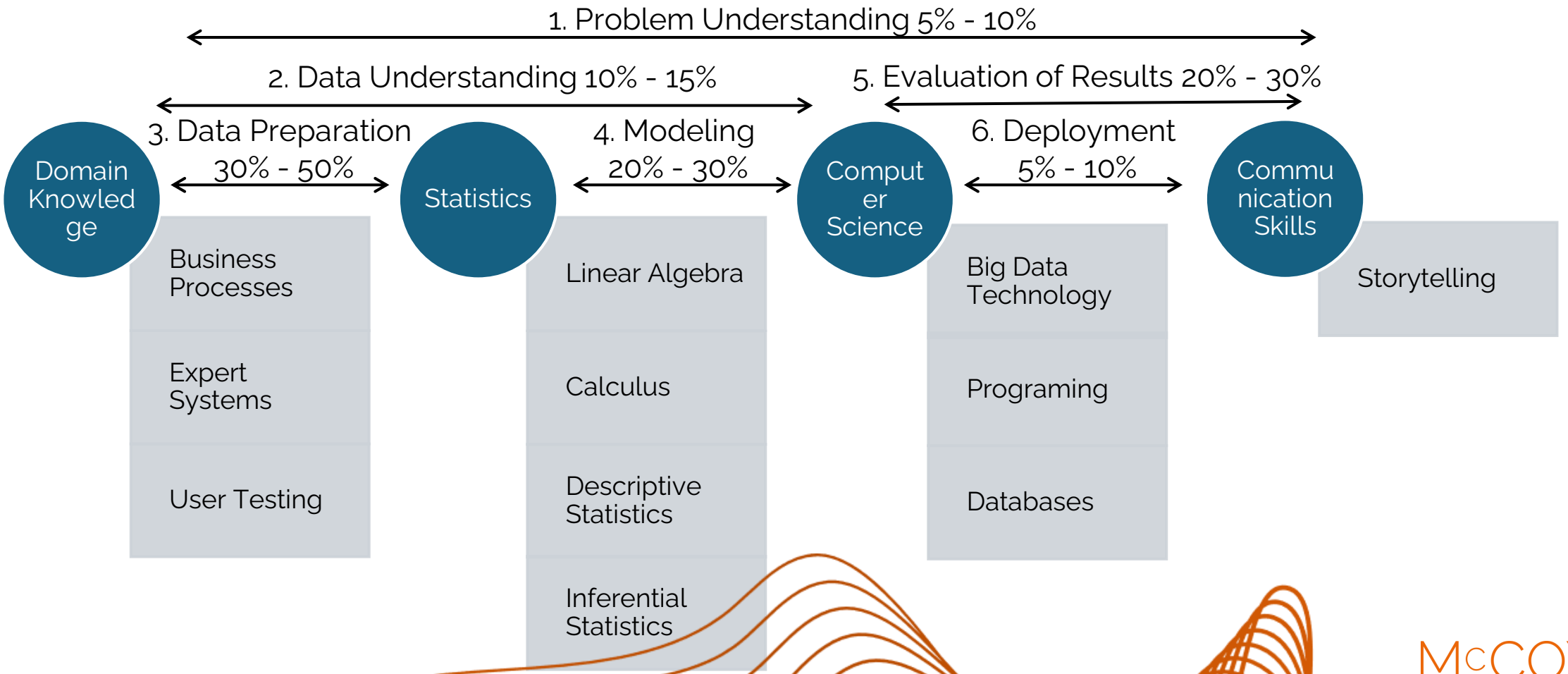
The Science in Science



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IBP for demand – demand planning

Description

During demand planning, you use statistical forecasting methods to gain full demand transparency for mid- and long-term forecasts, resulting in an adopted global demand plan at the end of each week. As the demand planning process expert, the local demand planner, or the global demand planner, you collaborate in a globally distributed demand planning team and align on your decisions using SAP Build Work Zone. You can combine automated, exception-based planning processes as well as manual planning capabilities and execute role-based local and global demand planning.

Scope

Use Case
- Mid- or long-term demand planning
- Advanced statistical forecasting
- Role-based local and central planning

Benefits
- Improved forecast accuracy with automatic forecast models based on historical data
- Increased efficiency through automated exception-based planning, embedded analytics, and collaboration capabilities

Frequency
- Weekly
- New global demand plan at the end of every week

Participants
- Local demand planner, global demand planner, demand planning process expert

Technical details

Input
- Order-based or time-series-based sales history
- Approved consensus demand plan from the last S&OP cycle
- Additional input: sales forecast, final sensed demand*

Output
- Global demand plan
- Combined final demand = global demand plan + last final sensed demand*

Planning Level
- Weeks / Product / Location / Customer

Planning Operator
- Statistical forecasting based on forecast models that support a broad range of forecasting algorithms and any combinations thereof

User interaction

Fiori Apps
- Data Integration Jobs
- Dashboards - Advanced
- Monitor Custom Alerts
- Planner Workspaces
- Manage Planning Notes

Planning Views
- Historical Data Cleanse, 1 worksheet
- Statistical Forecast, 1 worksheet
- Local Demand Plan, 1 worksheet
- Global Demand Plan, 2 worksheets
- 2 Web-based planning views

Alerts
- 2 predefined custom alerts: Global Demand Planner, Statistical Fcst Error Measures

Analytics
- 1 predefined 'Demand Planning' dashboard with 4 charts + 2 alert overviews

Collaboration
- No predefined process management or SAP Build Work Zone integration

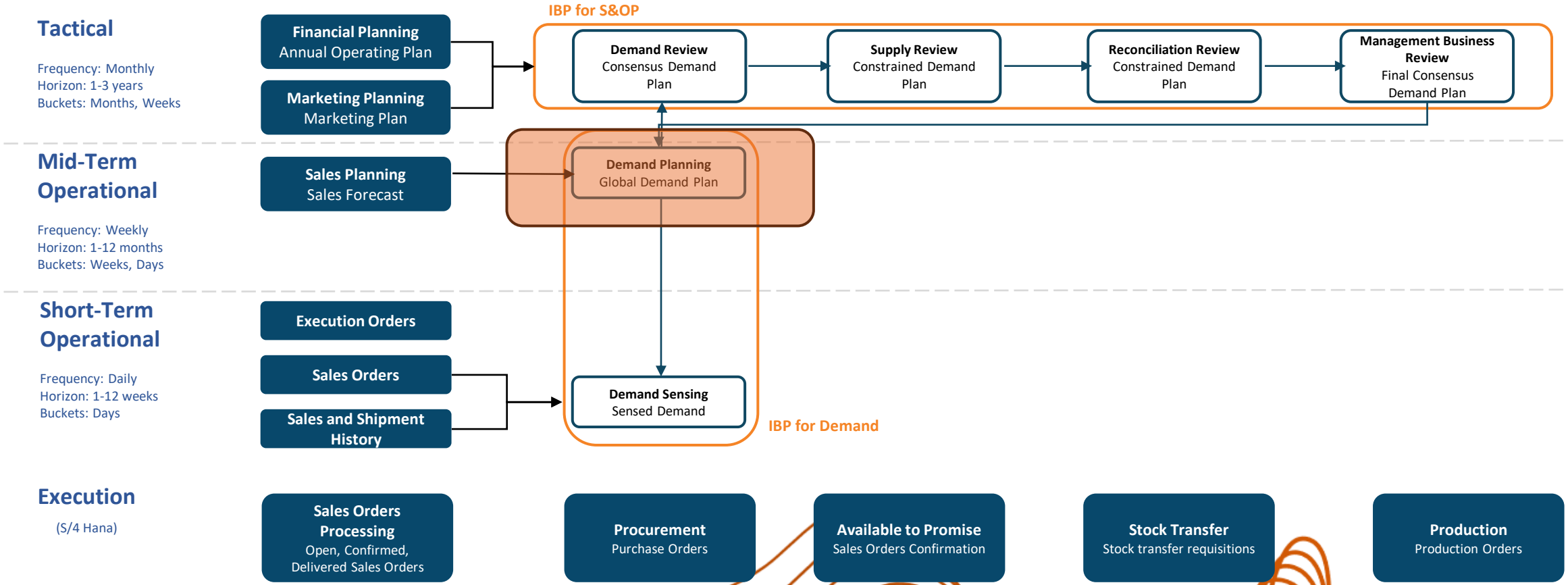
*only if the *IBP for demand – demand sensing* scope item is implemented

Unified Planning Process Flow

SAP IBP Process

Optional/External Process

Unified Planning Process Flow



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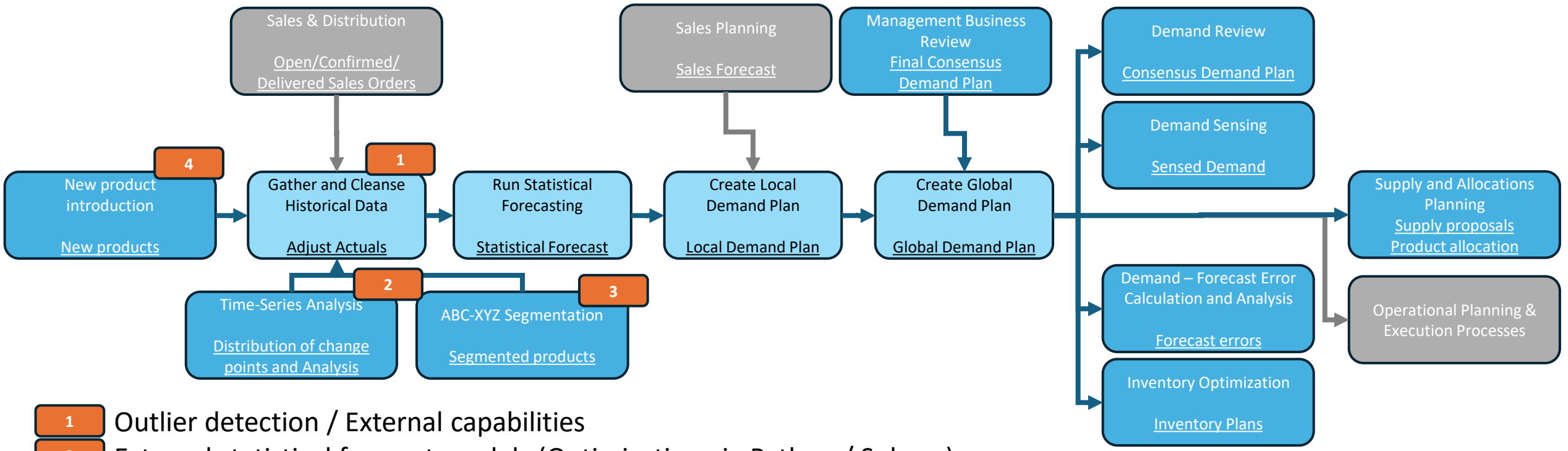
Demand Planning – Process flow



1 Outlier detection / External capabilities
2 External statistical forecast models (Optimization via Python / Solvers)
3 Segmentation
4 New product intro

Demand Planning | SAP IBP Process
External Process | McCoy IP

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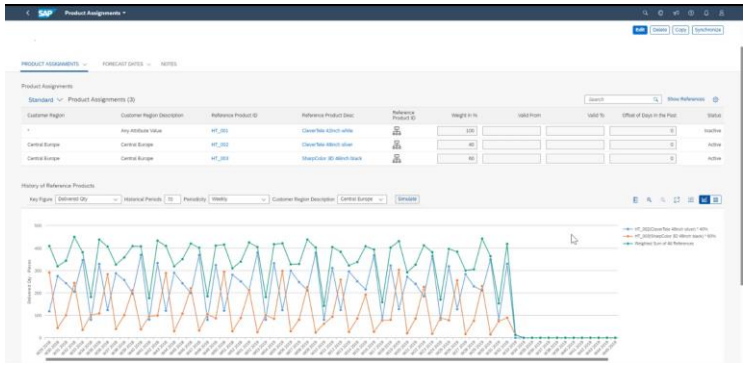
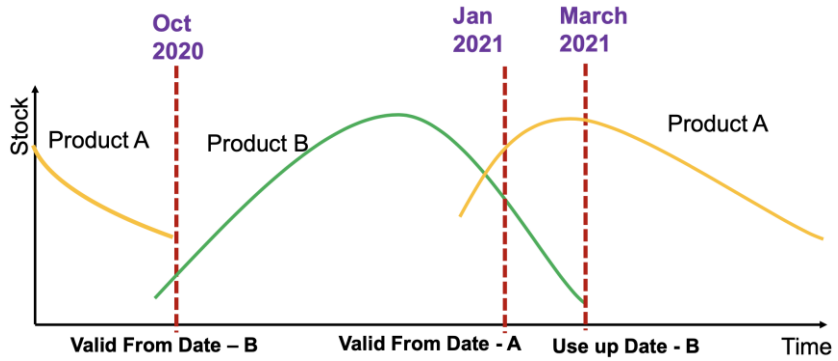
Product Life-Cycle Management

Demand Planning



- New Product Introduction
- Use of phase in / phase out
- Promotion planning
- Data realignment

Supply Planning



- Stock use-up scenario's
  - Discontinuation without or without use-up
    - Hard stop
    - Soft Stop
    - Full interchangeability
  - Promotion (temporary switch)

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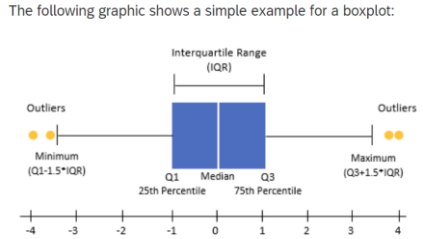
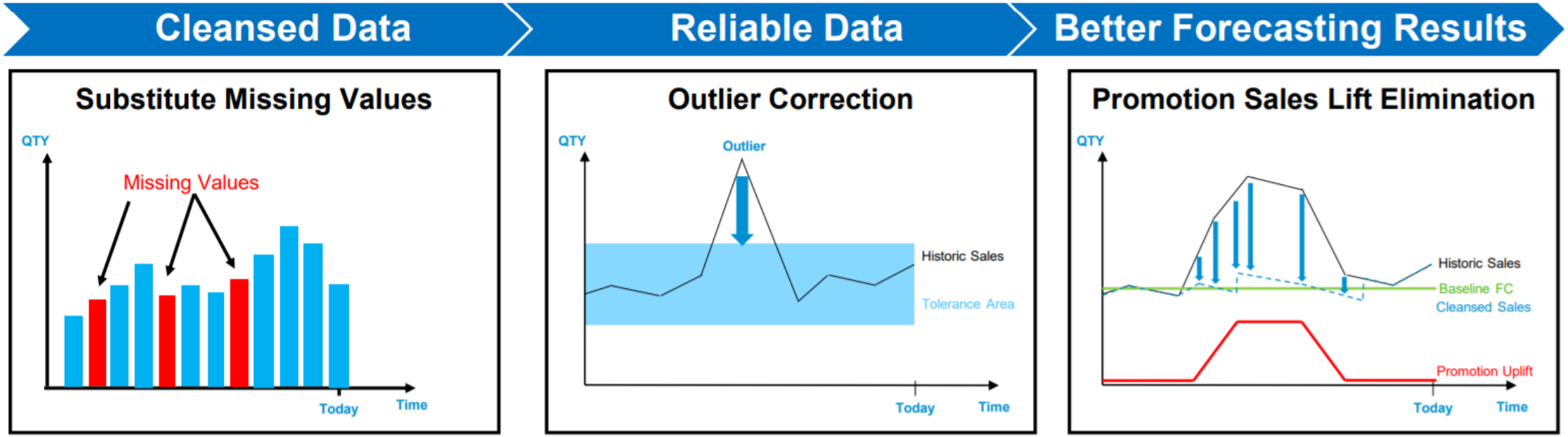
Automated historical data cleansing

- **Automated Data Cleansing**: Definition of pre-processing algorithms that automatically cleanse the data before the actual forecasting run (for example, it can automatically correct the outliers)
  - Outliers are detected with Gradient Boosting





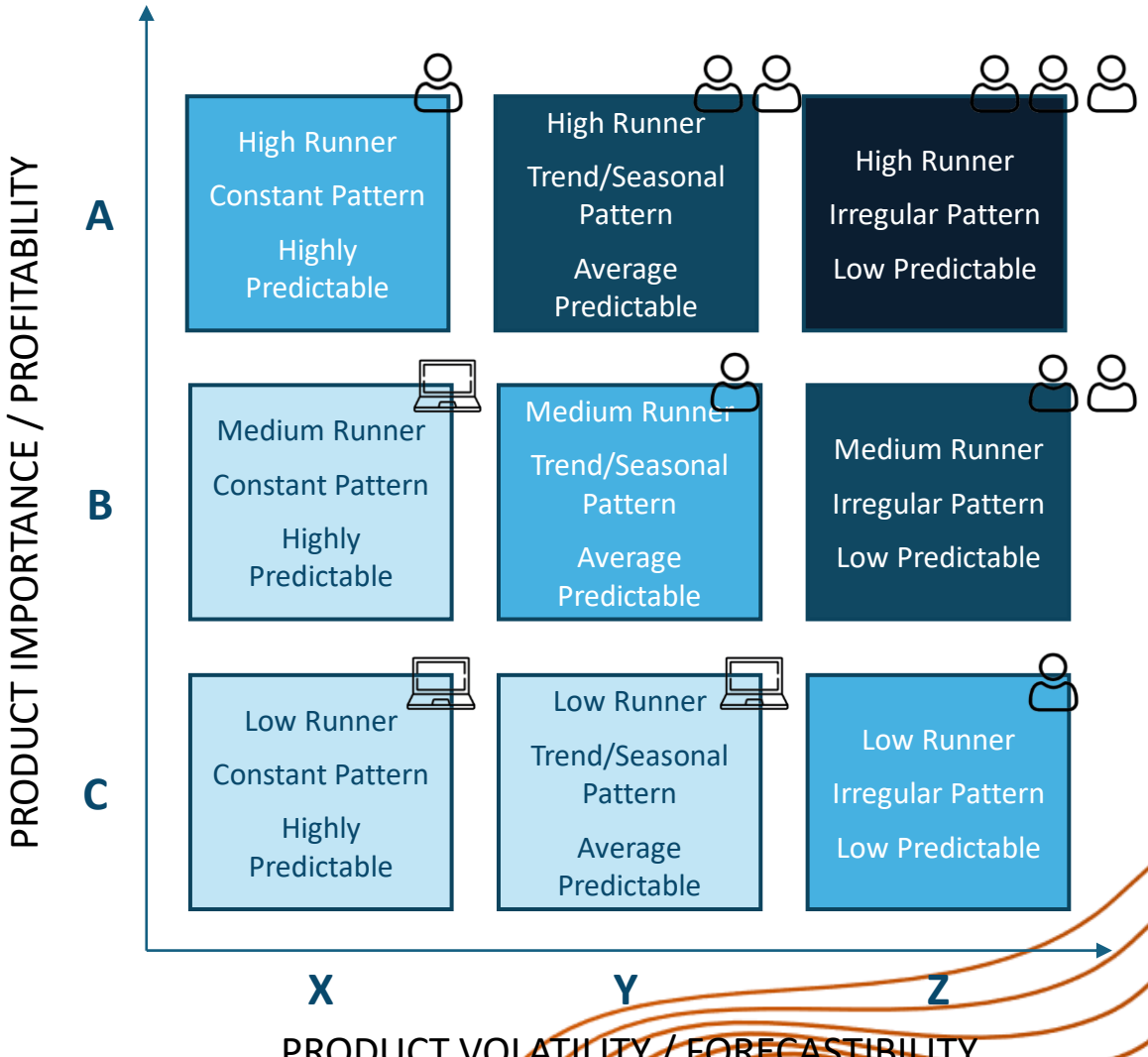
Available statistical Forecasting algorithms in IBP

- As a demand planner, you run a forecast every week or month for multiple products or product groups in the background with mass processing and then review and adjust the figures interactively using the IBP Excel Add-In.
- For Example, Forecast Model 'Best Fit' compares the different algorithms and applies the algorithm with the highest accuracy.

Best Forecast using Test Phase	Information	MAPE for Automated Exponencial Smoothing on test phase: 22.003%.
Best Forecast using Test Phase	Information	MAPE for Auto-ARIMA on test phase: 19.775%.
Best Forecast using Test Phase	Information	MAPE for Croston 1 on test phase: 30.791%.
Best Forecast using Test Phase	Information	MAPE for Croston 2 on test phase: 30.791%.
Best Forecast using Test Phase	Information	MAPE for Gradient Boosting on test phase: 26.745%.
Best Forecast using Test Phase	Information	Lowest MAPE value on test phase was 19.775%.
Best Forecast using Test Phase	Information	Auto-ARIMA was selected.
Best Forecast using Test Phase	Information	Auto-ARIMA was selected 1 times.

Algorithm	Time Scope
Simple Moving Average	Mid-term and long-term
Single Exponential Smoothing	Mid-term and long-term
Double Exponential Smoothing	Mid-term and long-term
Triple Exponential Smoothing	Mid-term and long-term
Simple Average	Mid-term and long-term
Weighted Average	Mid-term and long-term
Adaptive response rate single exponential smoothing	Mid-term and long-term
Automated Exponential Smoothing	Mid-term and long-term
Croston Method	Mid-term and long-term
Multiple Linear Regression	Mid-term and long-term
Auto ARIMA/SARIMA	Mid-term and long-term
Auto ARIMAX/SARIMAX	Mid-term and long-term
Brown Exponential Smoothing	Mid-term and long-term
Gradient Boosting of Decision Trees	Mid-term and long-term
Demand sensing	Short-term

ABC/XYZ Segmentation



- Segment your portfolio by using automated models to define ABC/ XYZ classification
- Highly customizable
- Run segmentation jobs regularly (monthly, quarterly…)
- Define planning strategies based on segmentation results

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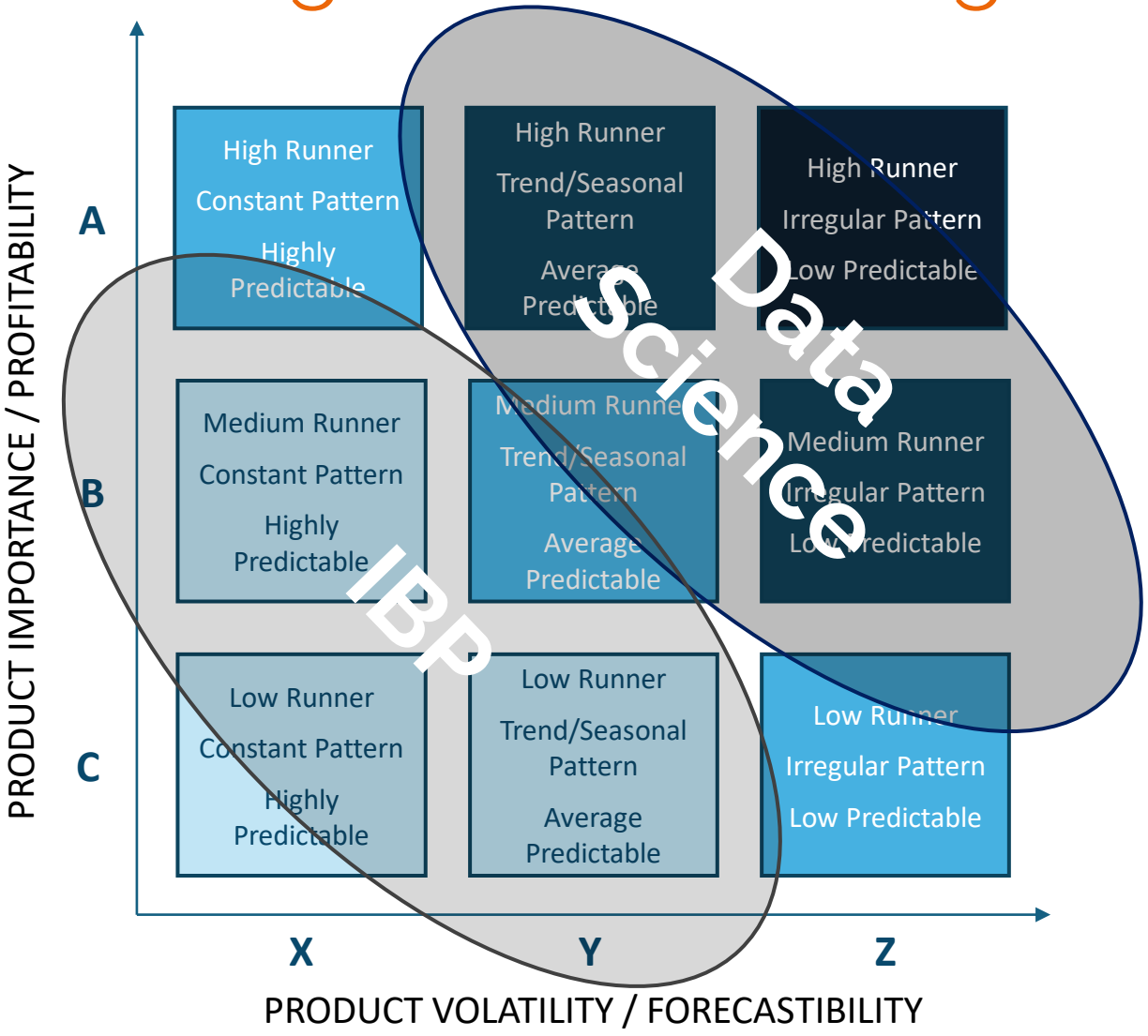
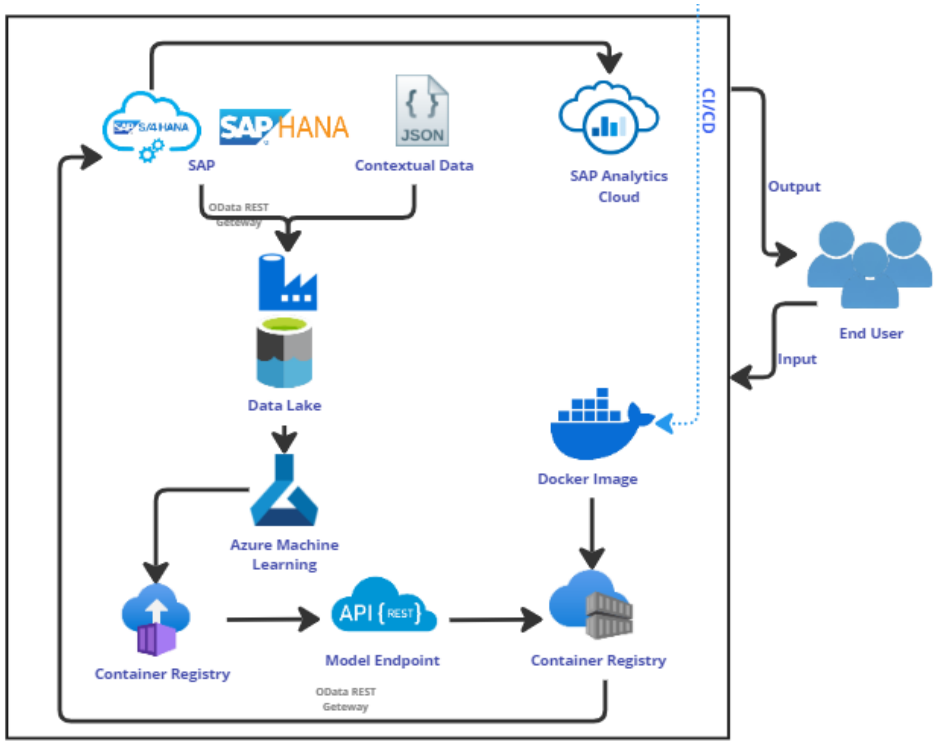
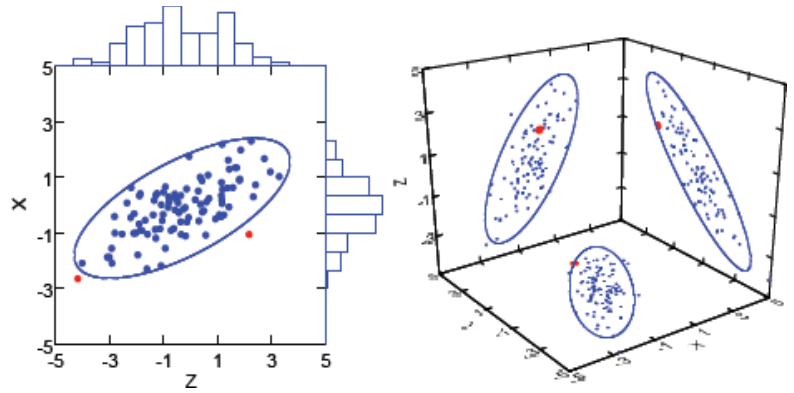
The right tool for the right science







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SALES & MARKETING

- Churn Reduction
- Customer Acquisition
- Lead Scoring
- Product Recommendation
- Campaign Optimization
- Customer Segmentation
- Next Best Offer/Action

OPERATIONS

- Predictive Maintenance
- Load Forecasting
- Inventory/Demand Optimization
- Product Recommendation
- Price Optimization
- Manufacturing Process Opt
- Quality Management
- Yield Management




FRAUD AND RISK

- Fraud and Abuse Detection
- Claim Analysis
- Collection and Delinquency
- Credit Scoring
- Operational Risk Modeling
- Crime Threat
- Revenue and Loss Analysis

FINANCE AND HR

- Cash Flow and Forecasting
- Budgeting Simulation
- Profitability and Margin Analysis
- Financial Risk Modeling
- Employee Retention Modeling
- Succession Planning

OTHER SECTORS

- Life Sciences
- Health Care
- Media
- High Education
- Public Sector / Social Sciences
- Construction and Mining
- Travel and Hospitality
- Big Data and IoT

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Conclusions

- Statistics
  - We tend to jump to conclusions
  - We have incorrect intuitive feelings about probability
- The nice part of statistics is that it's the same formula in every tool!
- Science is as good as its interpretation.
- A Business Problem is needed to apply science upon.

$$Data(Analytics + Analysis)^{Adoption} = Business\ Growth$$

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Questions?

$$
\begin{aligned}
a + b + c &= 4 \\
a^2 + b^2 + c^2 &= 10 \\
a^3 + b^3 + c^3 &= 22 \\
a^4 + b^4 + c^4 &= ?
\end{aligned}
$$

Your Business Science case?

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Thank you for your attention!

The next session starts at 4pm

Session	Room
SAP & GenAI - SAP	1 = Paterskerk
Ervaringen SAP Public Cloud - Basic-Fit	2 = August
SAP Datasphere - Lumileds	3 = Louis
Signavio en toekomst S/4 - Nikon	4 = Walter
Integratie nieuwe stijl - McCoy	5 = Jos
Hyperautomatisering & SAP - Google	6 = Kapel

But first.. a short break at the bar!