

LauzHack 2024
November 30th, 2024

Bristol Myers Squibb's Challenge Details



Benoit Bacle
Central forecasting &
Capabilities Lead



Not for product promotional use



At Bristol Myers Squibb,
our mission is to

discover, develop and
deliver innovative medicines
that **help patients prevail**
over serious diseases



**We are driven by a
single vision**

Transforming patients' lives
through science ®



BMS is one of the top 7 Pharma companies* in the world

Rank	Company	Headquarters	2023 Revenues (\$USD)
1	Johnson & Johnson	United States	\$53.5B
2	Abbvie	United States	\$52.7B
3	Novartis	Switzerland	\$52.5B
4	Merck & Co.	United States	\$50.8B
5	Roche Pharmaceuticals (division of Roche Group)	Switzerland	\$49.1B
6	Pfizer	United States	\$48.2B
7	Bristol Myers Squibb	United States	\$44.4B
8	AstraZeneca	United Kingdom	\$43.8B
9	Sanofi	France	\$40.8B
10	GSK	United Kingdom	\$36.7B

*2024 Pharm Exec Top 50 Companies

Focus on...Forecasting



Why is good forecasting critical?

- ✓ To guarantee appropriate **product supply**
- ✓ To set **financial targets**
- ✓ To allocate **resources and investments**
- ✓ To assess **potential of new assets**
- ✓ To make the **right business decisions** at the right time!

How we do Forecasting in Pharma

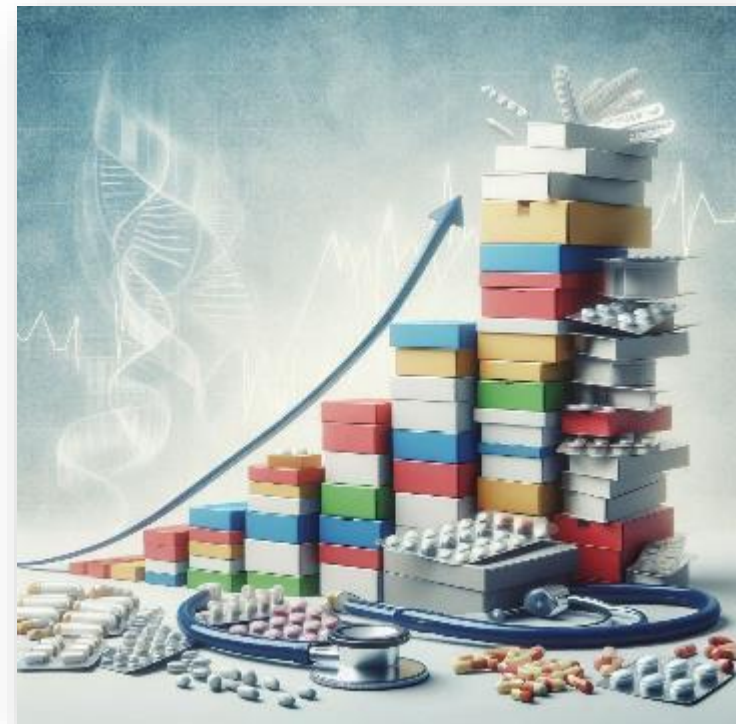
Based on epidemiology

Patient-based modeling



Based on historical data

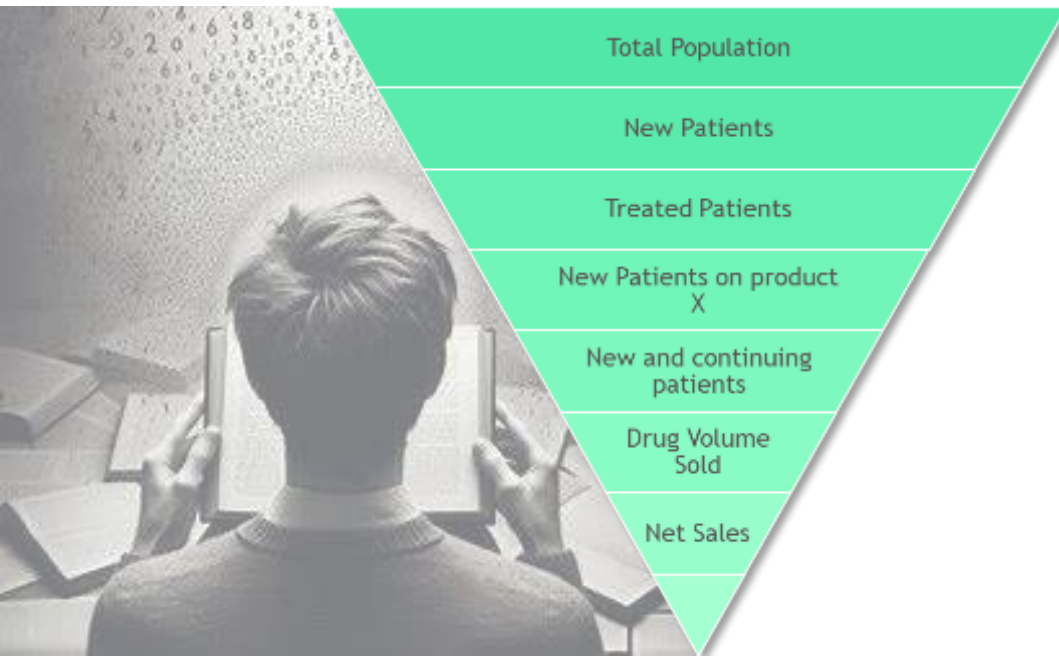
Time series forecasting



Challenge with Time Series Forecasting

Explain the trend and relationships to operational variables to convince stakeholders and transition from Patient flow modeling to Time Series Forecasting

Patient flow: STORY



VS

Trending: MATHS

Peak sales 2025
\$ 3 650 459



Project Overview

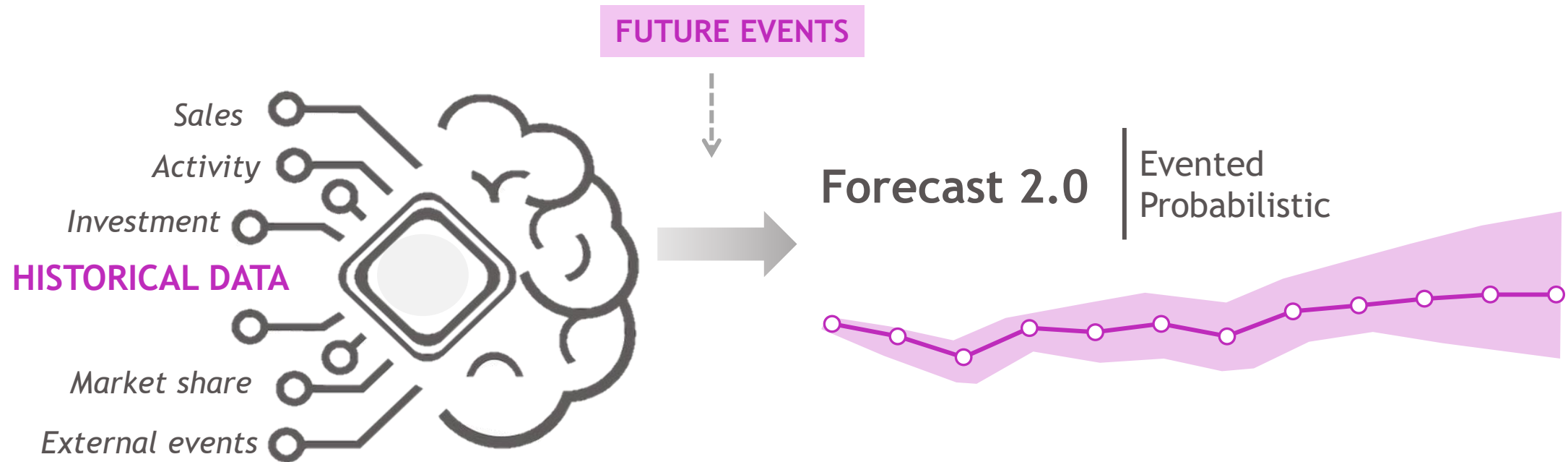
The ask

Develop an advanced time series forecast model with the following features:

- Ability to forecast sales based on multiple historical variables and to understand the relationships between those parameters
- Capable of modeling future events impact on trendline

Forecast time frame

- Monthly forecast till December 2025 and up to 2027



Project Overview

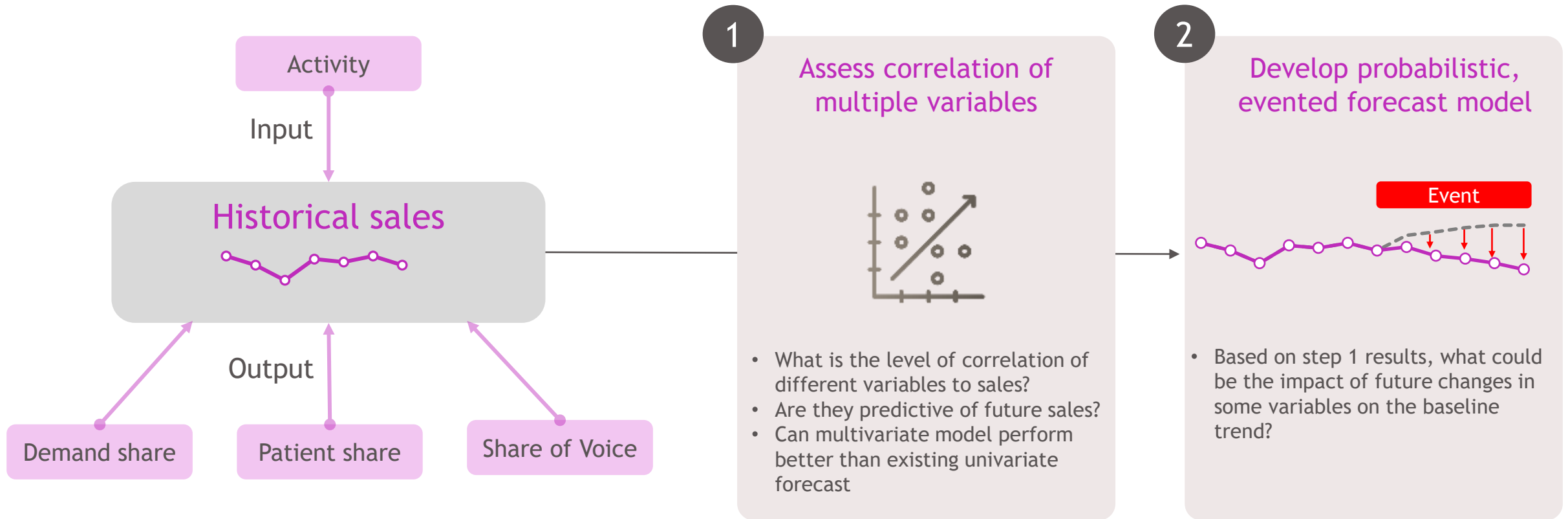
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Benefits of this project?



- Increase the “**marketability**” of your profile with a critical business challenge attractive to many companies
- Expand your **experience** on **time series forecasting**
- Develop a **concrete solution** that could reduce risk of medicines out of stock and ensure patients’ treatment continuity

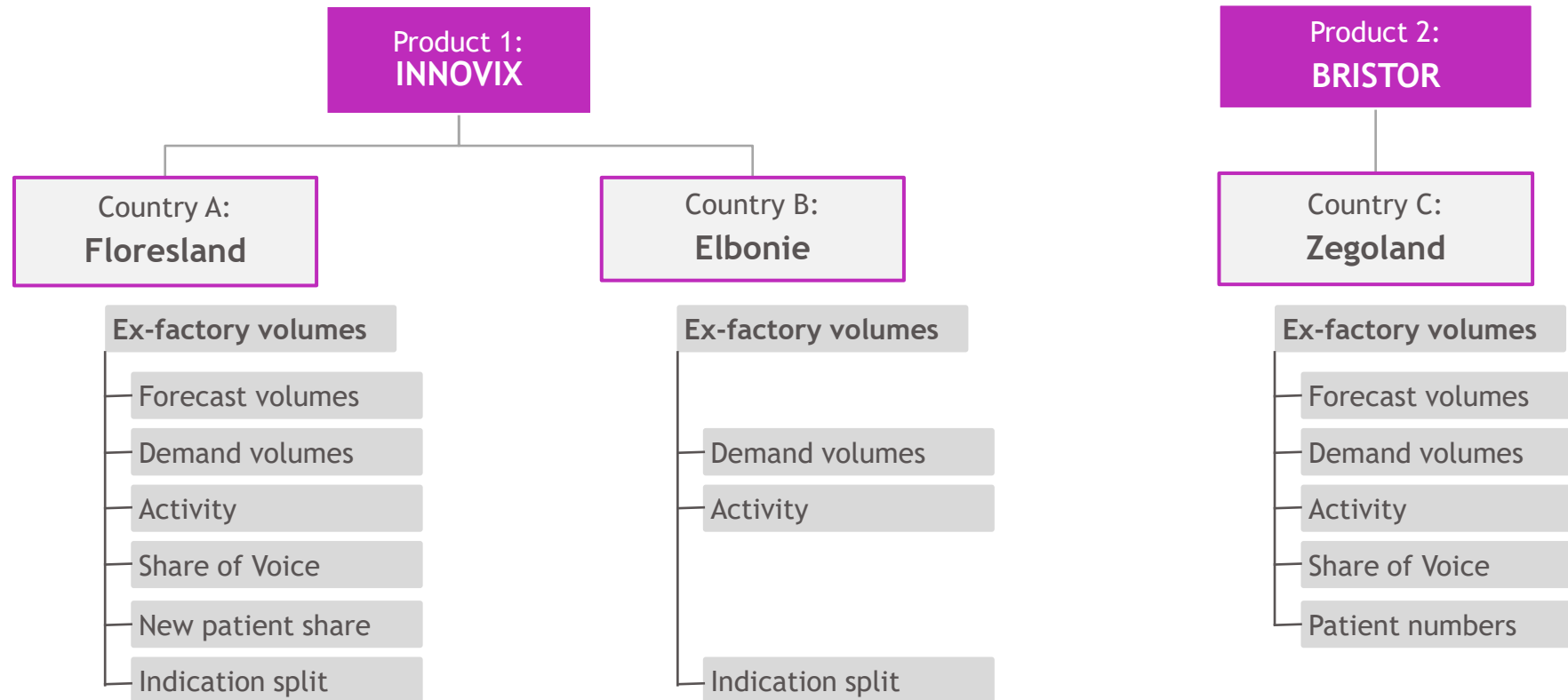


- Increase forecast **future predictivity, accuracy** to ensure adequate medicines supply
- **Reduce forecast workload** enabling efficient resource reallocation
- **Enhance business decisions** to support companies’ strategy and investments

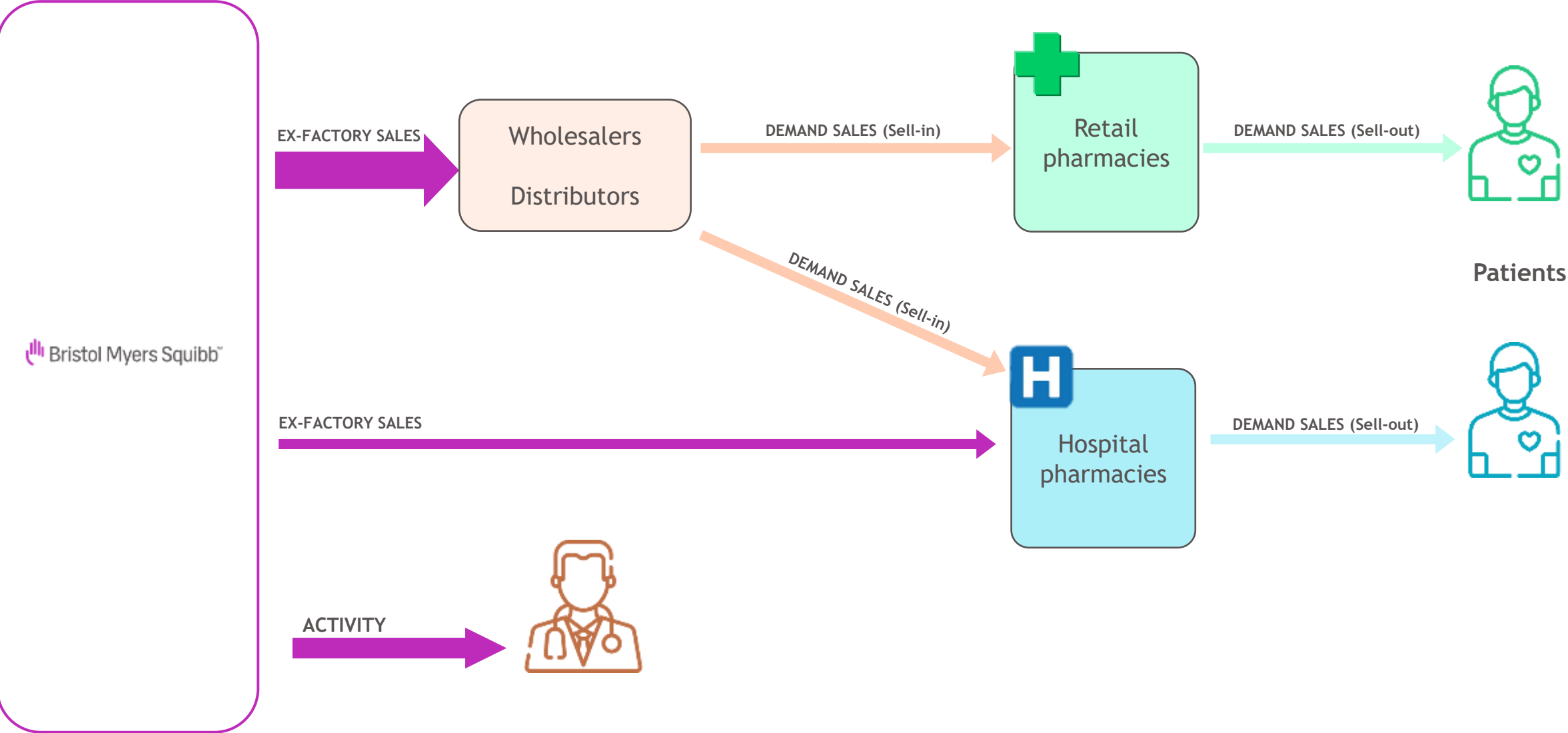
Resource available

- **BMS dataset:**

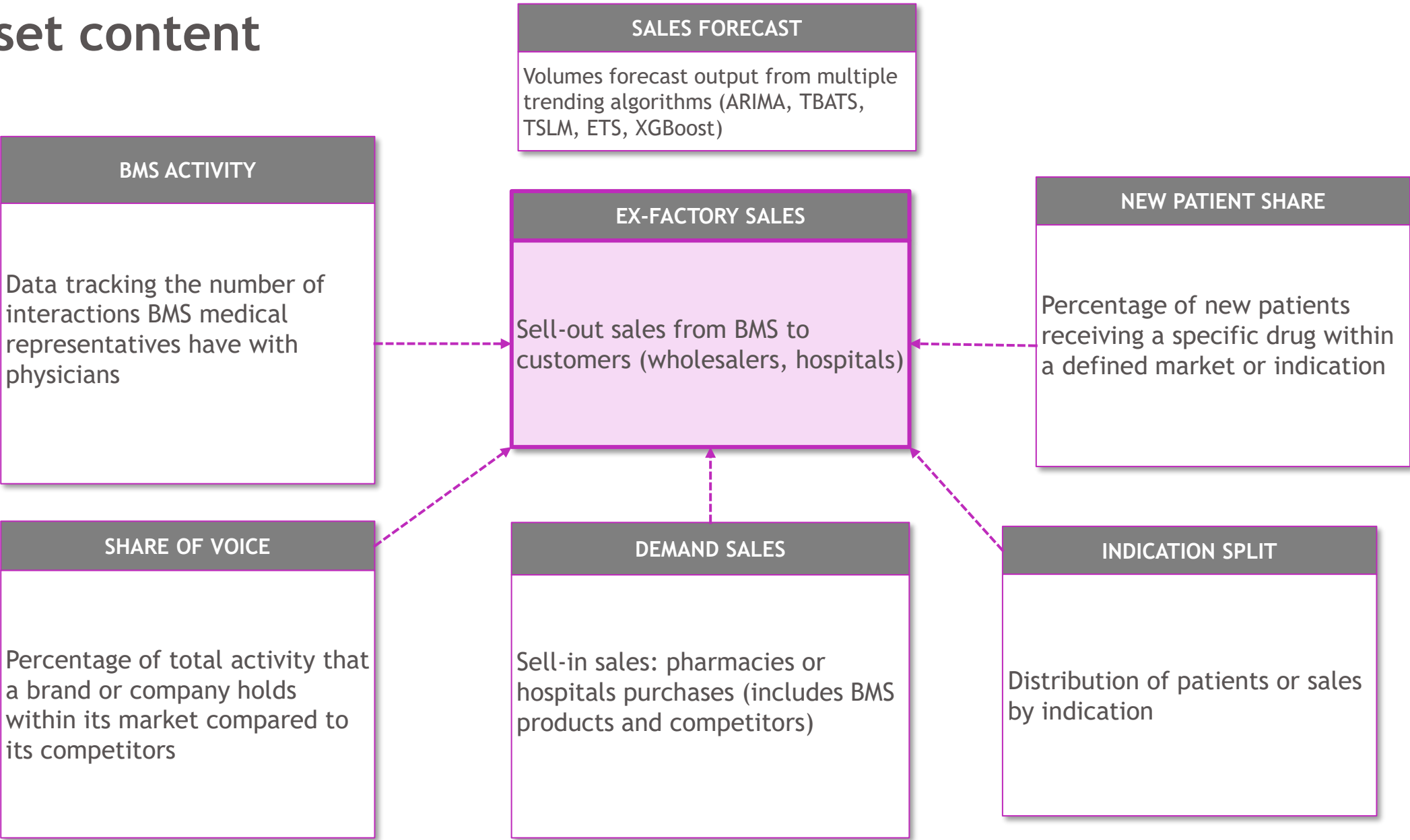
- 3 excel files (one per country) containing real data for 2 different BMS products and 3 distinct countries
- Product, country name and therapeutic indication have been anonymized
- INNOVIX is commercialized for multiple indications (therapeutic use or business markets) and BRISTOR is used in 2 indications



Data mapping



Dataset content

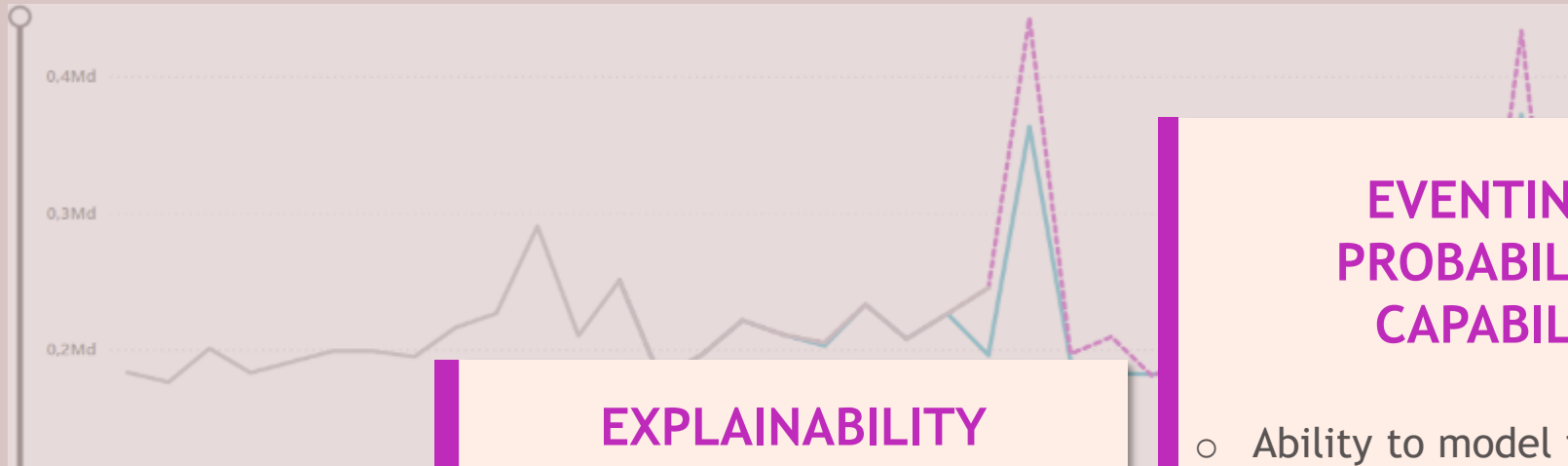


Other resources

- AWS SageMaker, AWS Bedrock
- **Forecast models or libraries**
 - Meta Prophet
 - Chronos: probabilistic time series models
 - Bayesian structural TS
 - Causal Impact
 - Multivariate TS forecasting on GitHub

What we are looking for as the winning project...

User friendly front-end



ACCURACY

- Be as or more accurate than current forecast trends
- Demonstrate forecast accuracy based on MAPE, MSE

EXPLAINABILITY

- Assess relationship of variables to sales
- Be able to explain how the model works to non Data scientist

EVENTING & PROBABILISTIC CAPABILITY

- Ability to model impact on the trendline of future events (based on assumptions and probability of occurrence*)

Thank you

