Automated Predictive Analytics

For maintenance and quality:

Let the data speak for itself!

WARWICK ANALYTICS

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24 – 28 April 2017 • Hannover • Germany

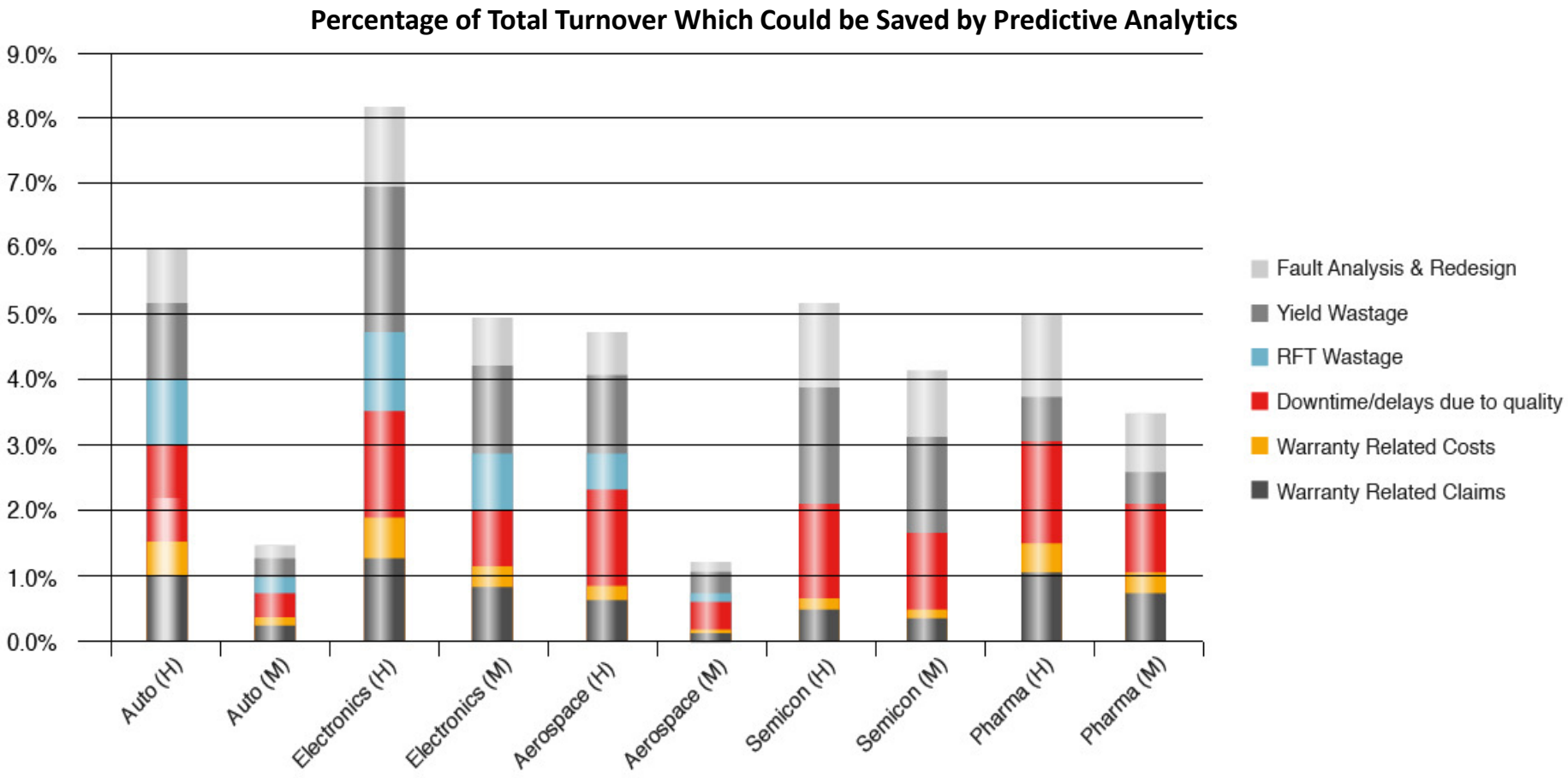
HANNOVER MESSE

Dan Somers

28 April 2017

Question:
Why are we still talking about Predictive Analytics?

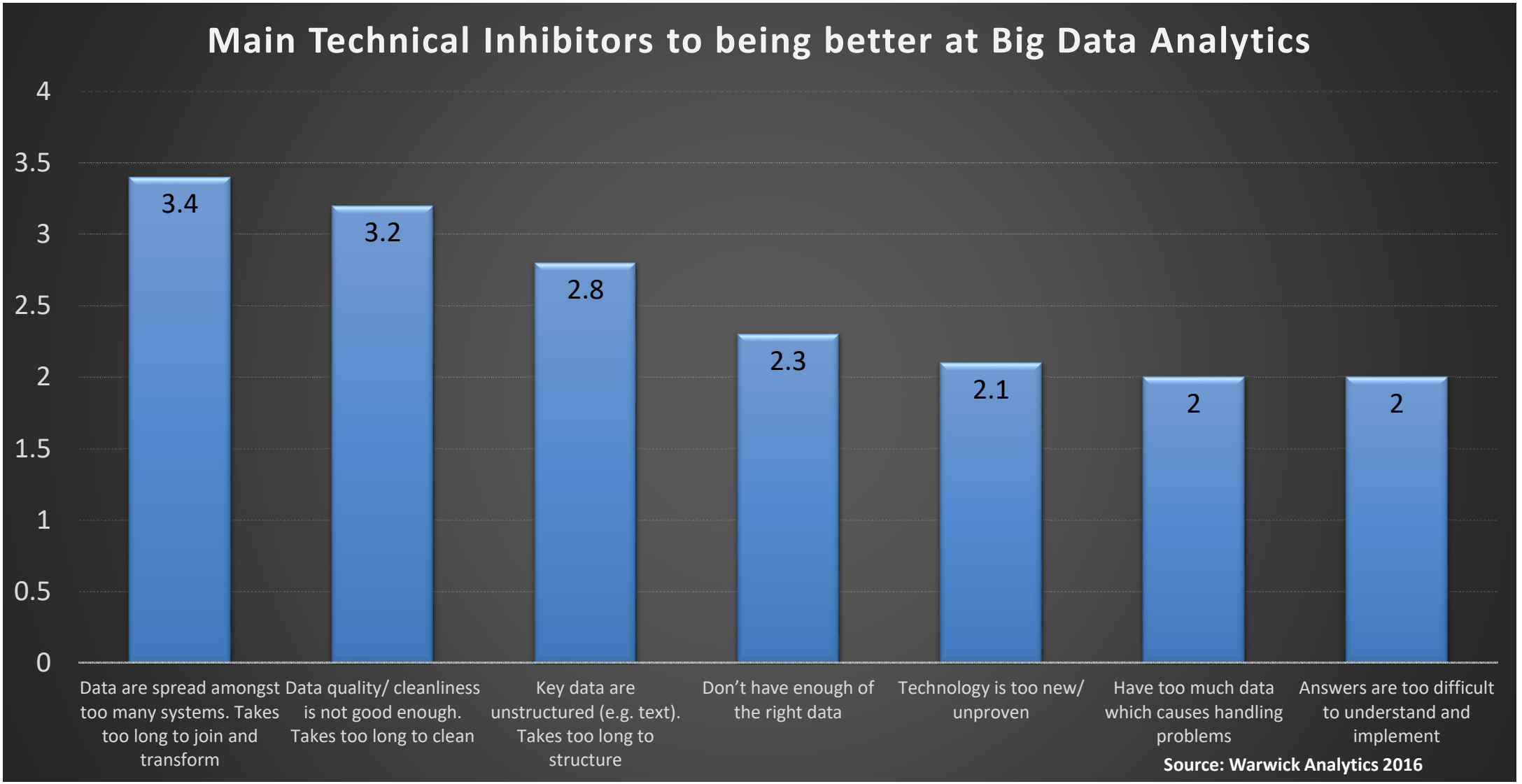
The economical benefits are huge



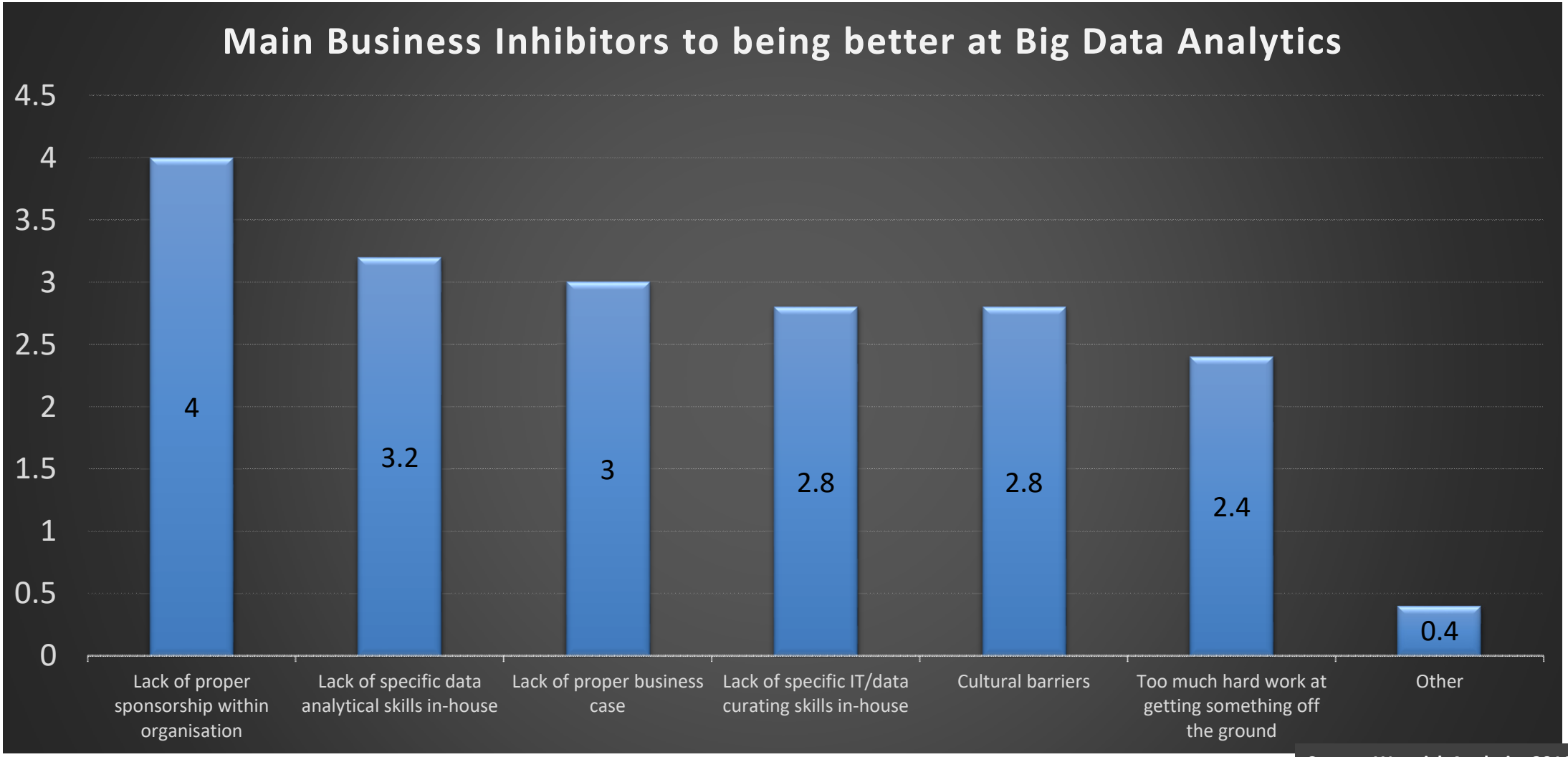
Source: Financial Accounts, WA

Why has it not achieved more to date?

Data issues are the main technical challenges

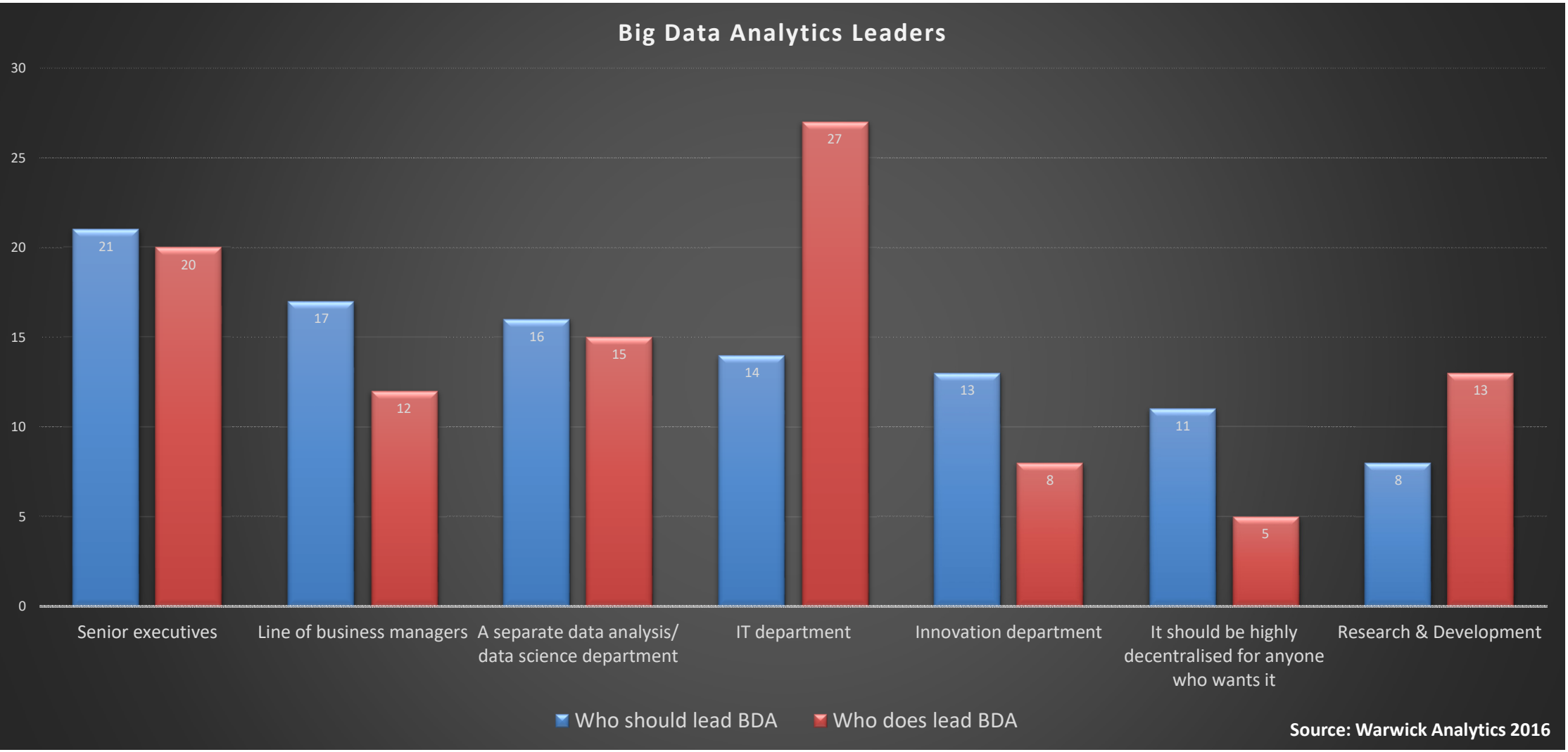


Lack of sponsorship was the main business challenge

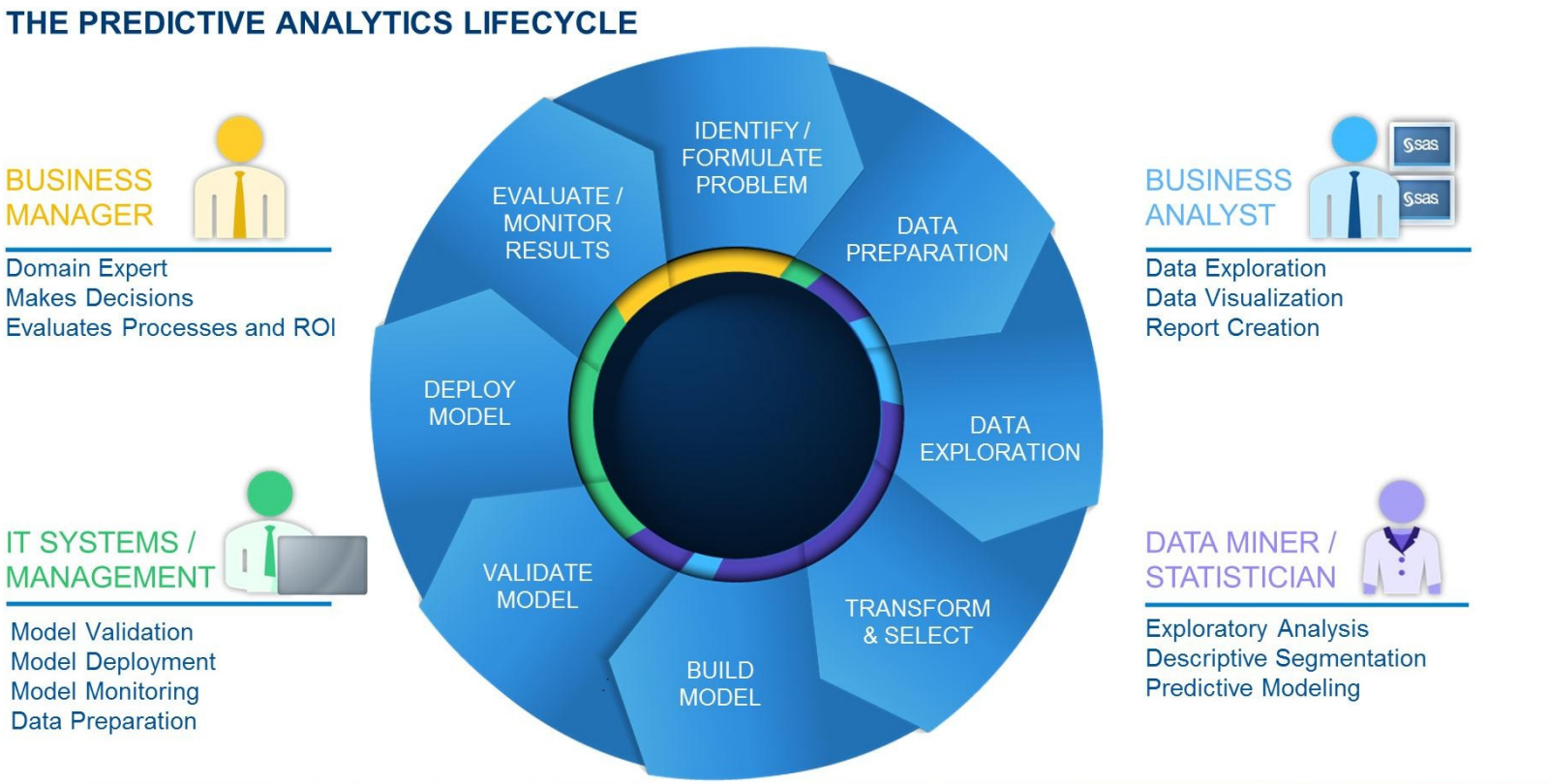


Source: Warwick Analytics 2016

Big Data Analytics was being mostly led by IT



Answer: Today Predictive Analytics is a project, not a product.



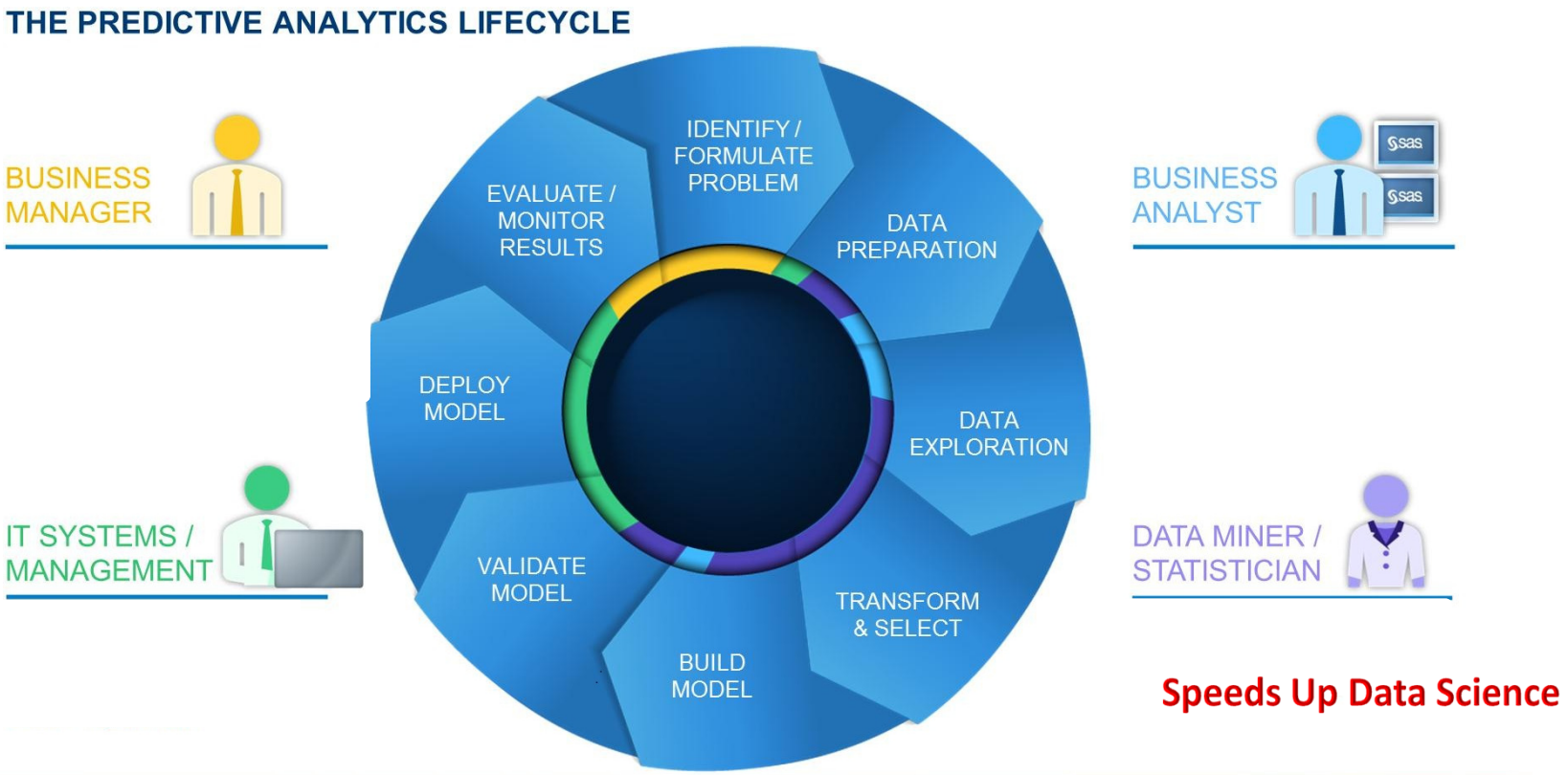
Source: SAS

The Technology

About Warwick Analytics

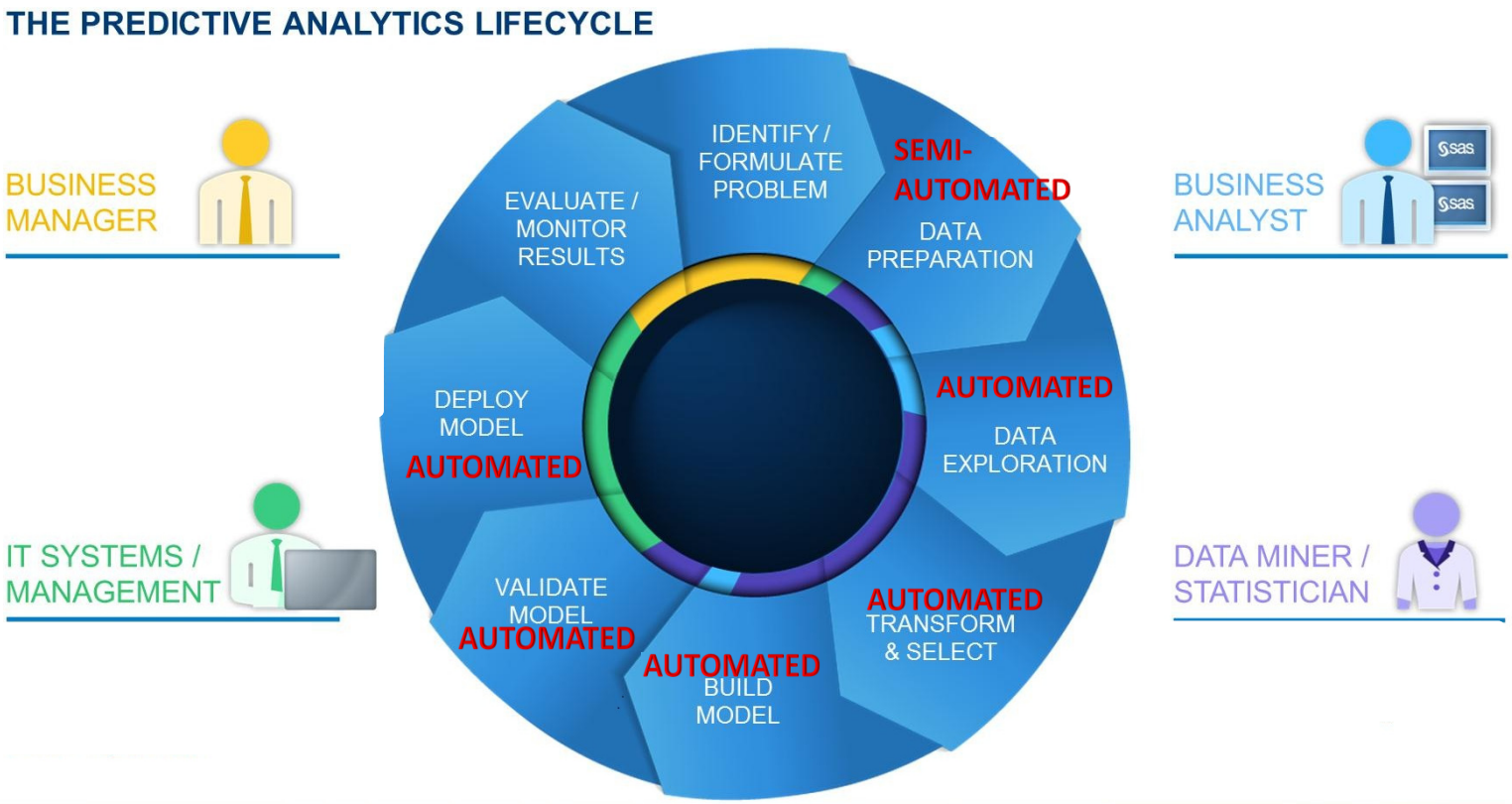
- Founded 2011, after ten years of academic research at Warwick University
- Proprietary algorithms AIR and OL
- Prestigious international awards:
  - DEMO winner (Silicon Valley)
  - SAP's Global Award. most innovative partner
  - Frost & Sullivan's Global Manufacturing Software Award

Answer: Today Predictive Analytics is a project, not a product.



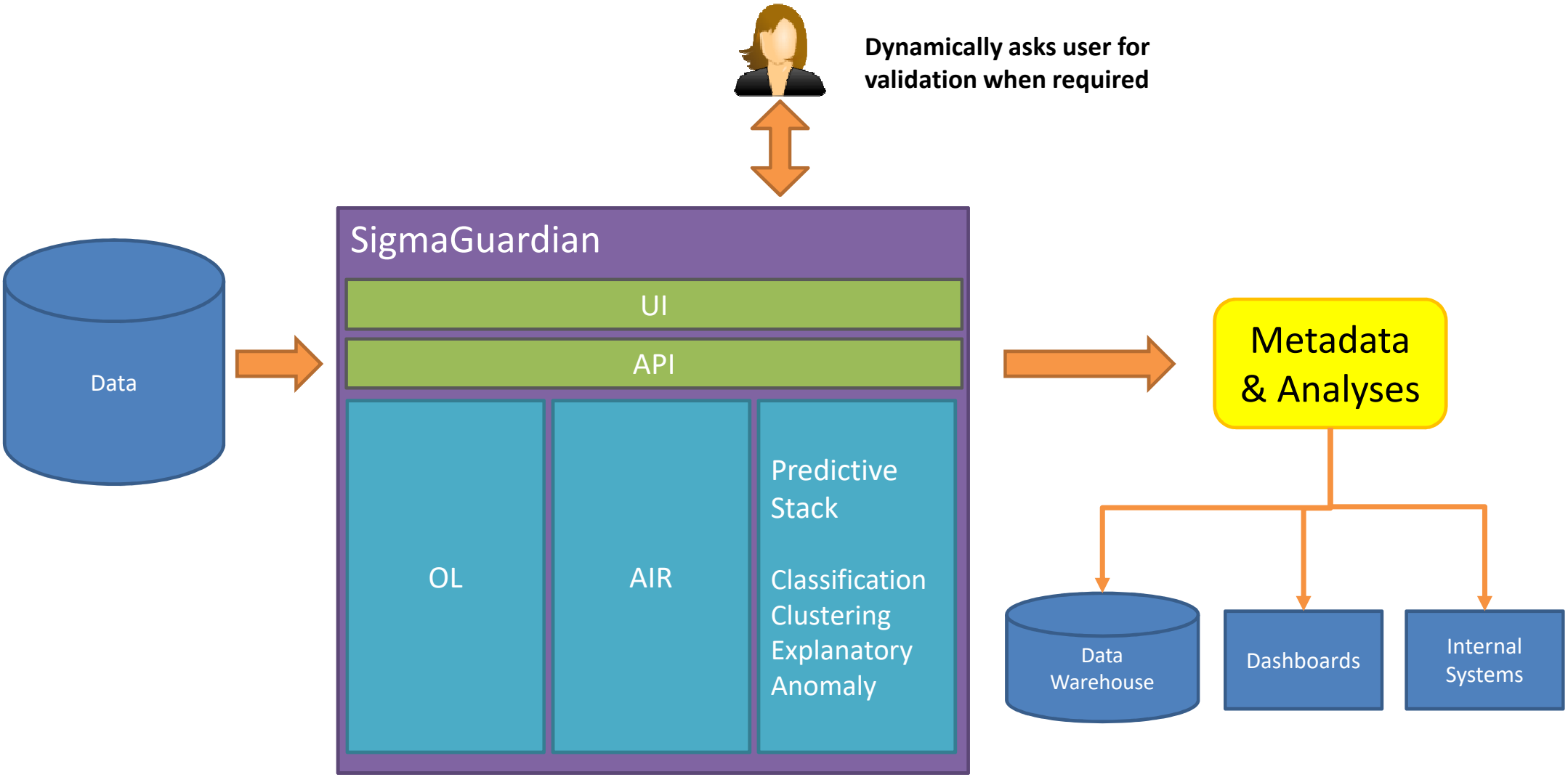
Source: SAS

Thought: Imagine if there were an automated product…



Source: SAS, WA

Product is easy to deploy and use and interface to other systems



Case Studies

Case Studies:

Customer Experience

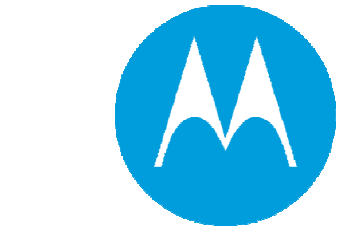
Automatically analyse heterogeneous ‘Voice of Customer’ data to generate ‘next best actions’ to increase customer satisfaction and sales

Predictive Maintenance

Automated predictive maintenance from heterogeneous warranty and maintenance data to improve quality and reduce costs

Case Study 1:
Eliminating Warranty Problems including No Fault Found

Mobile Phone Manufacturer

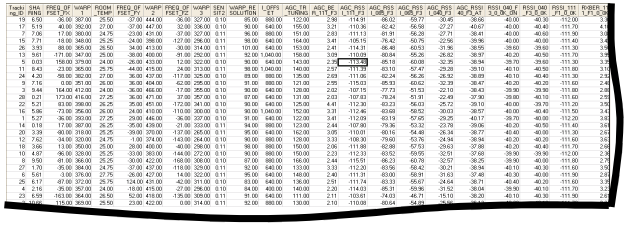


MOTOROLA

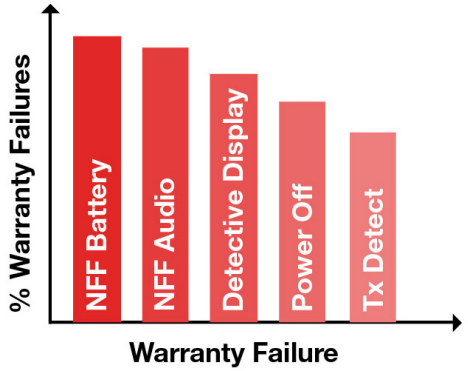
The background was high NFF warranty failures

PROCESS
Mobile phone assembly process

DATA
(i) Manufacturing Data
(ii) Service Data



PARETO ANALYSIS
Illustration of Top-5 Warranty failures out of 23 reported failures



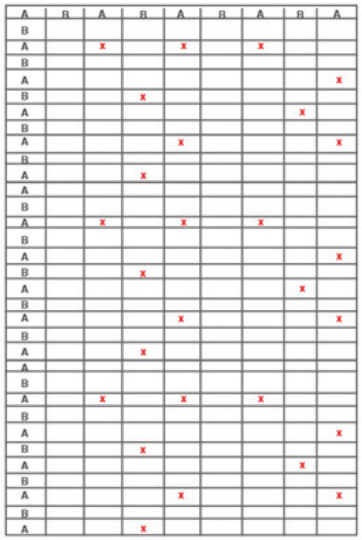
Variables measured

- FREQ_OFFSET_FX
- FREQ_OFFSET_FY
- WARP_RESOLUTION
- AVG_PWR_NL_F5
- RXBER_111_F1_0_0K
- -
- -
- -
- AUTOWRSP_F1
- AGC_TR_TUNING

170 parameters

The solution was very quick and eliminated problem

Data associated with NFF-battery failure



Identification

Critical parameter identification

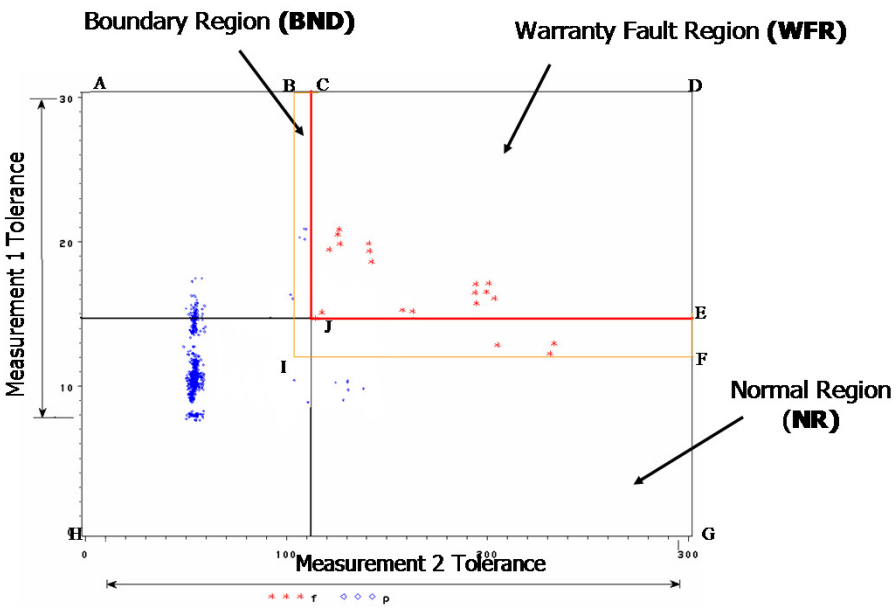
- FREQ_OFFSET_FX
- FREQ_OFFSET_FY
- WARP_RESOLUTION
- AVG_PWR_NL_F5
- RXBER_111_F1_0_0K
- -
- -
- -
- AUTOWRSP_F1
- AGC_TR_TUNING

Out of 170 parameters,
2 parameters which explains the
NFF-battery problem are identified

Identified Parameter

Reporting

Fault Region



Warranty Fault Region is identified
based on Data Mining Kernal

Case Study 2:
Predictive Maintenance
Utilities Plant

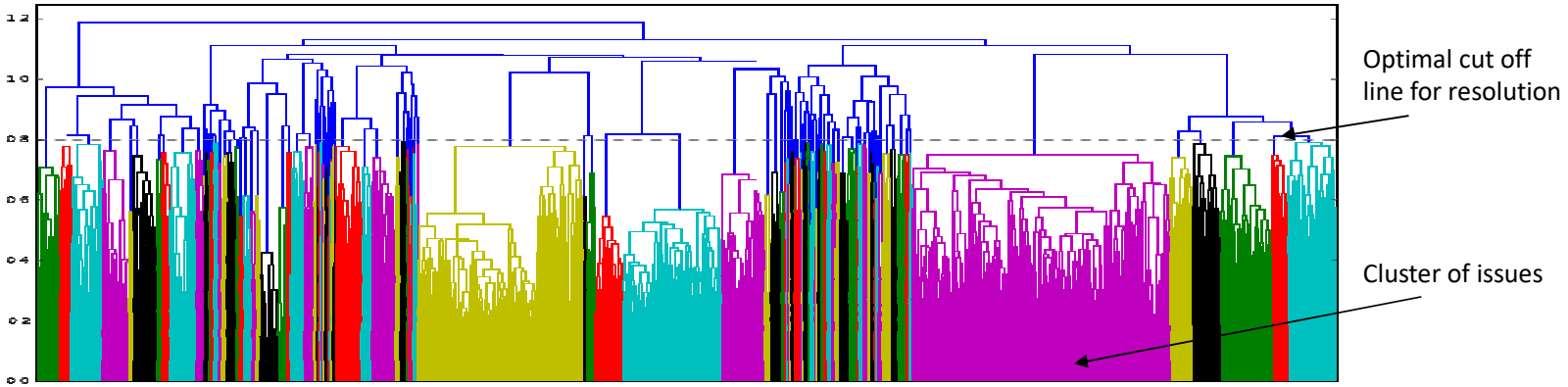
The background was to lower maintenance costs & downtime

- Energy company with disparate data systems
  - Data: SAP, Asset Maintenance, Historians

- The condition-monitoring team was very experienced and strong
  - First step was to classify all the maintenance events into similar categories

The solution was two-step: first classification, then predicting

- Step 1: AIR and OL used to classify the free text into meaningful categories



- Step 2: RCASE machine learning algorithm generates ‘predictors’ of maintenance events from historian data and features

Case Study 3:
Increasing yield
Pharmaceutical company

NOVARTIS

Background was variable yield

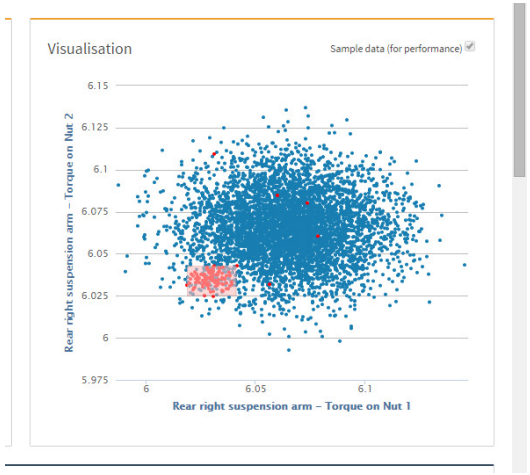
- Looking to improve consistency and yields for a haemorrhoid drug

- *“The product is formed from a complex series of reactions from intermediate chemicals. It is very sensitive to many factors and has been a challenge to control the impurities for a long time. Clearly it is imperative to better understand the factors which drive impurity formation so that we can maximise the quality and avoid rejections”*

Site Operational Excellence Lead

Solution found causal factors and defined optimum controls

- SigmaGuardian found the ‘regions’ which best defined the root causes



- *“We are very pleased with the analysis that SigmaGuardian provided. We did not expect the results to be as good as they were, particularly with limited data we provided. Also the speed of calculation and the ease of interpreting the results was impressive too.”*

  Site Operational Excellence Lead

DEMO

- **DANKESCHÖN / THANK YOU**

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