

SP02

Using Data and Text Mining to drive Innovation

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TO KNOW®

Agenda

Context

- The state of the European pharmaceutical industry

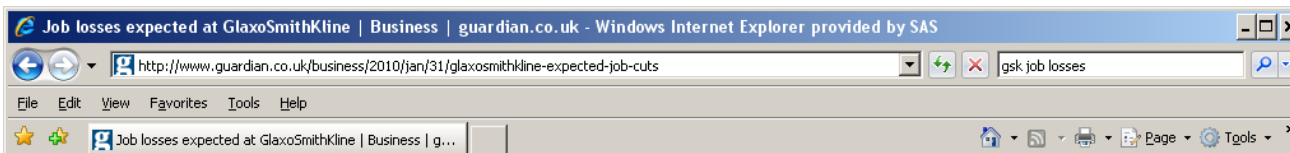
What is analytics?

- An introduction to the main elements and why they matter

The promise of analytics

- How analytics can revolutionise the pharmaceutical industry

Dark Days for the Pharmaceutical Industry in Europe



guardian.co.uk

News | Sport | Comment | Culture | Business | Money | Life & style | T

Business > Job losses

Job losses expected at GlaxoSmithKline

- GlaxoSmithKline expected to announce thousands of job cuts
- Drug-maker likely to shrink workforce in Europe and US while continuing drive into Asia
- Analysts predict firm will report pre-tax profits of £8.7bn

Heather Stewart

guardian.co.uk, Sunday 31 January 2010 15.53 GMT
Article history



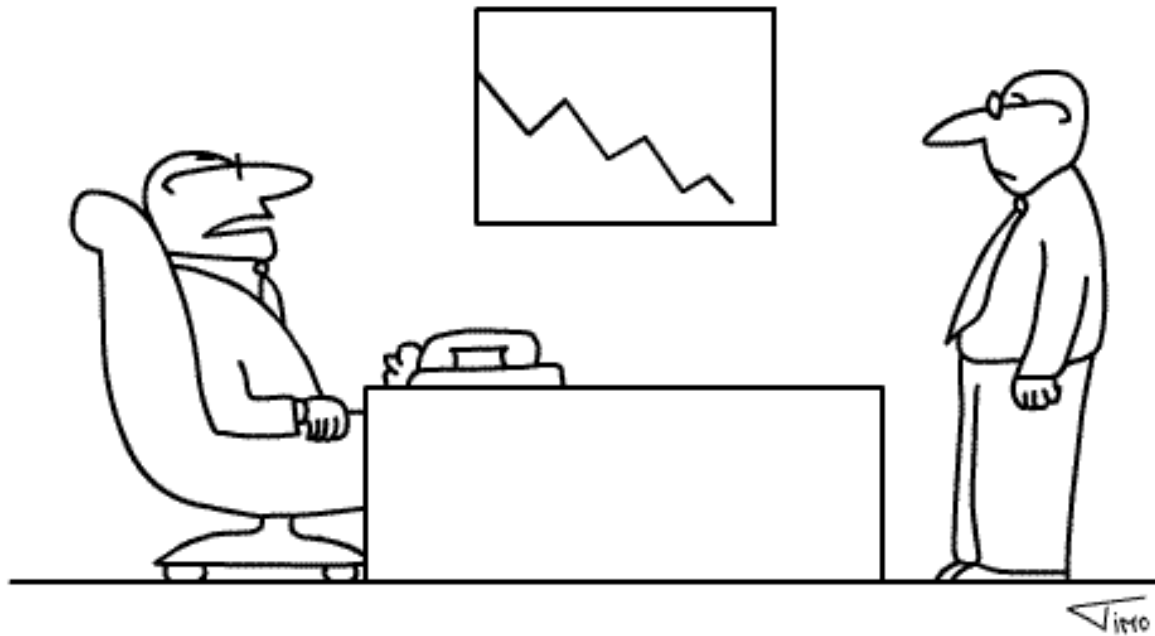
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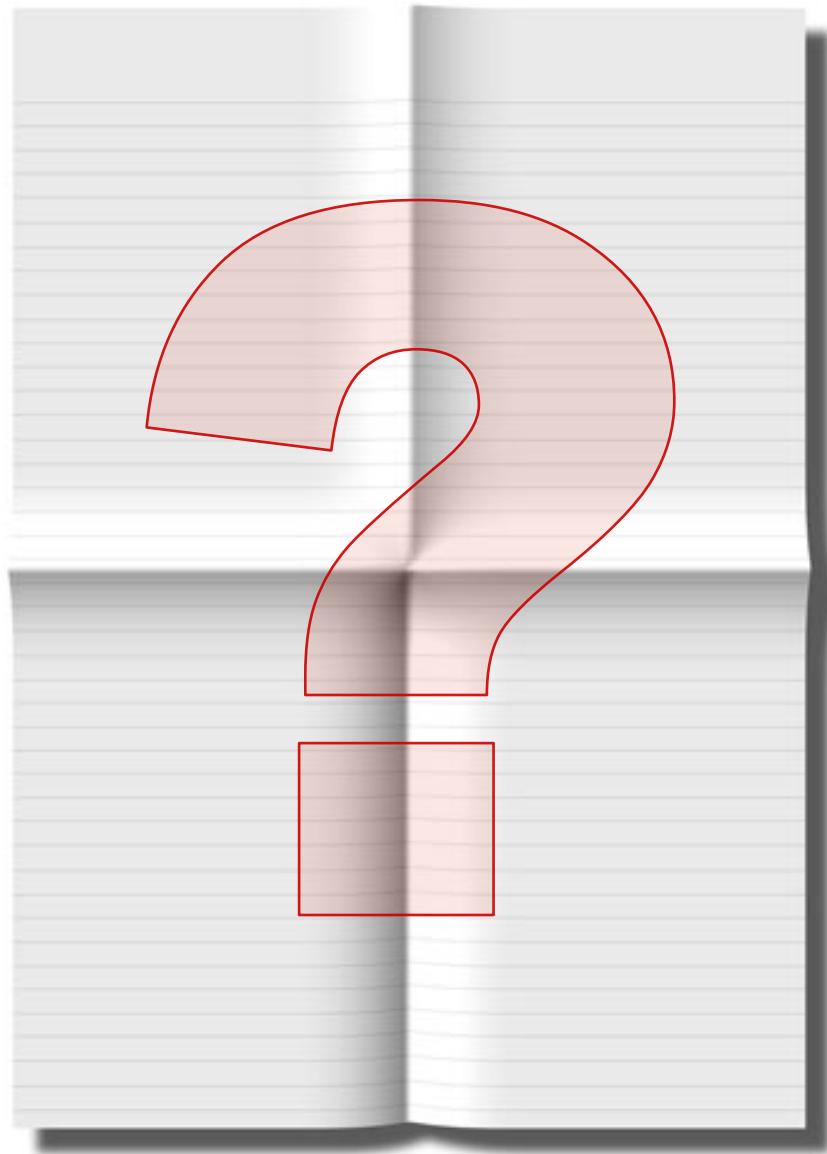
Why Analytics?



Decision Making

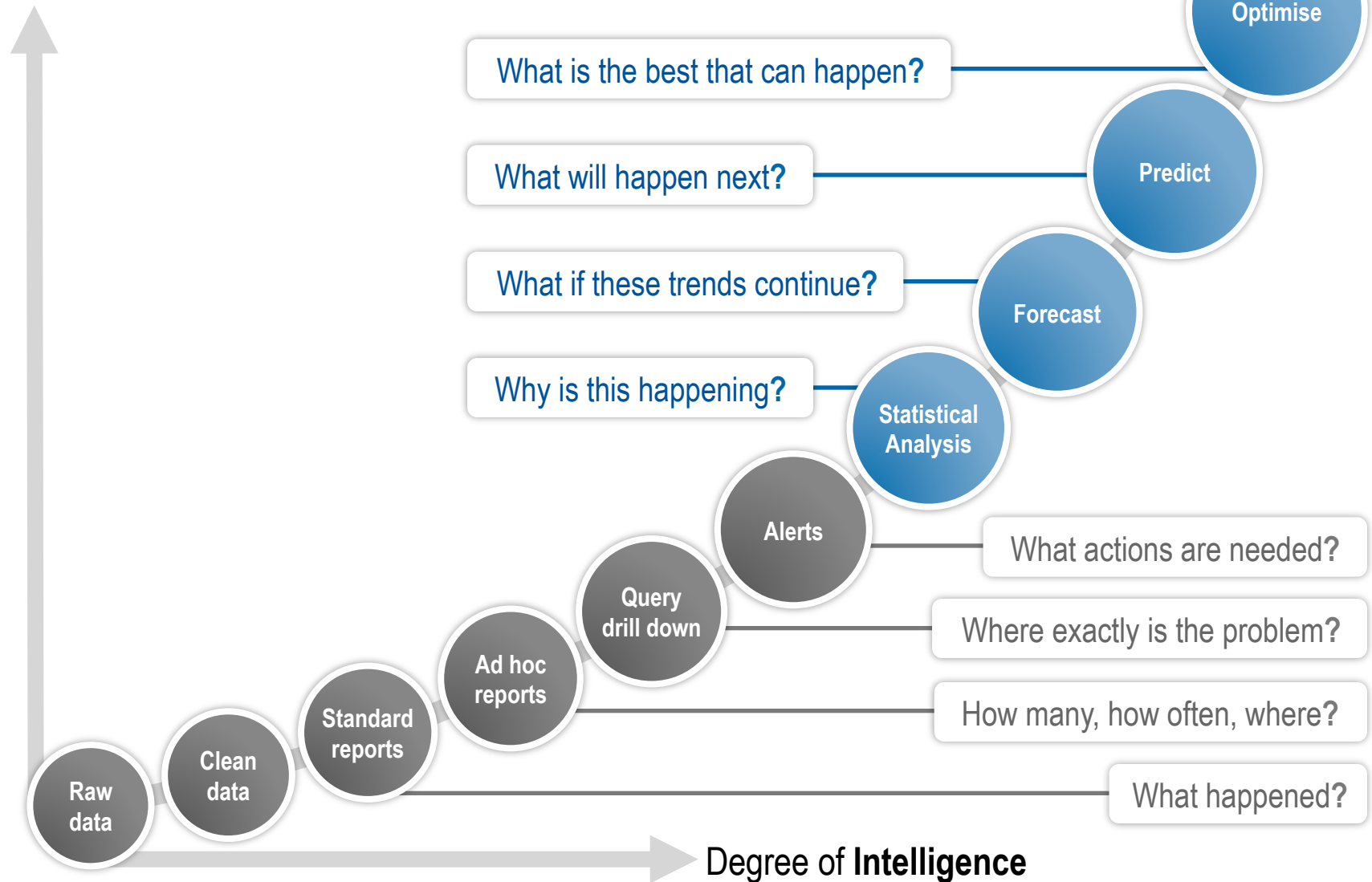


“It would appear, Hopkins, that your gut feel was only indigestion.”





Competitive
Advantage



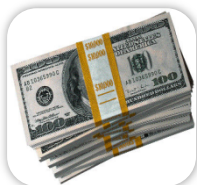
Visualisation & Statistical Analysis

“Quickly find related patterns within a set of data.”



Associations

“Identifying events that occur together, potentially with a sequence or order.”



“We’ve doubled our output in terms of the number of reports we produce for peer review publications, and the Ministry of Health and Long-Term Care, with only a 10 percent increase in our frontline analytic staff”

■ Dr. Jan Hux, Chief Operating Officer

Challenges:

- Sifting through 17 years of data on every hospitalization, physician appointment and publicly funded drug claim in Ontario to guide provincial healthcare decision making

SAS Solution:

- Grid enabled platform for Data Mining, Text Mining and Optimisation

Business Impact:

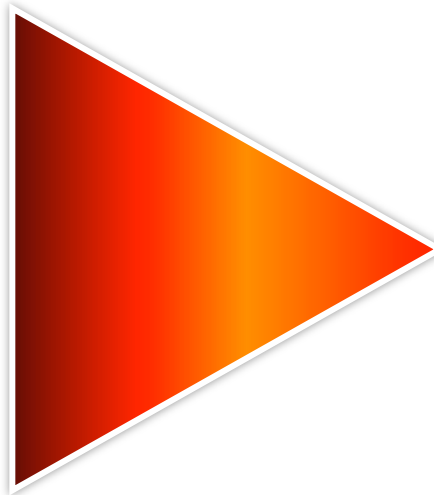
- Able to evaluate chronic care and map chronic diseases to improve the lives of Ontarians

Variable Identification

“What’s important to answer a specific question?”

Masses of information...

Age	No. of staff
County	Income Band
Practice Size	Brick
Gender	Last Training
GI Specialist	Contact History
Other Products	Attended Meeting
Web customer	Marital status
Existing Prescriber	Value
Status	Time as GP



Existing Prescriber



Attended Meeting



GI Specialist



Brick



Behaviour Explained

Top 10 Pharmaceutical Company

Challenges:

- Determining the causes of manufacturing batch failures

SAS Solution:

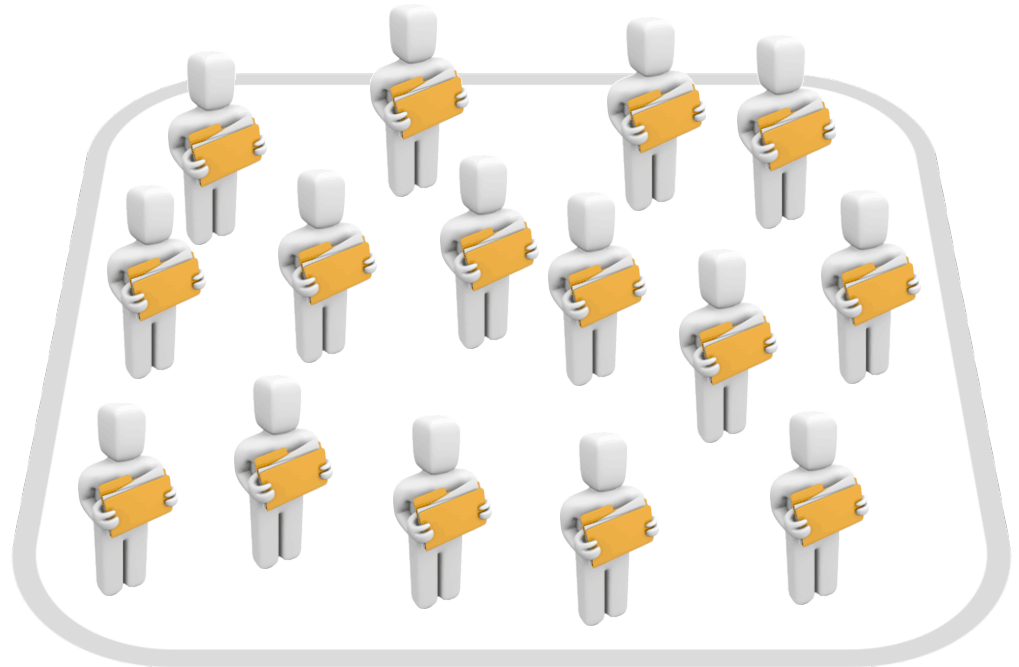
- Data integration, data analysis and web portal

Business Impact:

- Batch Failures almost eliminated from manufacturing line for best selling product, saving £2M per annum
- Other products subsequently included from across the globe

Segmentation

“Create groups that have similar characteristics. Also a measure of how different each group is from the others.”

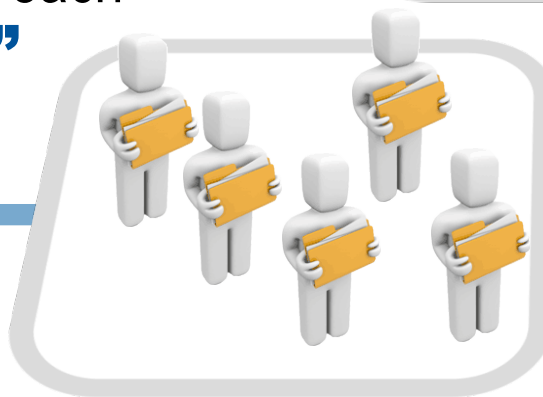
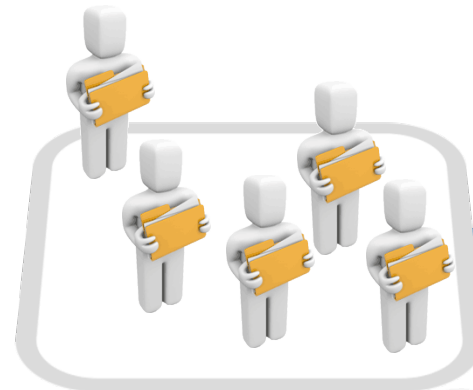


Segmentation

“Create groups that have similar characteristics. Also a measure of how different each group is from the others.”

Physician Group A

Large practice, Strong formulary, Hard to see



Physician Group B

Small Practice, Weak formulary, Easy to see



Physician Group C

GI Specialists, existing prescribers of Brand B

Top 10 Pharmaceutical Company

Challenges:

- Improving sales force targeting to get the most out of the sales reps

SAS Solution:

- SAS Physician Targeting solution

Business Impact:

- Able to reduce the number of physicians targeted from 62,000 to 39,000 while maintaining the same level of prescribing potential, saving \$18M
- Competitive advantage from calling on physicians not targeted by other companies

G	T	E	W	V	G	H	U	I	B	C	X	A
Q	W	E	T	D	F	G	J	K	O	I	U	T
C	M	N	X	H	G	A	L	O	J	U	T	Q
A	Z	C	F	T	E	R	T	N	J	H	Y	U
O	P	H	Y	R	M	W	S	D	F	M	N	B
V	H	J	U	Y	T	I	P	Q	A	P	G	F
S	D	W	V	B	U	I	N	S	W	B	C	Z
A	L	K	J	T	M	A	P	I	O	I	U	X
F	E	W	I	Y	N	H	K	D	N	Q	U	P
Q	P	S	F	T	E	M	X	T	R	G	E	O

Top 20 Pharmaceutical Company

Challenges:

- Identifying key opinion leaders in the Rheumatoid Arthritis market

SAS Solution:

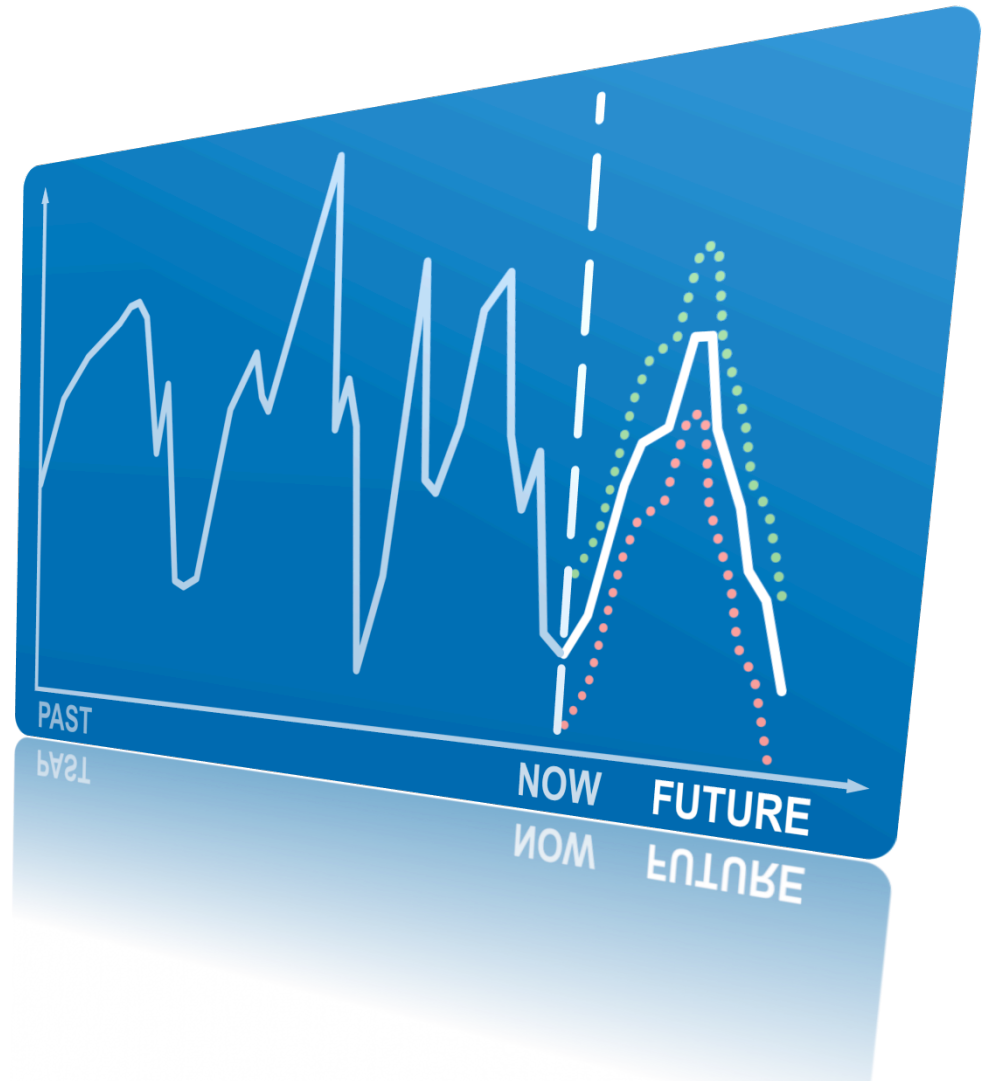
- SAS Text Analytics

Business Impact:

- Able to identify KOLs from mining of publications
- As a side benefit identified Vioxx signals

Time Series Forecasting

“Observations repeated over time, with past values and other factors being used to predict future values.”



“SAS is the linchpin of our supply chain management strategy.”

■ Custom Pak Materials Manager

Challenges:

- Ability to track customer usage and demand patterns to accurately predict inventory levels and meet customer demand.

SAS Solution:

- Analytics for accurate and unique forecast for each Custom Pak and consumables product.

Business Impact:

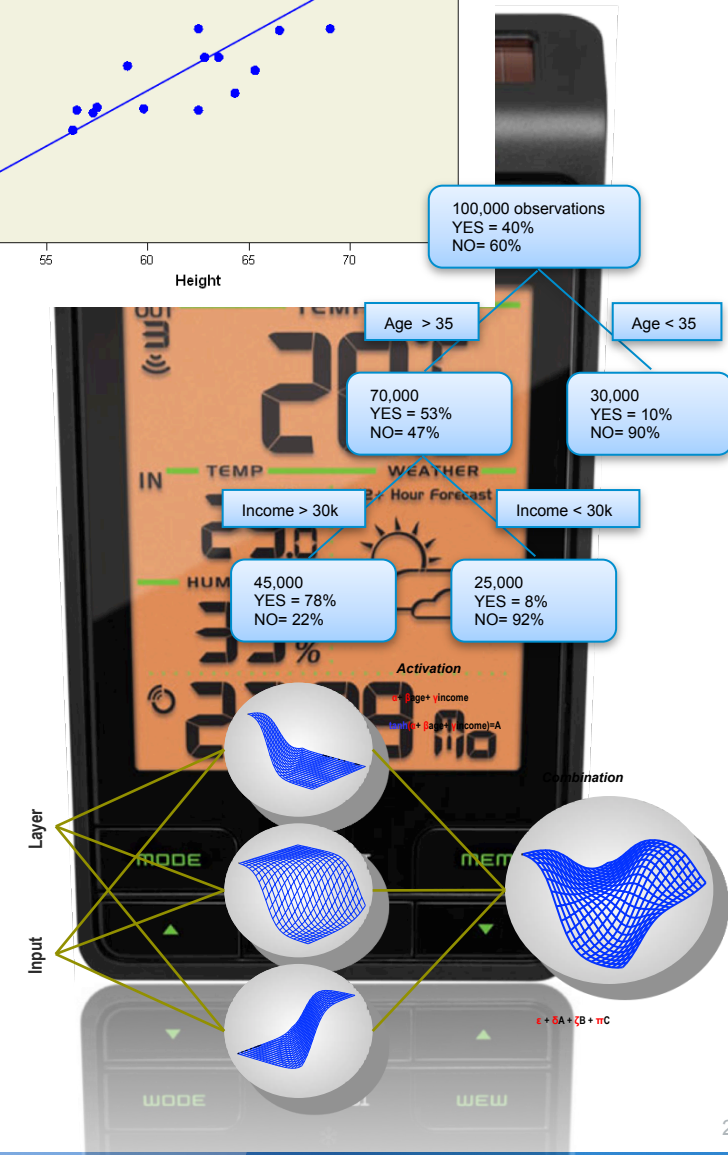
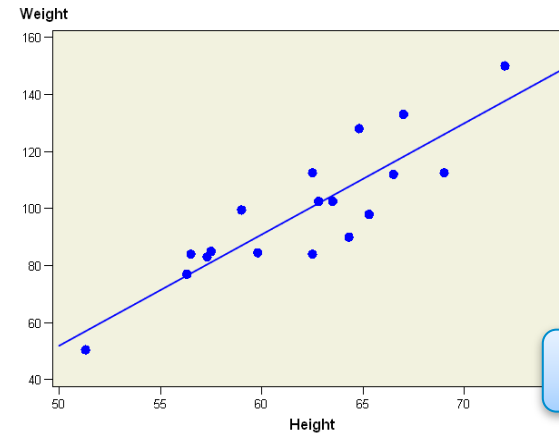
- Saved \$6 million in inventory costs.
- Customer service levels have been improved year on year.
- Able to negotiate lower purchasing costs and maintain excellent relationships with suppliers.

Predictive Modelling

“What are the chances of an event occurring some future point in time?”

“Should an event occur, what is the impact or amount involved?”

Relationship between height and weight



US Healthcare Provider

Challenges:

- High costs and poor outcomes for patients with Asthma and Cardiac conditions

SAS Solution:

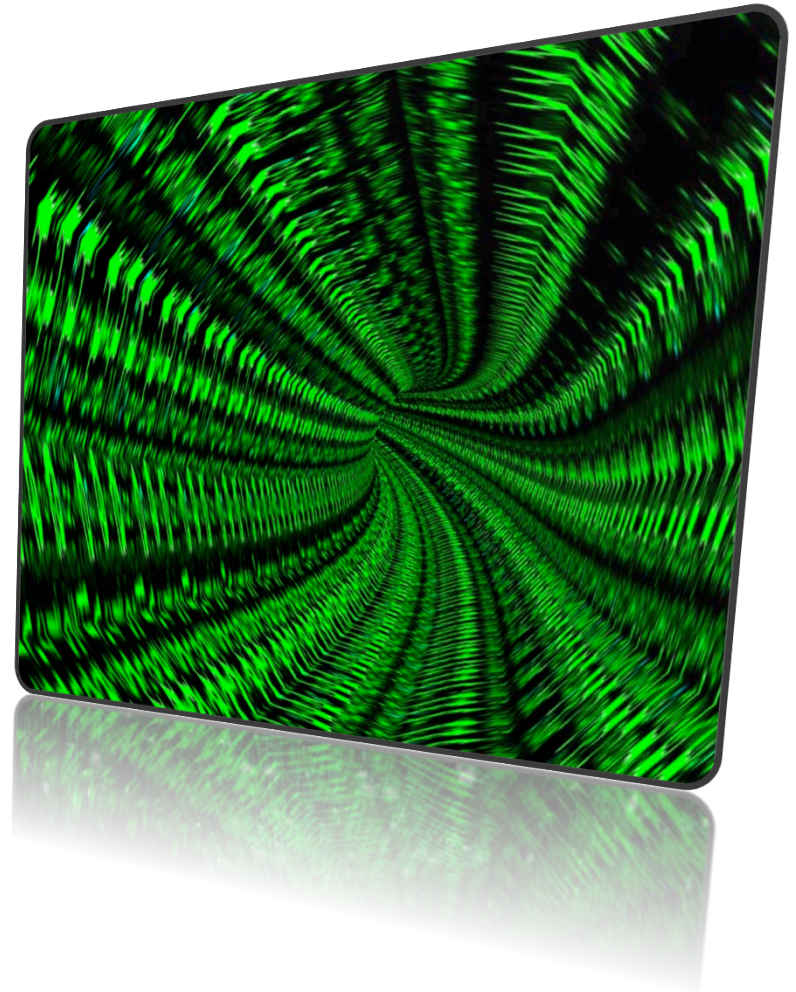
- Data Mining

Business Impact:

- Built a predictive model to identify Asthma and cardiac patients at risk of hospitalisation
- Reduced hospitalisations by 80%

Simulation

“Understand the impact of changing conditions based on different scenarios.”



US Biotechnology Company

Challenges:

- Need to eliminate costly trials with inconclusive outcomes

SAS Solution:

- Grid enabled simulation application on 120 processor Linux Cluster

Business Impact:

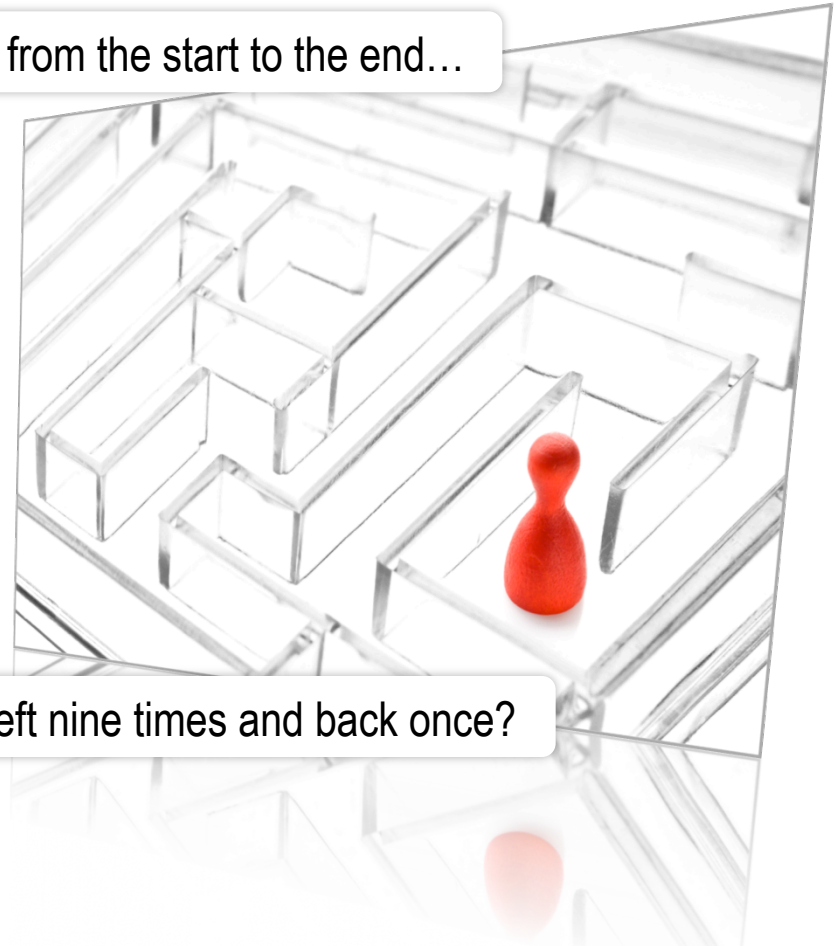
- Massive increase in throughput of simulations (1,000 replicates/day → 10,000 replicates/hour)
- Generally available SAS application created

Constraint Based Optimisation

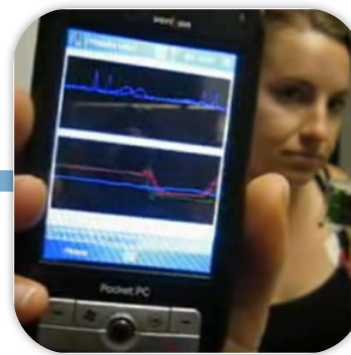
How quickly can you get from the start to the end...

“What is the right thing to do to maximise or minimise an objective given a number of limitations.”

... given you can only turn left nine times and back once?

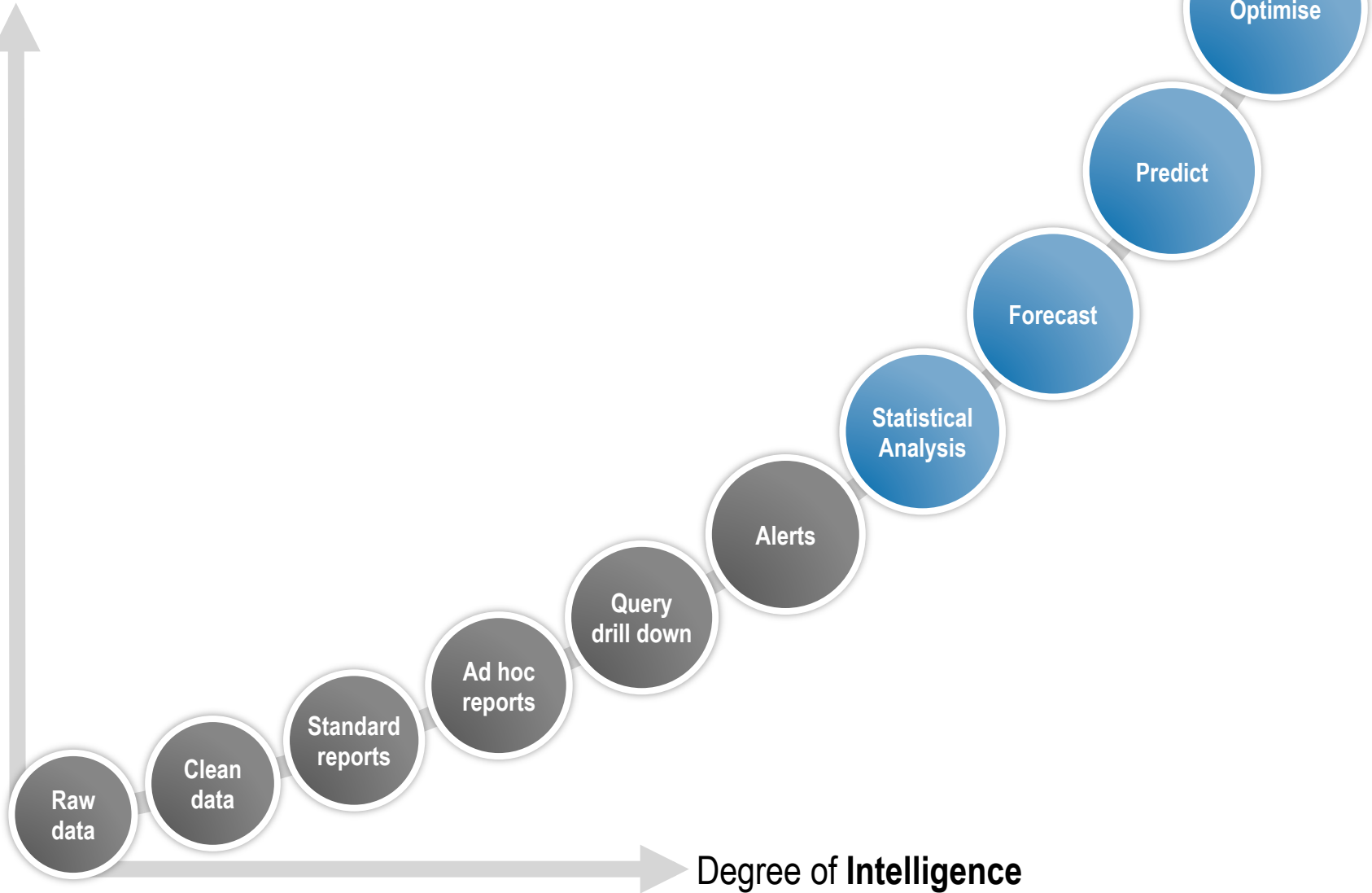


Model Management



“Make accurate, fact-based decisions using the right method at the right time.”

**Competitive
Advantage**

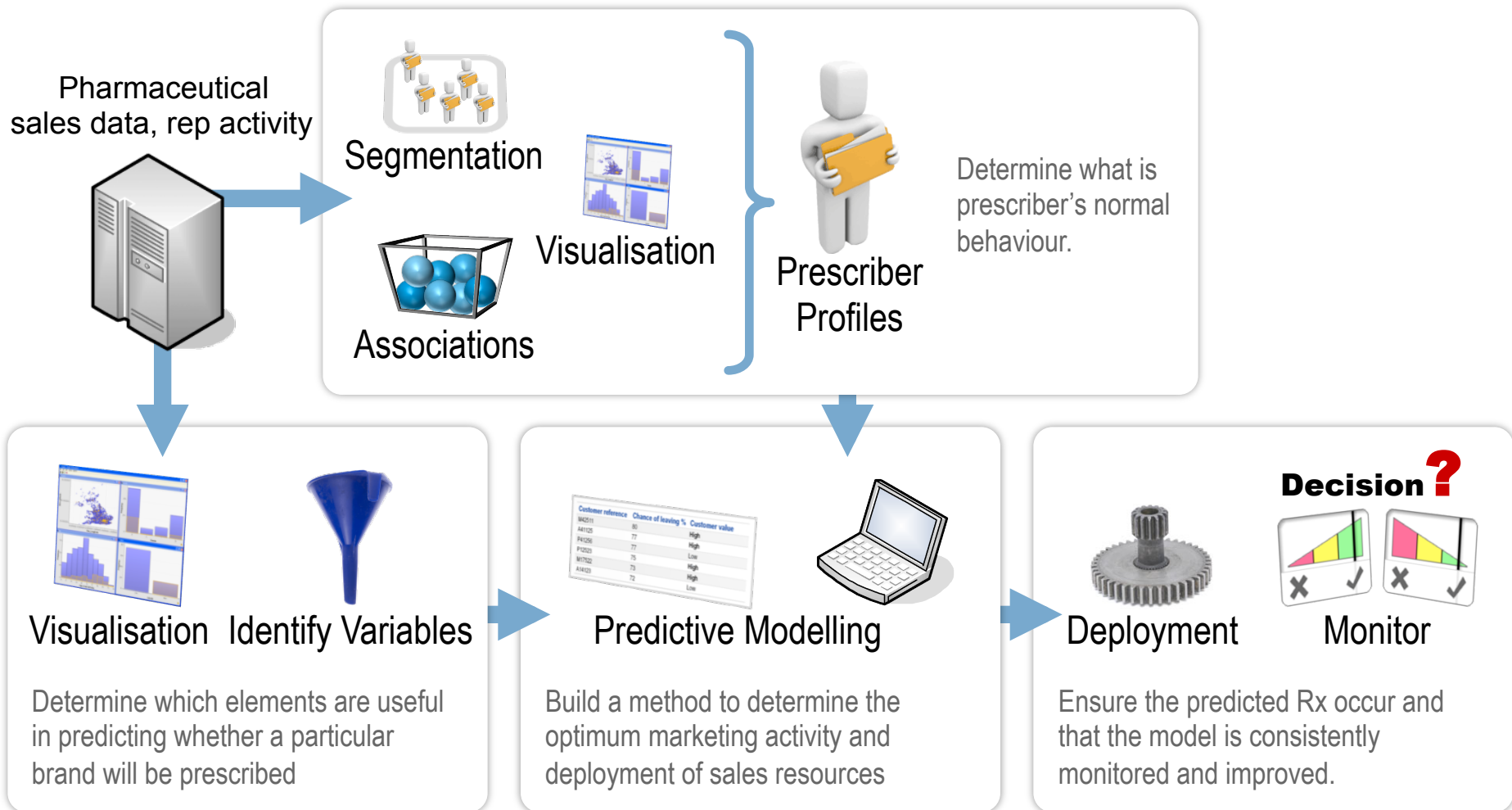


Degree of Intelligence

It's Not Magic!



Where will Prescriptions be Made?







The Value of Analytics

Predictive modelling

- Healthcare provider reduces hospitalisations by 80%
- The average cost of an asthma hospitalisation is \$11,671

Variable Reduction

- Large Pharma saves £2m per annum on one product by reducing batch failures

Simulation

- Trial Simulation avoids inconclusive trials – typically \$10-30M saving each time

Forecasting

- Alcon save \$600M in inventory reduction

The Options for the European Pharmaceutical Industry



