

Business Analytics

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(The opinions expressed in this presentation are the presenter's own and do not reflect the view of Alkermes)

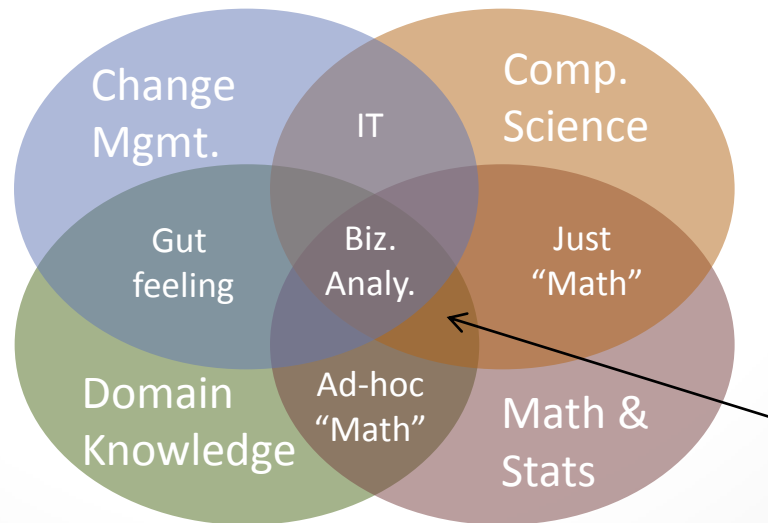


(People+Processes+data)Analytics=

Patient
&
Business
Results

What is Business Analytics?

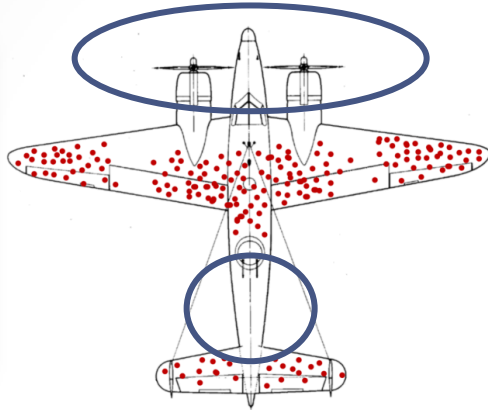
- Analytics
 - It is the discovery, interpretation, **communication** and **operationalization** of meaningful patterns in data
- Business analytics
 - It is the use of analytics to support and enhance all business related decision making processes
- The 4 areas of expertise*



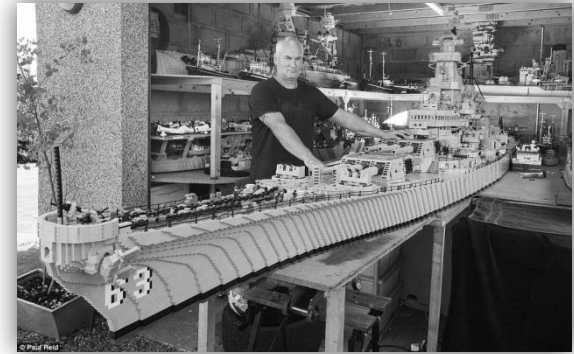
Unused business analytics
(a.k.a. supply only business analytics)

Why do we need math and stats?

Biases

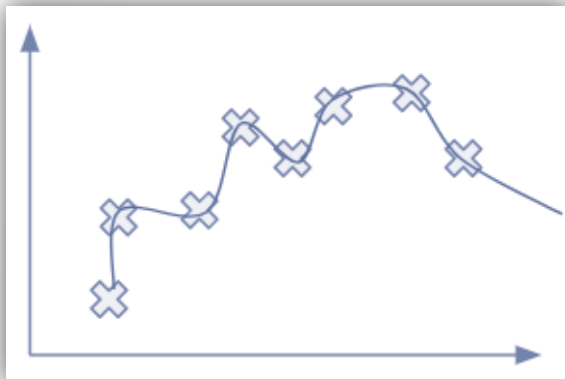


Model building and selection



<https://www.dailymail.co.uk/news/article-3211458/Fisherman-51-spent-three-years-building-world-s-biggest-Lego-model-warship-USS-Missouri-beaten-just-inches-American-rival.html>

Overfitting



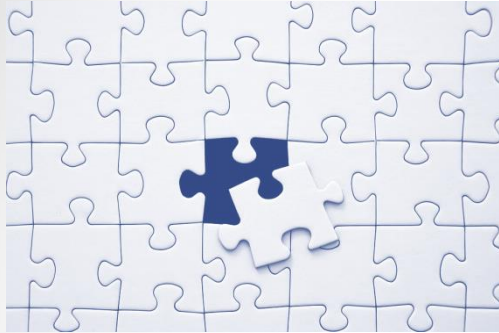
Spurious correlations

The real cause of increasing autism prevalence?



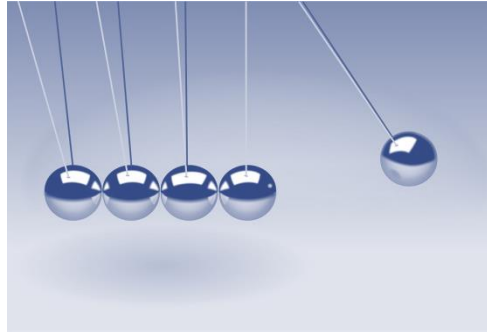
Sources: Organic Trade Association, 2011 Organic Industry Survey; U.S. Department of Education, Office of Special Education Programs, Data Analysis System (DANS), OMB# 1820-0043. *Children with Disabilities Receiving Special Education Under Part B of the Individuals with Disabilities Education Act

Why is business knowledge fundamental?



Problem Framing

- What question are we trying to answer?
- What assumptions make sense?
- What data is available and what data is **usable**?



Analytics selection

- What is analytically sound?
- What can the business handle?
- What "simplifications" would the business accept?



Trust Building

- Nobody is going to listen to you if you don't prove that you know the business
- Nobody cares what you know until they know that you care

What is the role of computer science?

- Data issues
- Environment issues
- Speed issues



- Develop user interface



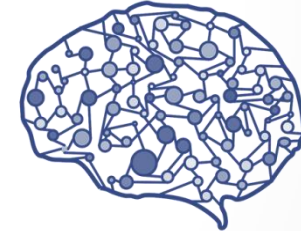
Back end develop.

- Architecture
- Modularization
- Maintainability and scalability
- Parallelization
- Automation



Front end develop.

- Architecture
- Modularization
- Maintainability and scalability
- User experience



AI/ML

- Efficient coding on algorithms
- Algorithm development (whether we like it or not)

Why is change management critical?

Support and ownership



Change the system



- People
- Processes
 - Proactive measurement
- Incentives

Analytics driven culture



Where can we play*?

- Commercial
 - New product planning (NPP)
 - Portfolio management
 - Forecasting
 - Market research
 - Marketing (Helena will provide an example)
 - Sales operations (e.g. targeting)
 - Pricing and contracting
 - Supply chain
- Supporting functions
 - HR
 - Compliance
 - Finance
- Medical
 - Clinical trial and program design that goes beyond efficacy (Lucy will provide an example)
 - Clinical operations (e.g. site selection, trial enrollment forecast)
 - Clinical trial supply chain

Some specific examples...

- What is the market opportunity for product XXX?
What countries should be prioritized for launch?
 - Descriptive analytics
- Did the launch of device XXX have an impact on sales?
 - Times series clustering
- What is the impact of our touchpoints on sales? Are they ROI positive?
 - Random effects models
- What physicians should we target for the launch of product XXX?
 - Decision tree based methodologies (random forest, gradient boosting, C-trees)
- Do co-pay cards have an impact on how long patients stay on product XXX?
 - Survival analysis



What “outcomes” we need to deliver on?



- Quality
 - Good enough
 - Meaningful
 - Actionable



- Cost
 - Sensitivity wildly varies across organizations
 - Nothing is free even if it is done internally



- Speed
 - As important as quality as business cycles can not be delayed



- Interpretability
 - It does not matter how good your analytics are, if you can not get buy-in from the business, your effective impact is **ZERO**

The engagement model...



- Targeted
 - Impactful
 - Strong business support
 - Early in the process focus on projects with high probability of success



- Agile
 - Iterative
 - Based on customer feedback



- Multifaceted
 - Consultant
 - Parent
 - Teacher

Three things to remember...

- To be successful a business analytics team requires:
 - Technical knowledge
 - Domain knowledge
 - IT knowledge
 - Change management knowledge
- From an outcomes perspective, it is necessary to balance not only quality, cost and time but also interpretability
- Projects should be...
 - Prioritized not only on impact/effort but also on support from the business
 - Run in an agile fashion with constant feedback from the business