The Art & Science of Business Analytics
95-872
Lecture 1: January 19, 2018
Course Objectives

- Outlining a framework for understanding what it takes to successfully leverage business analytics for competitive advantage
- Understanding key analytics techniques and how they can be applied across the value chain of a firm’s operations
- Understanding how Big Data capabilities are effecting the way companies are approaching business analytics
- Outlining a reference architecture for enabling Big Data and Analytics capabilities
- Laying out an approach for building out strategic business analytics capabilities within large organizations
- Gaining hands on experience to perform analyses that lead to strategic business recommendations

Fundamentally, this course is a Management course – not a Technology course
Student Expectations

- Prerequisites or equivalent
  - 95-703 (Database management)
  - 95-796 (Stats for IT managers)
  - or equivalent

- Class preparation and participation

- Pull your weight on the group projects
  - Don’t be a free rider

- Demonstrate personal integrity

- Be flexible
Course Material

- Canvas

- Books
  - No required book
  - Course material drawn in part from Business Analytics for Managers (Laursen, Thorlund)

- Cases
  - Two group case studies (due 2/2 and 3/2)
  - One case study for final take home project (?)

- Additional reading
  - Original U.S. Constitution (circa 1787) to be read prior to Lecture #5
    - http://www.usconstitution.net/constquick.html
  - As posted
Grading

- Cases studies (group grade): 60%
  - Groups can be 3-5 students (TBD- based on enrollment)
  - Each group to present both cases
  - Presentations 2/2 and 3/2
  - Peer reviews will help determine a portion of the group grade (15%)

- Class participation: 20%
  - Includes: case presentation, participation in in-class discussions/exercises

- Final case: 20%
  - Take home, individual
Course Outline
# Course Outline

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>01/19/2018</td>
<td>Business Analytics Framework</td>
</tr>
<tr>
<td>01/26/2018</td>
<td>Framework applicability across industries</td>
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<tr>
<td>02/02/2018</td>
<td>Web Analytics, Analytics in Action, Case presentations</td>
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<tr>
<td>02/09/2018</td>
<td>Business Analytics Techniques/Methods</td>
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<tr>
<td>02/16/2018</td>
<td>Exploratory Analytics, Big Data, Cognitive computing, IoT</td>
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<tr>
<td>02/23/2018</td>
<td>Business Analytics Architectures, GM/FB Guest speakers (TBD)</td>
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<tr>
<td>03/02/2018</td>
<td>Business Analytics Planning, Case Presentations</td>
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Managing Business Analytics within an Enterprise

- **Business Strategy**
  *Leverage the data – Transform the business*

- **Data-Oriented Culture**
  *Act on the Data – Convert insight to action*

- **Analytics Skills and Tools**
  *Understand the Data – Create Insights*

- **Information Management**
  *Manage the Data – Make the data useful*

- **Business Applications**
  *Create the data – Operate the business*

Information Requirements

Information Supply

Lecture 2: Framework Applicability across industries, Startsoft Case overview
Lecture 3: Web Analytics, Stratsoft case discussion

**Business**
- Software firm in the business analytics, selling integrated Performance Management software
- Positioning: Mid-market
- Target buyers: Senior level business managers

**Operational targets**
- Discounts <10%
- Returns <3%
- Selling greater volumes of bundled products

**Management issues**
- Rationalize product line?
- Different approach for different countries?
- Increase spending on advertising?

**Approach**
- Understand Stratsoft’s competitive strategy
- Assess Stratsoft’s positioning
- Examine data to validate soundness of the strategy
- Examine specific process(es) to identify the problems

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**Technology Adoption Lifecycle**

- Innovators
- Early Adopters
- Early Majority
- Late Majority
- Laggards

Area under the curve represents number of customers

"The Chasm"
### Lecture 4: Business Analytics Techniques and Methods

<table>
<thead>
<tr>
<th>Degree of Complexity Competitve Advantage</th>
<th>Cognitive</th>
<th>Prescriptive</th>
<th>Predictive</th>
<th>Descriptive</th>
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</thead>
<tbody>
<tr>
<td>Natural Language Processing</td>
<td>Can we glean insights from language?</td>
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<tr>
<td>Machine Learning</td>
<td>Can we observe patterns and improve insights based on feedback?</td>
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<td>Stochastic Optimization</td>
<td>How can we achieve the best outcome including the effects of variability?</td>
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<tr>
<td>Optimization</td>
<td>How can we achieve the best outcome?</td>
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<tr>
<td>Predictive modeling</td>
<td>What will happen next if?</td>
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<tr>
<td>Simulation</td>
<td>What could happen … ?</td>
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<tr>
<td>Forecasting</td>
<td>What if these trends continue?</td>
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<tr>
<td>Alerts</td>
<td>What actions are needed?</td>
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<tr>
<td>Query/drill down</td>
<td>What exactly is the problem?</td>
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<tr>
<td>Ad hoc reporting</td>
<td>How many, how often, where?</td>
<td></td>
<td></td>
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<tr>
<td>Standard Reporting</td>
<td>What happened?</td>
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Based on: Competing on Analytics, Davenport and Harris, 2007
Lecture 5: Exploratory Analytics and Big Data, Cognitive Computing, IoT

**Guided Analytics**
*Why We Have Data Warehouses*

**Exploratory Analytics**
*Why We Have Big Data*

**Business Users**
Determine questions
Reports Orientation

**IT**
Structures the data to answer the questions

**Information Technologies**
Delivers a platform to enable creative discovery
Archives data for:
Trend Analysis
Historical Reporting
Compliance Trend

**Business**
Explores the information – ad hoc questions

Monthly sales reports
Profitability analysis
Customer surveys

Brand sentiment
Product strategy
Maximum asset utilization
Lecture 6: Business Analytics Architectures, GM guest speaker

**Kimball**

Conformed Dimensions

**Inmon**

Conformed Dimensions

Graphic Source: http://www.bidwbooks.com/bill-inmon-vs-ralph-kimball/
Lecture 7: Business Analytics Planning; Case Presentations

What do we get for it?
A cost benefit analysis at the program level

What should we be doing?
An “outside in” view of what customers see and value

How should we be doing it?
An “inside out” assessment of what we think and do

When should we be doing it?
Consolidated and prioritized initiatives to operationalize the business

How do we rally the organization to sustained action?

What are the underlying processes?
Processes and metrics

Quick Wins