Exploring the Use of Big Data in Strategic Business Education
A Case Study Approach

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Ithaca College

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Ithaca College
Ithaca College (IC) is located in Ithaca, NY U.S.A.
Ithaca College

- 4-year Private Comprehensive Residential College
- Started as a Conservatory of Music in 1892
- 6,200 UG, 500 Grads, and 700 Faculty
- $39,500 Tuition in 2014-15
- Four Professional Schools (Music, Business, Health Sciences, and Communications) and One Liberal Arts School
- Experiential and Integrative Learning
- IBM’s Smarter Planet Client
Ithaca College’s Challenges

- **Tuition-Driven Budget**
  - Tuition Revenue is the most significant source of income

- **Declining High School Graduates in Northeast U.S.A.**
  - About 80+% of Ithaca’s Students are from Northeast

- **Need for More Diverse Student Body**
  - Only 15% of the 2009 Cohort were ALANA (African, Latino/a, Asian and Native American)
  - Ithaca’s strategic plan -- 20% by 2020
Ithaca College’s Response

Education –

• Revised Core Curriculum
• Promoting Experiential and Integrative Learning
  (School of Business, Trading Room, Investment Track)

Enrollment –

• Test-Optional admission Policy implementation in 2012
• Invest in IC PEERS (own Social Network) and associated
  Predictive Analytics with Big Data

Marketing – Institutional Branding Campaign

Finance – Increased Affordability for Students and Families
Case No. 1

Ithaca College’s School of Business
“Trading Room” and
Big Data & Analytics
The Trading Room at Ithaca College

- AACSB accredited premier education
- ~700 Undergraduates and 30 MBAs
- Housed in a LEED Platinum Certified Sustainable Building
- Undergraduate Degrees in:
  - Accounting
  - Business Administration
  - Legal Studies
- Graduate Degrees in:
  - M.B.A.
  - M.B.A. in Professional Accountancy
The Trading Room at Ithaca College

The Center for Trading and Analysis of Financial Instruments (The Trading Room)

- Since 1994 (Pioneer)

- Dual monitor setups at each of 49 teaching workstations & 12 Bloomberg terminals

- Students can access to Big Financial Data through Analytics from over 125 data sources (stock, bond, currency, commodity, and industry & macroeconomics data from all over the world) in real-time
The Trading Room in Action
Philosophy and Purpose

Marriage of Theory and Practice

- Student-Managed Activities
  - The Core Trading Consultants (=CTC)
  - The Investment Challenge
  - IC Investment Club
  - Investment Track

- Interactive/Dynamic Learning

- Leadership Nurturing

- Certifications in Bloomberg and Eikon
The Trading Room as Teaching Tool

Example - 5 Courses with more than $500,000
Real-Time Portfolio Management I and II Example (400-level advanced finance courses in sequence)

Learning through Real Activities

- Investment Decision Making
- Initiation and Execution of Trades
- Portfolio Formation and Risk Evaluation
- Assessment of Portfolio Position and Performance Evaluation against Benchmarks

Using the Ithaca Real-Time Fund for Learn and Earn
Analyzing Big Data through Analytics

- Bloomberg Terminals (12)
- Eikon (previously known as Thomson One) (60)
  - A specialized analytics developed by Bloomberg and Thomson Reuters
  - Enables students to interpret, analyze, and monitor real-time Big Data (created in trades of equities, bonds, options, futures, currencies, commodities, and other valuable assets) in the financial markets

- Data Stream
- Morningstar, Valueline, Russell Investments
- @RISK and Decision Tools Suite
- BARRA on Campus Portfolio Risk Analysis
Analyzing IBM using Eikon

<table>
<thead>
<tr>
<th>International Business Machines Corp</th>
<th>IBM</th>
<th>Last 186.4300 USD</th>
<th>☢ +0.01 0.01%</th>
<th>Hold</th>
</tr>
</thead>
</table>

**PEERS FOR IBM**

<table>
<thead>
<tr>
<th>RIC</th>
<th>Company Name</th>
<th>Market Cap (US$ Millions)</th>
<th>Enterprise Value (US$ Millions)</th>
<th>Economic Sector</th>
<th>Industry Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM</td>
<td>International Business Machines Corp</td>
<td>188,216</td>
<td>222,857</td>
<td>Technology</td>
<td>Software &amp; IT Services</td>
</tr>
<tr>
<td>HPQ</td>
<td>Hewlett-Packard Co</td>
<td>60,993</td>
<td>69,803</td>
<td>Technology</td>
<td>Computers &amp; Office Equipment</td>
</tr>
<tr>
<td>EMC</td>
<td>EMC Corp</td>
<td>58,111</td>
<td>56,911</td>
<td>Technology</td>
<td>Computers &amp; Office Equipment</td>
</tr>
<tr>
<td>ACN</td>
<td>Accenture PLC</td>
<td>53,063</td>
<td>48,130</td>
<td>Industries</td>
<td>Commercial Services &amp; Supplies</td>
</tr>
<tr>
<td>CSCO</td>
<td>Cisco Systems Inc</td>
<td>129,580</td>
<td>92,658</td>
<td>Technology</td>
<td>Communications Equipment</td>
</tr>
<tr>
<td>CSN</td>
<td>Computer Sciences Corp</td>
<td>8,513</td>
<td>8,818</td>
<td>Technology</td>
<td>Software &amp; IT Services</td>
</tr>
<tr>
<td>ORCL</td>
<td>Oracle Corp</td>
<td>172,333</td>
<td>153,197</td>
<td>Technology</td>
<td>Software &amp; IT Services</td>
</tr>
<tr>
<td>MSFT</td>
<td>Microsoft Corp</td>
<td>379,775</td>
<td>314,977</td>
<td>Technology</td>
<td>Software &amp; IT Services</td>
</tr>
</tbody>
</table>

**PEER COMPARISON**

**Valuation (LTM = Last Twelve Month Fundamentals; NTM = Next Twelve Month SmartEstimates)**

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<thead>
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</tr>
</thead>
<tbody>
<tr>
<td>IBM</td>
<td>10.8</td>
<td>9.8</td>
<td>1.9</td>
<td>7.7</td>
<td>9.2</td>
<td>7.1</td>
<td>2.4</td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td></td>
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</tr>
</tbody>
</table>

**Growth (LTM = Last Twelve Month Fundamentals; NTM = Next Twelve Month SmartEstimates; LGT = Long Term Growth Mean Estimate)**

<table>
<thead>
<tr>
<th>RIC</th>
<th>EPS NTM vs LTM</th>
<th>EPS This Oh_ Yoy</th>
<th>EPS This Year</th>
<th>EPS LGT</th>
<th>Revenue NTM vs LTM</th>
<th>Revenue This Oh_Yoy</th>
<th>EBITDA NTM vs LTM</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM</td>
<td>10.8%</td>
<td>8.2%</td>
<td>11.9%</td>
<td>8.3%</td>
<td>-1.1%</td>
<td>4.5%</td>
<td>5.5%</td>
</tr>
<tr>
<td>Median</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Profitability (LTM = Last Twelve Month Fundamentals)**

<table>
<thead>
<tr>
<th>RIC</th>
<th>ROE LTM</th>
<th>RDA LTM</th>
<th>Gross Margin LTM</th>
<th>Operating Margin LTM</th>
<th>Operating Margin 5 Yr Avg</th>
<th>Pretax Margin LTM</th>
<th>Net Margin LTM</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM</td>
<td>95.3%</td>
<td>14.9%</td>
<td>49.1%</td>
<td>20.3%</td>
<td>19.6%</td>
<td>26.3%</td>
<td>17.0%</td>
</tr>
<tr>
<td>Median</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**Balance Sheet (LTM = Last Twelve Month Fundamentals)**

<table>
<thead>
<tr>
<th>RIC</th>
<th>Debt/Equity</th>
<th>Net Debt/EBITDA</th>
<th>Interest Coverage LTM</th>
<th>Current Ratio LTM</th>
<th>Quick Ratio LTM</th>
<th>Inventory Turns LTM</th>
<th>Aged Receivables DSO LTM</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM</td>
<td>207.4%</td>
<td>1.1</td>
<td>49.6</td>
<td>1.1</td>
<td>1.1</td>
<td>20.7</td>
<td>111.6</td>
</tr>
</tbody>
</table>
<HELP> for explanation.

IBM US Equity 2) Peers 3) Actions Supply Chain Analysis

Viewing: International Business Machine
Analyze: Latest Sales Surprise % USD Display Name □ Quantified Relationships Only
Show As: 7) Chart 8) Table 9) Company Exposure 10) Relationship Exposure 11) Custom Sort
Show Events: None

IBM US’s Exposure to Related Companies:
Suppliers are sorted by the cost (COGS/CAPEX/S&G&R&D) paid by IBM US.
Customers are sorted by the revenue IBM US gets from the customers.

International Business Machines Corp
23 BI Peers (BRITBPOV Index)

399 Suppliers
484 Customers

Analysis: Latest Sales Surprise Percentage

Australia 61 2 9777 8600 Brazil 5511 3048 4500 Europe 44 20 7330 7500 Germany 49 69 9304 1210 Hong Kong 852 2977 6000
Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000

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Students’ Presenting in Trading Room
Success of Our Students
Case No. 2

Ithaca College’s Enrollment Management and Big Data & Analytics
Ithaca College as a Pioneer in Social Enrollment Management

IC PEERS since 2007
(IC’s Own Social Network)

Social Enrollment Management through IC PEERS Big Data and Predictive Modeling
Admissions Yield Rate by IC PEERS Activity Level

Yield Rate = \# Enrolled / \# Accepted

Source: Ithaca College Enrollment Planning Internal Reports
Predictive Modeling using IC PEERS Activity Data

Data Used
- Behavioral - Who’s doing what
- Interactional - Who’s talking to whom
- Descriptive - Characteristics and interests
- Attitudinal - Opinions, preferences, and desires

Building the Model
- Predicting enrollment and retention probability for each student
- More than 20 Predictors
  - Traditional Predictors (Background, Aid, Academic)
  - Social Media Predictors (login #, Photo, Friends #)
- Using logistic regression and probabilistic neural network techniques
SPSS Modeler v15 as a Modeling Tool
Our Big Results since Fall 2010

- Huge Growth in Application
- More Stable Enrollment
- Large Increase in Minority Students
- Some Success in Increasing Retention
**Demographic Change and IC Applications**

**HS Grads in Northeast vs. IC Applications**

<table>
<thead>
<tr>
<th>Year</th>
<th>HS Grads in NE</th>
<th>IC Apps Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall '00</td>
<td>453,814</td>
<td>18,207</td>
</tr>
<tr>
<td>Fall '01</td>
<td>543,660</td>
<td>15,658</td>
</tr>
<tr>
<td>Fall '02</td>
<td>543,660</td>
<td>13,813</td>
</tr>
<tr>
<td>Fall '03</td>
<td>543,660</td>
<td>13,546</td>
</tr>
<tr>
<td>Fall '04</td>
<td>543,660</td>
<td>13,546</td>
</tr>
<tr>
<td>Fall '05</td>
<td>543,660</td>
<td>13,546</td>
</tr>
<tr>
<td>Fall '06</td>
<td>543,660</td>
<td>13,546</td>
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<tr>
<td>Fall '07</td>
<td>543,660</td>
<td>13,546</td>
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<td>Fall '08</td>
<td>543,660</td>
<td>13,546</td>
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<td>Fall '09</td>
<td>543,660</td>
<td>13,546</td>
</tr>
<tr>
<td>Fall '10</td>
<td>543,660</td>
<td>13,546</td>
</tr>
<tr>
<td>Fall '11</td>
<td>543,660</td>
<td>13,546</td>
</tr>
<tr>
<td>Fall '12</td>
<td>543,660</td>
<td>13,546</td>
</tr>
<tr>
<td>Fall '13</td>
<td>543,660</td>
<td>13,546</td>
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<tr>
<td>Fall '14</td>
<td>543,660</td>
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<td>Fall '15</td>
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<td>Fall '16</td>
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<td>13,546</td>
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<tr>
<td>Fall '17</td>
<td>543,660</td>
<td>13,546</td>
</tr>
<tr>
<td>Fall '18</td>
<td>543,660</td>
<td>13,546</td>
</tr>
</tbody>
</table>

**Source:** High School Graduates by NCES

**Actual 1999/00 – 2006/07**

**Projection 2007/08 – 2018/19**
More Stable Freshman Enrollment

Freshmen Enrollment (October 1)  Yield %

Source: Oct 1 Enrollment Reports 2000 - 2014 by IR
ALANA (Minorities) Enrollment

<table>
<thead>
<tr>
<th>Year</th>
<th>% of Freshmen Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>12.0%</td>
</tr>
<tr>
<td>2007</td>
<td>11.7%</td>
</tr>
<tr>
<td>2008</td>
<td>13.4%</td>
</tr>
<tr>
<td>2009</td>
<td>14.9%</td>
</tr>
<tr>
<td>2010</td>
<td>15.4%</td>
</tr>
<tr>
<td>2011</td>
<td>18.4%</td>
</tr>
<tr>
<td>2012</td>
<td>19.2%</td>
</tr>
<tr>
<td>2013</td>
<td>22.3%</td>
</tr>
<tr>
<td>2014</td>
<td>22.3%</td>
</tr>
</tbody>
</table>

Source: August Final Reports by Admission
Conclusion

- Ithaca College is successfully managing the challenges with the effective use of Big Data and Analytics in teaching as well as in servicing students!
- Visit us at www.Ithaca.edu
- Business School at www.ithaca.edu/business/
- Tune in the Ithaca College – IBM joint webinar hosted by Chronicle of Higher Ed
- Abraham’s E-mail: Mulugetta@ithaca.edu
- Yuko’s E-mail: YMulugetta@ithaca.edu