DETERMINING THE ECONOMIC VALUE OF YOUR DATA

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UNIVERSITY SAN FRANCISCO, SCHOOL OF MANAGEMENT
EXECUTIVE FELLOW
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“Organizations do not need a big data strategy; they need a business strategy that incorporates big data.”

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HERE IS WHAT WE ARE GOING TO LEARNED

• Understand a maturity model that measures how effective your organization is at leveraging data and analytics to power your business models

• Learn a process for breaking down your organization’s key business initiatives into supporting data, analytics, and technologies

• Learn techniques to identify data sources that “might” yield better predictors of business performance and

• Discover how to “Think like a data scientist”

• Understand the roles of data science and the data lake in supporting your big data business strategy

⭐️ Explore a methodology for determining the economic value of the organization’s data and resulting analytics
BIG DATA BUSINESS MODEL MATURITY INDEX

Measures degree to which organizations have integrated data and analytics into their business models.

Key Business Processes
- Economic Drivers
- Business Monetization
- Business Insights
- Business Optimization
- Prescriptive Recommendations

Business Metamorphosis
Insights Monetization
DRIVING BUSINESS AND IT BIG DATA ALIGNMENT

BUSINESS INITIATIVE

STAKEHOLDERS

KEY DECISIONS

QUESTIONS

DATA

ARCHITECTURE & BIG DATA TECHNOLOGIES
BIG DATA IS CREATING A "CONNECTED" WORLD
Your Customers Are Leaving Their Digital Fingerprints All Over Internet
Every Two Days We Create As Much Information As We Did From The Dawn Of Civilization Until 2003
- Eric Schmidt, Google CEO

A Billion People Visit Facebook Every Day
- Business Insider

By 2018, Leading Enterprises Will Support 1,000–10,000 TIMES More Customer Touch Points
- IDC
BUT MILLENNIALS DEMANDING MORE

- 27% would consider a branchless digital bank
- 71% consider their banking relationship to be transactional rather than relationship driven
- 51% want their bank to proactively recommend products and services for their financial needs
- 48% are interested in real-time and forward-looking spending analysis

Source: "Millennials: Designing A Bank For The Future"
BY 2020: BRAVE NEW “CONNECTED” WORLD

- 30 Billion CONNECTED DEVICES
- 7 Billion CONNECTED PEOPLE
- 44 Zettabytes OF DATA
- Millions OF NEW BUSINESSES

Source: Gartner Group, 2014
“INTERNET OF THINGS” BECOMING...

- 39% of the world's population is connected
- 13B connected things
- Technology powers 80% of business process
- More data is created in one year than in previous 5000
...THE "INTERNET OF ONE"
HERE IS WHAT WE LEARNED?

• There is a growing *bounty* of available data (social media, video, audio, wearable computing, Internet of Things, smart appliances, bionic human)

• However...

  Money is to Wealth, as Data is to Knowledge

• Big Data is not about big; Big Data is about **SMALL**
  – At the level of the individual (humans or machines)
  – Understand individual behaviors, preferences, propensities, tendencies, inclinations, interests, passions, associations, affiliations, etc.
BIG DATA / IOT CHALLENGE: TRANSITIONING FROM “CONNECTED” TO “SMART”
BIG DATA IS...  SMART FACTORIES
BIG DATA IS... SMART HOSPITALS
BIG DATA IS...

SMART CITIES
BUT WHAT IS “SMART”? 

“SMART” IS THE SUM OF THE DECISIONS THAT SUPPORT AN ENTITY’S BUSINESS OBJECTIVES

“Smart” City would include the following Decisions (Use Cases):

- Roads
- Bike lanes
- Pedestrian lanes
- Traffic flow
- Parking
- Road maintenance
- Building permits
- Events management
- Pollution
- Sustainability
- Malls
- Office Parks
- Crime
- Parks
- Schools
- …
BIG DATA IS... SMART UNIVERITIES
“SMART” UNIVERSITY EXERCISE

WHAT DECISIONS DOES A UNIVERSITY NEED TO MAKE TO SUPPORT ITS EDUCATIONAL AND BUSINESS OBJECTIVES?
“SMART” UNIVERSITY EXERCISE

WHAT DECISIONS DOES A UNIVERSITY NEED TO MAKE TO SUPPORT ITS EDUCATIONAL AND BUSINESS OBJECTIVES?

- Marketing
- Student recruiting
- Admissions
- Student retention
- Student performance
- Classes / curriculum
- Professor recruiting
- Professor retention
- Safety

- Facilities maintenance
- Capital programs
- Energy usage
- Carbon footprint
- Donor targeting
- Legacy giving
- Events
- Athletics
- ...
HERE IS WHAT WE LEARNED?

• The Internet of Things (Industrial Internet) is creating a “connected” world via machine-to-machine communications

• But “connected” does not necessarily mean “smart”

• “Smart” is the sum of the Decisions that support an entity’s business objectives

• Use Cases are groupings of Decisions around a common subject area
INTRODUCING
DATA SCIENCE
EVOLUTION OF ANALYTICS

Business Intelligence AND Data Science

Data Science
- Predictive analytics
- Prescriptive analytics
- What is likely to happen?
- What should I do?

Business Intelligence
- Standard reporting
- What happened?

Business Value
- High
- Low

Time Horizon
- Past
- Future
WHAT IS DATA SCIENCE?

DATA SCIENCE: IDENTIFYING THOSE VARIABLES AND METRICS THAT MIGHT BE BETTER PREDICTORS OF PERFORMANCE

A's vs. Yankees Cost Per Win ($M)

- Athletics
- Yankees

BUSINESS INTELLIGENCE PROCESS

**Step 1:** Pre-build data schema (schema-on-load)

**Step 2:** Define question to be answered (queries)

**Step 3:** Use Business Intelligence (BI) tool’s graphical user interface (GUI) to construct query

**Step 4:** BI tool creates SQL

**Step 5:** SQL is run against data warehouse to create report
**DATA SCIENCE PROCESS**

**Step 1:** Define *Decision* to be made or *Hypothesis* to test

**Step 2:** Gather data...and more data (Data Lake: SQL + Hadoop)

**Step 3:** Prepare data; Build schema (schema-on-query)

**Step 4:** Visualize the data (Tableau, Spotfire, ggplot2,...)

**Step 5:** Build analytic models (SAS, R, MADlib, Mahout,...)

**Step 6:** Evaluate model results (probabilities, confidence levels)

**Historical**
- Kronos
- Epic
- Lawson

**Weather Forecast**

**CDC**

**Google Trends**

**Physician Notes**

**Local Events**

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*REPEAT*
# Different Levels of Analytics

<table>
<thead>
<tr>
<th>Descriptive Analytics (What happened?)</th>
<th>Predictive Analytics (What is likely to happen?)</th>
<th>Prescriptive Analytics (What should we do?)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• What were revenues last week?</td>
<td>• What will revenues be next week?</td>
<td>• Run BOGOF Burrito promotion Wednesday 7–9pm to attract 55–75 more college students</td>
</tr>
<tr>
<td>• How many customers visited the store during last Sunday’s Farmer’s Market?</td>
<td>• How many customers will visit the store during next Sunday’s Farmer’s Market?</td>
<td>• Add 2 more workers 11:00am–2:00pm and 5:00pm–9:00pm on May 5</td>
</tr>
<tr>
<td>• What products sold more than the week before?</td>
<td>• Which products will likely sell the most next week?</td>
<td>• Increase chicken inventory next week by 15%</td>
</tr>
<tr>
<td>• How many employees did we hire last month?</td>
<td>• How many new employees will we need to hire next month?</td>
<td>• Increase hiring pipeline next month by 20 candidates</td>
</tr>
</tbody>
</table>

- **Prescriptive Analytics**
  - What should we do?
  - Run BOGOF Burrito promotion Wednesday 7–9pm to attract 55–75 more college students
  - Add 2 more workers 11:00am–2:00pm and 5:00pm–9:00pm on May 5
  - Increase chicken inventory next week by 15%
  - Increase hiring pipeline next month by 20 candidates

- **Predictive Analytics**
  - What is likely to happen?
  - What will revenues be next week?
  - How many customers will visit the store during next Sunday’s Farmer’s Market?
  - Which products will likely sell the most next week?
  - How many new employees will we need to hire next month?

- **Descriptive Analytics**
  - What happened?
  - What were revenues last week?
  - How many customers visited the store during last Sunday’s Farmer’s Market?
  - What products sold more than the week before?
  - How many employees did we hire last month?
## SUMMARY: BI VS. DATA SCIENCE

<table>
<thead>
<tr>
<th>Business Intelligence (BI)</th>
<th>Data Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retrospective</td>
<td>Forward-looking view</td>
</tr>
<tr>
<td>Reports, Dashboards, KPI’s</td>
<td>Patterns, Correlations, Models</td>
</tr>
<tr>
<td>Descriptive Questions</td>
<td>Predictive/Prescriptive Decisions</td>
</tr>
<tr>
<td>What Happened?</td>
<td>What Is Likely To Happen?</td>
</tr>
<tr>
<td>Summarized Data</td>
<td>Granular Data</td>
</tr>
<tr>
<td>Aggregated <em>(Comparative)</em> Analysis</td>
<td>Individual <em>(Behavioral)</em> Analysis</td>
</tr>
</tbody>
</table>

→ Questions are Informative  → Decisions are Actionable
HERE IS WHAT WE LEARNED?

• **Data Science** is about identifying those variables and metrics that *might* be better predictors of performance
  – If you don’t have enough *might* moments, you’ll never have any *breakthrough* moments

• Data Science is about learning from failure
  – Requires “*fail fast/learn faster*” environment

• Data Lake **unchains** data science team from schema-heavy, highly-regulated data warehouse in order to rapidly ingest and test new data sources and new analytic algorithms
THINKING LIKE A DATA SCIENTIST
THINKING LIKE A DATA SCIENTIST

Must get Business Users to “Think Like a Data Scientist”

• Identify right *decisions* to make, *predictions* to create and *hypotheses* to test

• Evolve from descriptive questions to *predictive* and *prescriptive* questions

• Brainstorm different data sources and metrics that might yield *better predictors of business performance*

• Blend metrics and variables to create actionable “*scores*”

• Identify where and how analytics (user-centric design) can *influence* customer behaviors and *empower* front-line employees
THINKING LIKE A DATA SCIENTIST PROCESS

Step 1: Identify Key Business Initiative
Step 2: Develop Business Stakeholder Personas
Step 3: Identify Strategic Nouns
Step 4: Capture Business Decisions
Step 5: Brainstorm Business Questions
Step 6: Leverage “By” Analysis
Step 7: Create Actionable Scores
Step 8: Putting Analytics Into Action
STEP 1: IDENTIFY BUSINESS INITIATIVES

Chipotle Business Initiatives

- Build people culture that attracts and empowers top performers
- Grow revenues (up 20.3% in 2012) opening new stores (opened 183 in 2012)
- Increase comparable restaurant sales growth (7.1% in 2012)
- Marketing building Chipotle brand and engaging with our customers
BUSINESS INITIATIVES

WHAT ARE THE CHARACTERISTICS OF A BUSINESS INITIATIVE THAT MAKE IT A GOOD BIG DATA CANDIDATE?

• Sense of **Urgency** (9-12 Months)
• Important To The **Business**
• Compelling **ROI**
• Clear Business **Ownership**
• Strong IT **Leadership**
• Bounty of Potential **Data** Sources
• **Analytics Friendly**
**STEP 2: IDENTIFY BUSINESS STAKEHOLDERS**

**CHIPOTLE STAKEHOLDER:** STORE MANAGER  
**CHIPOTLE BUSINESS INITIATIVE:** INCREASE SAME STORE SALES

**Overview:** Typically 2 to 4 years of Chipotle experience; promoted through the ranks to store manager within same store  
**Quote:** “I love Chipotle, so working here only seemed natural”

<table>
<thead>
<tr>
<th>Key Decisions</th>
<th>Supporting Business Questions</th>
<th>Pain Points</th>
</tr>
</thead>
</table>
| **Staffing**    | • What’s the likely store traffic throughout the day?  
                  • When and for how long are the local events?  | Lacks real-time model that allows him to update changing demand variables                                        |
| **Inventory**   | • Given store traffic estimates, how much additional inventory will I at what points in the day?  
                  • What local events that could impact inventory?  
                  • What are the types of local events?          | Doesn’t have insights into extra inventory at neighboring stores that might fill temporary inventory gaps       |
| **Customer       | • What’s the best comp to give unsatisfied customer?  
                  • How important is that customer to me?  
                  • What is the cost of the different comp options?  | Doesn’t know “how valuable” that particular customer is to the Chipotle                                          |
| **Satisfaction**|                                                                                                                         |                                                                                                                 |
| **Production**  | • Do I need to shift staff to produce more materials given the store traffic and time of day?  
                  • Which products are most popular for local events?                                                       | Doesn’t have insights into local events that could dramatically impact production needs                           |
STEP 3: IDENTIFY BUSINESS ENTITIES

CHIPOTLE BUSINESS INITIATIVE: INCREASE SAME STORE SALES

- **Customers**: Preferences such as products, locations, time of day, day of week, frequency, recency, monetary, etc.
- **Stores**: including traffic patterns, customer demographics and product preferences by time of day/day of week, etc.
- **Local Events**: details about local sporting and entertainment events including dates, times, type of event, number/roles/ages of participants, etc.
- **Competitors**: details including location, size of store, target audience, products, price points, promotions, hours, etc.
- **Employees**: details about demographics, experience, education, wages, training and performance ratings, etc.
- **Suppliers**: details about financial history, current financial stability, business history, supplier performance ratings, quality, reliability, etc.
STEP 4: CAPTURE BUSINESS DECISIONS

CHIPOTLE BUSINESS INITIATIVE: INCREASE SAME STORE SALES

- **Staffing**: How many staff do I need? What skills do I need? What roles do I need?
- **Scheduling**: When (dates and times)? For how long? How much overtime?
- **Inventory**: How much? Meats? Accessories? Beverages?
- **Production**: How much to produce? When? What types of items to produce?
- **Corporate sales (catering)**: Who to target? When are their events? What’s the priority targets?
- **Local events promotions**: Which events? What type of promotion? When to promote?
- **Local events sponsorships**: Which events? What type of sponsorship? When to sponsor?
Brainstorm the decisions necessary to support the targeted business initiative across business stakeholders.

**Business Initiative:** Increase Same Store Sales
GROUP DECISIONS INTO USE CASES
Group the decisions into common subject areas or use cases

Business Initiative: Increase Same Store Sales

- Increase shopping bag revenue
- Increase corporate catering
- Increase non-corporate catering
- Increase Store Traffic via local events marketing
- Improve promotional effectiveness
- Increase Store Traffic via Loyalty program
- Improve New Product Introduction Effectiveness
## STEP 5: IDENTIFY PREDICTIVE QUESTIONS

### CHIPOTLE BUSINESS INITIATIVE: INCREASE SAME STORE SALES

<table>
<thead>
<tr>
<th>Descriptive Questions</th>
<th>Convert to</th>
<th>Predictive Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>What were revenues last week?</td>
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<td></td>
<td>How many employees will we need to hire next month?</td>
</tr>
</tbody>
</table>
STEP 6: IDENTIFY VARIABLES & METRICS
CHIPOTLE BUSINESS INITIATIVE: INCREASE SAME STORE SALES

*What data might I want in order to predict... What will revenues be next week?*

- Store location
- Store size
- Store open date
- Store last remodel date
- Local demographics
- Local house values
- Local economic conditions
- Products sold
- Product add-on items
- Product configuration
- Time of day
- Day of week (weekends)
- Holidays
- Seasonality
- Weather conditions
- Traffic patterns
- Miles from high school
- Miles from mall
- Miles from business park
- Local sporting events
- Local entertainment events
- ...

Dell - Internal Use - Confidential
**STEP 7: CREATE ACTIONABLE SCORES**

**CHIPOTLE BUSINESS INITIATIVE:** INCREASE SAME STORE SALES

*What data might I want in order to predict... What will revenues be next week?*

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**Economic Potential**

**Local Vitality**
**STEP 8: IDENTIFY RECOMMENDATIONS**

**CHIPOTLE BUSINESS INITIATIVE: INCREASE SAME STORE SALES**

<table>
<thead>
<tr>
<th>Decisions</th>
<th>Recommendations</th>
<th>Scores / Metrics</th>
</tr>
</thead>
</table>
| **Staffing** | • How many people to staff?  
• What special skills do I need?  
• What are the staffing times? | **Economic Potential Score** | Local demographics  
Local house values  
Local economy  
Local unemployment rate |
| **Inventory** | • How much food inventory?  
• How much utensils and bowls inventory? | **Local Vitality Score** | Miles from high school  
Miles from mall  
Miles from business park  
# Local sporting events  
# Local entertainment events |
| **Promotions** | • What local events to sponsor?  
• What coupons to offer at which local events? | | |
CHIPOTLE: PUTTING ANALYTICS INTO ACTION

CHIPOTLE BUSINESS INITIATIVE: INCREASE SAME STORE SALES

Predicted Store Value = \int \text{[Current Store Value]}, \text{[Economic Potential]}, \text{[Local Vitality]}

- Revenue
- Market Basket
- Product Margins
- Store Tenure
- Customer Visits
- Frequency
- Recency
- Monetary

- Unemployment
- Population growth
- College degrees
- Income levels
- Average age
- Home values
- Building permits
- City budgets
- Nearby schools
- Nearby malls
- Organic food propensities
- Political preferences

Current Store Value | Predicted Store Value
HERE IS WHAT WE LEARNED?

• **Analytics** needs to be treated like a *business discipline*
  
  – Need to get business leaders to embrace the power of “thinking like a data scientist”

• Focus your big data journey on what’s important to the business (**Business Initiatives**)

• Identify and prioritize the **Decisions (Use Cases)**; linkage point to the data science team

• Leverage “By Analysis” to brainstorm variables and metrics that *might* be better predictors

• Create **Scores** that support delivery of **Recommendations** to customers and employees
DETERMINING THE ECONOMIC VALUE OF DATA
DETERMINING ECONOMIC VALUE OF DATA

“Data is an unusual currency. Most currencies exhibit a one-to-one transactional relationship. For example, the quantifiable value of a dollar is considered to be finite - it can only be used to buy one item or service at a time, or a person can only do one paid job at a time. But measuring the value of data is not constrained by transactional limitations.

In fact, data currency exhibits a **network effect**, where data can be used at the same time across multiple use cases thereby increasing its value to the organization. **This makes data a powerful currency in which to invest.**”

Source: “Determining the Economic Value of Data”
Economic Multiplier is an effect where an increase in spending produces an increase in national income and consumption greater than the initial amount. Every time there is an injection of money into the economy, there is an economic multiplier effect.
ECONOMIC MULTIPLIER EFFECT: DATA

Economic Multiplier is an effect where an increase in spending produces an increase in national income and consumption greater than the initial amount. Every time there is an injection of money into the economy, there is an economic multiplier effect.
INTELLECTUAL CAPITAL “RUBIK’S CUBE” CHALLENGES

• How does the organization determine the economic value of its data in order to drive prioritization and investment decisions?
• How does the organization avoid data silos, shadow IT spend and unmanaged data proliferation that thwart the potential value of data?
• How does the organization avoid the disillusionment of “orphaned analytics”?
• How do you re-tool the organization to establish a technical and cultural environment for collaborative value creation?

How does one leverage asset that appreciates (not depreciates) with usage and can be used simultaneously across multiple business processes?
INTELLECTUAL CAPITAL RUBIK’S CUBE SOLUTION

Decisions (Use Cases) - clusters of decisions around a common subject area in support of an organization’s key business initiatives

Data – detailed historical transactions coupled with internal unstructured data and publicly-available and 3P data sources

Analytics - data transformed into actionable analytic insights (scores, association rules, propensities, clusters, recommendations)
**CHIPOTLE BUSINESS INITIATIVES**

**Chipotle Business Initiatives**

- **Build people culture that attracts and empowers top performers**
- **Grow revenues (up 20.3% in 2012)**
  opening new stores (opened 183 in 2012)
  - Increase comparable restaurant sales growth (7.1% in 2012)
- **Marketing building Chipotle brand and engaging with our customers**

---

Dear Shareholders,

We are pleased with Chipotle’s performance in 2012, and are confident that the continuing strength of our business is a direct result of our focus on the key elements that drive our business, primarily our unique food and people culture. Together, these priorities are at the heart of our vision to change the way people think about and eat fast food.

Our food culture sets us apart from other restaurants. We have always used great quality ingredients and prepared the food we serve using classic cooking techniques in open kitchens. We are proud of the way we source our fresh ingredients, and we find and maintain relationships with suppliers who share our commitment to excellence in food, quality, and sustainability. Our diverse menu offers a wide variety of options for our guests. We believe this broad line of products is a major factor in our success, and that we are positioned at the forefront of the emerging fast food category.

Throughout 2013, we continued to push executives to deliver better, more cost-effective results. Our ongoing efforts to reduce our cost structure and increase our efficiency, along with continued cost control efforts, resulted in a record-breaking $1.1 million in profit. We also continued to work with our suppliers to ensure that our food is produced in a sustainable manner. We continuously work with our suppliers to ensure that our food is produced in a sustainable manner.

We believe that Chipotle is the leader in the fast food category. We are proud of the way we source our fresh ingredients, and we find and maintain relationships with suppliers who share our commitment to excellence in food, quality, and sustainability. Our diverse menu offers a wide variety of options for our guests. We believe this broad line of products is a major factor in our success, and that we are positioned at the forefront of the emerging fast food category.

We will continue to invest in our people culture and marketing initiatives. We will work to attract and retain the best talent, and we will continue to build our brand and engage with our customers.

Sincerely,

Dinesh Thakkar
Founder, Chairman, & Co-CEO

Marc Shurtleff
Co-CEO

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*Chipotle 2012 Annual Report*
ESTIMATE **FINANCIAL IMPACT** OF TARGETED BUSINESS INITIATIVE

- Calculate a rough order estimate of the financial value of the target business initiative

- Beware “analysis paralysis”; rough order estimate or a “range of value” is sufficient

<table>
<thead>
<tr>
<th>Targeted Business Initiative: &quot;Increase Same Store Sales 7%&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chipotle Sales ($M)</td>
</tr>
<tr>
<td>Number of Stores</td>
</tr>
<tr>
<td>Average Store Sales ($M)</td>
</tr>
<tr>
<td>7% Increase in Avg Store Sales ($M)</td>
</tr>
<tr>
<td>Annual Impact ($M)</td>
</tr>
</tbody>
</table>
BRAINSTORM DECISIONS BY STAKEHOLDER

Brainstorm the decisions necessary to support the targeted business initiative across business stakeholders

Business Initiative: Increase Same Store Sales
GROUP DECISIONS INTO USE CASES

Group the decisions into common subject areas or use cases

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- Improve New Product Introduction Effectiveness
**DOCUMENT USE CASES**

**BUSINESS INITIATIVE: INCREASE SAME STORE SALES**

**INCREASE STORE TRAFFIC VIA LOCAL EVENTS MARKETING:** Leverage local events (little league, soccer tournaments, school sports, college events, concerts, etc.) with localized marketing campaigns, promotions and sponsorship to increase store traffic during local events.

<table>
<thead>
<tr>
<th>BUSINESS POTENTIAL</th>
<th>IMPLEMENTATION RISKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Develop highly-localized marketing campaigns and promotions based on the local store demographics, economics and social vibrancy</td>
<td>• Tracking effectiveness of campaigns</td>
</tr>
<tr>
<td>• Understand local events’ demographics in order to make sponsorship and promotional determinations</td>
<td>• Capturing (screen scraping) local events data</td>
</tr>
<tr>
<td></td>
<td>• Ability to create localized campaigns</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CHIPOTLE FINANCIAL GOALS IMPACT</th>
<th>IMPLEMENTATION CONSIDERATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Store Revenue Growth</td>
<td>• Capturing and governing additional data</td>
</tr>
<tr>
<td>Customer Acquisition</td>
<td>• Ability to monitor sponsorship effectiveness</td>
</tr>
<tr>
<td>Customer Retention</td>
<td>• Store manager training and capabilities</td>
</tr>
<tr>
<td>Market Basket Margin</td>
<td>Overall Impact on Goals: 2.0</td>
</tr>
<tr>
<td>Product Cross-Sell</td>
<td>Overall Ease of Implementation: 2.5</td>
</tr>
<tr>
<td>New Products</td>
<td></td>
</tr>
<tr>
<td>Overall Impact on Goals: 2.0</td>
<td></td>
</tr>
</tbody>
</table>

Revenue Potential: $_______
CREATE USE CASE SCENARIOS

For each use case, create a financial scenario for each impacted business function

**USE CASE: INCREASE STORE TRAFFIC VIA LOCAL EVENTS MARKETING**

**Field Marketing:** incremental revenue generated from localized events pamphlets and brochures = $62.5M

**Store Operations:** co-branded holiday events with local businesses (Christmas event with New York Times) = $55M

<table>
<thead>
<tr>
<th><strong>Field Marketing Scenario</strong></th>
<th><strong>Store Operations Scenario</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of local event days per year per store</td>
<td>Number of holiday event days per year per store</td>
</tr>
<tr>
<td>Avg Number of event attendees per day per store</td>
<td>Avg Number of event attendees per day</td>
</tr>
<tr>
<td>Incremental Conversion Rate</td>
<td>Incremental Conversion Rate</td>
</tr>
<tr>
<td>Net New Customer Visits per Store</td>
<td>Net New Customer Visits per Store</td>
</tr>
<tr>
<td>Average Transaction Size</td>
<td>Average Transaction Size</td>
</tr>
<tr>
<td>Number of Stores</td>
<td>Number of Stores</td>
</tr>
<tr>
<td>Incremental Annual Revenue Impact ($M)</td>
<td>Expenses on extra utilities ($M)</td>
</tr>
</tbody>
</table>

| 50 | 65 |
| 525 | 700 |
| 15.0% | 16.0% |
| 3,938 | 7,280 |
| $11.25 | $11.25 |
| 1,410 | 1,410 |
| $62.5 | $31 |

**Wages to Temporary Employees ($M)**

$29.5

**Incremental Annual Revenue Impact ($M)**

$55.0
# ESTIMATE FINANCIAL IMPACT OF USE CASE

Leverage group dynamics to estimate value of each use case with respect to overall value of targeted business initiative

<table>
<thead>
<tr>
<th>Key Business Initiative: Increase Same Store Sales by 7%</th>
<th>Use Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Estimated value of Business Initiative: $191M annually)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial Value ($M)</td>
<td>Increase Store Traffic via local events marketing</td>
</tr>
<tr>
<td>Financial Value ($M)</td>
<td>$62.0</td>
</tr>
<tr>
<td>Field Marketing</td>
<td>$62</td>
</tr>
<tr>
<td>Store Operations</td>
<td>$55</td>
</tr>
<tr>
<td>Product Development</td>
<td>$45</td>
</tr>
<tr>
<td>Corporate Marketing</td>
<td>$50</td>
</tr>
<tr>
<td>Procurement</td>
<td>$22</td>
</tr>
</tbody>
</table>
**ESTIMATE FINANCIAL IMPACT OF USE CASE**

Assess (weigh) relative value of each individual data source vis-à-vis each individual use case

<table>
<thead>
<tr>
<th>Financial Value ($M)</th>
<th>$62.0</th>
<th>$56.0</th>
<th>$26.0</th>
<th>$24.0</th>
<th>$14.0</th>
<th>$18.0</th>
<th>$27.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>POS Transactions</td>
<td>●</td>
<td>●</td>
<td></td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Market Baskets</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Local Demographics</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Traffic</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Weather</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Local Events</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td></td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

*Key Business Initiative: Increase Same Store Sales by 7%
(Estimated value of Business Initiative: $191M annually)*
ESTIMATE FINANCIAL IMPACT OF USE CASE

Applying relative data source weighting to the value of each decision to get rough estimate of the data to that use case

<table>
<thead>
<tr>
<th>Key Business Initiative: Increase Same Store Sales by 7% (Estimated value of Business Initiative: $191M annually)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Use Cases</strong></td>
</tr>
<tr>
<td><strong>Data Sources</strong></td>
</tr>
<tr>
<td>Financial Value ($M)</td>
</tr>
<tr>
<td>POS Transactions</td>
</tr>
<tr>
<td>Market Baskets</td>
</tr>
<tr>
<td>Local Demographics</td>
</tr>
<tr>
<td>Traffic</td>
</tr>
<tr>
<td>Weather</td>
</tr>
<tr>
<td>Local Events</td>
</tr>
<tr>
<td>Value of data across all the use cases</td>
</tr>
</tbody>
</table>

Dell - Internal Use - Confidential
**DATA SOURCE x USE CASE MAPPING**

Data is the fuel of the modern, intelligent organization – an asset to be gathered, enriched and re-used across multiple Use Cases.

<table>
<thead>
<tr>
<th>Data Sources</th>
<th>Increase Store Traffic Local Events</th>
<th>Increase Store Traffic Loyalty</th>
<th>Increase Shopping Bag Revenue</th>
<th>Increase Corporate Catering</th>
<th>Increase Non-corporate Catering</th>
<th>Improve New Product Introductions</th>
<th>Improve Promotional Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Point of Sales</td>
<td>$62M</td>
<td>$56M</td>
<td>$26M</td>
<td>$24M</td>
<td>$14M</td>
<td>$18M</td>
<td>$27M</td>
</tr>
<tr>
<td>Market Baskets</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Store Demographics</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Local Competition</td>
<td>√</td>
<td></td>
<td></td>
<td>√</td>
<td></td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Store Manager Demo</td>
<td></td>
<td></td>
<td>√</td>
<td>√</td>
<td></td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Consumer Comments</td>
<td></td>
<td></td>
<td></td>
<td>√</td>
<td></td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Social Media</td>
<td>√</td>
<td>√</td>
<td></td>
<td>√</td>
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<td>√</td>
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<tr>
<td>Weather</td>
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<td>√</td>
<td></td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Local Events</td>
<td>√</td>
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<td>√</td>
</tr>
<tr>
<td>Traffic</td>
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<td>√</td>
<td></td>
<td>√</td>
<td>√</td>
</tr>
</tbody>
</table>

"Increase Same Store Sales" Use Cases ($191M)
Analytic Profiles are structures that standardize the collection and re-application of analytics about Business Entities across multiple use cases.

<table>
<thead>
<tr>
<th>Customer WDS120356 Analytic Profile</th>
<th>NCE Score</th>
<th>Var</th>
<th>Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
ANALYTIC PROFILES: CUSTOMER

Create scores that support the decisions that support each use case, and store those scores in the appropriate Analytic Profile

<table>
<thead>
<tr>
<th>Customer WDS120356 Analytic Profile</th>
<th>NCE Score</th>
<th>Var</th>
<th>Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographic segments 1.0</td>
<td>92</td>
<td>1.85</td>
<td>▲</td>
</tr>
<tr>
<td>Behavioral segments 1.2</td>
<td>67</td>
<td>3.25</td>
<td>▼</td>
</tr>
<tr>
<td>Loyalty Index 2.0</td>
<td>82</td>
<td>2.25</td>
<td>▲</td>
</tr>
<tr>
<td>Frequency Index 1.0</td>
<td>65</td>
<td>1.90</td>
<td>▼</td>
</tr>
<tr>
<td>Recency Index 1.0</td>
<td>92</td>
<td>1.89</td>
<td>▼</td>
</tr>
</tbody>
</table>

Use Case #1: Increase Store Traffic Local Events

Use Case #2: Increase Store Traffic Loyalty

Use Case #3: Increase Shopping Bag Revenue

Use Case #4: Increase Corporate Catering
# Analytic Profiles: Customer

Over time, more data is applied and the analytics stored in the Analytic Profiles grow and get refined across multiple use cases.

## Traditional Data
- Purchases
- Product Preferences
- Add-on Preferences
- Drink Preferences
- Visit Frequency
- Visit Recency
- Visit Monetary
- Market Basket
- Group Size
- Coupons
- Consumer Comments
- Store Manager Notes

## Non-traditional Data
- Social Media Posts
- Home Value
- Employment history
- Job Change Frequency
- Job Change Recency
- Industry certifications
- Industry awards
- Social Media Connections
- Education degrees
- Rank of college
- College donations
- Volunteer activities
- Parking tickets

<table>
<thead>
<tr>
<th>Customer WDS120356 Analytic Profile</th>
<th>NCE Score</th>
<th>Var</th>
<th>Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographic segments 3.2</td>
<td>92</td>
<td>1.85</td>
<td>▲</td>
</tr>
<tr>
<td>Behavioral segments 3.1</td>
<td>67</td>
<td>3.25</td>
<td>▼</td>
</tr>
<tr>
<td>Loyalty Index 2.0</td>
<td>82</td>
<td>2.25</td>
<td>▲</td>
</tr>
<tr>
<td>Frequency Index 1.0</td>
<td>65</td>
<td>1.90</td>
<td>▼</td>
</tr>
<tr>
<td>Recency Index 1.0</td>
<td>92</td>
<td>1.89</td>
<td>▼</td>
</tr>
<tr>
<td>Lifetime Value Calc 1.0</td>
<td>99</td>
<td>1.05</td>
<td>▲</td>
</tr>
<tr>
<td>Event Propensity 1.0</td>
<td>14</td>
<td>1.74</td>
<td></td>
</tr>
<tr>
<td>Promotion Propensity 1.1</td>
<td>02</td>
<td>1.15</td>
<td></td>
</tr>
<tr>
<td>Advocacy Propensity 2.1</td>
<td>08</td>
<td>1.20</td>
<td></td>
</tr>
<tr>
<td>Attrition Propensity 1.2</td>
<td>09</td>
<td>1.25</td>
<td></td>
</tr>
</tbody>
</table>
Analytic Profiles capture and codify insights about Business Entities that support multiple Use Cases

<table>
<thead>
<tr>
<th>Analytic Profiles (Business Entities)</th>
<th>“Increase Same Store Sales” Use Cases ($191M)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Increase Store Traffic Local Events</td>
</tr>
<tr>
<td></td>
<td>Increase Store Traffic Via Loyalty</td>
</tr>
<tr>
<td></td>
<td>Increase Shopping Bag Revenue</td>
</tr>
<tr>
<td></td>
<td>Increase Corporate Catering</td>
</tr>
<tr>
<td></td>
<td>Increase Non-corporate Catering</td>
</tr>
<tr>
<td></td>
<td>Improve New Product Introductions</td>
</tr>
<tr>
<td></td>
<td>Improve Promotional Effectiveness</td>
</tr>
<tr>
<td>$62M</td>
<td>$56M</td>
</tr>
<tr>
<td>$26M</td>
<td>$24M</td>
</tr>
<tr>
<td>$14M</td>
<td>$18M</td>
</tr>
<tr>
<td>$27M</td>
<td></td>
</tr>
<tr>
<td>Customers</td>
<td>√</td>
</tr>
<tr>
<td>Products</td>
<td>√</td>
</tr>
<tr>
<td>Stores</td>
<td>√</td>
</tr>
<tr>
<td>Managers</td>
<td>√</td>
</tr>
<tr>
<td>Local Events</td>
<td>√</td>
</tr>
<tr>
<td>Competitors</td>
<td>√</td>
</tr>
<tr>
<td>Suppliers</td>
<td>√</td>
</tr>
</tbody>
</table>
DATA LAKE PROMOTES DATA & ANALYTICS SHARING AND COLLABORATIVE VALUE CREATION

- Increase Store Traffic via Local Marketing
- Increase Store Traffic via Loyalty Program
- Increase Shopping Bag Revenue
- Increase Corporate Events
- Increase Non-corporate Events
- Optimize Store Remodeling
- Improve Manager Retention
- Improve Customer Retention
- Improve NPI Effectiveness
- Increase Promotional Effectiveness
- Increase Store Traffic via Local Marketing
- Increase Promotional Effectiveness
HERE IS WHAT WE LEARNED?

• Modern organization has new sources of **Intellectual Capital**: Data, Analytics, Use Cases

• Data as **currency** grows more valuable with re-use

• Populate your **Data Lake** one use case at a time

• **Analytic Profiles** support capture, refinement and re-use of analytics across use cases

• Data Lake can become your organization’s **collaborative value creation** platform
BIG DATA SUMMARY
“DATA IS THE NEW OIL...”

Understanding the “Economics of Oil” requires understanding the differences between **Potential Energy** versus **Kinetic Energy**
"Data is the new Oil" ...then "Analytics is the new Gas"

<table>
<thead>
<tr>
<th>Oil → Gas</th>
<th>Data → Analytics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil is raw and is of little direct use</td>
<td>Data is raw and is of little direct use</td>
</tr>
<tr>
<td>However, Oil has <strong>Potential Energy</strong></td>
<td>However, Data has <strong>Potential Value</strong></td>
</tr>
<tr>
<td><strong>Gas</strong> (refined Oil) has 5x to 10x more <strong>Potential Energy</strong> than Oil</td>
<td><strong>Analytics</strong> (refined Data) has 5x to 10x more <strong>Potential Value</strong> than Data</td>
</tr>
<tr>
<td>Burning Gas to <em>create motion</em> converts <strong>Potential Energy</strong> to <strong>Kinetic Energy</strong></td>
<td>Applying data science to <em>optimize decisions</em> converts <strong>Potential Value</strong> to <strong>Kinetic Value</strong></td>
</tr>
</tbody>
</table>

What happens to the **economic value** of a barrel of oil if the barrel of oil can be used **simultaneously across multiple uses** ...*without depletion*?

**Kinetic Energy** is the energy of motion, the movement of objects. Objects that are not in motion possess **Potential Energy**, which is converted to kinetic energy when some force (catalyst) acts upon the object to set it in motion.
HERE IS WHAT WE LEARNED

• Understand a maturity model that measures how effective your organization is at leveraging data and analytics to power your business models

• Learn a process for breaking down your organization’s key business initiatives into supporting data, analytics, and technologies

• Learn techniques to identify data sources that “might” yield better predictors of business performance and

• Discover how to “Think like a data scientist”

• Understand the roles of data science and the data lake in supporting your big data business strategy

• Explore a methodology for determining the economic value of the organization’s data and resulting analytics
THANK YOU!

BILL SCHMARZO
EMC GLOBAL SERVICES, CTO, BIG DATA PRACTICE

Executive Fellow, University San Francisco School of Management


• Determining the Economic Value of Data
• The Big Data Intellectual Capital Rubik’s Cube
• How to Avoid “Orphaned Analytics”
• To Achieve Big Data’s Potential, Get It Into The Boardroom
• Big Data Business Model Maturity Index (animation)
• How I’ve Learned To Stop Worrying And Love The Data Lake
• Thinking Like A Data Scientist

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Twitter: @schmarzo

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