

Big Data and Advanced Analytics (BDAA) for the Finance function

Citi TTS Client Advisory Board

May 2014

CONFIDENTIAL AND PROPRIETARY

Any use of this material without specific permission of McKinsey & Company is strictly prohibited

- **What is Big Data and Advanced Analytics?**
- How should Finance executives think about Big Data and Advanced Analytics?
- How can you get started?

What is Big Data and Advanced Analytics (“BDAA”)?

Big Data is...

- **Massive**, ranging from a few dozen terabytes to multiple petabytes
- **Diverse** in its form: semi- and unstructured data types
- **Distributed**: sourced from inside and outside the organization
- **Fast moving**, perpetually current data capture and transmission



Advanced Analytics is...

Use of techniques which are impossible to **replicate in scale, accuracy or scope** with traditional methods

- **Advanced techniques** beyond simple regression models (e.g., Bayesian models, neural networks, non-linear statistical modeling tools)
- **Predictive views** with increased accuracy due to larger sample sizes
- **“New analytics”**, e.g., application of analysis to social media chatter and data-mining



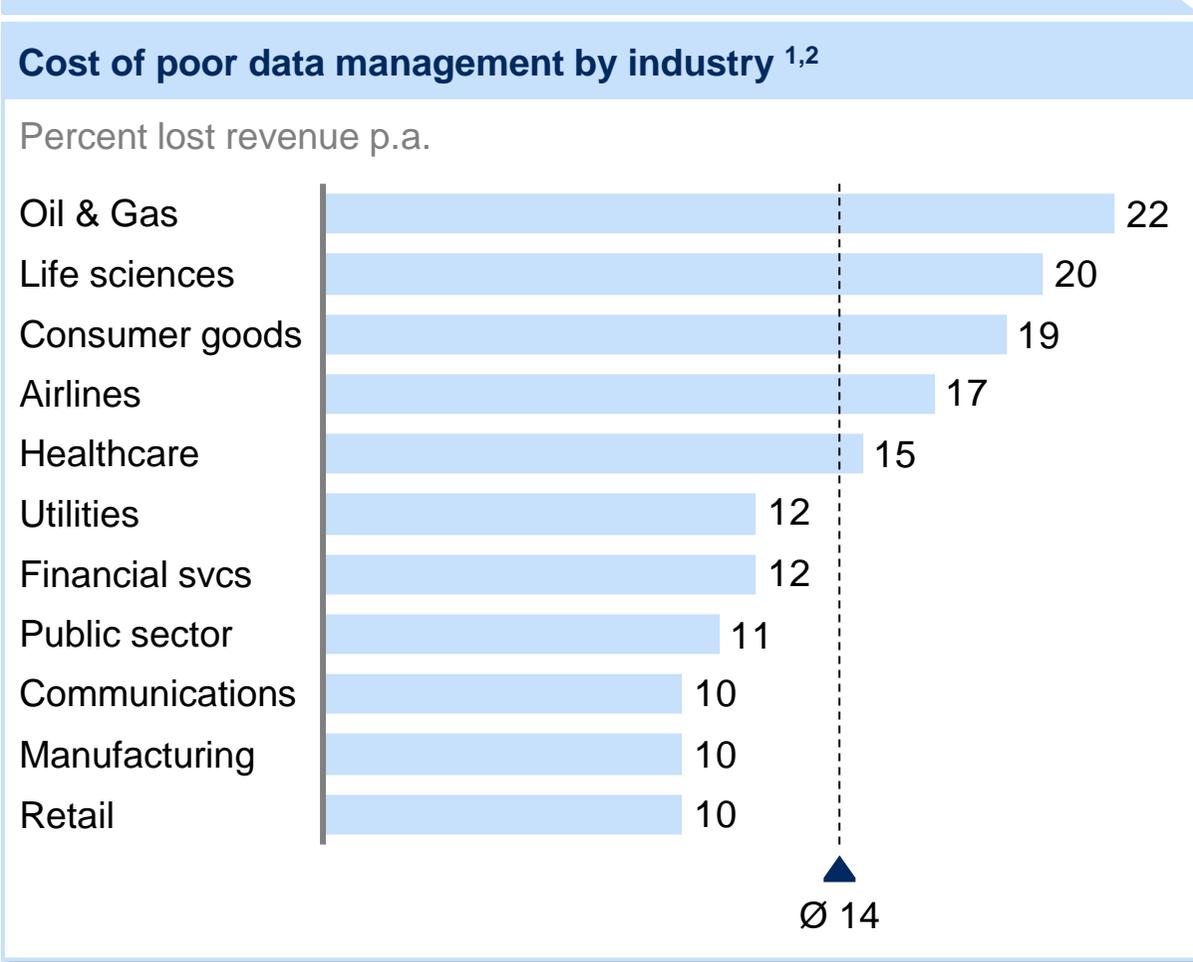
Finance BDAA toolkit

Impact of Big Data at your firms

What is the opportunity cost of not getting Big Data and Advanced Analytics right?

- A. No impact
- B. Less than 5% of revenue
- C. 5% to 10% of revenue
- D. 10% to 15% of revenue
- E. > 15% of revenue

Inability to leverage Big Data and poor data management costs firms an average of 14% in lost revenues per year



Heard in the field

“I am bombarded with so much data, I don’t know what to believe!”

“No single person owns data in my organization, so I have nowhere to go for help”

“Our IT systems trail our data needs two-fold, so until we fix that, we’ll never fully get our data capabilities right”

“Information and data reside everywhere in our organization so we need to go to BUs one by one to compile any database capabilities. Its very slow”

1 Represents percent of revenue loss due to inadequate data leverage; excludes additional benefits such as better capital usage (e.g., reduced working capital) and improved cost efficiencies

2 Survey of 333 North American C-level executives employed at organizations with at least 200 employees

Contents

- What is Big Data and Advanced Analytics?
- **How should Finance executives think about Big Data and Advanced Analytics?**
- How can you get started?

Finance executives are facing many traditional and new challenges

Challenges



Strategic decision making around growth
(e.g., organic / inorganic)

Typical root cause

- High reliance on legacy businesses over momentum
- Limited visibility into value drivers (e.g., city level vs. region)
- Inadequate “precision” around resource allocation (e.g., talent allocation)



Cost management

- High toll on resources required to support audit, compliance, reporting
- Inadequate visibility into cost drivers



Effectiveness as a performance challenger

- Significant knowledge disadvantage / information gap
- Lack of general appreciation of challenges on both sides: Finance and Business
- No internal consensus around which data should be used and from what source (e.g., high fragmentation of potential data sources)



Risk and upside management

- Poor understanding of value drivers
- Limited visibility into performance trends
- Overreliance on historical performance and data oversaturation



Inner- / cross-functional communication & collaboration

- Siloed nature of activities - minimal exchange of ideas and methods beyond the immediate team
- Incentives misalignment

BDAA provides opportunity to dramatically enhance Finance function's capabilities around the following eight areas

 Detailed further

A

Forecasting & scenario modeling



Enhance near-/long-term visibility into performance

B

Working capital optimization



Reduce working capital levels

C

Capital and resources allocation



Make better informed growth & project prioritization decisions

D

Revenue maximization



Take on a more active revenue manager role

E

Risk management



Enhance near-/long-term visibility into performance

F

Cost management



Implement more rigorous cost management techniques

G

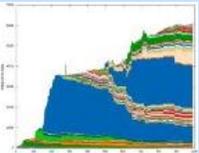
Human capital management



Maximize return on human capital investment

H

Visualization and transparency



Arm the organization with the right tools for decision making

Crowdsourcing has been leveraged by a number of companies resulting in a significant uplift in forecasting accuracy

Company	Examples of crowdsourcing tactics used	Impact
	<ul style="list-style-type: none"> Employees vote on next quarter sales for selected products 	<ul style="list-style-type: none"> Improved forecasting accuracy by 22% Identified “experts” who persistently show most accurate estimates
	<ul style="list-style-type: none"> Employees estimate the potential of new products on the market 	<ul style="list-style-type: none"> Improved accuracy by 81%, while lowering costs by \$7M (partial consumer survey replacement)
	<ul style="list-style-type: none"> Employees estimate economical cost drivers before official numbers are published 	<ul style="list-style-type: none"> Quicker information availability (e.g., planted soybean acreage in the US) with high accuracy (99%)
	<ul style="list-style-type: none"> Over 1,000 employees evaluate 26 product concepts through crowdvoting 	<ul style="list-style-type: none"> Quick (4 days), reliable (84% correlation with consumer survey) at low costs (90% savings)
<p>Disguised IT company</p>	<ul style="list-style-type: none"> Employees provide ideas on new business and customer acquisition models 	<ul style="list-style-type: none"> High participation (3,500 users) Identification of innovation leaders
	<ul style="list-style-type: none"> Consumers come up with new burger ideas and vote on their favorite creation 	<ul style="list-style-type: none"> Major sales boost Highly effective marketing (200k new Facebook fans)

- What can the crowd do for you and what can you do for the crowd?
- How can you tap your employees knowledge?
- How do you assess what customers actually want?

Enhance inventory management efficiency through innovative demand-sensing forecast approach

Traditional approach

- Apply seasonal modeling to historical data (e.g., Fourier time series with exponential smoothing) to forecast product sales
- Update model regularly with current production/supply, inventory and sales levels
- Typically results in 40-70% near-term forecast error

Vs.

Innovative approach

Integrate real-time account data from across the value chain



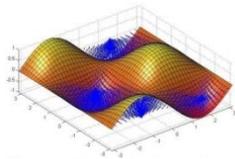
Incorporate external drivers



Integrate and standardize data from different sources



Use machine learning to recognize demand patterns and trends early



=

Calculate impact of advanced demand forecast on supply chain instantly – adjust production/procurement accordingly in real-time

Case examples



Introduced multi-enterprise demand-sensing application that draws sales data from retailers; reduced near-term forecast error by 40%



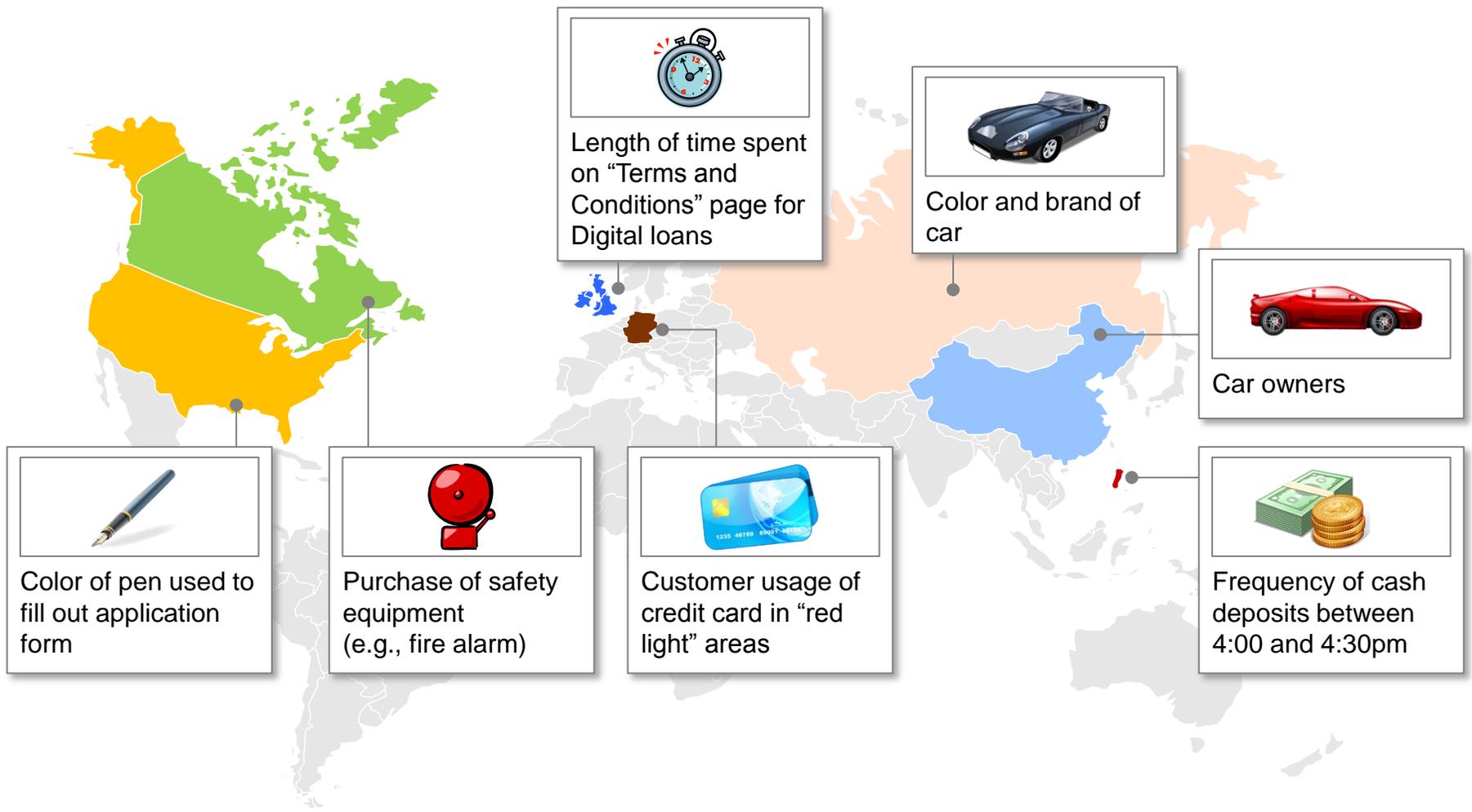
Informs inventory shipment strategies (e.g., types required) by linking distribution - to operations – to retailers demand near real-time



Uses long-term weather forecast technology for better inventory planning and more targeted replenishment (e.g., sell more seasonal merchandise)

Our experience shows that non-traditional factors have a high potential of improving the predictive power of models

Nontraditional factors that were used to build models



Opportunity areas at your firm

Where are the biggest opportunities for BDAA at your firm?

- A. Advanced forecasting and scenario modeling
- B. Working capital optimization
- C. Capital allocation / project prioritization
- D. Revenue maximization
- E. Advanced Risk Analytics
- F. Cost optimization
- G. Human capital management
- H. Visualization and transparency

Contents

- What is Big Data and Advanced Analytics?
- How should Finance executives think about Big Data and Advanced Analytics?
- **How can you get started?**

Big Data & Advanced Analytics key success factors

- I Foster a fact-based experimentation culture at the top of the house.** Cultivate a “govern by numbers” discipline, that enables data-driven experimentation
- II Build a robust data science talent bench.** BDAA initiatives call for a fundamentally different set of skills than Finance, with hybrid capabilities in analytics and creativity (e.g., knowledge of data machinery, architecture, and rigorous statistical analysis)
- III Don’t “boil the ocean”.** Ask specific and targeted questions to test educated hypotheses. Refocus when you hit diminishing analytical returns
- IV Develop a common data inventorying capability to ensure data accessibility.** Create a common data architecture (e.g., standardized data, centralized systems) with an inventory of both internal and external data to ensure enterprise-wide accessibility. Automate as needed
- V Start small and scale-up quickly when you find success.** Start BDAA initiatives within a BU or function. Refine and get it right before ramping up quickly across the enterprise
- VI Establish processes to execute on insight.** Have clear processes that translate analytically generated insights into business decisions and establish controls that govern these decisions

Ownership of BDAA initiatives at your firm

Who currently owns BDAA initiatives at your firm?

- A. CFO / Other Finance leaders
- B. CIO / CTO
- C. CMO / Other business unit leader
- D. CDO¹
- E. Others

Who do you believe is the optimal owner BDAA initiatives at your firm?

- A. CFO / Other Finance leaders
- B. CIO / CTO
- C. CMO / Other business unit leader
- D. CDO
- E. Others

1: CDO stands for Chief Data Officer

The Finance function is in a unique position when it comes to harvesting benefits of BDAA

What makes Finance function uniquely positioned to benefit from BDAA?

- **Unique access to various types of data**
- **Skills and analytical ownership** (e.g., predictive / forecasting models, capacity models, scenario modeling)
- **Objectivity / source of truth**
- **Cross-functional / cross-regional visibility**
- **Risk / compliance oversight**
- **Technology oversight**

A

Customer data
(e.g., age, income, wallet)

B

Transactional data
(e.g., shopping preferences)

C

Operational data
(e.g., supply chain, working capital, emails)

D

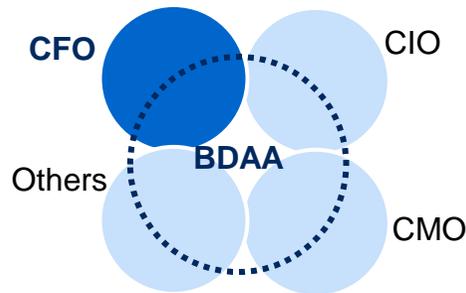
Public structured data
(e.g., public disclosures, scientific/ engineering data)

E

Public unstructured data (e.g., news and media, market feeds, social media)

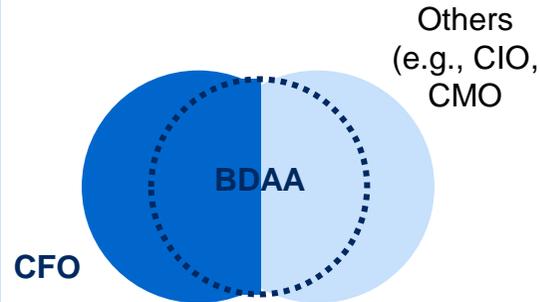
Finance function can play different roles to dial-up or down their involvement in BDAA initiatives

Option I: CFO as the owner of Finance BDAA strategy



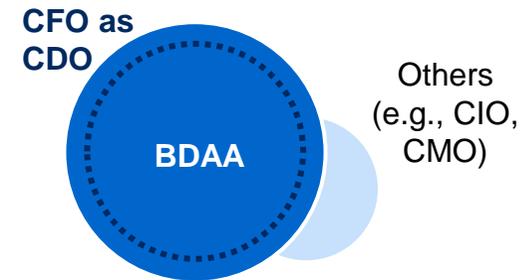
- CFO role is limited to identification and prioritization of BDAA opportunities in Finance function only
- Typically exists in sectors / companies with limited centralization and/or BDAA focus
- Cross-functional / BU opportunities are typically missed
- Limited CFO influence on strategic priorities
- Likely to require BDAA “proof of concept” to change the dynamics

Option II: CFO as the enterprise-wide BDAA portfolio manager



- CFO role includes broad visibility into enterprise-wide BDAA opportunities
- Responsible for efforts’ prioritization; viewed as a “challenger”
- Prevalent in organizations with top down push for more coordination

Option III: CFO as the owner for the enterprise data program



- CFO role includes
 - identification of BDAA opportunities enterprise-wide
 - aggregation of internal / external data
 - ownership of enterprise-wide BDAA analytics
- Prevalent in highly centralized organization embracing the potential impact / value of BDAA on the organization

Finance influence in the organization

NOTE: CDO stands for Chief Data Officer

Discussion questions

- **What are some of the key successes / challenges your organization faces today on BDAA efforts?**
- **How have you leveraged external partners to capture value from Big Data and Advanced Analytics?**
- **What role do you see Citi / TTS playing? What value do you see from such a collaboration?**