

# Big Data, Big Challenges

Moving Toward Business Analytics Maturity

**Dr. Henry DeVries**

Ellucian

September 25, 2015

BUGMI



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# Session Rules of Etiquette

**Please turn off your cell phone/pager**

**If you must leave the session early, please do so as discreetly as possible**

**Please avoid side conversation during the session**

**Thank you for your cooperation!**

# Introduction

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# About Me...

## Henry DeVries

- Management Consultant, Principal  
Targeted services for Business Analytics
- Ph.D. Cornell University  
40 years in higher education
- Faculty member, administrator, researcher
  - 16 years as CIO at Calvin College in Grand Rapids, MI
  - 13 years (concurrently) as CFO
  - Active in NACUBO, CACUBO, EDUCAUSE, CCCU

# Introduction

**“BIG Data” is a hot topic these days, but just what does it mean for higher education?**

**We’ll explore just what big data is in the context of higher education and learn how business analytics tools can help address the challenges of big data.**

# Agenda

- 1 Challenges of Big Data
- 2 Challenges Facing Higher Ed
- 3 Challenge's to Reaching Business Analytics Maturity
- 4 Challenges to Big Data Projects

# Definitions

## Is it Business Intelligence?

- “BI is any activity, tool, or process used to obtain the best information to support the process of making decisions.”  
-- *BI for Dummies*
- Purpose is to produce timely, accurate, high-value, actionable information.

## Is it Business Analytics?

- “The discovery and communication of meaningful patterns in data”
  - 1) descriptive and predictive models to gain knowledge from data (data analysis).
  - 2) using this insight to recommend action or guide decision-making (communications)

**“Analytics is used in a higher education environment to analyze various collected data points to gain insight and make informed decisions about complex issues.**

**Specific areas include academic analytics, business intelligence, and learning analytics”**

- Academic analytics: key institutional goals
- Business Intelligence: business performance
- Learning analytics: teaching/learning transaction



# Challenges of BIG Data

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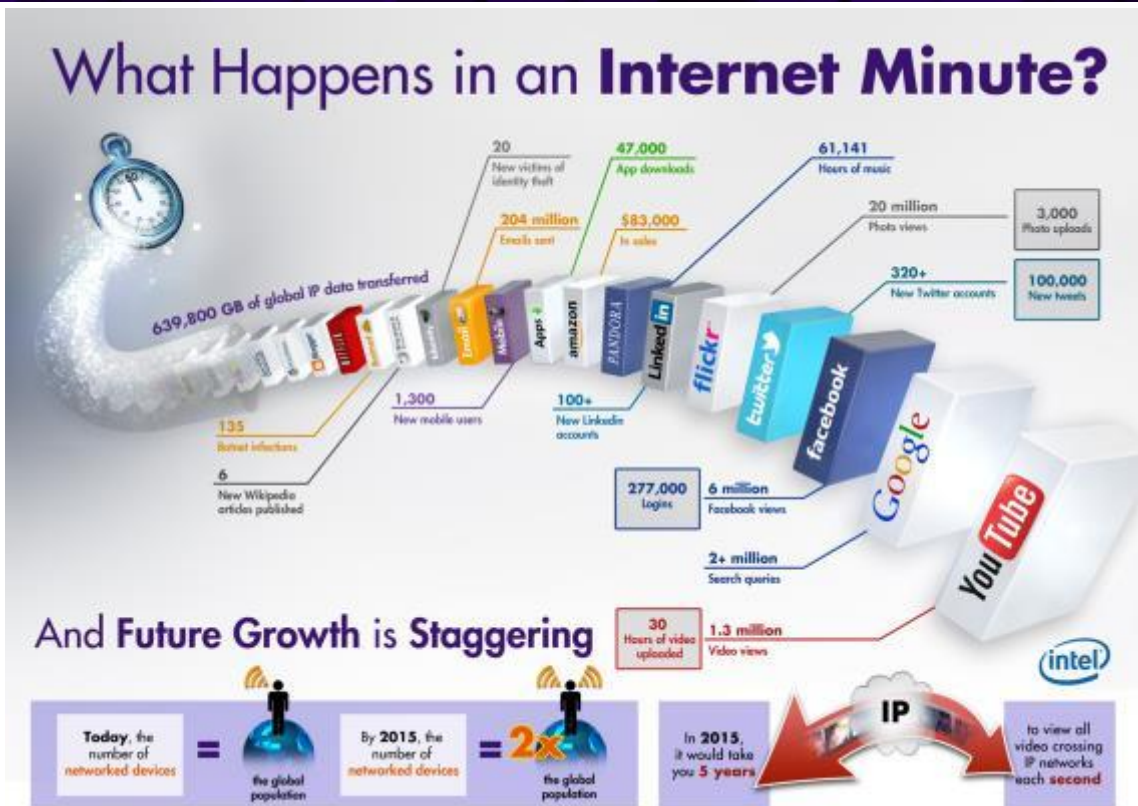
# Definition of Big Data

In 2012, Gartner updated its “3V’s” definition – “Big data are high volume, high velocity, and/or high variety.”



Big data is a collection of data sets so large and complex that it becomes difficult to process using on-hand database management tools or traditional data processing applications.

# What Happens in a Internet Minute?



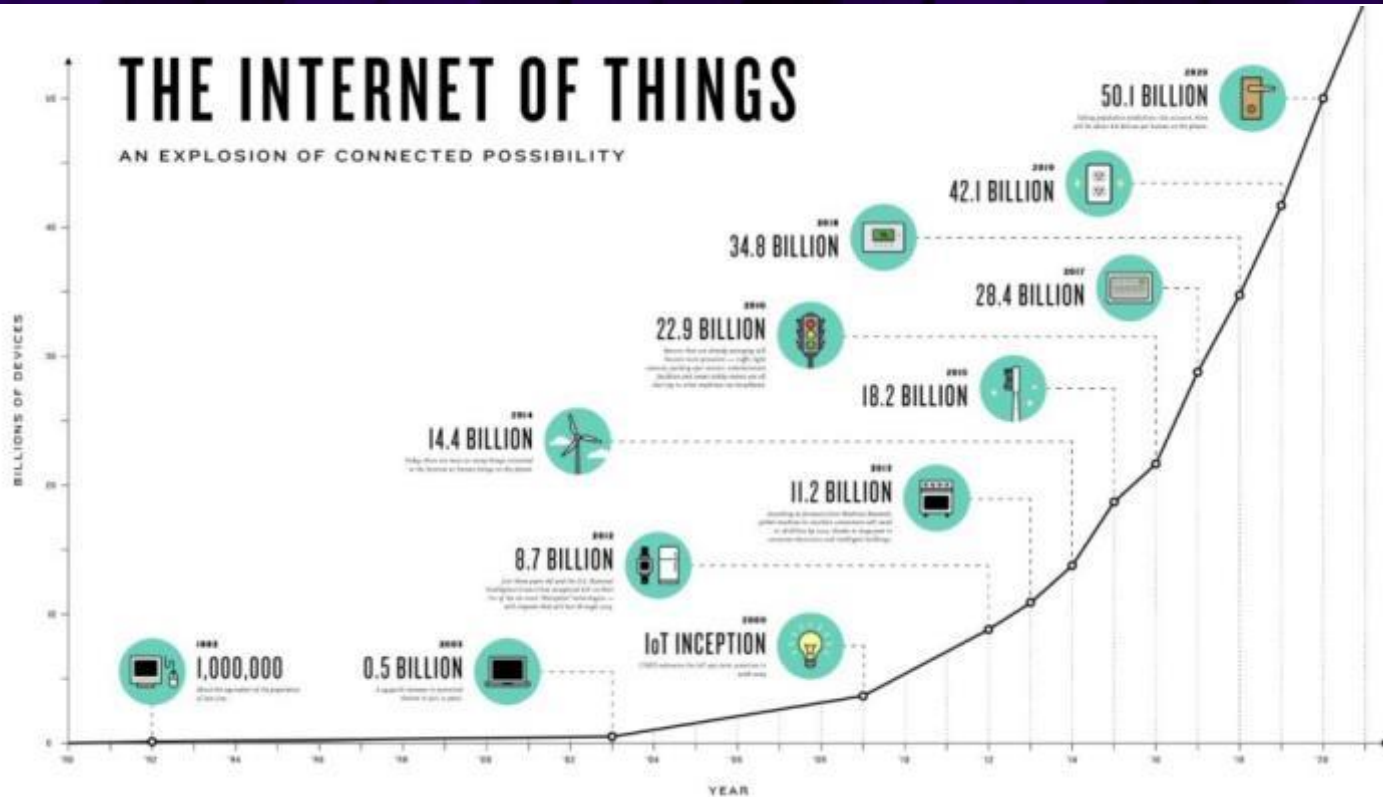
# Just One Example...



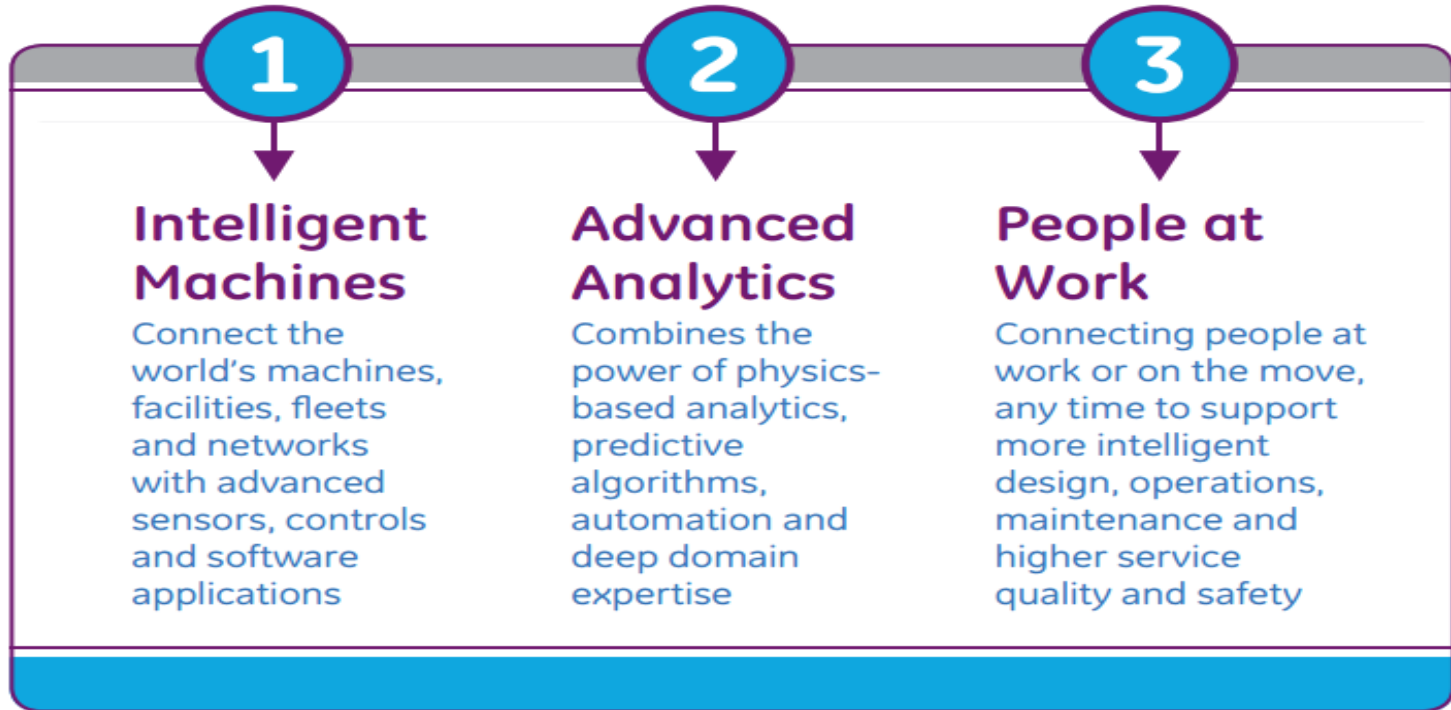
**1 engine,  
in one hour,  
20 Terabytes**

**1 Boeing 737,  
NYC to LAX,  
240 Terabytes**

# The Internet of Things



# “The Industrial Internet”



*Industrial Internet: Pushing the Boundaries of Minds and Machines*, Evans and Annunziata, Nov 26, 2012

# Powerful Motivation

Table 1: Industrial Internet: The Power of 1 Percent

## What if... Potential Performance Gains in Key Sectors

Industry	Segment	Type of Savings	Estimated Value Over 15 Years (Billion nominal US dollars)
Aviation	Commercial	1% Fuel Savings	\$30B
Power	Gas-fired Generation	1% Fuel Savings	\$66B
Healthcare	System-wide	1% Reduction in System Inefficiency	\$63B
Rail	Freight	1% Reduction in System Inefficiency	\$27B
Oil & Gas	Exploration & Development	1% Reduction in Capital Expenditures	\$90B

Note: Illustrative examples based on potential one percent savings applied across specific global industry sectors.  
Source: GE estimates

# Challenges facing Higher Ed

“Our big data challenge”

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## Funding Pressures

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## Doing More with Less

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## Academic Outcomes

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## Institutional Effectiveness

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## Accountability

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## Consumerization of Education

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## Obama 2020 Challenge

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## Lifelong Learning

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# Resulting Higher Ed Challenges

## Revenue Management

- Optimizing Recruitment, Retention and Fundraising
- Increasing Online Course Capacity to Drive New Enrollment
- Improving Grant Writing Expertise, Industry Partnerships

## Operational Efficiency

- Maximizing Use of Fixed Assets While Containing Cost
- Targeting Consolidation, Process Improvements, Metrics
- Financial visibility, discipline, controls

## Student Success

- Reducing the Friction Associated with Pursuing Degree
- Applying Technology to Tailor Learning Process to Student
- Matching Interests, Aptitudes and Opportunities

## Accountability

- Pressure to Demonstrate Institutional Effectiveness
- Focus on Retention, Graduation Rates, Learning Outcomes
- Many Constituencies to Serve

## Technology

- Evaluating Effectiveness of Investments
- Using Technology to Gain Operational Efficiencies
- Still Want to Meet Expectations of “YouTube” Generation

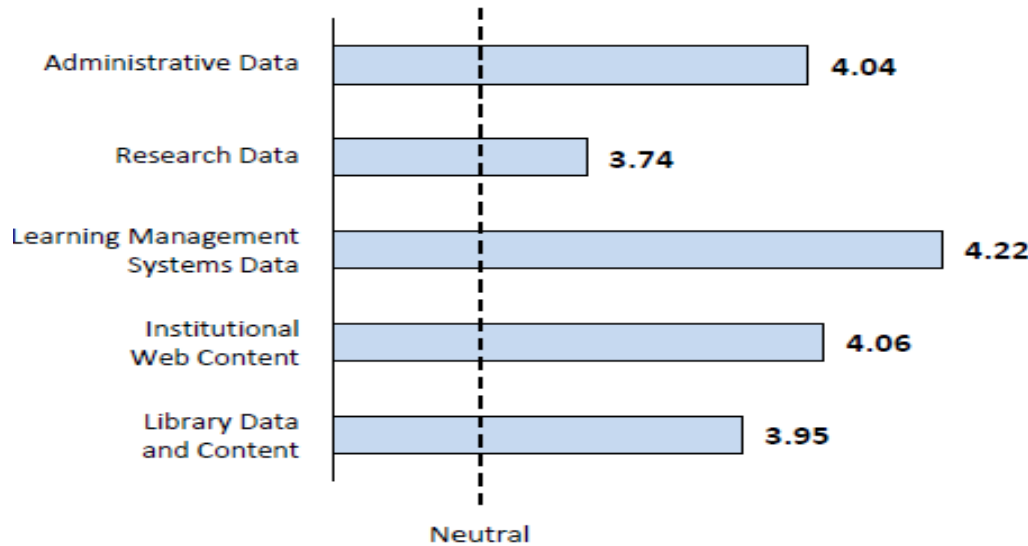
# Drowning in Data?

## *Institutions Have Data but Lack Useful Insights*

### Volume of Data Steadily Increasing...

*Institutions' Response to Change in Volume of Data in Past 12 Months*

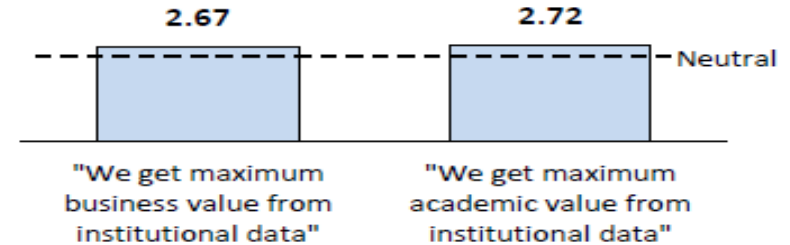
1 = greatly decreased; 5 = greatly increased



### ...But Value of Data Lags Considerably

*University Executives' Assessment of Data Management Outcomes*

1 = strongly disagree; 5 = strongly agree





## Lots of Data, But No Information

“I have tons of data, but it’s all in incomprehensible Excel spreadsheets. It is almost impossible to decipher.”

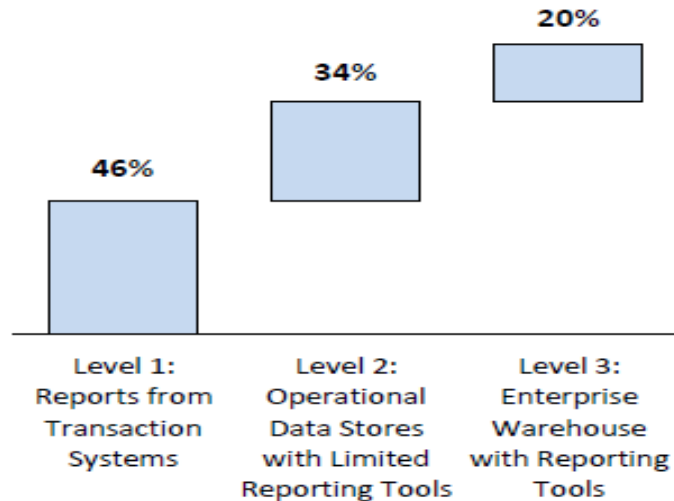
*Vice President of Finance and Administration  
Mid-Sized Community College*

# Winning a Battle, but Losing the War

*Universities Investing in Data Analytics are Reporting Progress*

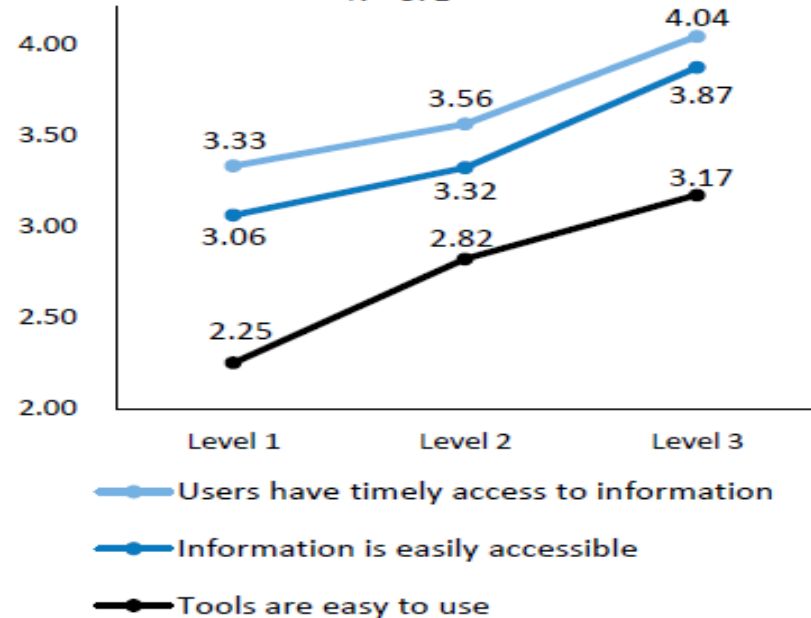
*Universities' Reporting and Analytical Capability*

N = 350



*Universities' Mean Satisfaction with Reporting and Analytical Capability*

N = 371

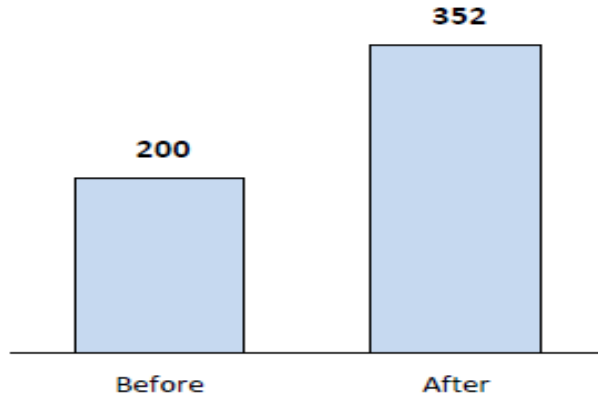


# With Friends Like These

## *Universities' Reporting Capacity Crowded Out by External Reporting Burden*

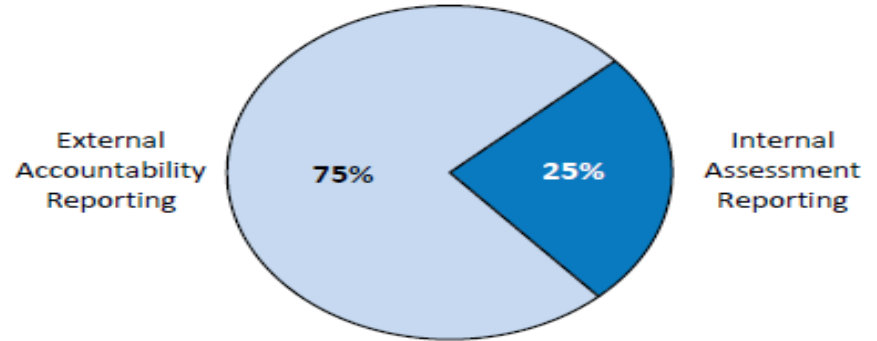
### **Increasing Regulatory Burden...**

*Number of Federal Reporting Requirements Before and After Higher Education Act of 2008*



### **...Puts Strain on IR's Reporting Capacity**

*Distribution of IR Reporting Capacity*

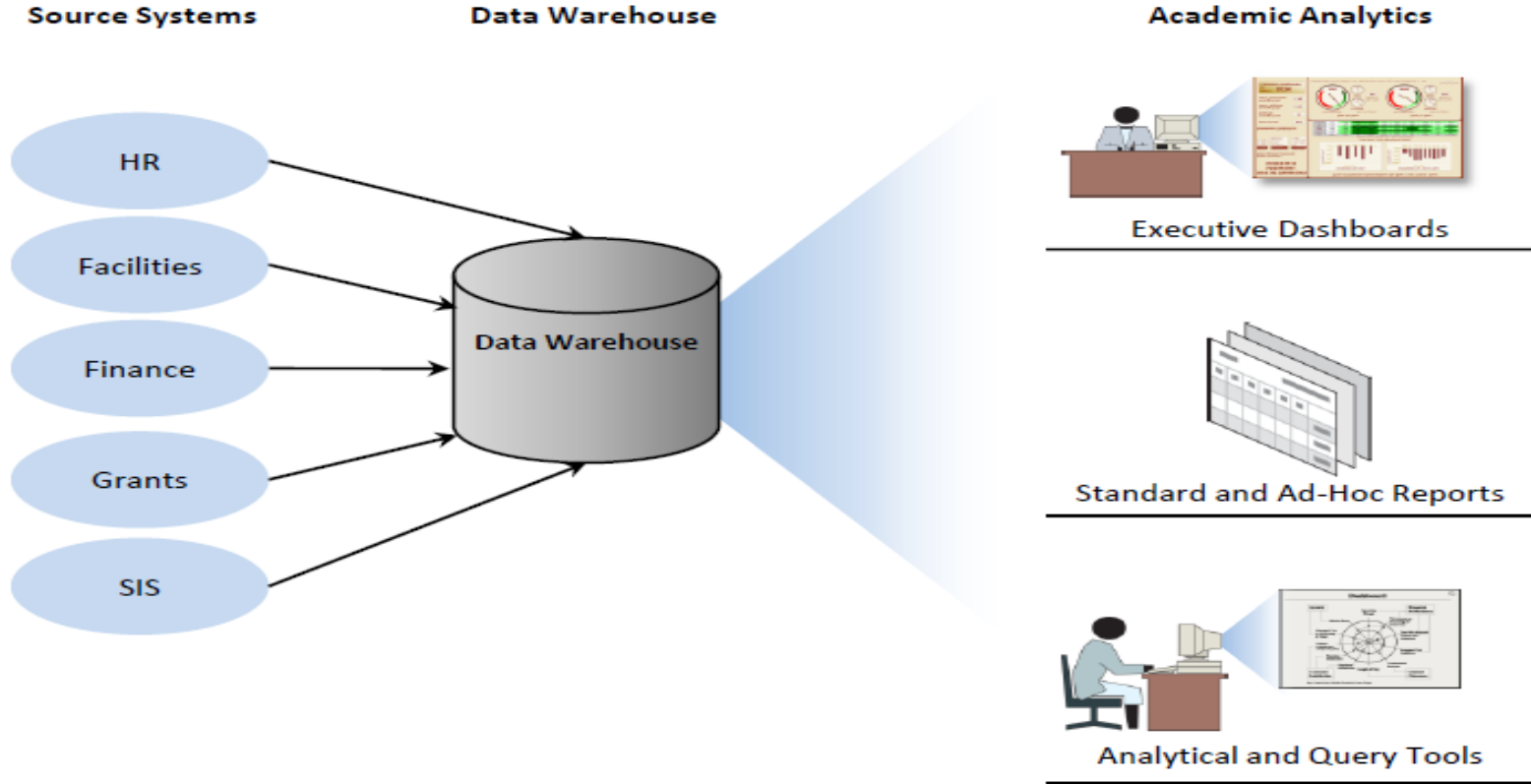


# Challenges to Reaching Business Analytics Maturity

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# A (Simplified) Overview of the Academic Analytics Environment





# Visibility, Insight, and Foresight: Equipping People with the Information They Need to Be Successful

## Data Needs

## Audience

Performance  
Data



**EXECUTIVES**

Dashboards & Scorecards for  
Performance Management  
“Am I achieving my goals?”

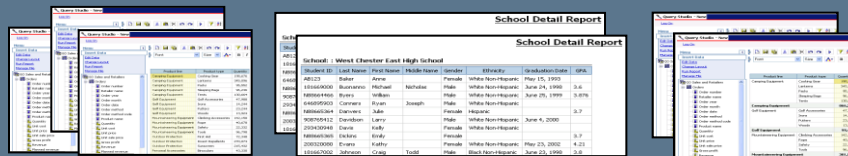
Trend,  
Summary  
Data



**MANAGEMENT**

Dashboards, Reports and  
Analytics to Monitor Progress  
“How am I doing?”

Detailed  
Data



**KNOWLEDGE WORKERS**

Ad-hoc analysis tools to identify  
and understand trends  
“Why is this happening?”

**STAFF**

Production reports and ad-hoc  
access for daily operations  
“What do I need to do?”

# Logical Progression to the Questions that BA addresses

**What happened?**

**Descriptive analytics**

**Why did it happen?**

**Diagnostic analytics**

**What's happening/trending now?**

**Trend Analytics**

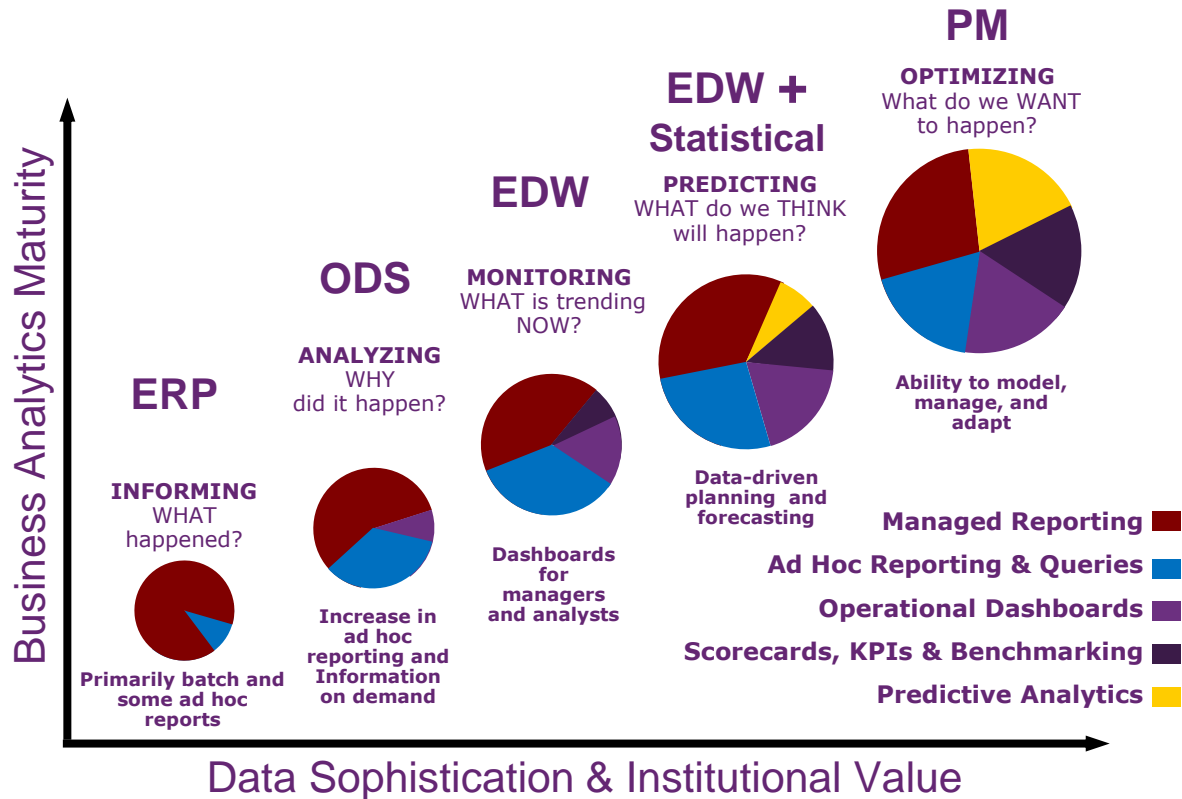
**What do we think will happen?**

**Predictive Analytics**

**What do we want to happen?**

**Prescriptive Analytics**

# BA Maturity in Higher Education



# What Else Happens with Evolving Business Analytics?

Data volume grows

Number of users grows

Depth of analysis grows

Query complexity grows

Need to visualize grows

Expectations grow

We hope that:

Data-driven decision-making grows

# Challenges to Big Data Projects

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# Top Barriers to Effective BI (From Ellucian 2011 BI Research)

**Lack of analytical drill-down capabilities**



**Lack of integrated data sets**



**Lack of departmental access to data**



**Slow turnaround time, IR/IT bottleneck**



**Lack of analytical staff**



# Current tools: tracking KPIs/reporting data (Ellucian/AIR 2014 Research)

**60% - MS Excel**

**16% - Crystal Reports**

**16% - MS SharePoint**

**14% - IBM Cognos**

**11% - Evisions Argos**

# What are current tool barriers? (Ellucian/AIR 2014 Research)

**39% - need more training**

**38% - cost**

**33% - the right data aren't available**

**30% - inability to engage all institutional departments**

**29% - user friendliness**

**28% - lack of historical data and decision capture**

**24% - no ERP integration**



# The ideal analytical tool (Ellucian/AIR 2014 Research)

**74% - access to all required data**

**69% - ability to capture all historical data and decisions**

**59% - ability to engage all major departments electronically**

**50% - out-of-box integration with ERP**

**48% - built-in KPIs and metrics for tracking performance**



Business Technology News & Insights

# Why 55% of Big Data projects fail – and what IT can do about it

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 February 13, 2013 By [Sam Narisi](#)  0 Comments and 0 Reactions

# Cultural Issues “Lack of Cooperation...”

**Engage IT and IR early, and often**

**Data must be reliable**

**Data must be shared, not held**

**Data must be trusted**

**Data definitions must be uniform across the institution**

**Data, and reporting, must be secure**

**“Single source of the truth”**

# Resource Issues

## **Make sure you understand the scope of the project**

- Time
- People
- Dollars

## **Be prepared to make the investment in staff to use these tools**

- At all levels, appropriate to the task

# Human Capital Issues

**Be prepared to train your people**

**It's a hot market for qualified BI analysts; “brain drain”**

**Consider options for shared services**

**Leverage the culture of collaboration that is common in higher education**

# Sustainability Issues

## **It will require additional resources over time**

- IT/technical staff for central operations
- IT/IA/Reporting analysts to support departmental users with the new tools

## **Knowledge transfer to institutional employees**

- Effective use of the new tools
- Understanding new policies and procedures
- How to leverage the new information environment

## **Change management will be an important aspect of the effort to build this sustainability**

# Closing

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# Summary

**Big data is coming, but higher ed has access to the tools to deal with the challenges**

**Higher ed analytics, 3 domains (EDUCAUSE)**

- Academic analytics: strategic
- Business intelligence: operational
- Learning analytics: student-focused

**A mature business analytics deployment can help you manage the big data challenge(s) in higher ed**

**Understand what you are getting yourself into**



# Questions & Answers

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# Thank you!

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