

# 12th Annual Acquisition Research Symposium

## Big Data: Big Confusion? Big Challenges?

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# Value of Big Data

Improvements in strategic decision making operational efficiency

- Generating new data sources
  - Predictive analytics
  - Market research

(AMA Survey top 5)

# Data to Decisions: “placing a big bet on big data”

The Department of Defense investing \$250 million annually

- Harness and utilize massive data in new ways and bring together sensing, perception and decision support to make truly autonomous systems that can maneuver and make decisions on their own.
- Improve situational awareness to help warfighters and analysts and provide increased support to operations.

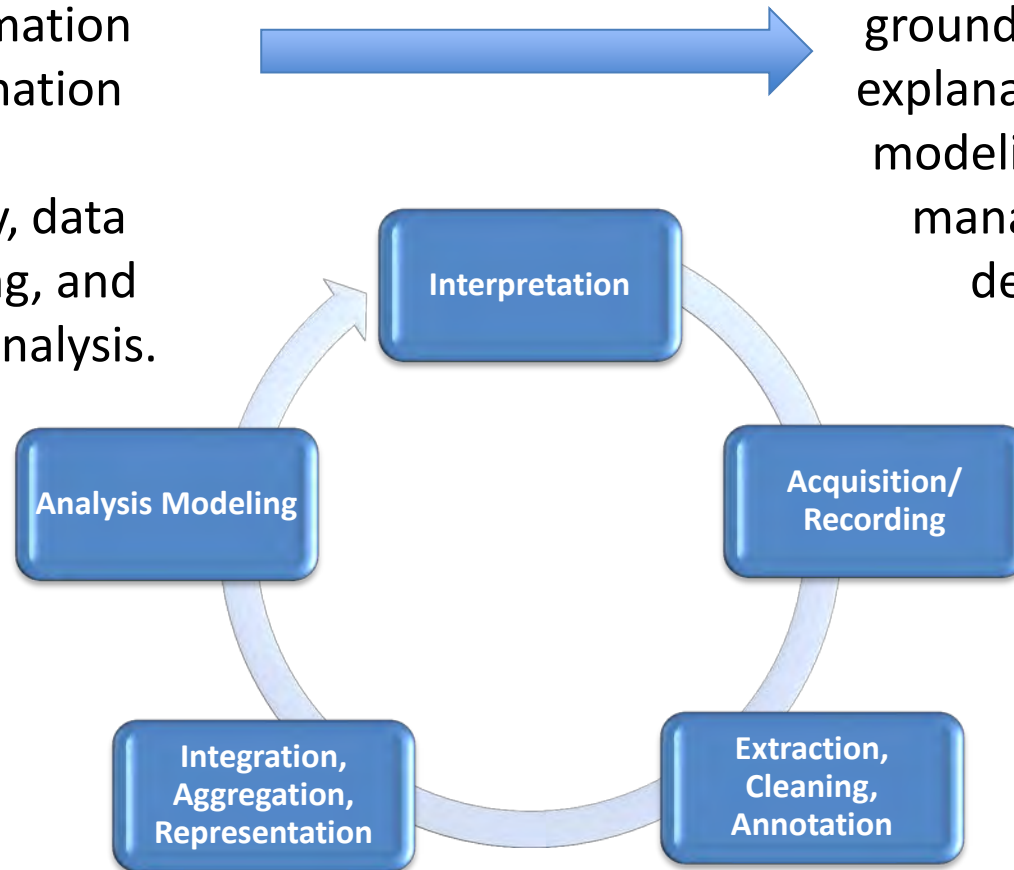
*Today, no matter what business you are in, technology, problem-solving and data analytics are at the heart of it.*

# Definitions

## Data Science & Business Analytics

Data Science - knowledge extraction, information discovery, information harvesting, data archaeology, data pattern processing, and exploratory data analysis.

Business Analytics – heavily grounded in OR, including explanatory and predictive modeling, and fact based management to drive decision making



## Big Datasets Bring....

noise accumulation,  
spurious correlations and  
incidental homogeneity

heavy computational cost  
and algorithmic instability

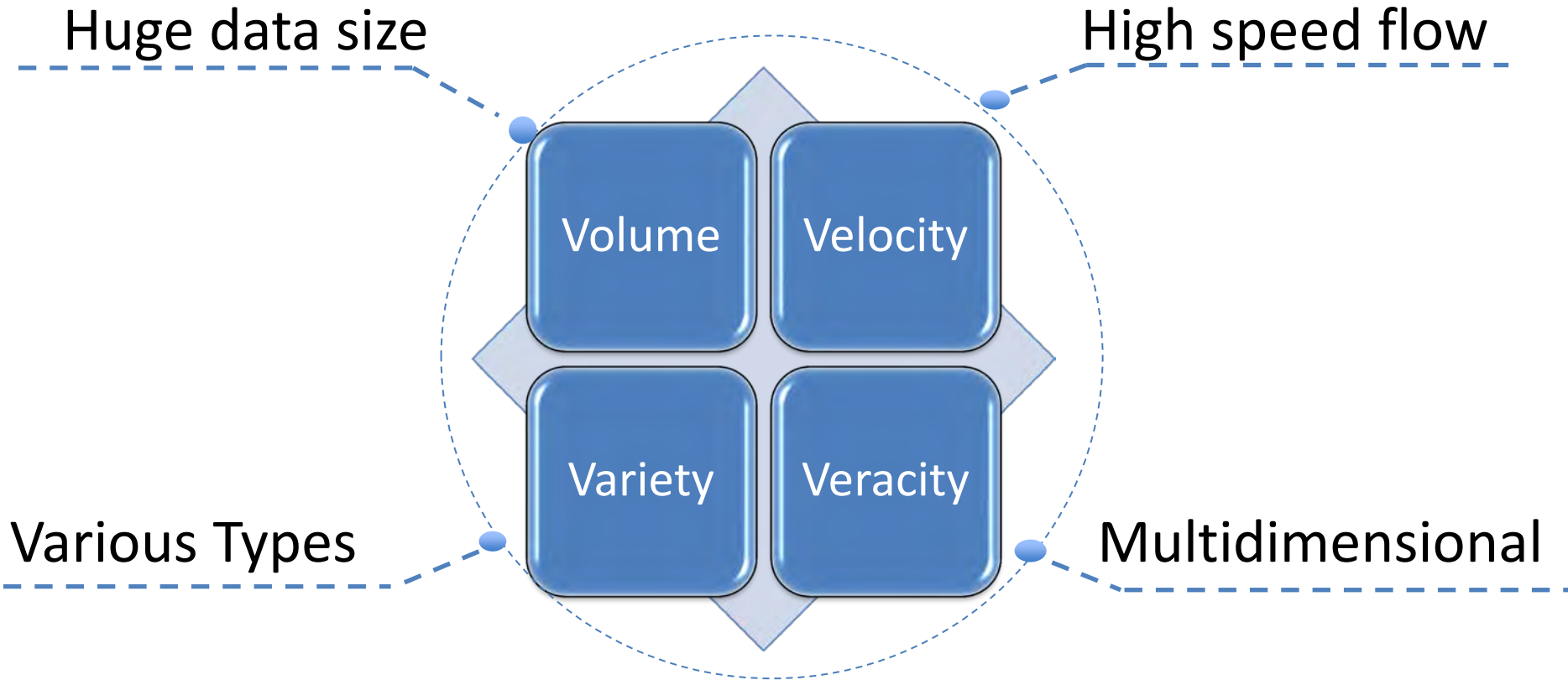
Aggregation from different  
systems can result in  
statistical biases &  
measurement error

## Big Datasets Demand....

**more  
adaptive and  
robust  
procedures**



According to IBM,  
2.5 quintillion bytes of data are produced every day



*Big data will intensify the need:*

- For changes in data quality and governance,
- For embedding analytics into operational systems, and
- For security, privacy, and regulatory compliance

Big Data's power does not erase the need for human insight  
– it only elevates it.

Typical software  
engineering problems

Four management challenges:

1. Leadership
2. Talent management
3. Decision making responsibility and accountability
4. Culture

Far and above all others

*Turning data into insight is by far the biggest challenge...Forcing a major change in paradigms*

Traditional Analytical Approach – Specifications and Requirements for canned queries and reports

*Too many permutations*

Big Data Analytical Approach – Foster On Demand Analysis

Skills gap - Most of us today are woefully data illiterate

### Top 5 Needs:

- Critical Thinking
- Problem Solving
- Extrapolating Conclusions
- Communicating and Presenting
- Evidence Based Decision Making



# Take Away

“The evidence is clear: Data-driven decisions tend to be better decisions”

## Biggest Challenge

organizations are in the difficult position of having to build the capacity to approach problems in an analytical way

Erik Brynjolfsson  
Andrew McAfee