Business Analytics

Learning objectives

- Define Visual Analytics and explain how it differs from information visualization.

- Identify major categories and applications of business analytics (BA) and explain how various form of BA are supported in practice

- Identify how the combination of BI and BA can result in competitive advantage for organizations
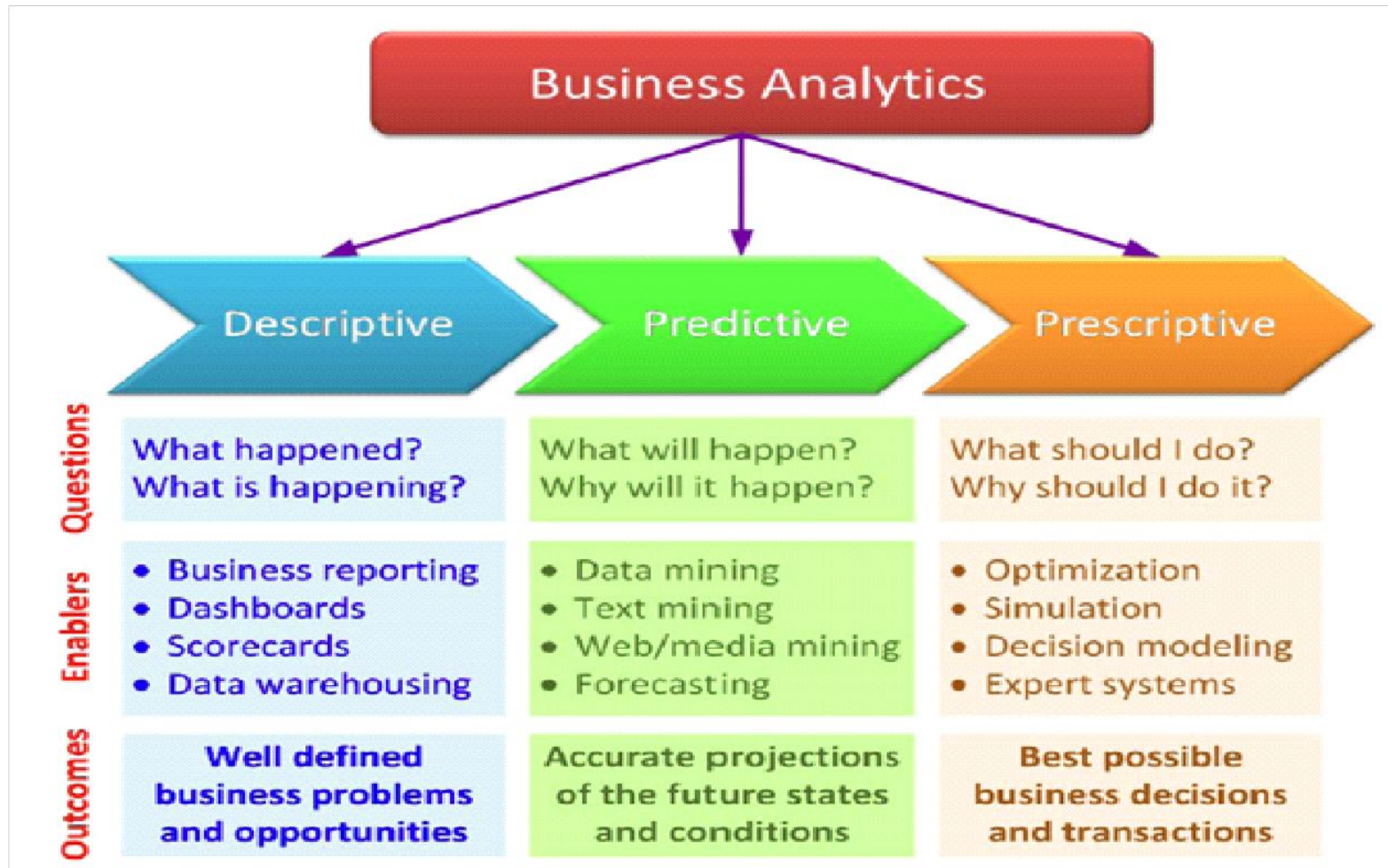
Business Analytics

Visual analytics is the combination of visualization and predictive analytics.

- ***Information visualization*** is aimed at answering
  - "what happened" and "what is happening" and
  - is closely associated with business intelligence (routine reports, scorecards, and dashboards),
- ***Predictive analytics*** is aimed at answering
  - "why is it happening," "what is more likely to happen," and
  - is usually associated with business analytics (forecasting, segmentation, correlation analysis).

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Business Analytics Overview

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Descriptive Analytics

- Descriptive or reporting analytics refers to
  - knowing what is happening in the organization
  - understanding some underlying trends and causes of such occurrences
- It involves
  - consolidation of data sources and availability of all relevant data in a form that enables appropriate reporting and analysis.
  - usually development of this data infrastructure is part of data warehouses

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Predictive Analytics

- Predictive analytics aims to determine what is likely to happen in the future.

- Uses statistical and data mining techniques to predict if the customer is likely to
  - switch to a competitor ("churn"),
  - buy next and how much,
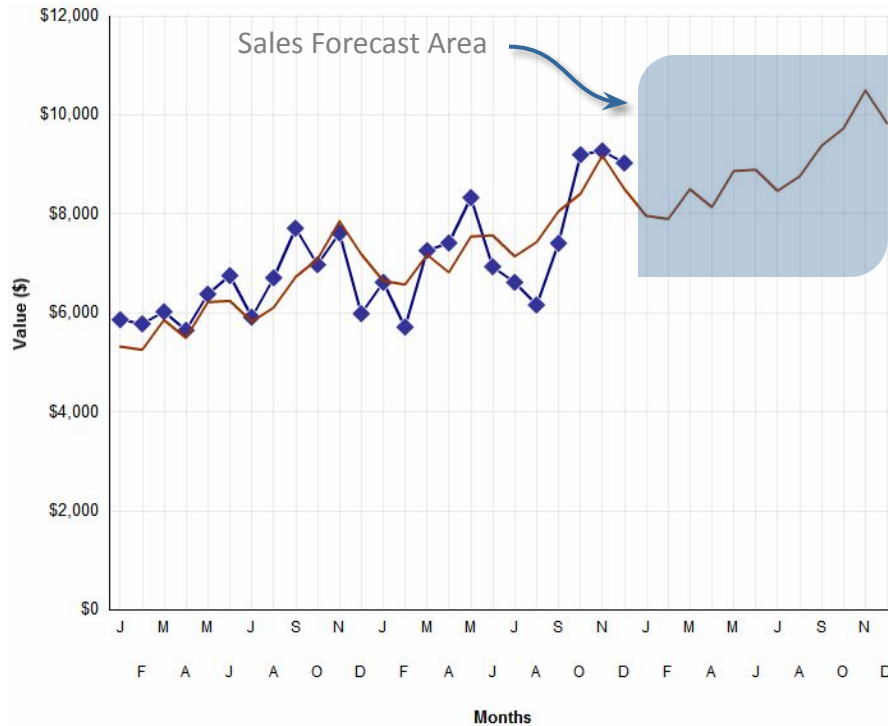 - respond to promotion,
  - worth the risk

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Bring Predictive Analysis into the Mainstream for Business Users

Typical Predictive Analyses Based on Regression Techniques

Powerful Predictive Analyses Based on Data Mining Techniques

Sales Forecast Area

DETERMINE WHO IS LIKELY TO …

Achieve Revenue
Stay in Budget
Respond
Purchase
Defraud
Be Profitable
Be On Time

Linear Regression
Logistic Regression
Tree Regression

Decision Tree
Clustering

Time Series
Association Rules

Neural Network
Rule Set

Support Vector Machines
Ensembles of Models

Prescriptive Analytics

Prescriptive analytics aim to recognize

- what is going on,

- the likely forecast, and

- the best performance possible using optimization techniques

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Big Data Analytics

- Big Data? It refers to data that
  - cannot be stored in a single storage unit
  - is arriving in many different forms, be they structured, unstructured, or in a stream
  - are clickstreams from Web sites, postings on social media sites such as Facebook, or data from traffic, sensors, or weather

- Big Data analytics solution
  - instead of pushing data to a computing node, solution pushes computation to the data

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Business and Visual Analytics Platforms

- More BI and analytics vendors are becoming aware that their customers require quick and preferably interactive visualizations, not just for their normal reporting systems, but also to illustrate predictive and prescriptive decision-making information.

- A high-powered visualization environment is one in which high-performance, in-memory solutions are applied to exploring massive amounts of data instantaneously.

- Due to the increasing demand for visual analytics coupled with fast-growing data volumes, there is an ever-growing need to invest in highly efficient Visual Analytics Platforms.

- MicroStrategy Visual Insight and SAS Visual Analytics are examples of such platforms.

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Companies Are Using BI and BA based Strategies To Achieve Business Excellence
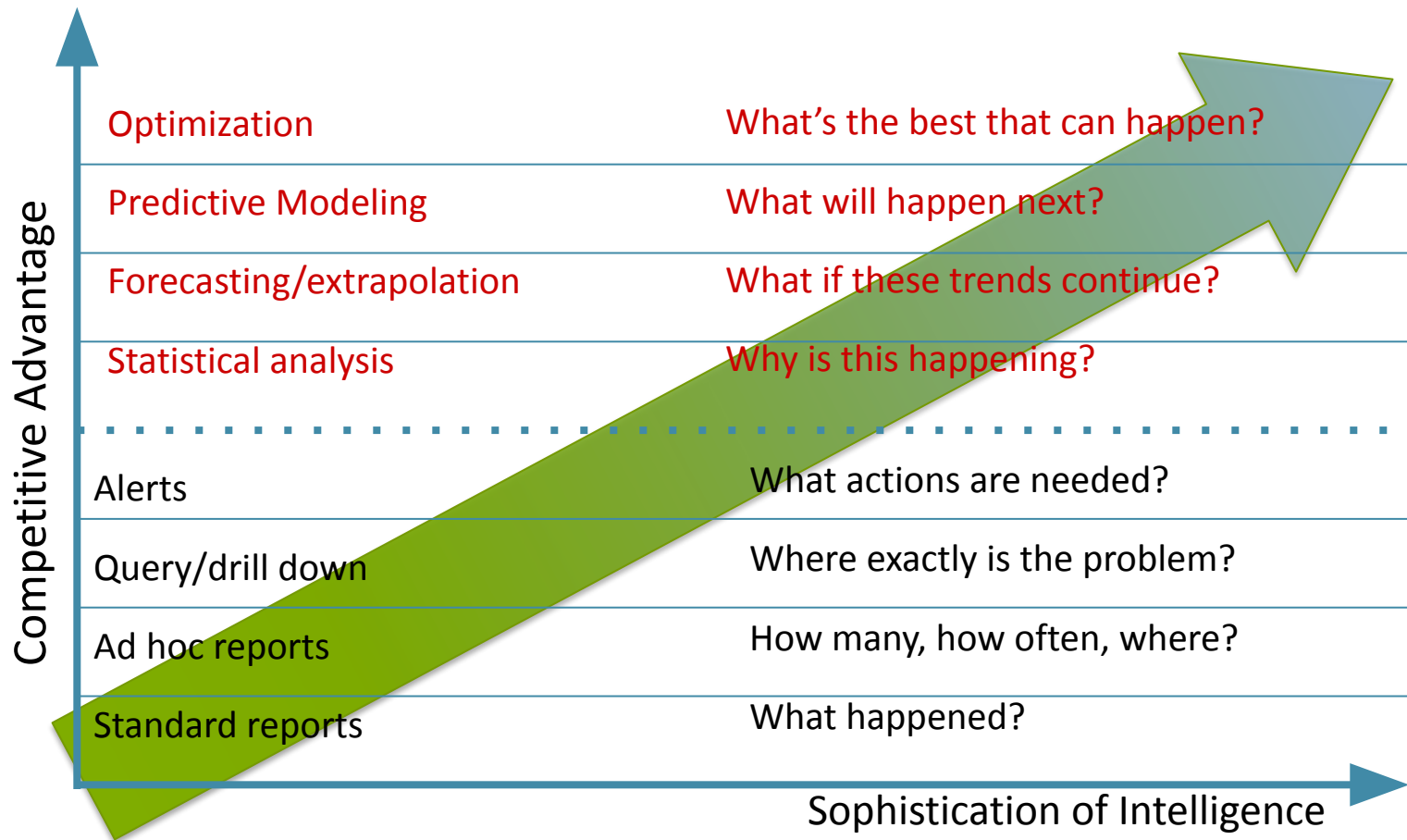
Competitive Advantage (vertical axis)

Sophistication of Intelligence (horizontal axis)

Optimization	What's the best that can happen?
Predictive Modeling	What will happen next?
Forecasting/extrapolation	What if these trends continue?
Statistical analysis	Why is this happening?
Alerts	What actions are needed?
Query/drill down	Where exactly is the problem?
Ad hoc reports	How many, how often, where?
Standard reports	What happened?

Competing on Analytics: The New Science of Winning, by Thomas H. Davenport and Jeanne G. Harris (Harvard Business School Press, March 2007).

Organizations Are Building Their Competitive Strategies Around Analytics

Analytic competitors are found in a variety of industries

Stage 5:
Analytical Competitors

Stage 4:
Analytical Companies

Stage 3:
Analytical Aspirations

Stage 2:
Localized Analytics

Stage 1:
Analytically Impaired

eCommerce
Google, Netflix, Yahoo!

Retail
Amazon.com, Wal-Mart

Telecoms
Sprint, O2, Bouygues Telecom

Pharmaceuticals
AstraZeneca, Solvay, Vertex

Entertainment
New England Patriots, Harrah's, Oakland A's, Marriott

Consumer Products
Anheuser-Busch, E&J Gallo Winery, P&G, Mars

Industrial Products
John Deere, CEMEX

Financial Services
Barclays Bank, Capital One, Progressive Insurance, WellPoint

Transport
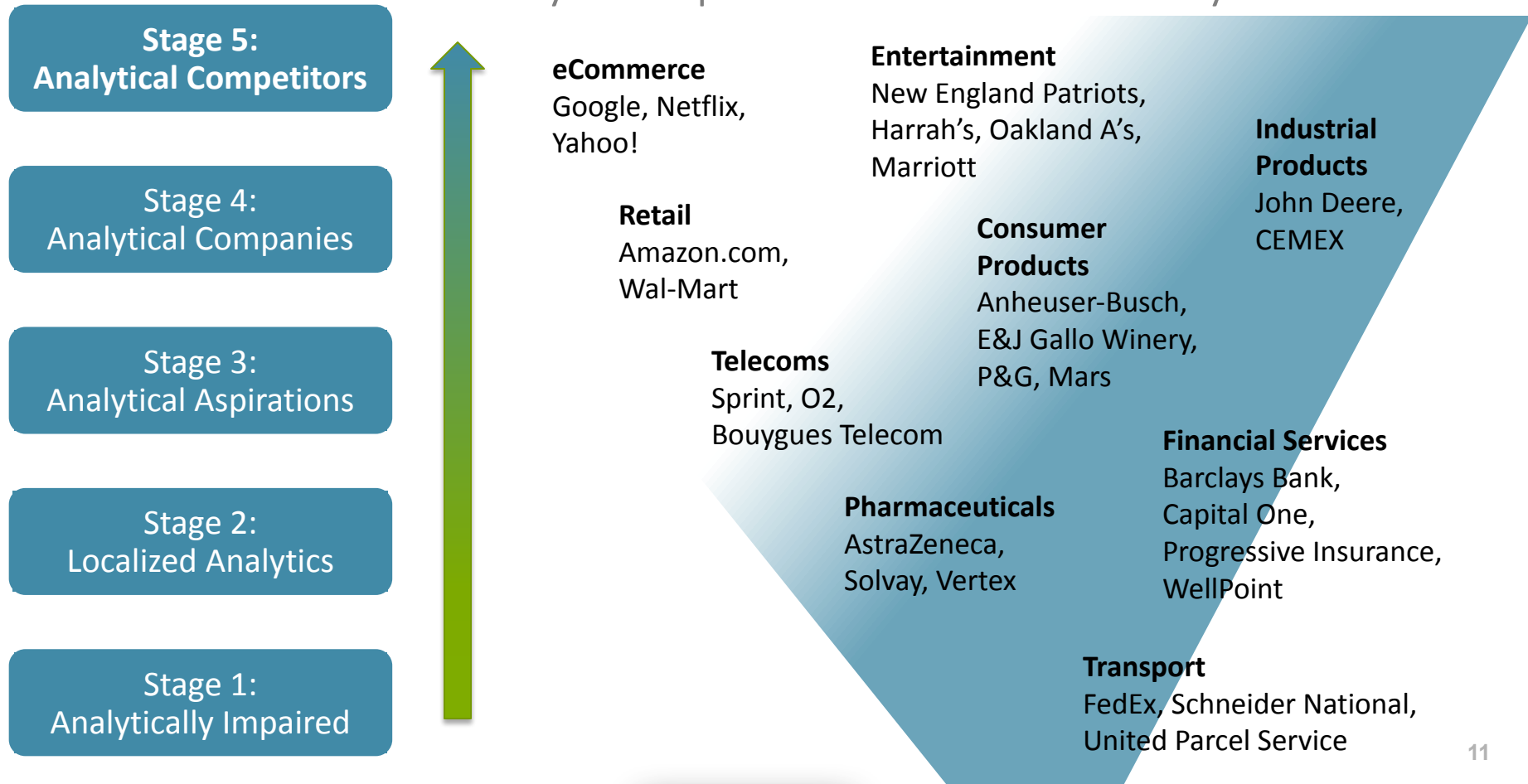FedEx, Schneider National, United Parcel Service

Competing on Analytics: The New Science of Winning, by Thomas H. Davenport and Jeanne G. Harris (Harvard Business School Press, March 2007).