

Kecerdasan Bisnis Terapan

Business Intelligence, Analytics, and Data Science

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Business Intelligence (BI)

①

Introduction to BI and Data Science

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Descriptive Analytics

3

Predictive Analytics

4

Prescriptive Analytics

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Big Data Analytics

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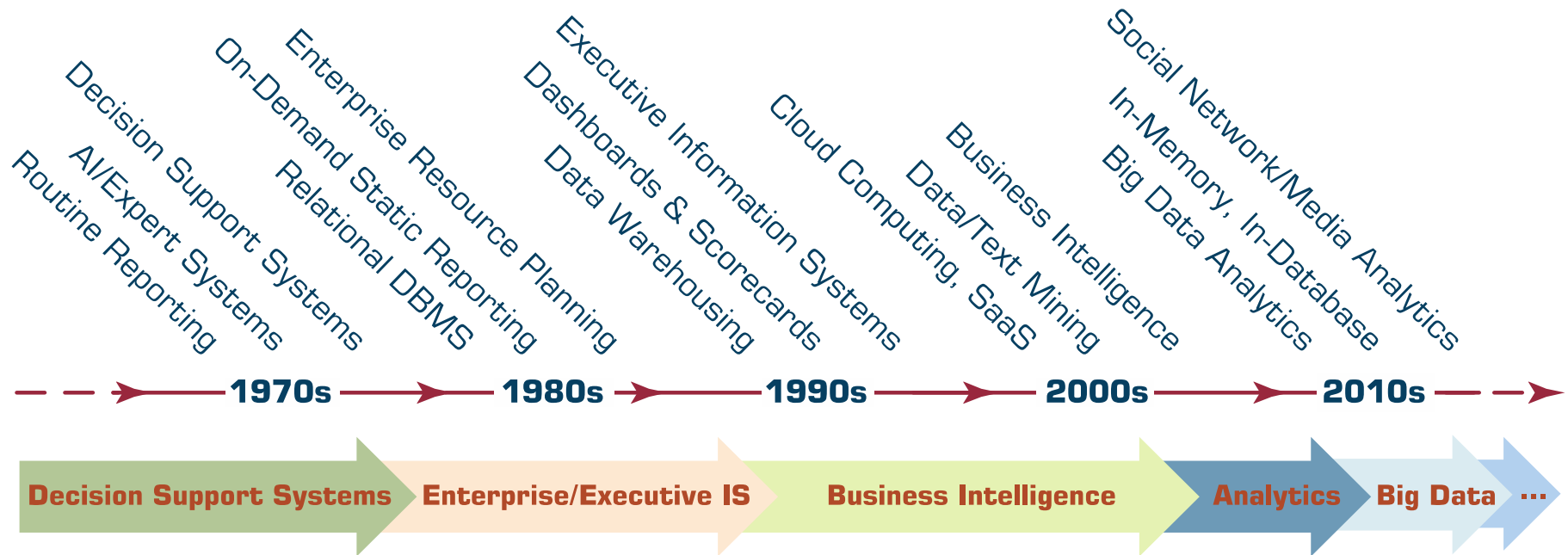
Future Trends

Outline

- Business Intelligence (BI)
- Analytics
- Data Science

Business Intelligence (BI)

Evolution of Decision Support, Business Intelligence, and Analytics



Changing Business Environments and Evolving Needs for Decision Support and Analytics

1. Group communication and collaboration
2. Improved data management
3. Managing giant data warehouses and Big Data
4. Analytical support
5. Overcoming cognitive limits in processing and storing information
6. Knowledge management
7. Anywhere, anytime support

Decision Support Systems (DSS)

(Gorry and Scott-Morton, 1971)

“interactive
computer-based systems,
which help decision makers
utilize data and models to
solve unstructured problems”

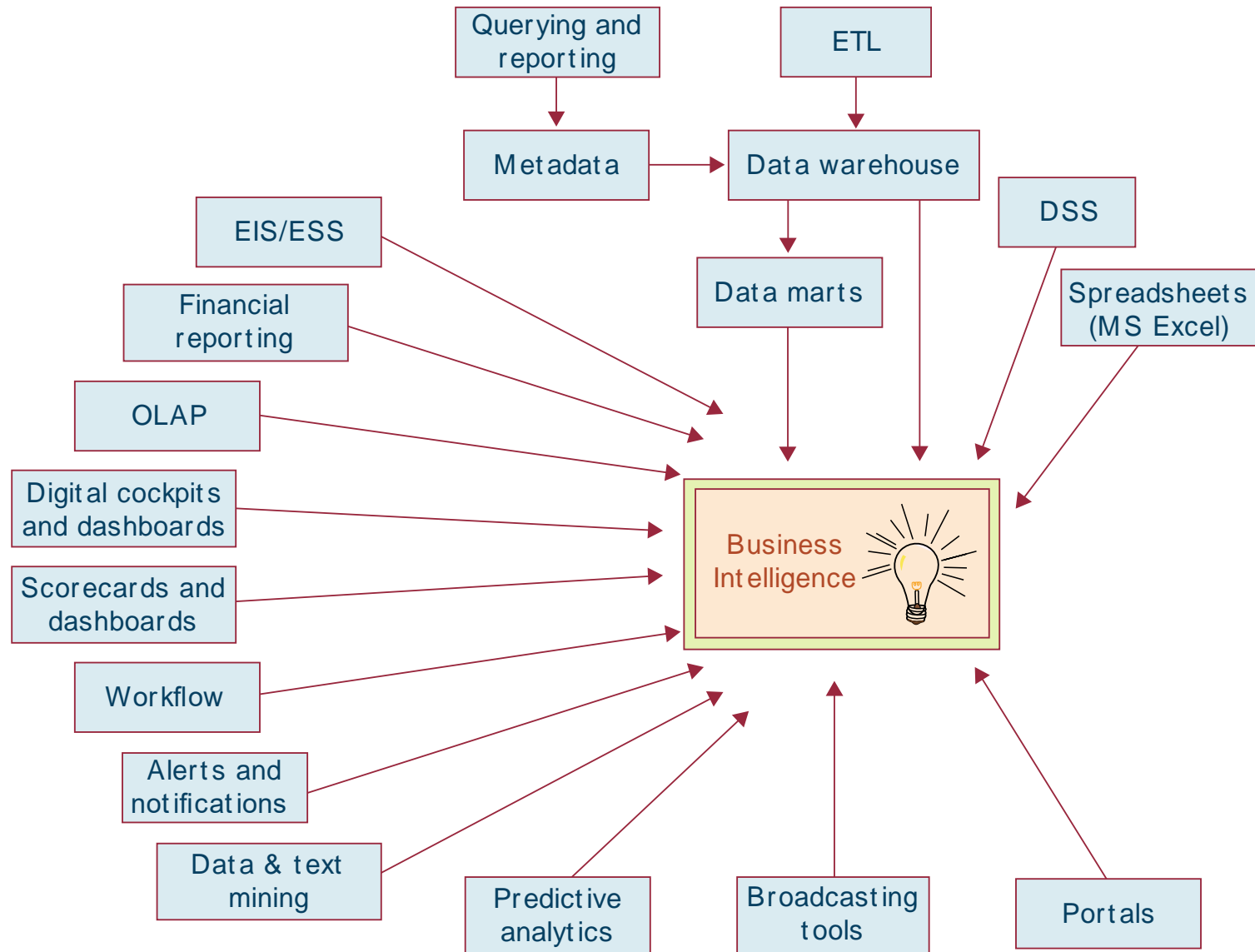
Decision Support Systems (DSS)

(Keen and Scott-Morton, 1978)

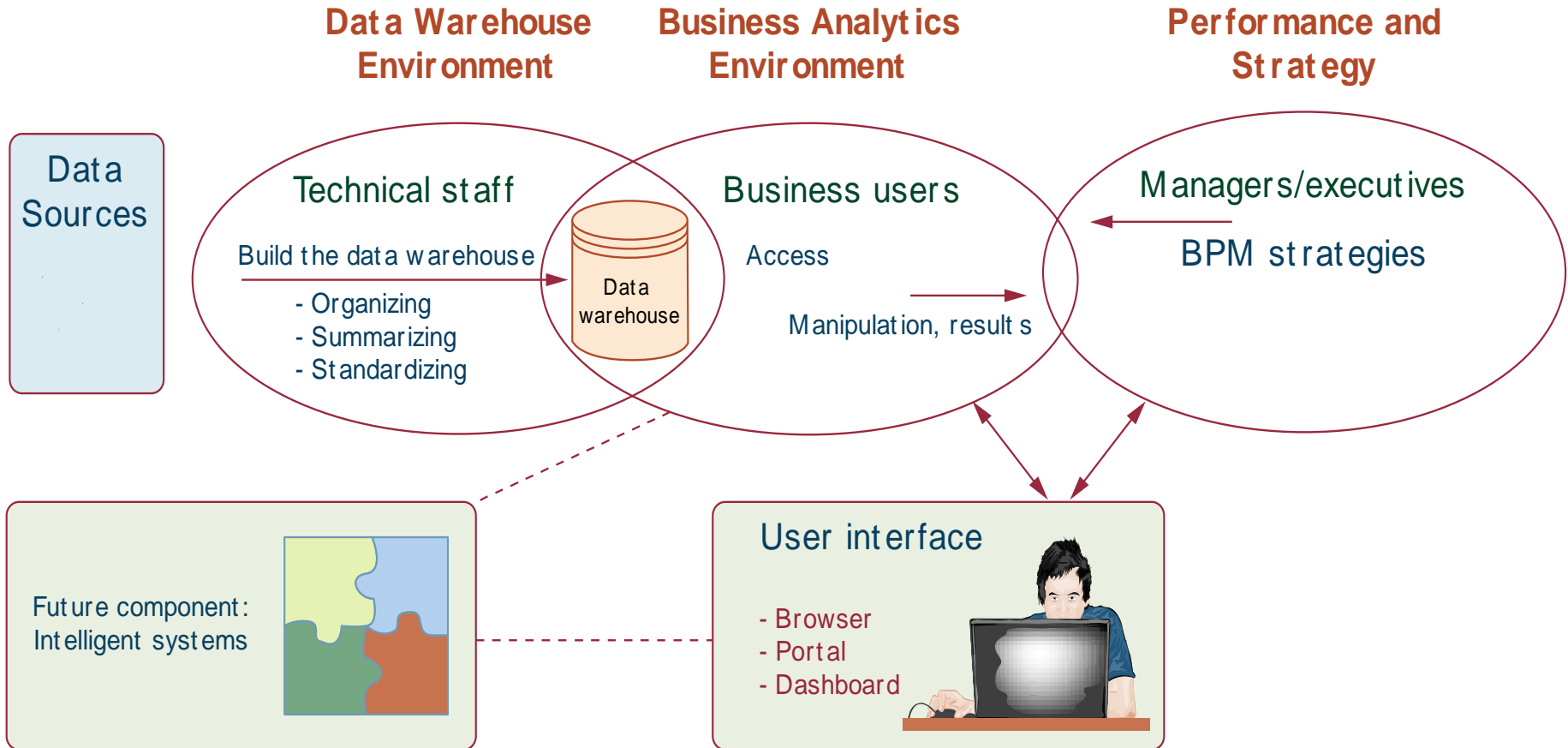
“Decision support systems couple the **intellectual resources** of individuals with the **capabilities of the computer** to **improve the quality of decisions**.

It is a computer-based support system for management decision makers who deal with semistructured problems.”

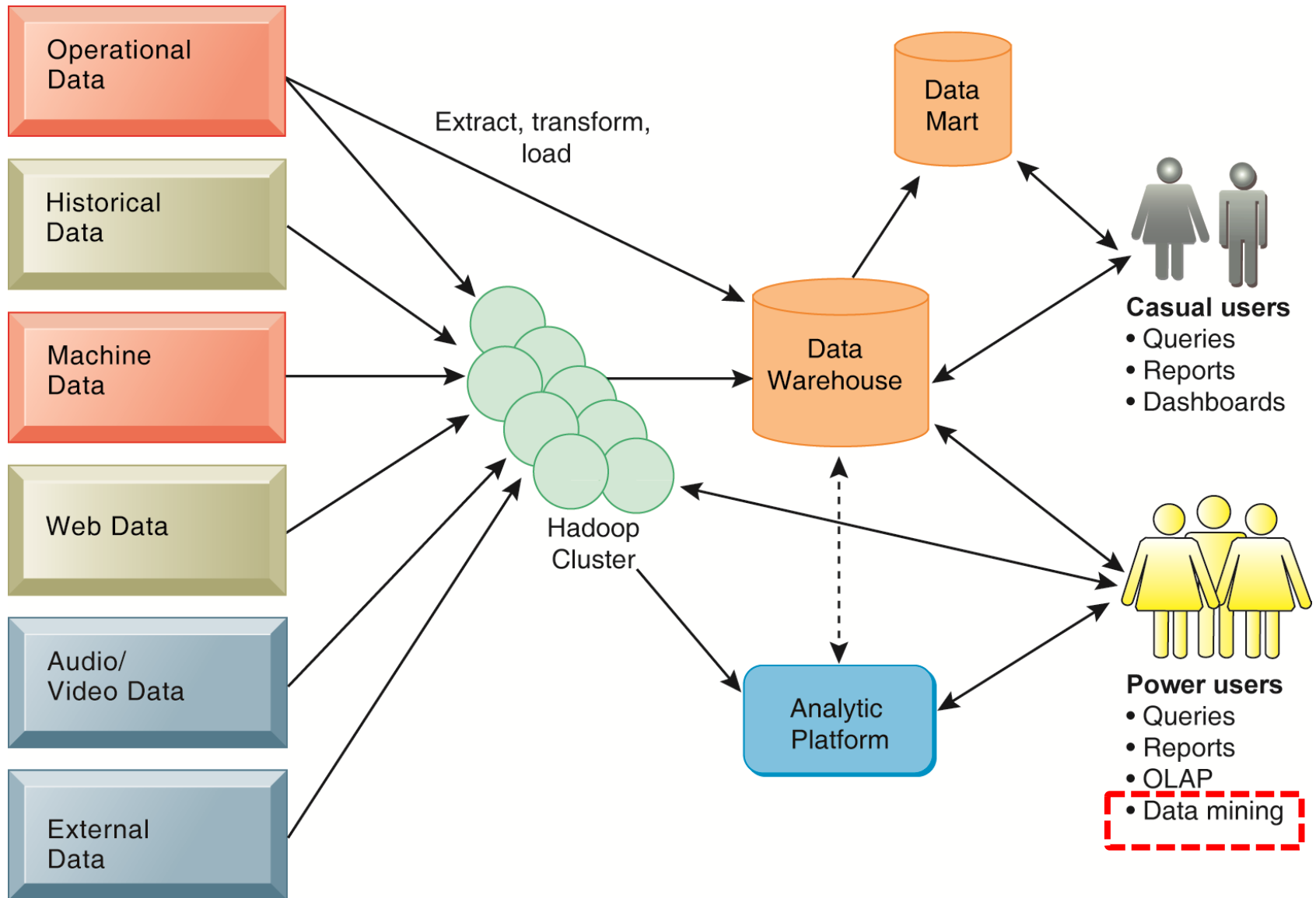
Evolution of Business Intelligence (BI)



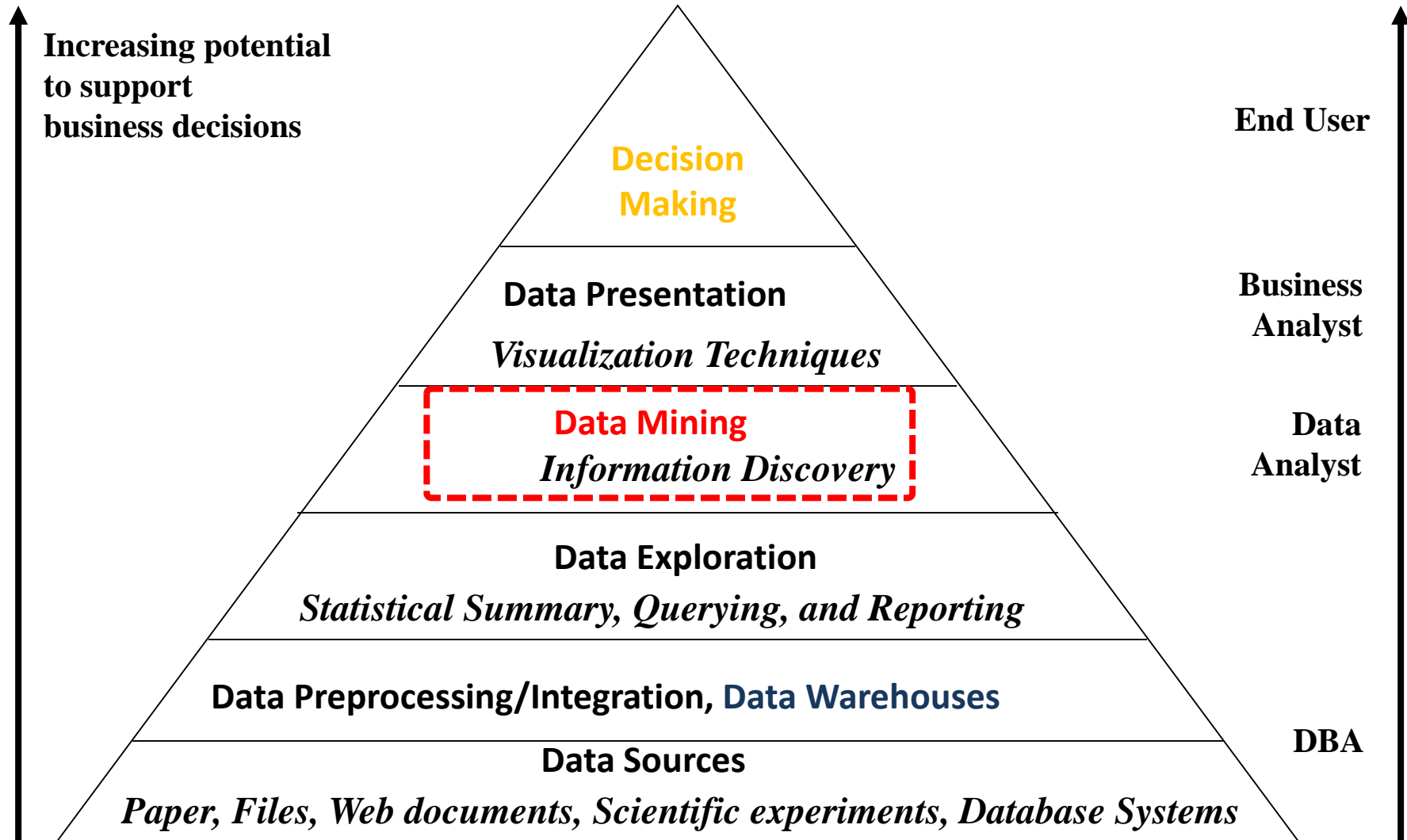
A High-Level Architecture of BI



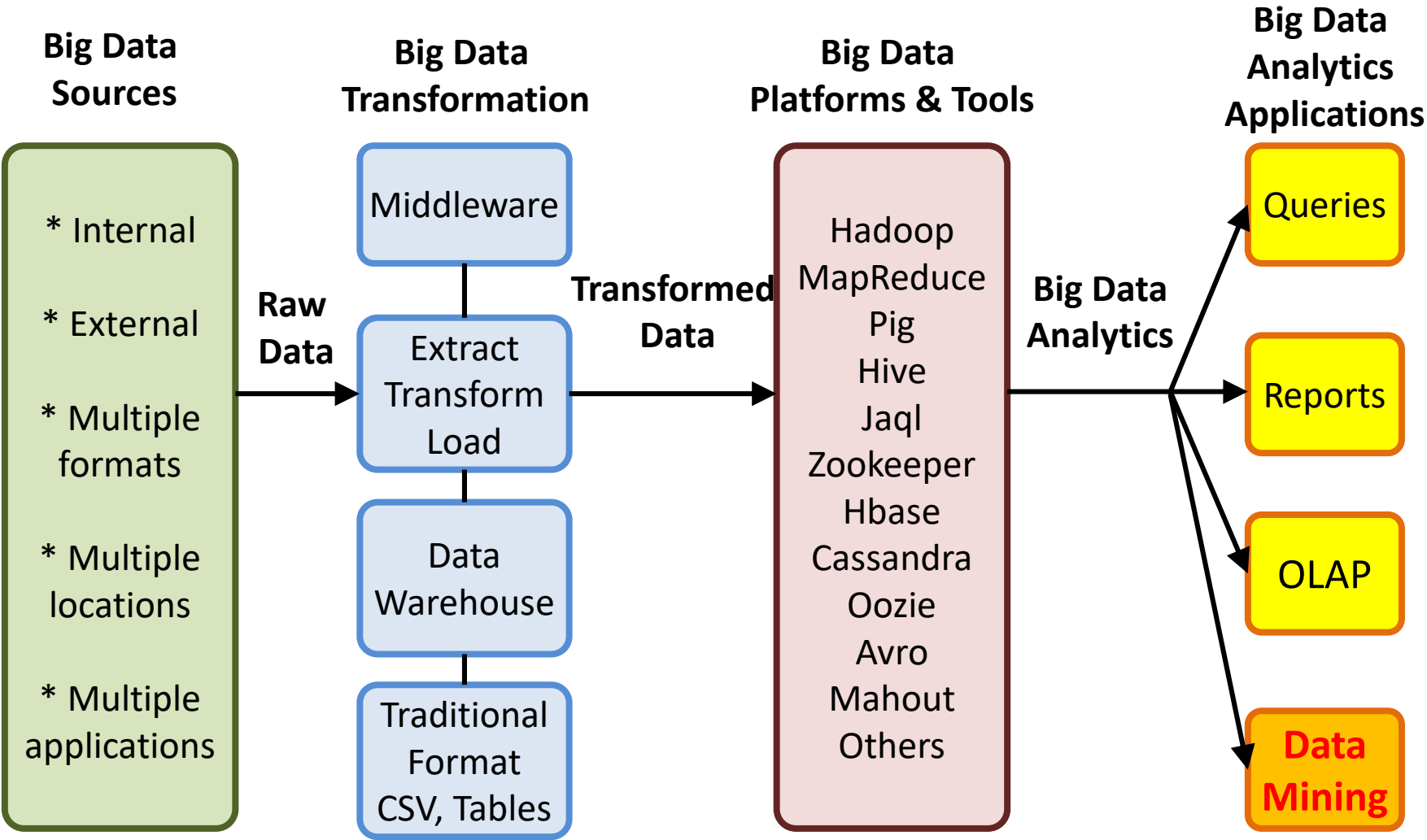
Business Intelligence (BI) Infrastructure



Business Intelligence and Data Mining



Architecture of Big Data Analytics

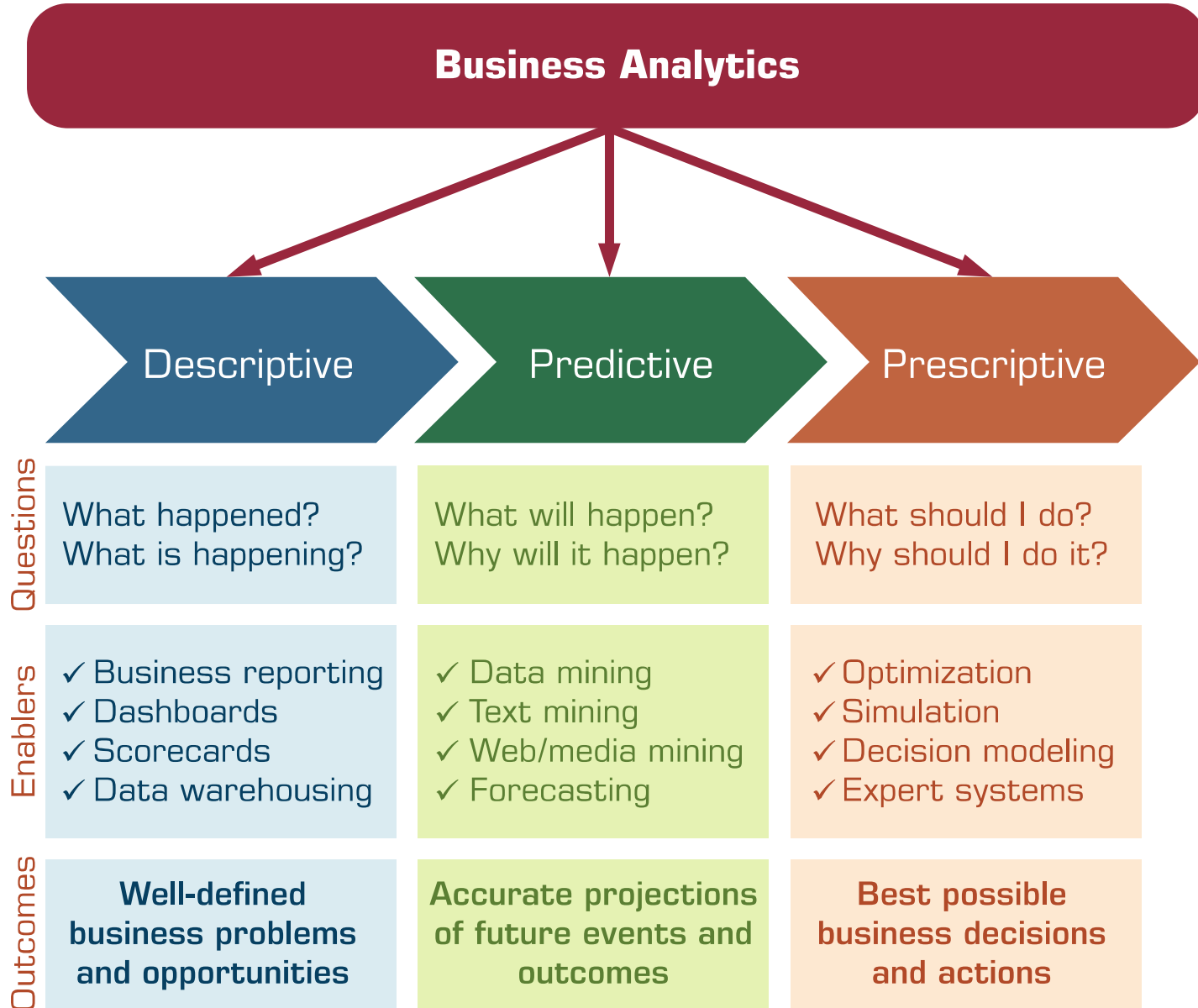


Architecture of Big Data Analytics



Analytics

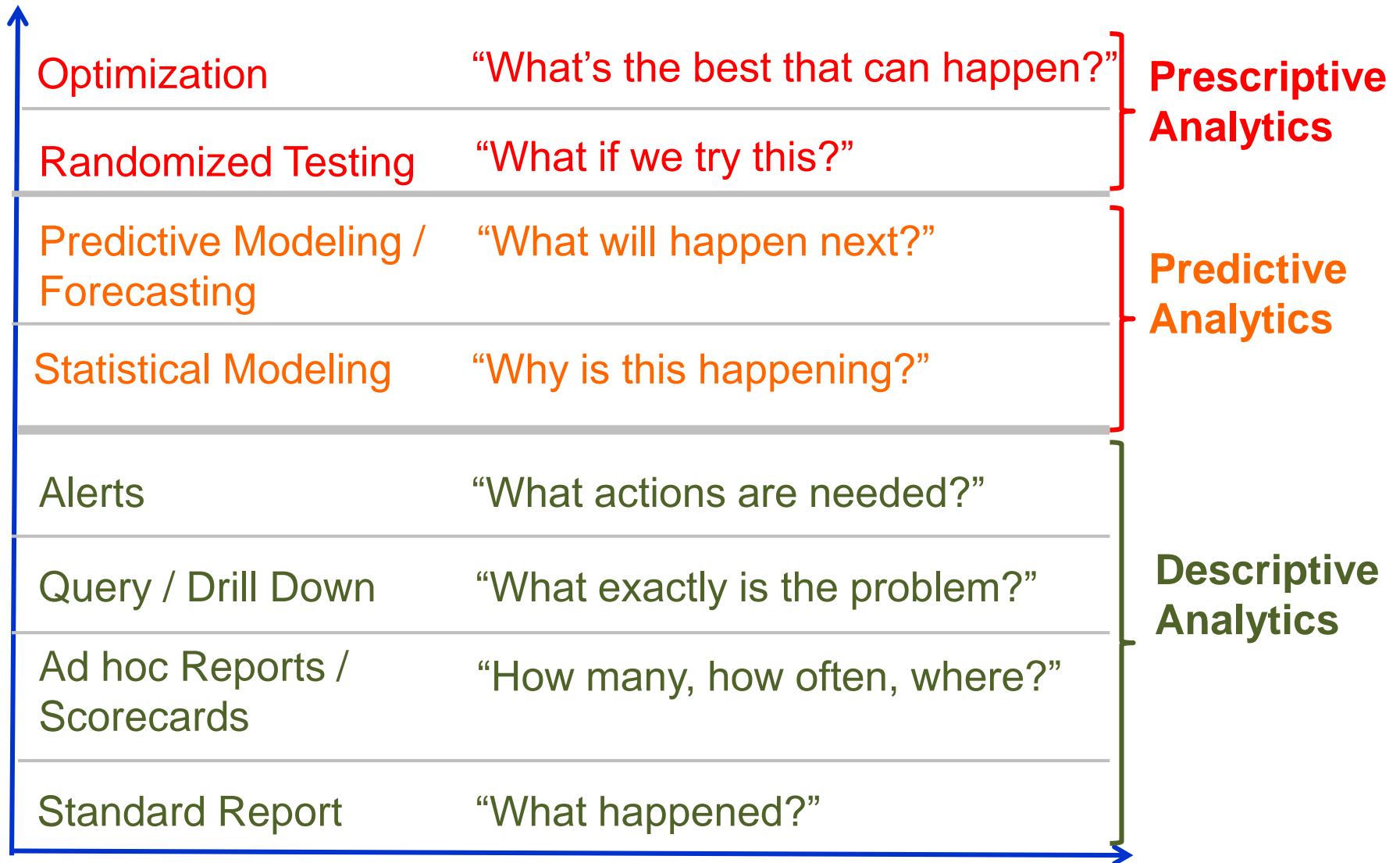
Three Types of Analytics



Three Types of Business Analytics

- Prescriptive Analytics
- Predictive Analytics
- Descriptive Analytics

Three Types of Business Analytics



Business Intelligence and Enterprise Analytics

- Predictive analytics
- Data mining
- Business analytics
- Web analytics
- **Big-data** analytics

Data Science

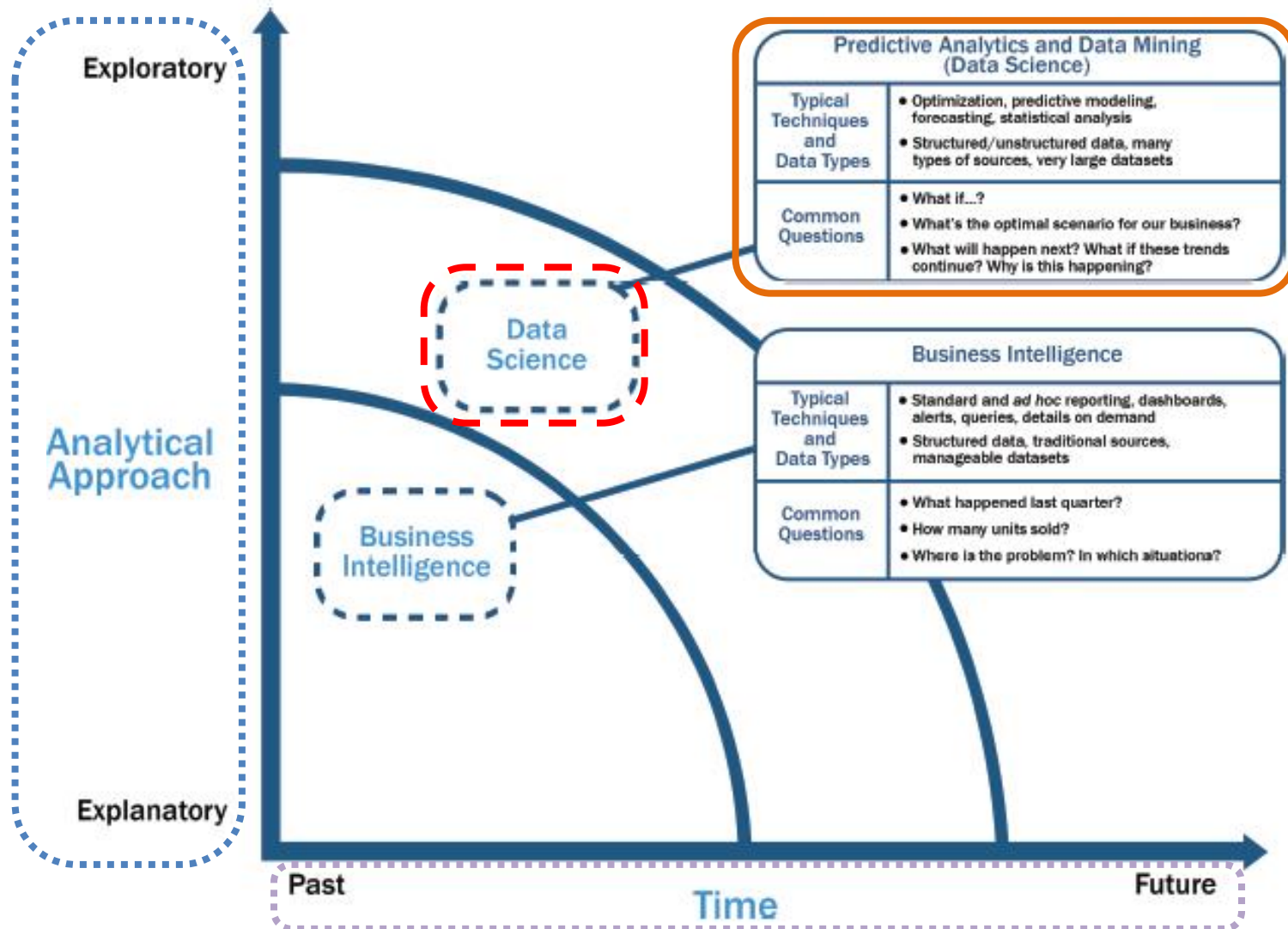
Data Analyst

- Data analyst is just another term for professionals who were doing BI in the form of **data compilation, cleaning, reporting**, and perhaps some **visualization**.
- Their skill sets included Excel, some SQL knowledge, and reporting.
- You would recognize those capabilities as **descriptive** or **reporting analytics**.

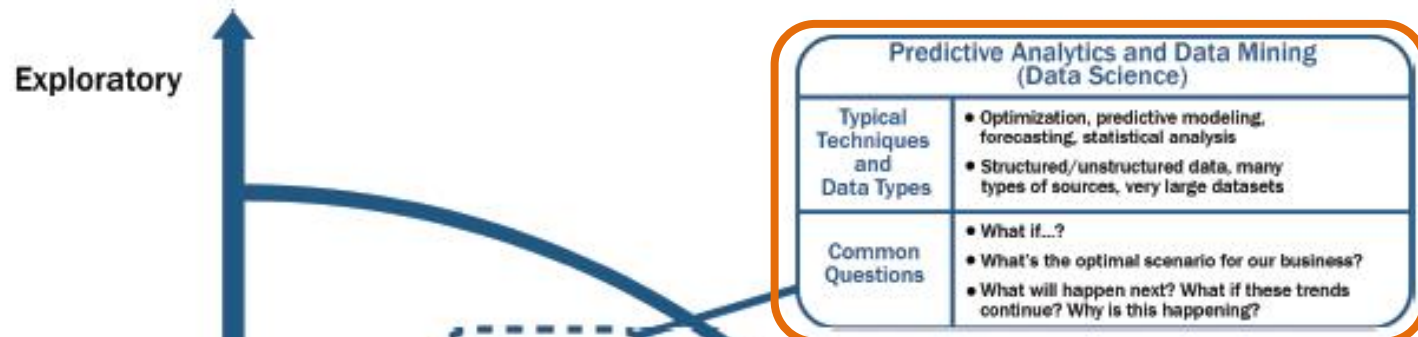
Data Scientist

- Data scientist is responsible for **predictive analysis, statistical analysis**, and more **advanced analytical tools and algorithms**.
- They may have a deeper knowledge of algorithms and may recognize them under various labels—**data mining, knowledge discovery, or machine learning**.
- Some of these professionals may also need deeper programming knowledge to be able to write code for data cleaning/analysis in current Web-oriented languages such as Java or Python and statistical languages such as R.
- Many analytics professionals also need to build significant expertise in **statistical modeling, experimentation, and analysis**.

Data Science and Business Intelligence



Data Science and Business Intelligence



Predictive Analytics and Data Mining (Data Science)

Past

Time

Future

Predictive Analytics and Data Mining (Data Science)

Structured/unstructured data, many types of sources,
very large datasets

Optimization, predictive modeling, forecasting statistical analysis

What if...?

What's the optimal scenario for our business?

What will happen next?

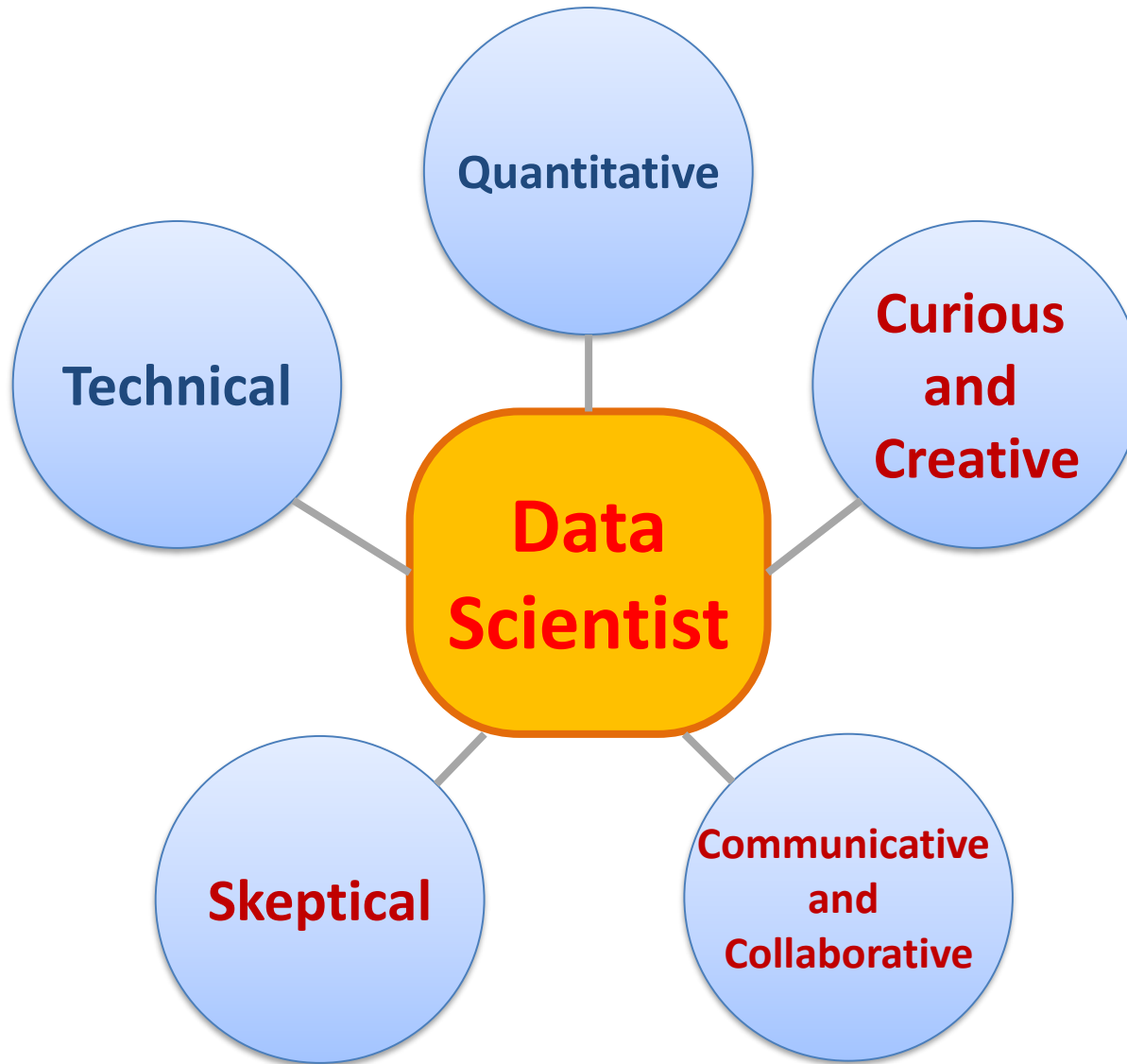
What if these trends continue?

Why is this happening?

Profile of a Data Scientist

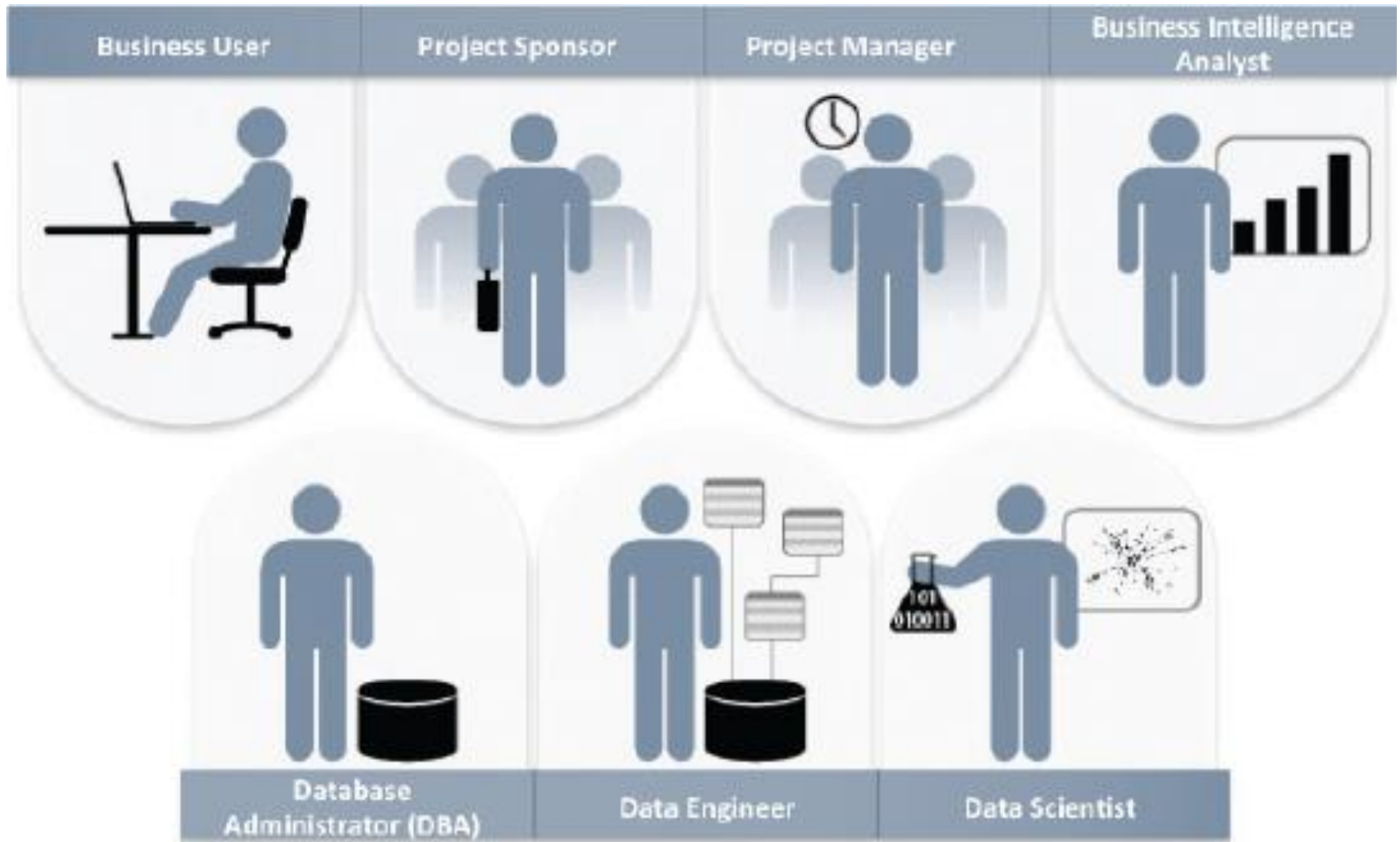
- **Quantitative**
 - mathematics or statistics
- **Technical**
 - software engineering, machine learning, and programming skills
- **Skeptical mind-set** and **critical thinking**
- **Curious** and **creative**
- **Communicative** and **collaborative**

Data Scientist Profile

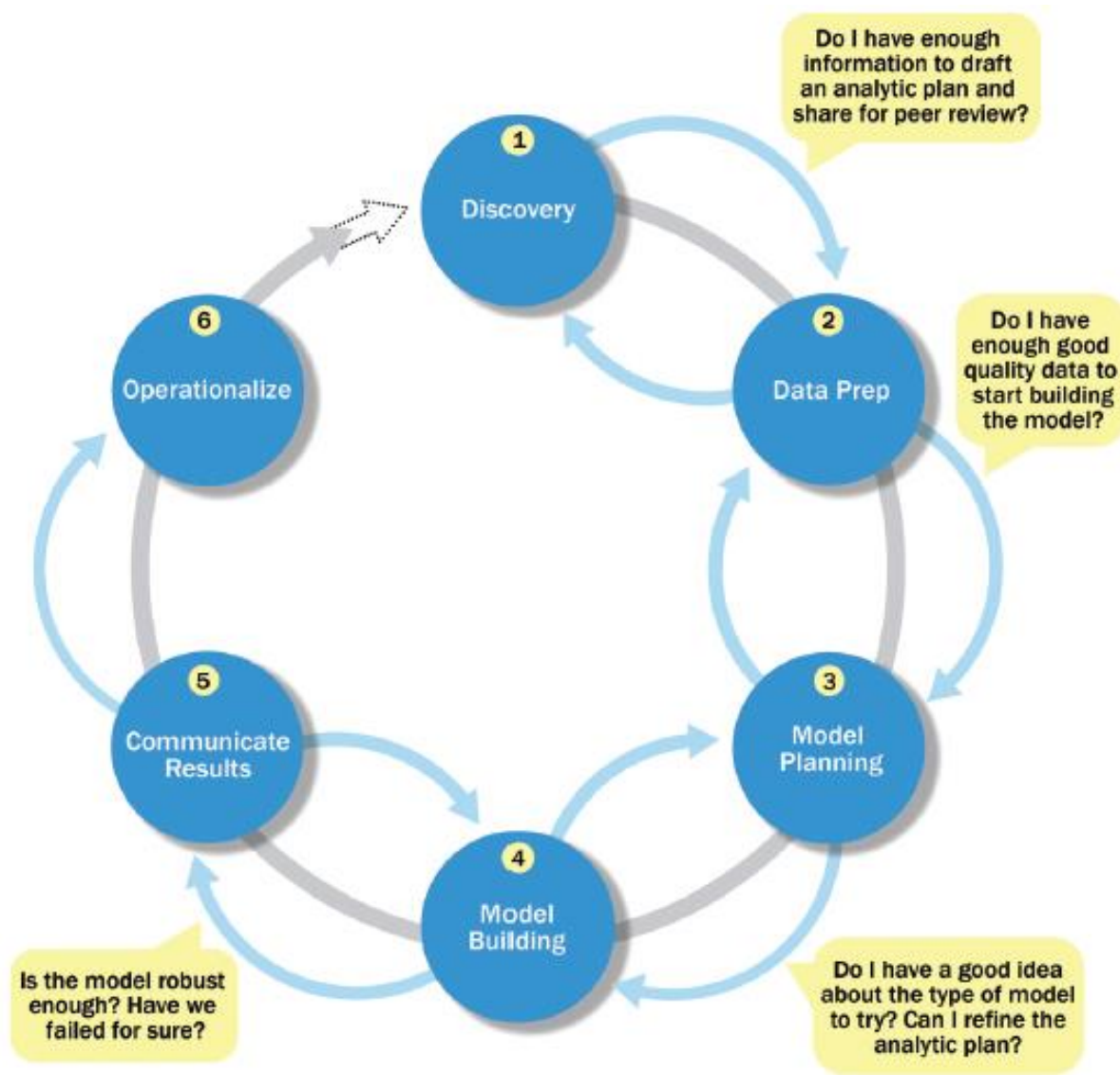


Big Data Analytics Lifecycle

Key Roles for a Successful Analytics Project



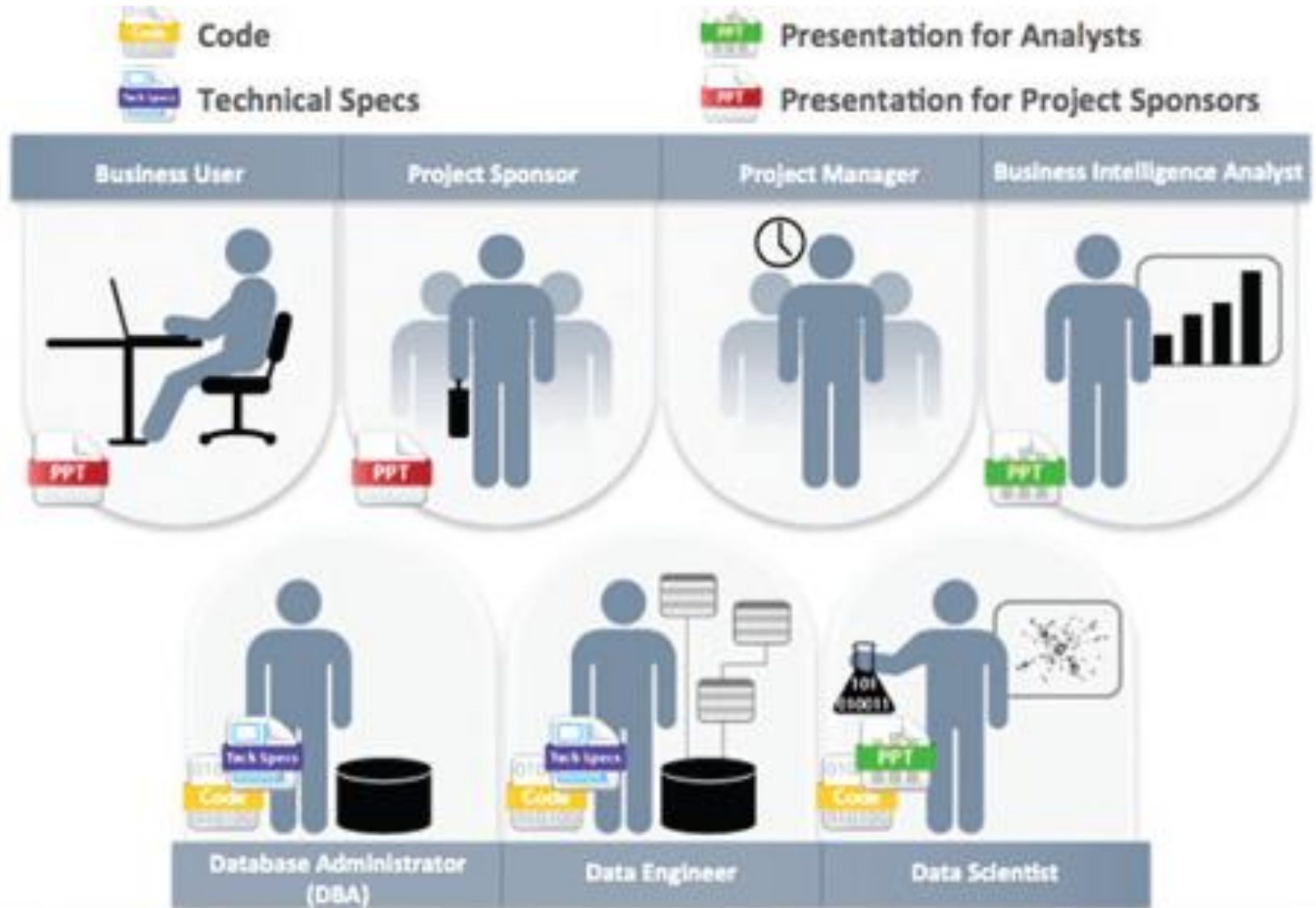
Overview of Data Analytics Lifecycle



Overview of Data Analytics Lifecycle

1. Discovery
2. Data preparation
3. Model planning
4. Model building
5. Communicate results
6. Operationalize

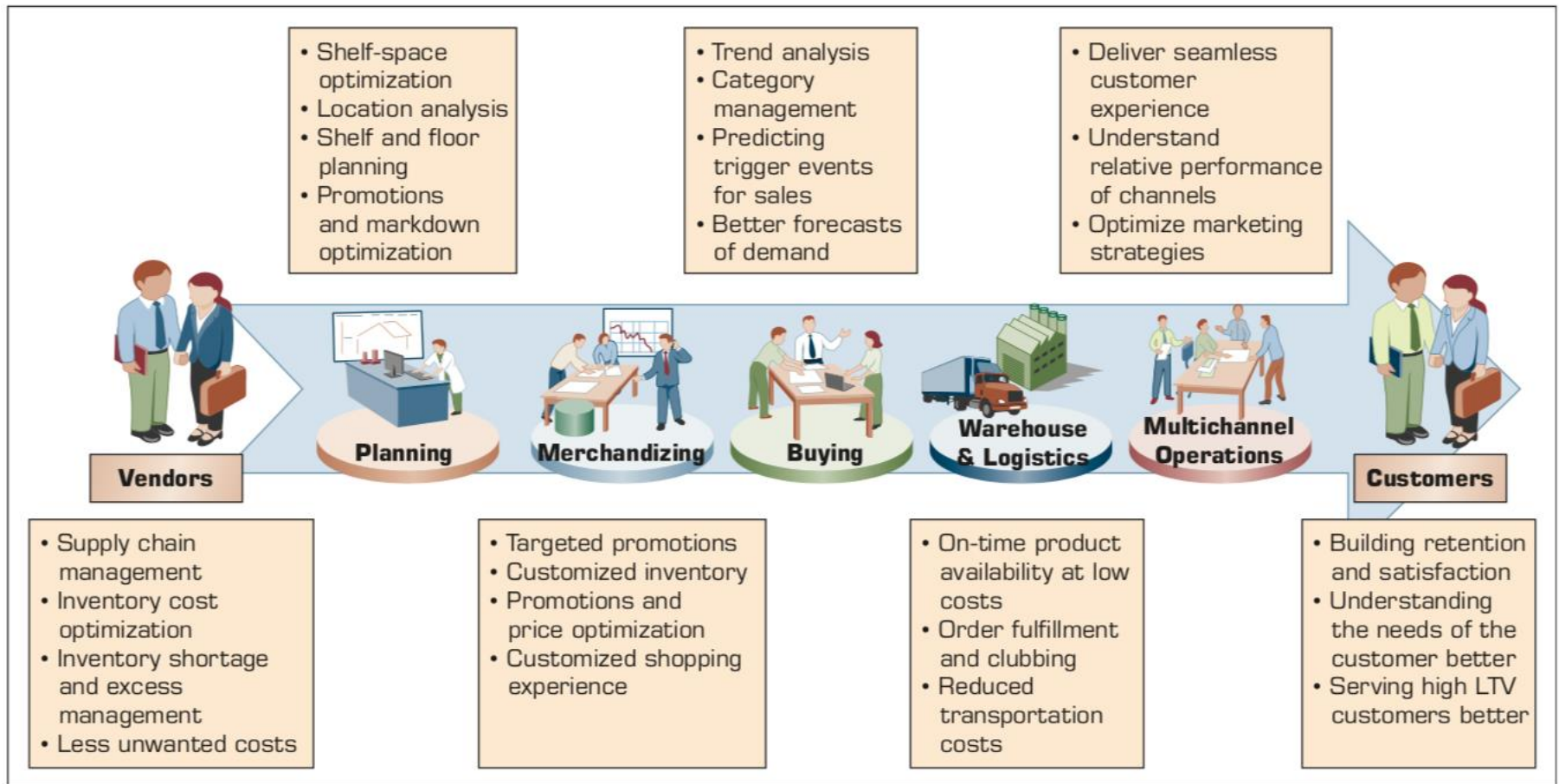
Key Outputs from a Successful Analytics Project



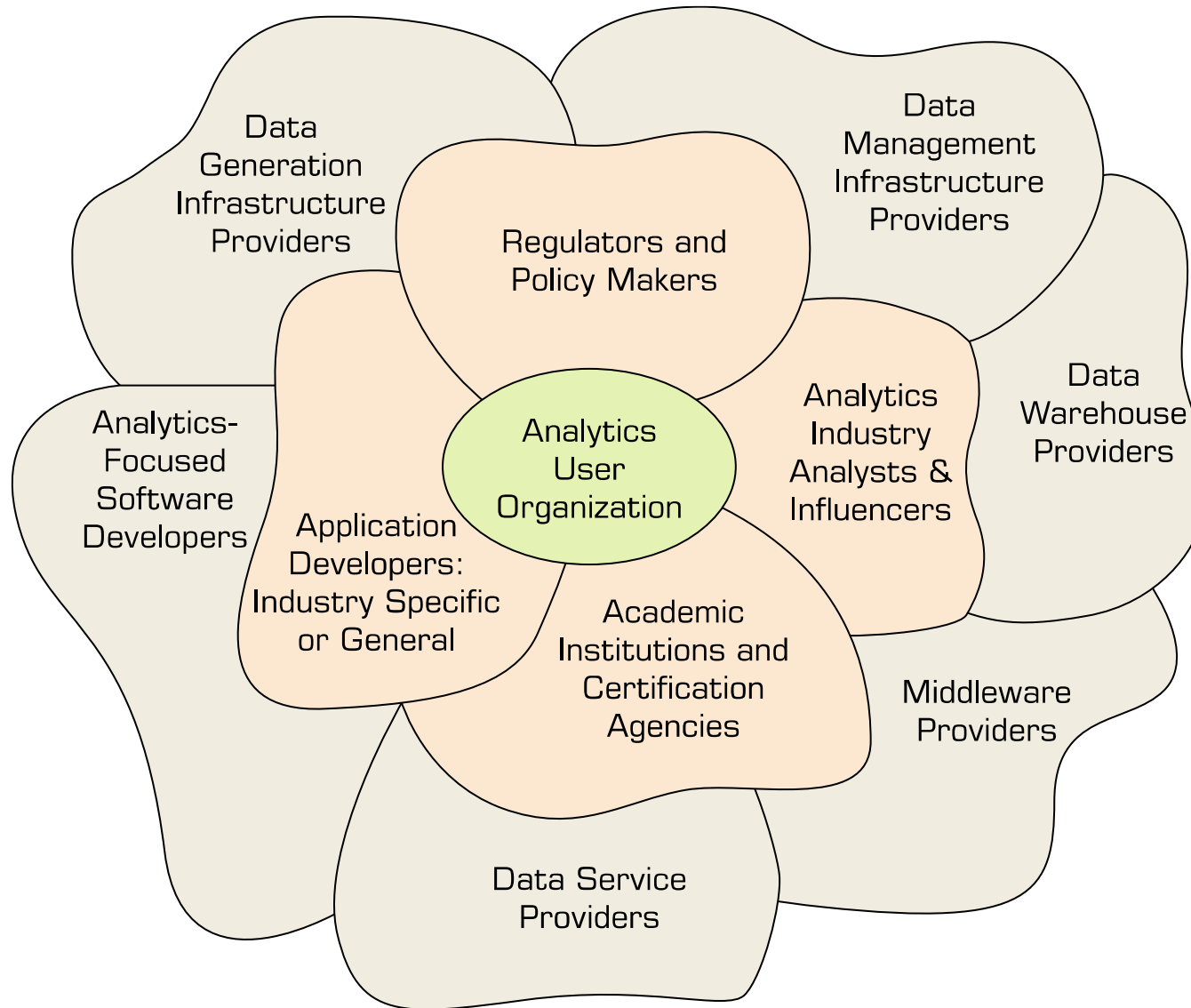
Example of Analytics Applications in a Retail Value Chain

Retail Value Chain

Critical needs at every touch point of the Retail Value Chain



Analytics Ecosystem



Google Colab

The screenshot shows the Google Colab web interface. At the top, the browser address bar displays the URL <https://colab.research.google.com/notebooks/welcome.ipynb>. The main header includes the Colab logo, the text "Hello, Colaboratory", and a menu with options: File, Edit, View, Insert, Runtime, Tools, Help. On the right side of the header, there is a "SHARE" button and a user profile picture. Below the header, a toolbar contains buttons for "CODE", "TEXT", "CELL" (with up and down arrows), and "COPY TO DRIVE". On the far right of the toolbar are "CONNECT" and "EDITING" buttons. A left-hand sidebar contains a "Table of contents" section with links to "Getting Started", "Highlighted Features", "TensorFlow execution", "GitHub", "Visualization", "Forms", "Examples", and "Local runtime support". The main content area features a large "Welcome to Colaboratory!" message with the Colab logo and a brief description: "Colaboratory is a free Jupyter notebook environment that requires no setup and runs entirely in the cloud. See our [FAQ](#) for more info." Below this is a "Getting Started" section with a list of links: "Overview of Colaboratory", "Loading and saving data: Local files, Drive, Sheets, Google Cloud Storage", "Importing libraries and installing dependencies", "Using Google Cloud BigQuery", "Forms, Charts, Markdown, & Widgets", "TensorFlow with GPU", and "Machine Learning Crash Course: Intro to Pandas & First Steps with TensorFlow". A "Highlighted Features" section is partially visible, starting with a "Seedbank" subsection that says "Looking for Colab notebooks to learn from? Check out [Seedbank](#), a place to discover interactive machine learning examples." Below that, the "TensorFlow execution" subsection begins with the text "Colaboratory allows you to execute TensorFlow code in your browser with a single click. The example below adds two matrices." followed by a mathematical equation:
$$\begin{bmatrix} 1. & 1. & 1. \end{bmatrix} + \begin{bmatrix} 1. & 2. & 3. \end{bmatrix} = \begin{bmatrix} 2. & 3. & 4. \end{bmatrix}$$

Summary

- Business Intelligence (BI)
- Analytics
- Data Science

References

- Ramesh Sharda, Dursun Delen, and Efraim Turban (2017), Business Intelligence, Analytics, and Data Science: A Managerial Perspective, 4th Edition, Pearson.
- Kenneth C. Laudon & Jane P. Laudon (2014), Management Information Systems: Managing the Digital Firm, Thirteenth Edition, Pearson.
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- Stephan Kudyba (2014), Big Data, Mining, and Analytics: Components of Strategic Decision Making, Auerbach Publications.
- EMC Education Services, Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data, Wiley, 2015.