Tamkang University
淡江大學

商業智慧實務

Tamkang University

Practices of Business Intelligence

商業智慧、分析與資料科學

(Business Intelligence, Analytics, and Data Science)

1071BI02
MI4 (M2084) (2888)
Wed, 7, 8 (14:10-16:00) (B217)

Min-Yuh Day
戴敏育
Assistant Professor
專任助理教授
Dept. of Information Management, Tamkang University
淡江大學 資訊管理學系
http://mail. tku.edu.tw/myday/

2018-09-19

課程大綱 (Syllabus)

週次 (Week)	日期 (Date)	內容(Subject/Topics)
1	2018/09/12	商業智慧實務課程介紹 (Course Orientation for Practices of Business Intelligence)
2	2018/09/19	商業智慧、分析與資料科學 (Business Intelligence, Analytics, and Data Science)
3	2018/09/26	人工智慧、大數據與雲端運算 (ABC: AI, Big Data, and Cloud Computing)
4	2018/10/03	描述性分析I：數據的性質、統計模型與可視化 (Descriptive Analytics I: Nature of Data, Statistical Modeling, and Visualization)
5	2018/10/10	國慶紀念日 (放假一天) (National Day) (Day off)
6	2018/10/17	描述性分析II：商業智慧與資料倉儲 (Descriptive Analytics II: Business Intelligence and Data Warehousing)

課程大綱 (Syllabus)

週次 (Week)　日期 (Date)　內容(Subject/Topics)

7　2018/10/24　預測性分析I：資料探勘流程、方法與演算法
(Predictive Analytics I: Data Mining Process, Methods, and Algorithms)

8　2018/10/31　預測性分析II：文本、網路與社群媒體分析
(Predictive Analytics II: Text, Web, and Social Media Analytics)

9　2018/11/07　期中報告 (Midterm Project Report)

10　2018/11/14　期中考試 (Midterm Exam)

11　2018/11/21　處方性分析：最佳化與模擬
(Prescriptive Analytics: Optimization and Simulation)

12　2018/11/28　社會網絡分析
(Social Network Analysis)

課程大綱 (Syllabus)

週次 (Week)	日期 (Date)	內容(Subject/Topics)
13	2018/12/05	機器學習與深度學習 (Machine Learning and Deep Learning)
14	2018/12/12	自然語言處理 (Natural Language Processing)
15	2018/12/19	AI交談機器人與對話式商務 (AI Chatbots and Conversational Commerce)
16	2018/12/26	商業分析的未來趨勢、隱私與管理考量 (Future Trends, Privacy and Managerial Considerations in Analytics)
17	2019/01/02	期末報告 (Final Project Presentation)
18	2019/01/09	期末考試 (Final Exam)

Business Intelligence (BI)

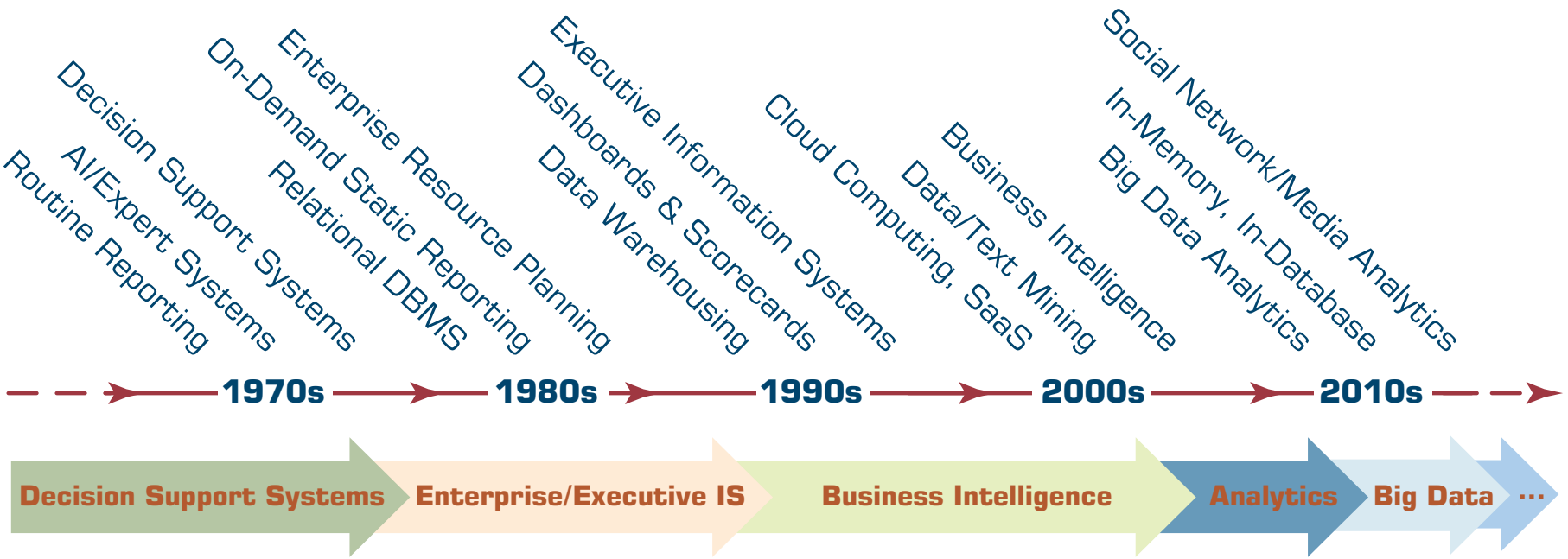
1. Introduction to BI and Data Science
2. Descriptive Analytics
3. Predictive Analytics
4. Prescriptive Analytics
5. Big Data Analytics
6. Future Trends

Outline

- Business Intelligence (BI)
- Analytics
- Data Science

Business Intelligence (BI)

Evolution of Decision Support, Business Intelligence, and Analytics



Source: Ramesh Sharda, Dursun Delen, and Efraim Turban (2017),
Business Intelligence, Analytics, and Data Science: A Managerial Perspective, 4th Edition, Pearson

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)

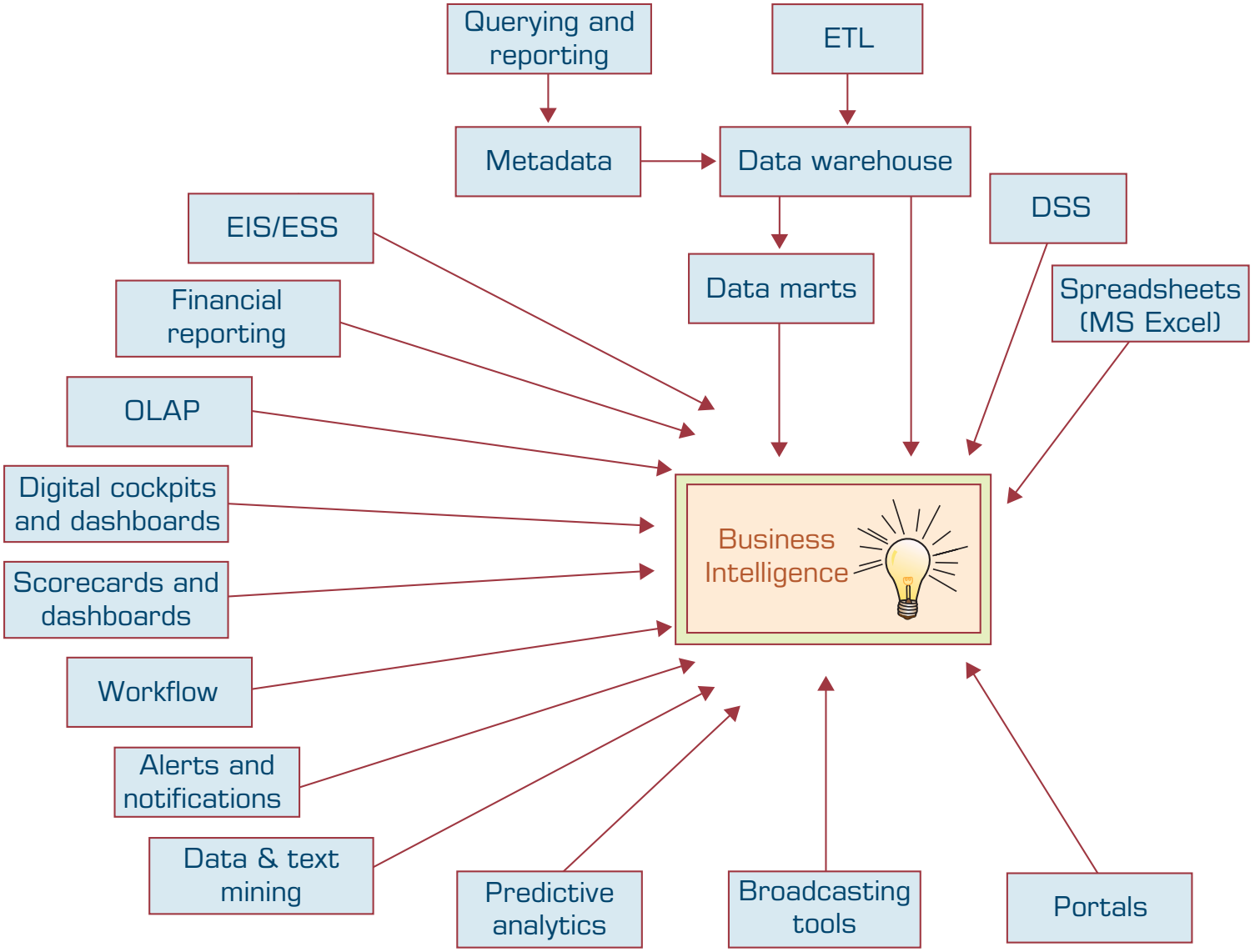
"interactive computer-based systems, which help decision makers utilize data and models to solve unstructured problems"

Decision Support Systems (DSS)

(Keen and Scott-Morton, 1978)

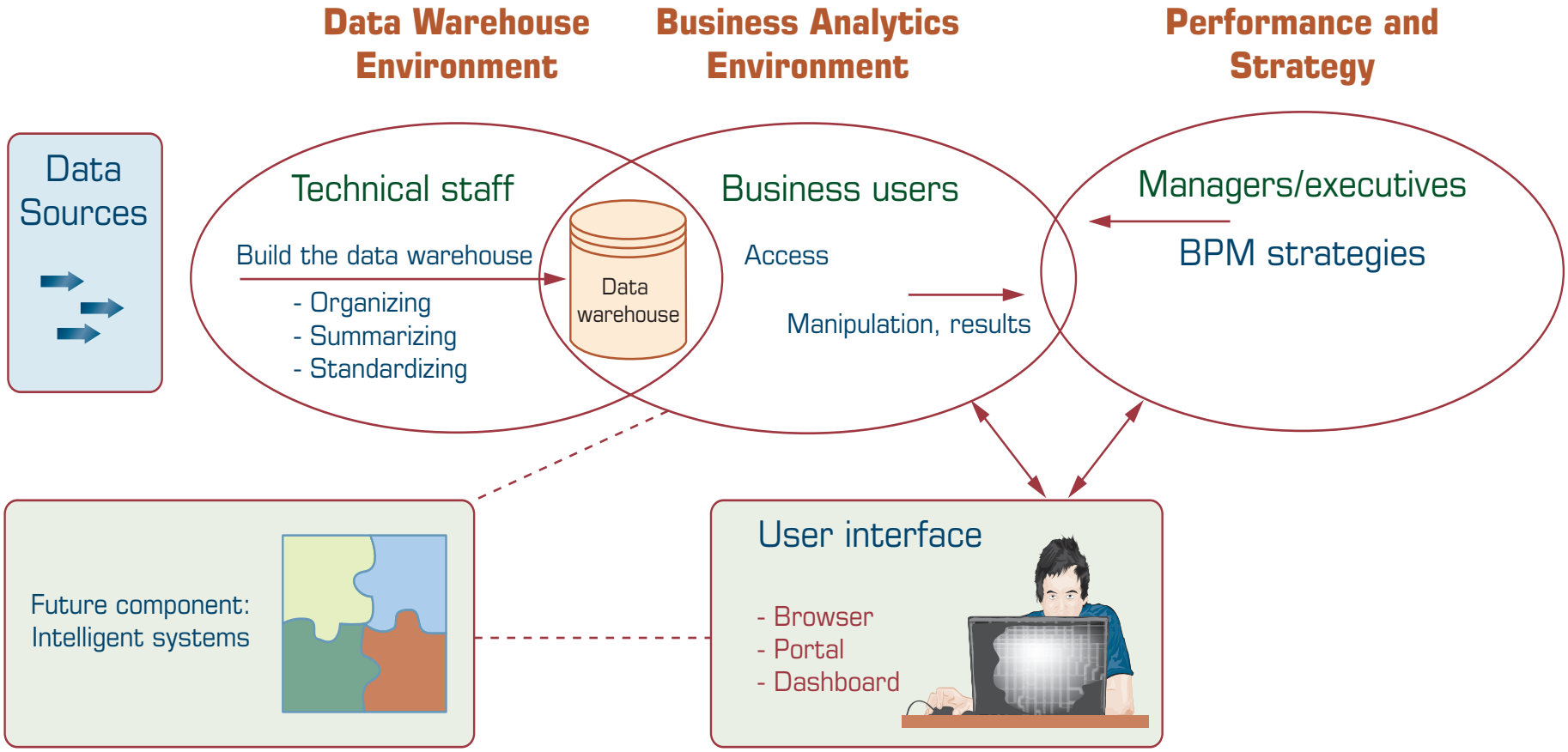
"Decision support systems couple the intellectual resources of individuals with the capabilities of the computer to improve the quality of decisions.
It is a computer-based support system for management decision makers who deal with semistructured problems."

Evolution of Business Intelligence (BI)



Source: Ramesh Sharda, Dursun Delen, and Efraim Turban (2017),
Business Intelligence, Analytics, and Data Science: A Managerial Perspective, 4th Edition, Pearson

A High-Level Architecture of BI



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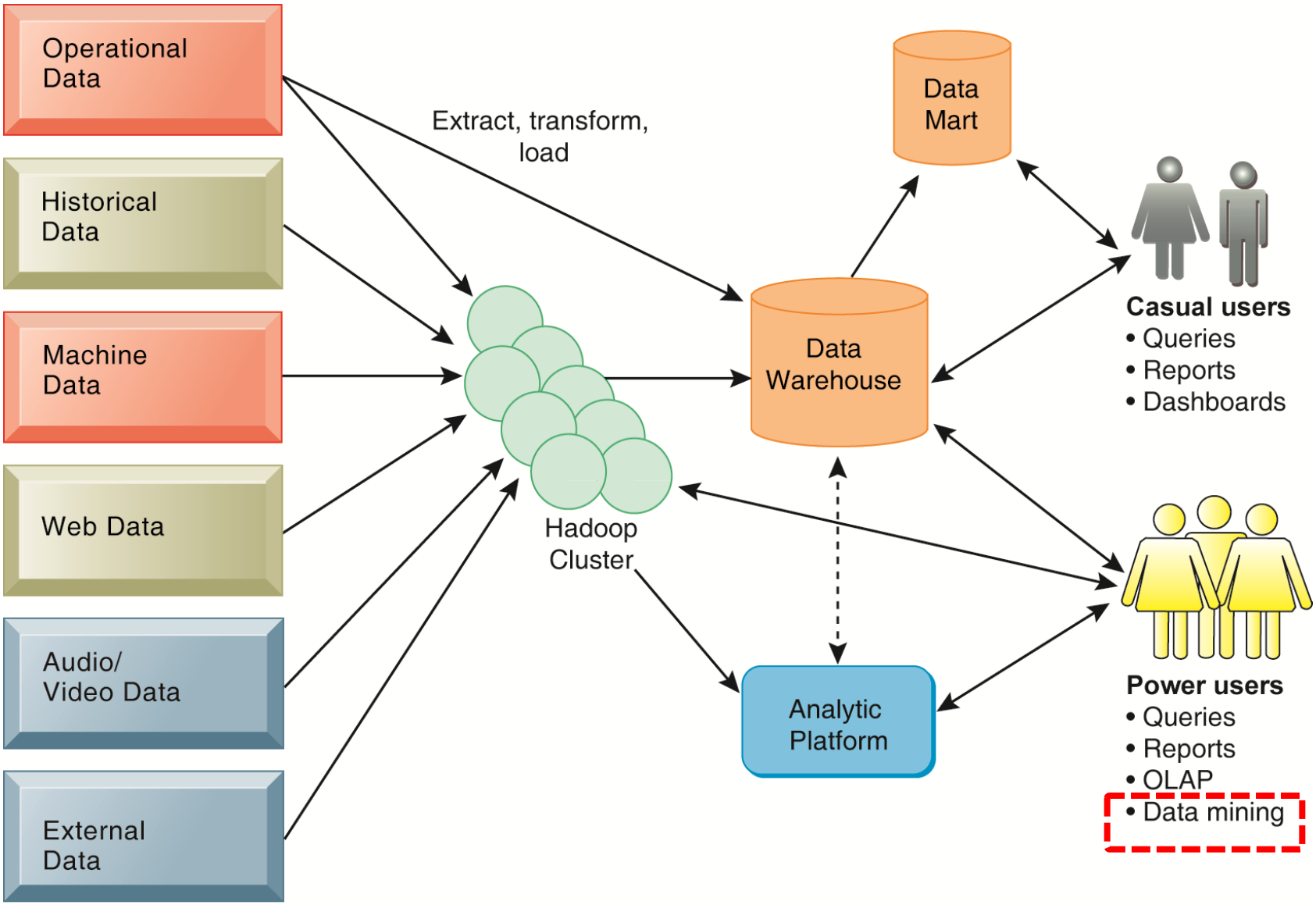
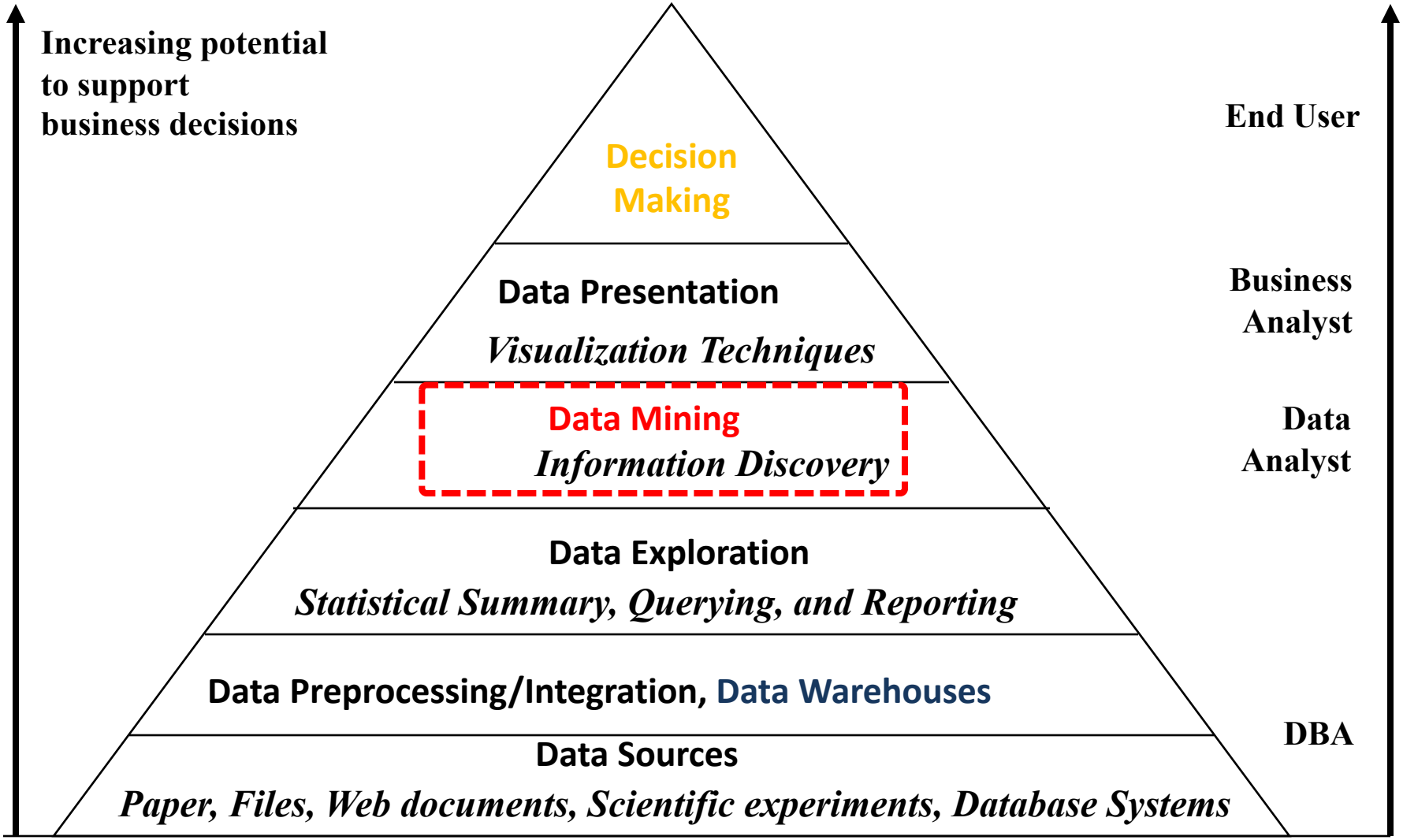
Business Intelligence (BI) Infrastructure



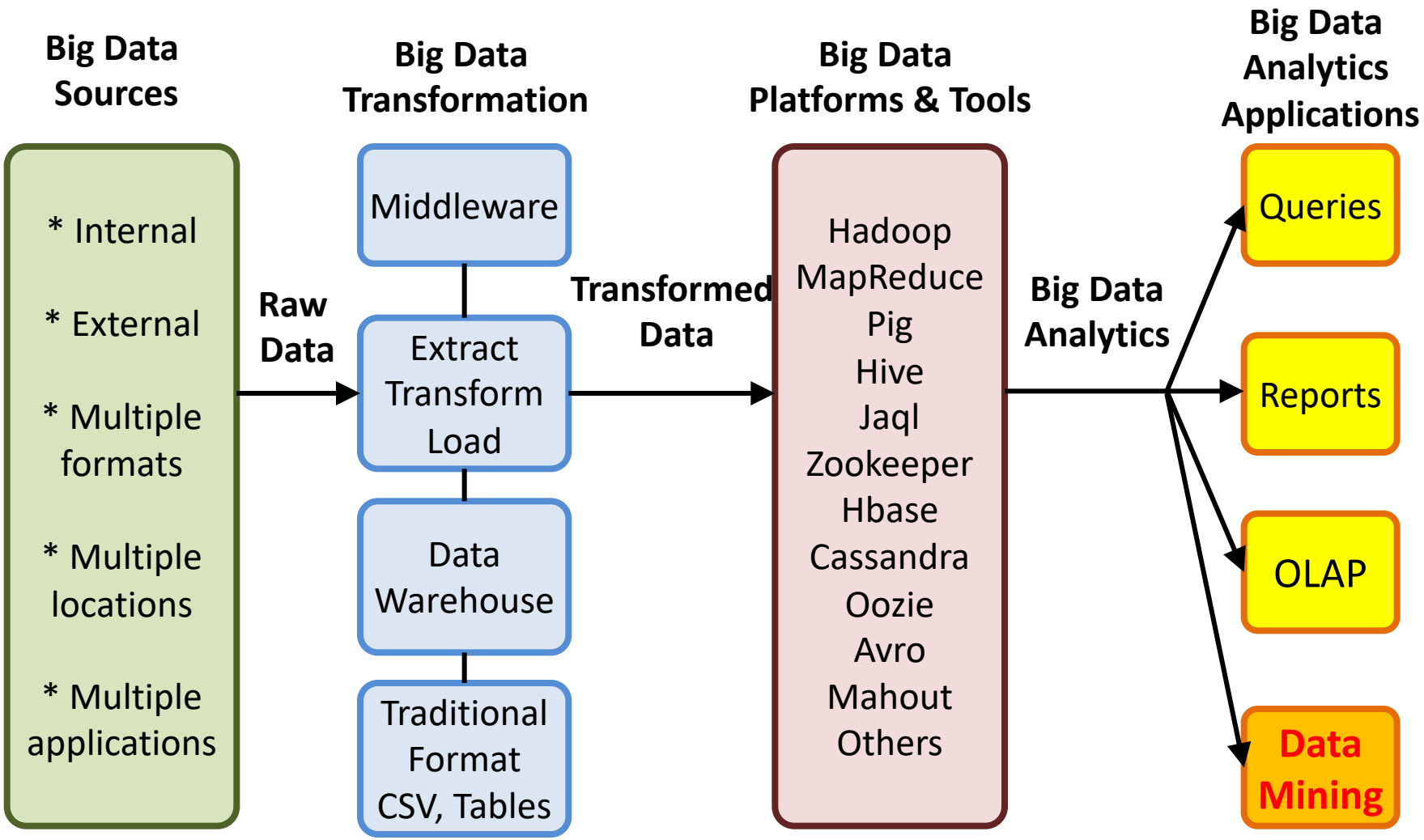
Source: Kenneth C. Laudon & Jane P. Laudon (2014), Management Information Systems: Managing the Digital Firm, Thirteenth Edition, Pearson.

Business Intelligence and Data Mining



Source: Jiawei Han and Micheline Kamber (2006), Data Mining: Concepts and Techniques, Second Edition, Elsevier

Architecture of Big Data Analytics



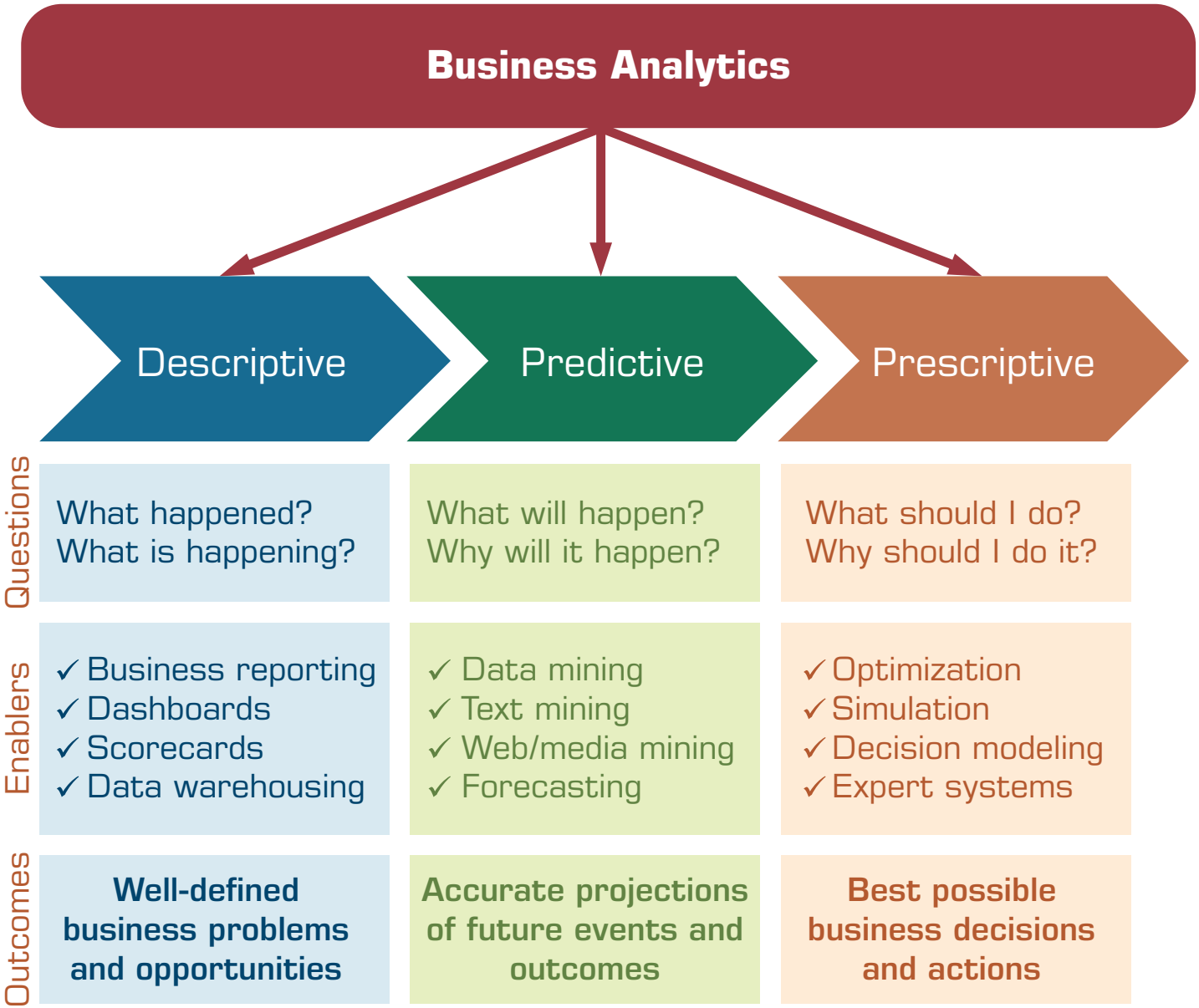
Source: Stephan Kudyba (2014), Big Data, Mining, and Analytics: Components of Strategic Decision Making, Auerbach Publications

Architecture of Big Data Analytics

Source: Stephan Kudyba (2014), Big Data, Mining, and Analytics: Components of Strategic Decision Making, Auerbach Publications

Analytics

Three Types of Analytics



Source: Ramesh Sharda, Dursun Delen, and Efraim Turban (2017),
Business Intelligence, Analytics, and Data Science: A Managerial Perspective, 4th Edition, Pearson

Three Types of Business Analytics

- Prescriptive Analytics
- Predictive Analytics
- Descriptive Analytics

Source: Thomas H. Davenport, "Enterprise Analytics: Optimize Performance, Process, and Decisions Through Big Data", FT Press, 2012

Three Types of Business Analytics

Source: Thomas H. Davenport, "Enterprise Analytics: Optimize Performance, Process, and Decisions Through Big Data", FT Press, 2012

Business Intelligence and Enterprise Analytics

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

Source: Thomas H. Davenport, "Enterprise Analytics: Optimize Performance, Process, and Decisions Through Big Data", FT Press, 2012

Data Science

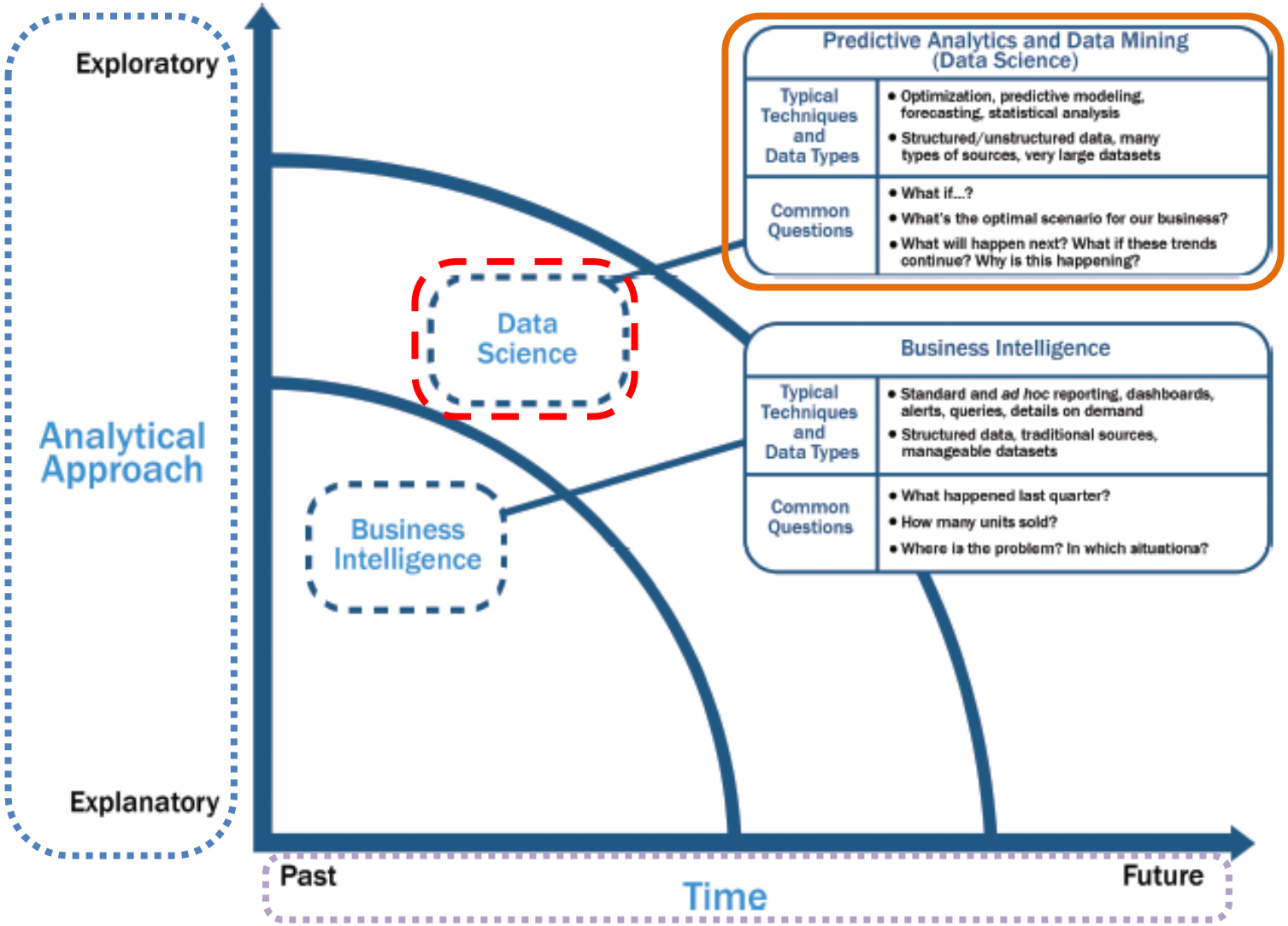
Data Analyst

- 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

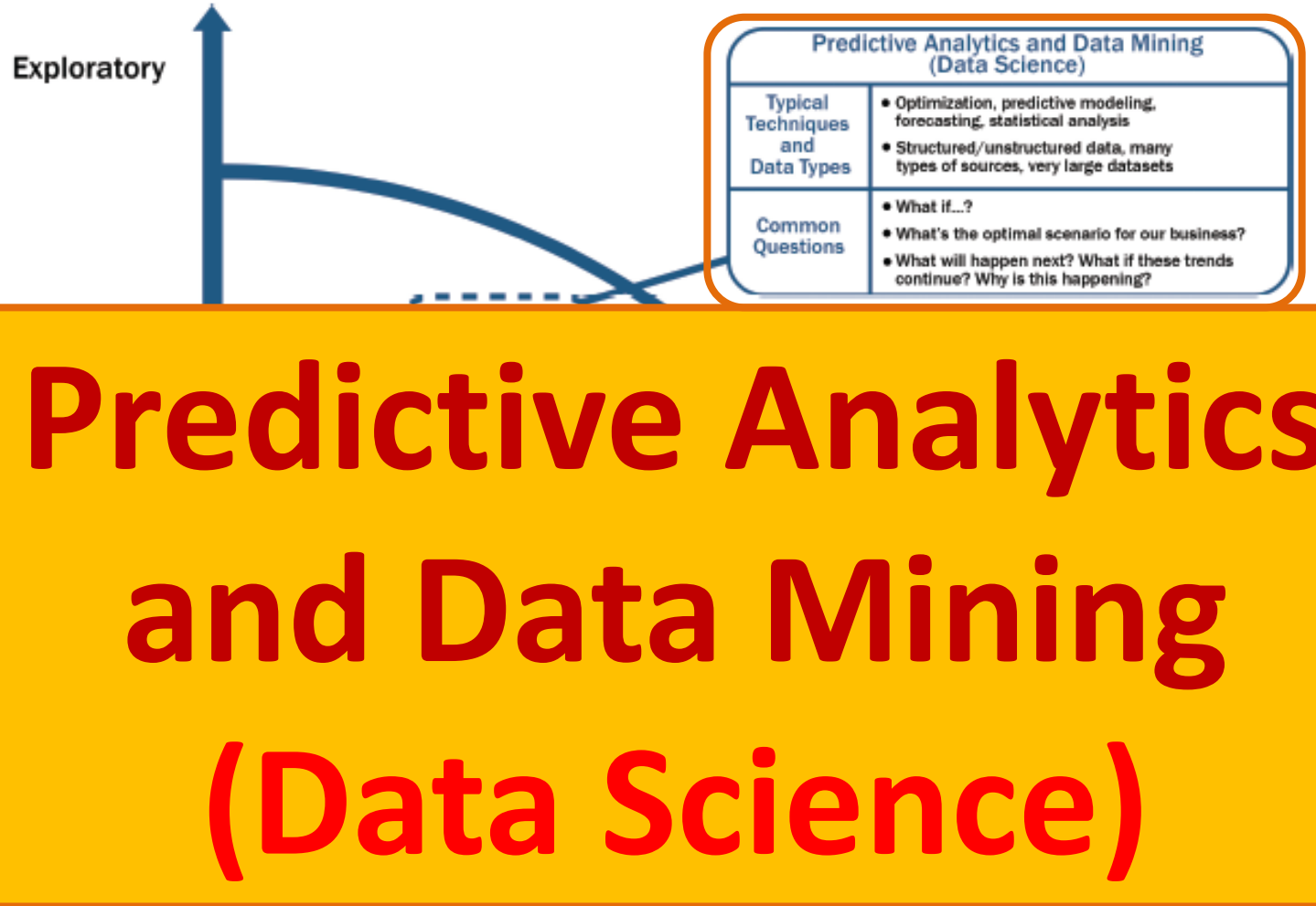
- Data scientist is responsible for predictive analysis, statistical analysis, and more advanced analytical tools and algorithms.
- They may have a deeper knowledge of algorithms and may recognize them under various labels—data mining, knowledge discovery, or machine learning.
- Some of these professionals 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



Source: EMC Education Services, Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data, Wiley, 2015

Data Science and Business Intelligence



Source: EMC Education Services, Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data, Wiley, 2015

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 countinue?
Why is this happening?

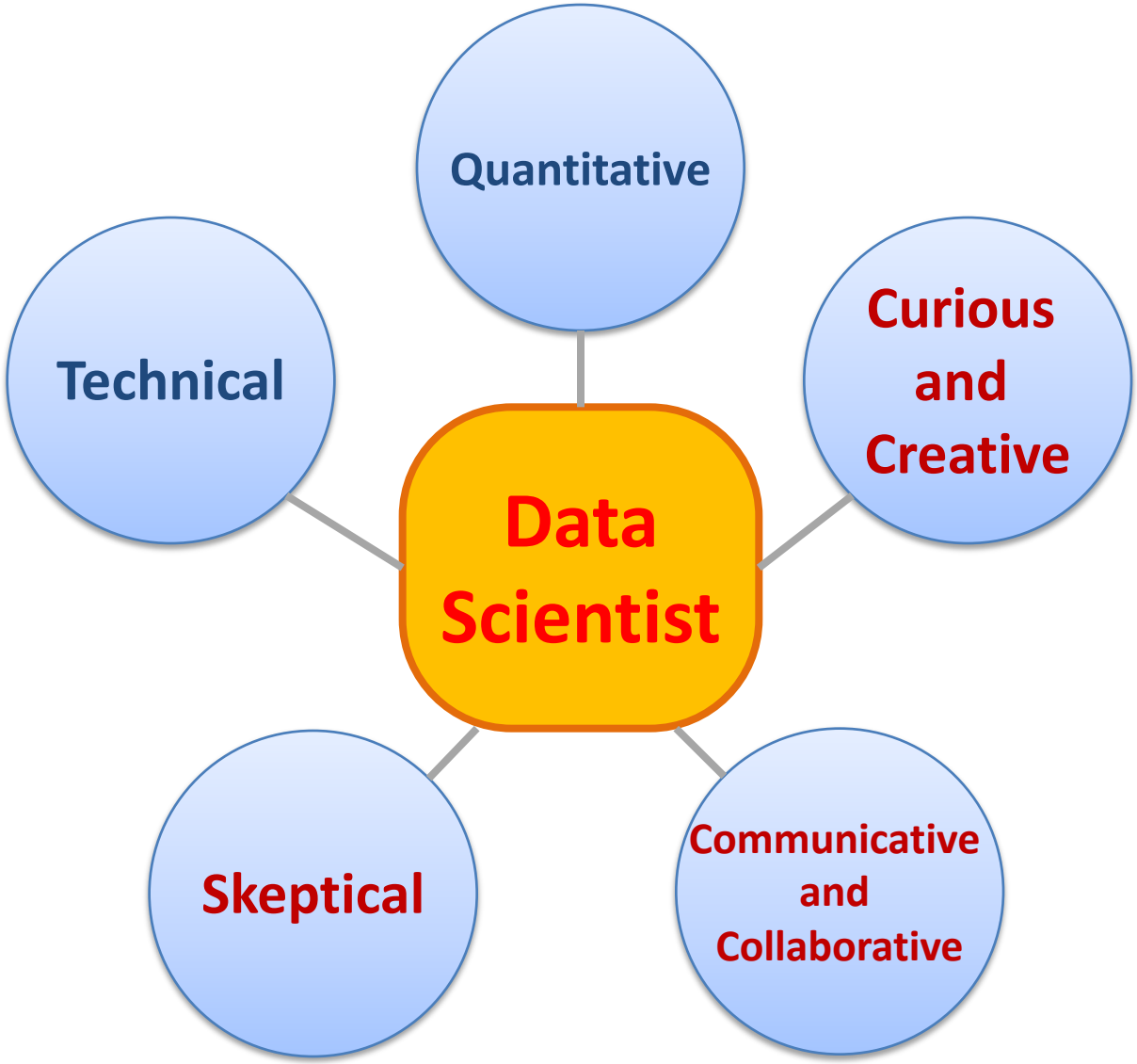
Source: EMC Education Services, Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data, Wiley, 2015

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**

Source: EMC Education Services, Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data, Wiley, 2015

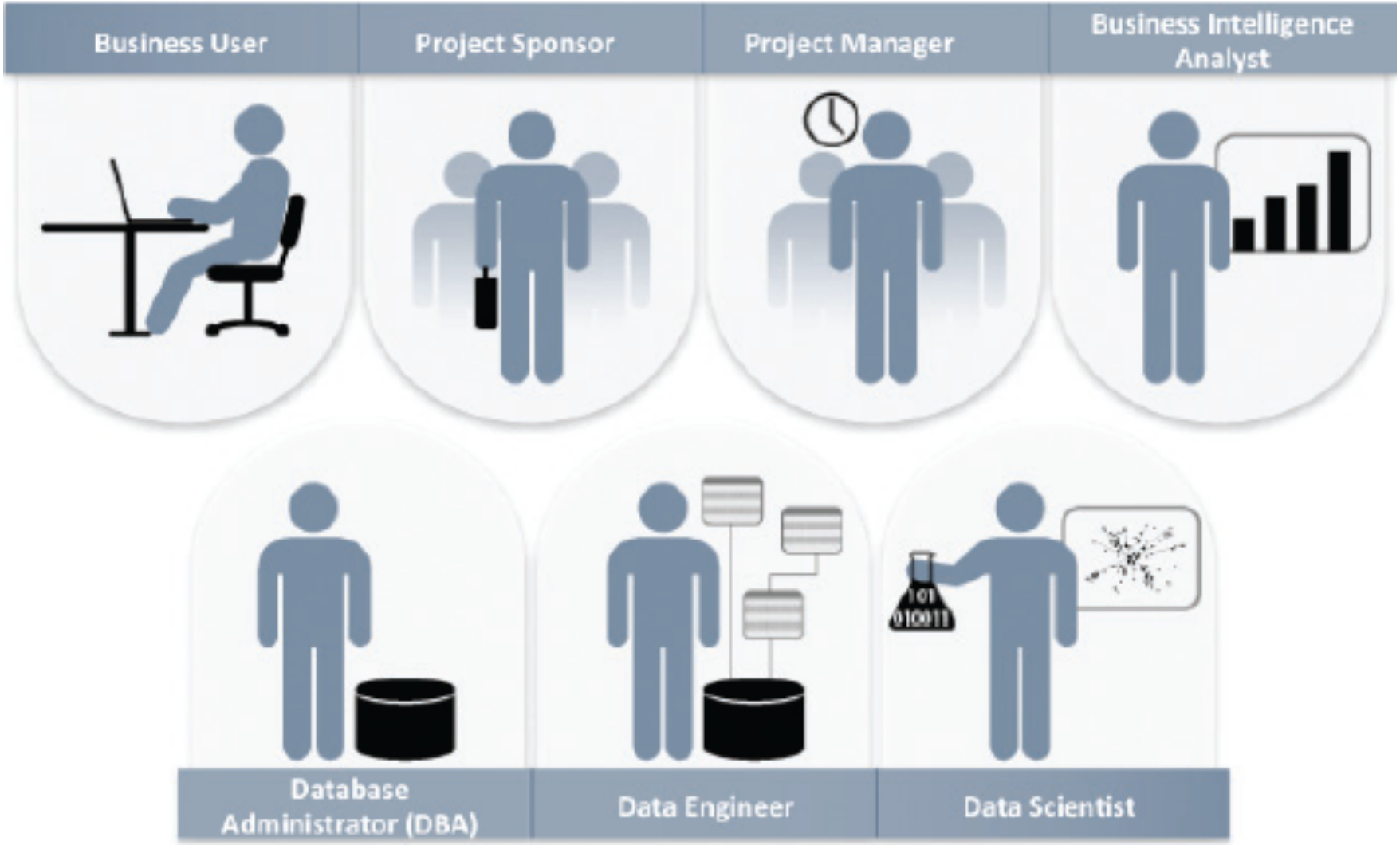
Data Scientist Profile



Source: EMC Education Services, Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data, Wiley, 2015

Big Data Analytics Lifecycle

Key Roles for a Successful Analytics Project



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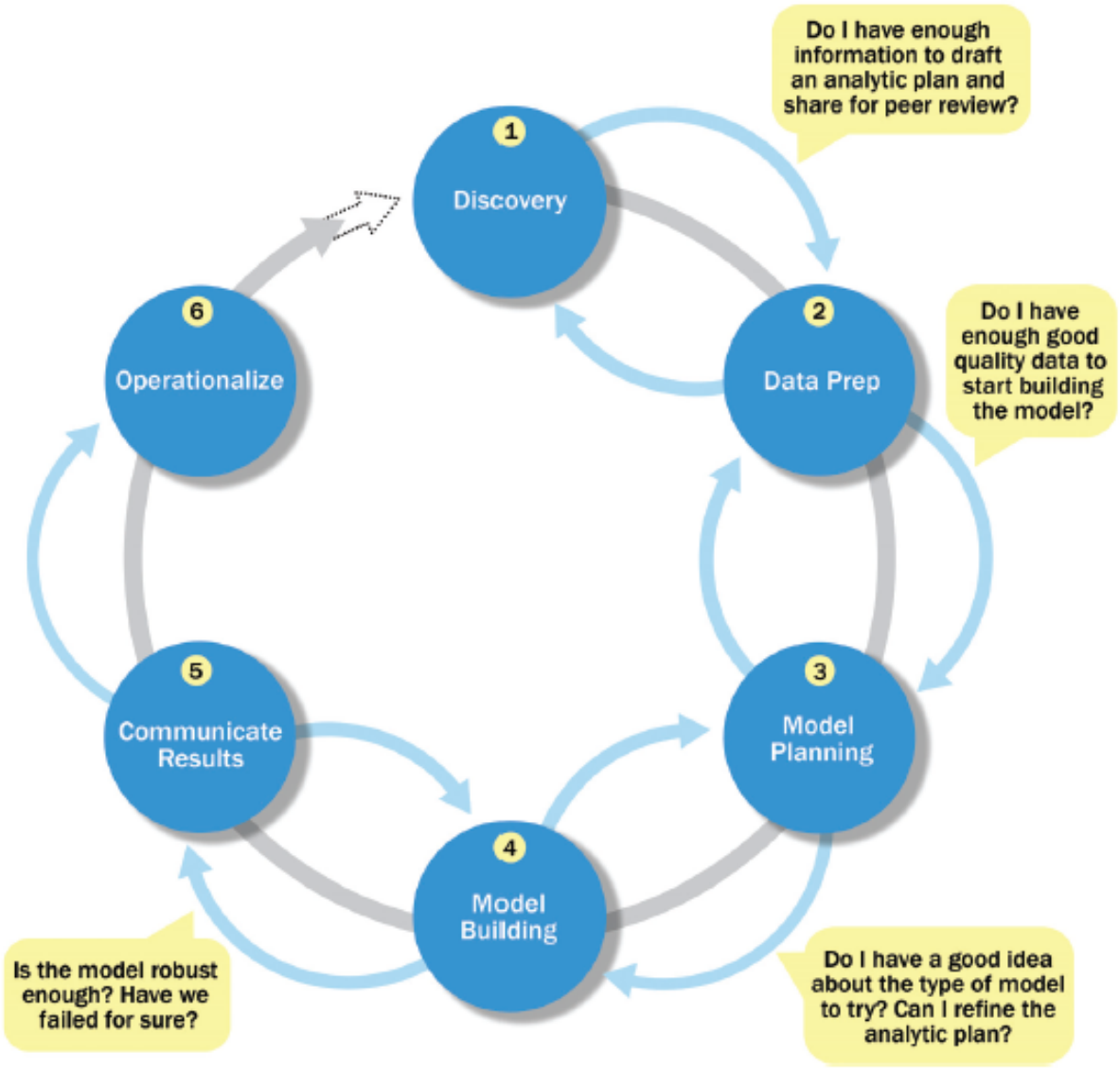
Overview of Data Analytics Lifecycle



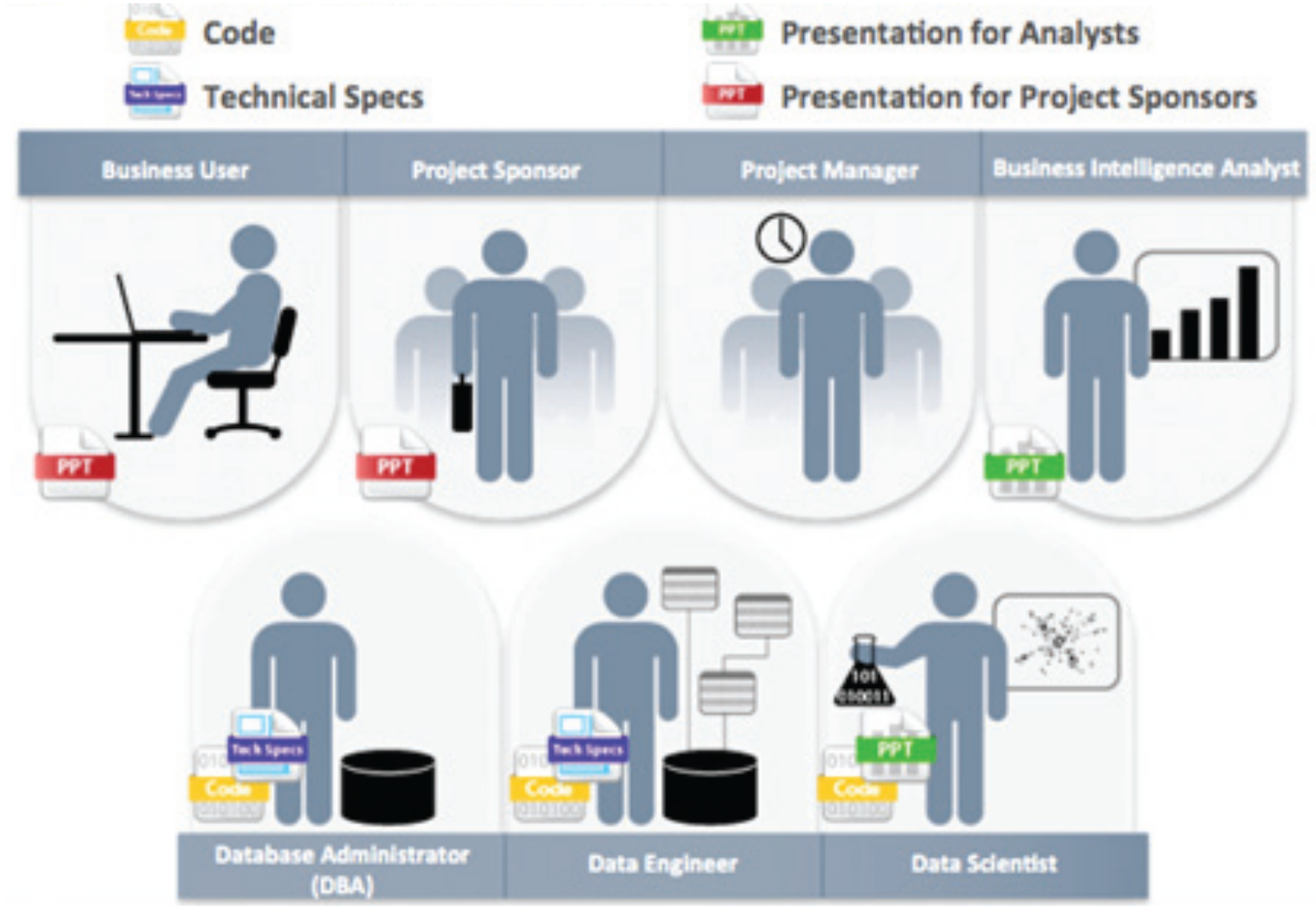
Source: EMC Education Services, Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data, Wiley, 2015

Overview of Data Analytics Lifecycle

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

Source: EMC Education Services, Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data, Wiley, 2015

Key Outputs from a Successful Analytics Project



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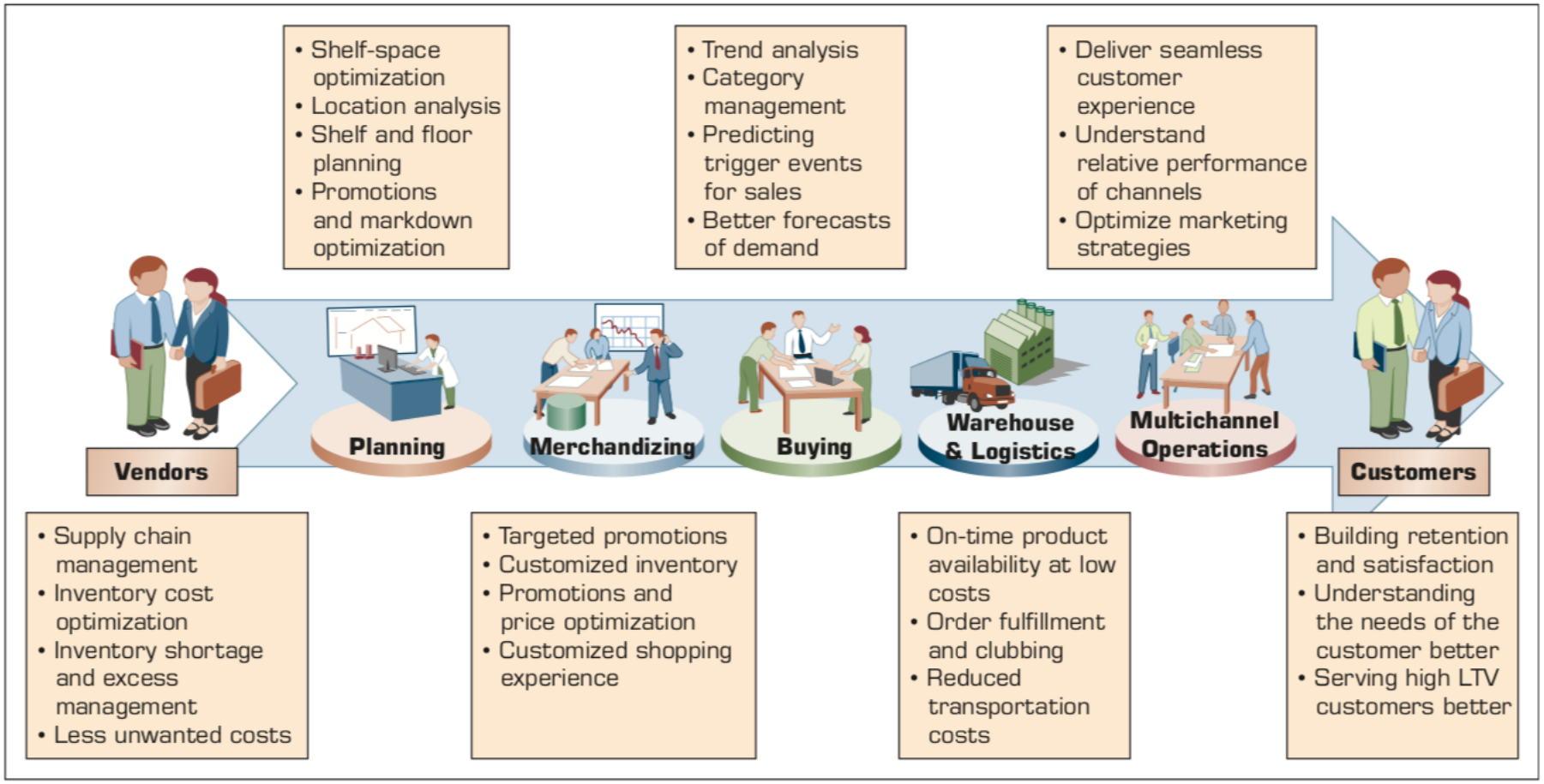
Example of Analytics Applications in a Retail Value Chain

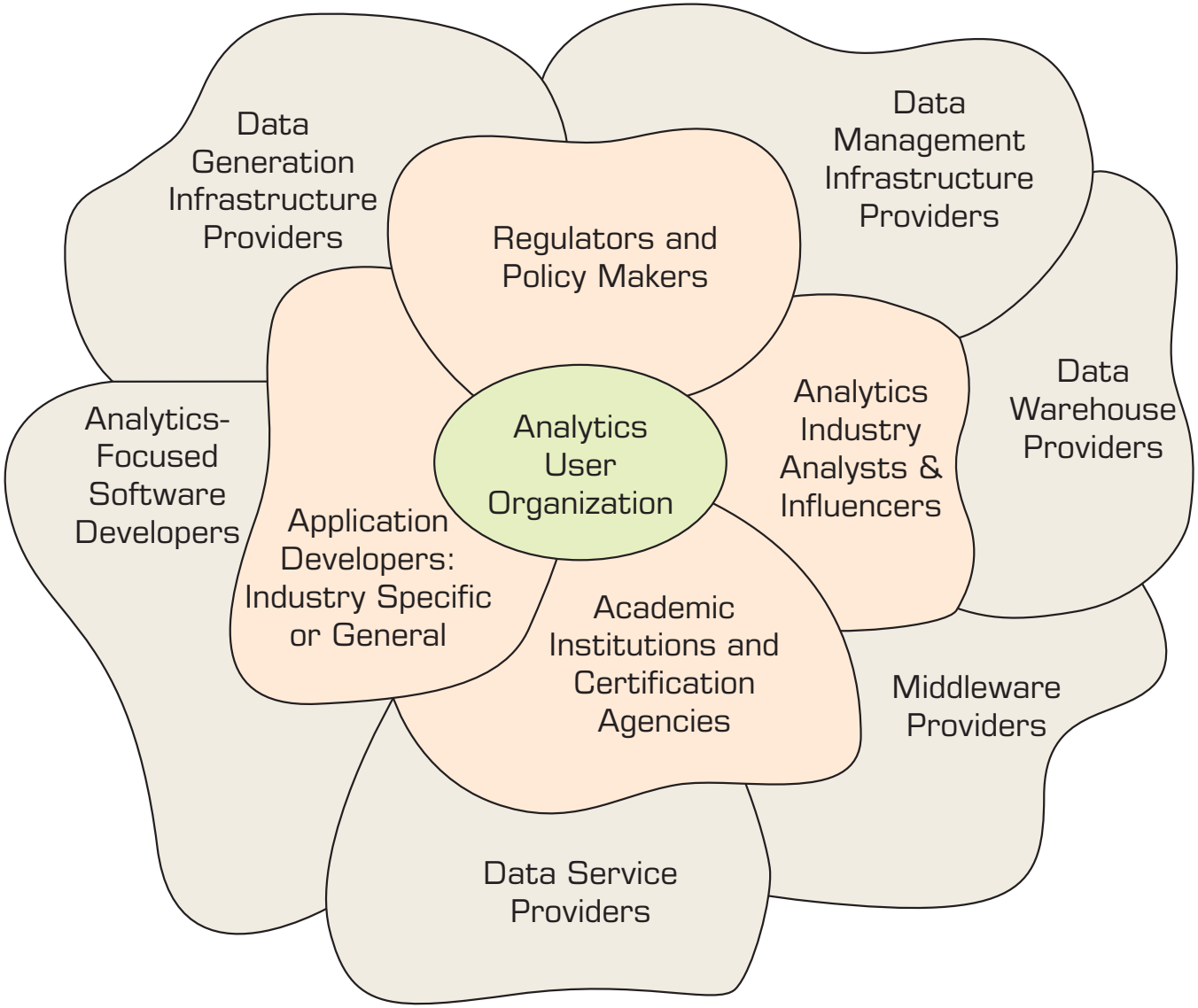
Retail Value Chain

Critical needs at every touch point of the Retail Value Chain



Source: Ramesh Sharda, Dursun Delen, and Efraim Turban (2017),
Business Intelligence, Analytics, and Data Science: A Managerial Perspective, 4th Edition, Pearson

Analytics Ecosystem

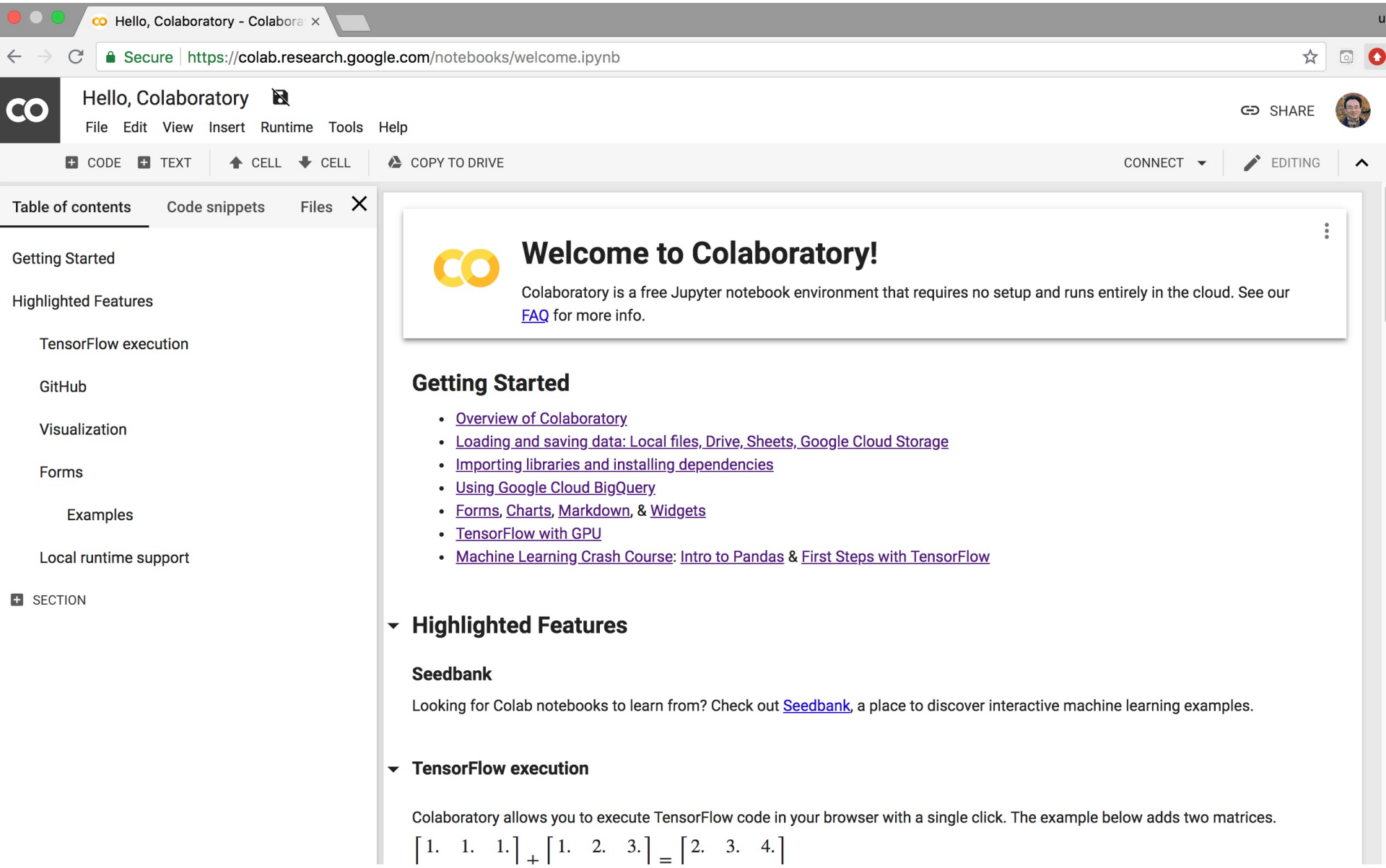


Source: Ramesh Sharda, Dursun Delen, and Efraim Turban (2017),
Business Intelligence, Analytics, and Data Science: A Managerial Perspective, 4th Edition, Pearson

Job Titles of Analytics

Source: Ramesh Sharda, Dursun Delen, and Efraim Turban (2017),
Business Intelligence, Analytics, and Data Science: A Managerial Perspective, 4th Edition, Pearson

Google Colab



https://colab.research.google.com/notebooks/welcome.ipynb

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.
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