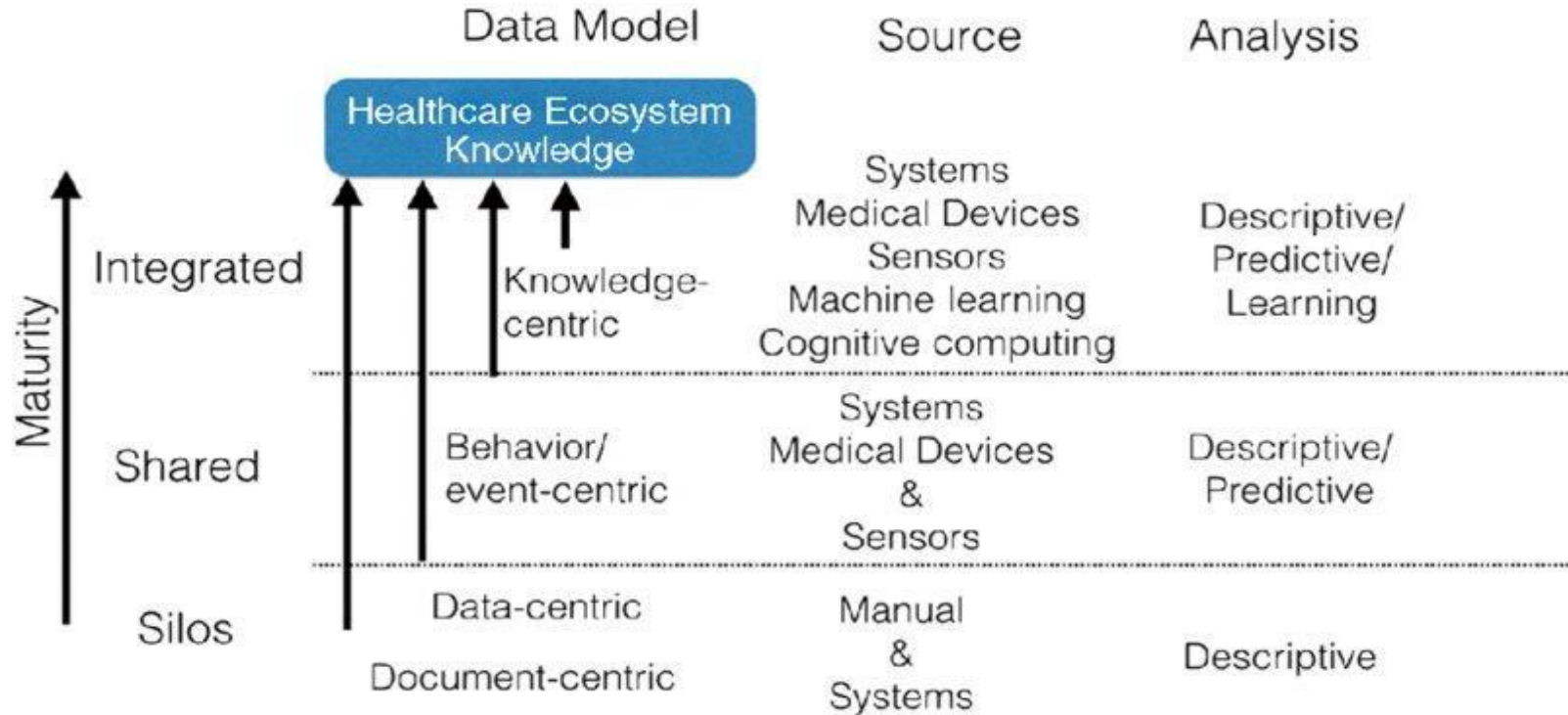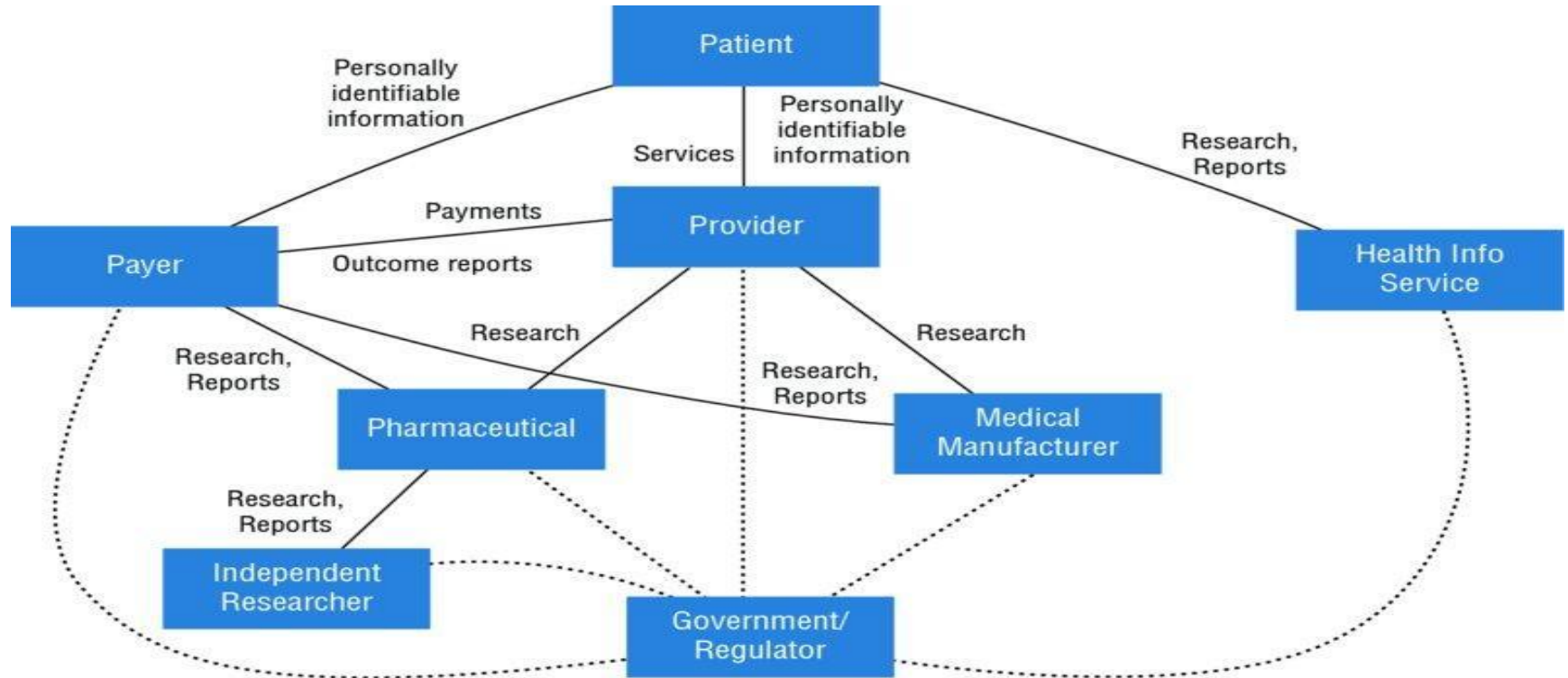# MODULE 6
Building a Cognitive Applications

- Healthcare providers
- Healthcare payers
- Medical device manufacturers
- Pharmaceutical firms
- Independent research labs
- Health information providers
- Government regulatory agencies

Foundations of cognitive computing for applications

Constituents in the Healthcare Ecosystem

The data managed and leveraged by different constituents in the healthcare ecosystem includes:

- **Patients**—From family history and habits to test results, individuals participating in the healthcare ecosystem produce personally identifiable information, which may be aggregated anonymously, where permitted, to guide care for those with similar attributes.
- **Providers**—Data covers a broad range of unstructured and structured sources. Some examples include patient medical records (EMR, doctors' office notes, and lab data), data from sensors and medical devices, intake records from the hospital, medical text books, journal articles, clinical research studies, regulatory reports, billing data, and operational expense data.

- **Pharmaceutical companies**—Data to support pharmaceutical research, clinical trials, drug effectiveness, competitive data, and drug prescriptions by medical providers.
- **Payers**—Data includes billing data and utilization review data.
- **Government agencies**—Regulatory data.
- **Data service providers**—Prescription drug usage and effectiveness data, healthcare terminology taxonomies, and software solutions to analyze healthcare data.

Learning from Patterns in Healthcare Data

Patient Attributes
Smoker, drug abuse, alcohol abuse, lives alone, dietary noncompliance

Socio-economic Attributes
Educational status, financial status

Physician Factors
Incorrect medicines given, overlooked important information about patient

Building on a Foundation of Big Data Analytics

Building on a foundation of big data analytics involves leveraging the vast amount of data available to organizations to gain insights, identify patterns, and make informed decisions.

Businesses must first ensure that they have the necessary infrastructure and tools to collect, store, and analyze data.

Implementing data management systems that can handle large amounts of data and provide real-time access to information.

Organizations need to hire skilled data scientists and analysts who can make sense of the data and extract valuable insights.

Proficient in using data analysis tools such as statistical modeling, machine learning, and data visualization to identify trends, patterns, and correlations in the data.

Organizations need to establish robust data security policies and protocols to protect sensitive information from cyber threats and ensure compliance with regulatory requirements.

Starting with a cognitive application for applications

Cognitive application for applications requires a deep understanding of the underlying technologies and their potential applications in different domains. It also requires collaboration between different stakeholders such as software developers, data scientists, and business analysts to identify opportunities and develop solutions that meet the needs of end-users.

Define the Questions Users will Ask

Ingest Content to Create the Corpus

Training the Cognitive System
Question Enrichment and Adding to the Corpus

Using a cognitive application to enhance the record

One way a cognitive application can enhance EMRs is by using natural language processing to extract relevant information from unstructured data, such as clinical notes and physician narratives. This can help healthcare providers identify patterns and trends in patient data, making it easier to make informed decisions about patient care.

Another way a cognitive application can enhance EMRs is by using machine learning algorithms to predict potential health issues and recommend treatment plans. By analyzing data from EMRs, including patient demographics, medical histories, and laboratory results, a cognitive application can identify patients who may be at risk for certain health conditions and suggest appropriate interventions.

Cognitive applications can also enhance the accuracy and completeness of EMRs by automating data entry tasks. For example, speech recognition technology can be used to transcribe physician-patient conversations, reducing the risk of errors and allowing physicians to focus on patient care rather than data entry.

Finally, cognitive applications can improve the accessibility and usability of EMRs by using natural language interfaces and chatbots to provide users with personalized support and assistance. This can help healthcare providers navigate complex EMRs more efficiently and improve the overall user experience.

Using cognitive application to improve teaching

Clinical teaching is an important aspect of medical education, where healthcare providers learn how to provide quality patient care in a supervised setting.
Using a cognitive application to improve clinical teaching can provide healthcare providers with personalized, real-time feedback and support to enhance their learning experience and improve patient outcomes.