MACQUARIE BUSINESS SCHOOL

WELCOME TO

MACQUARIE University

BUSA3430 and BUSA6430: Business Applications of AI

S1 2025

Week 2: AI for Business – Frameworks and their applications

Week 2 agenda

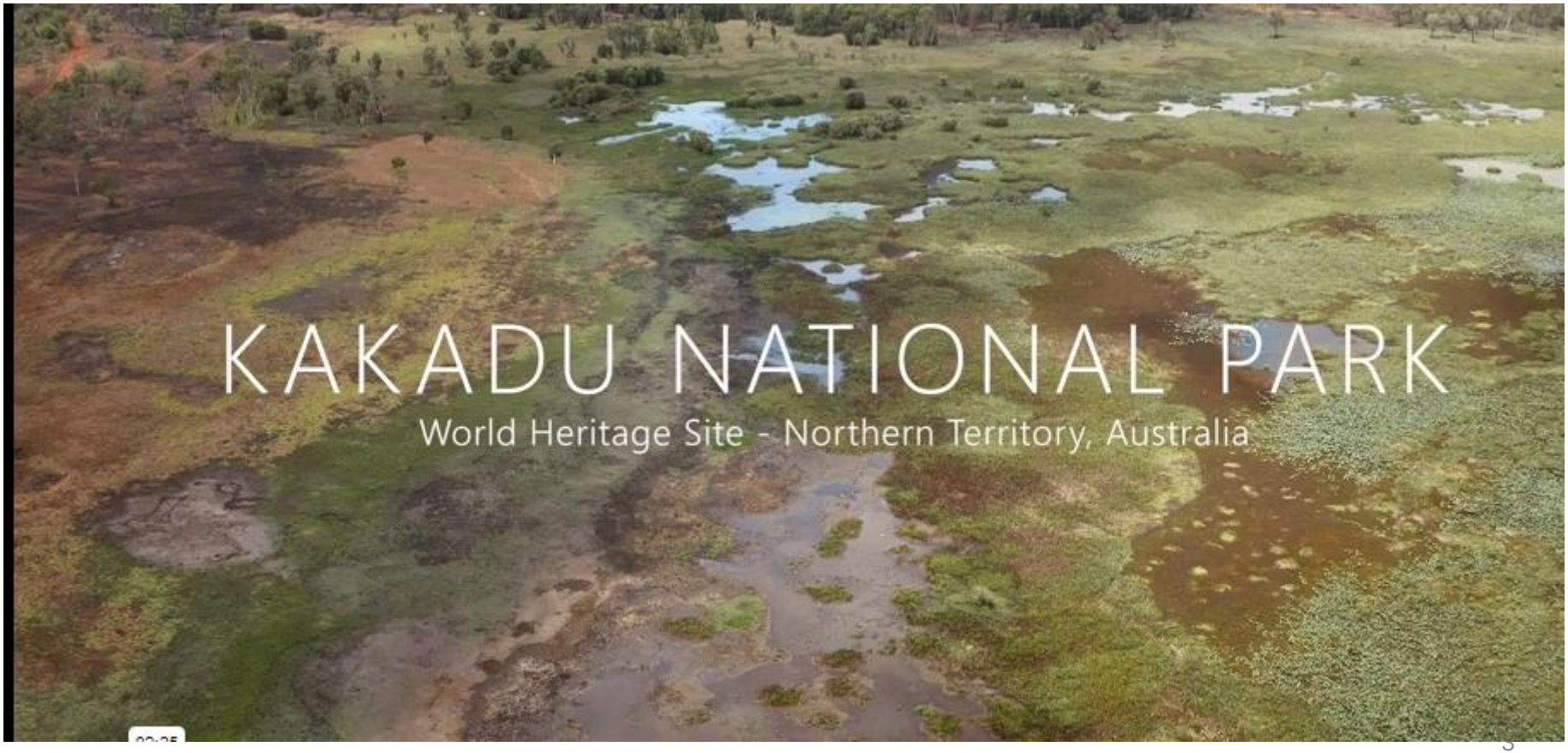
Part 1: A brief Week 1 revision

Part 2: Topic 2: AI in Business/Organisations

- Importance of human “pattern thinking” skills for AI
- Understanding AI for Business at different levels (from higher to more granular):
    - Use of AI in business from the socio-technical perspective (Information Systems framework)
    - Impact of AI change at deeper level (PACE Layers Framework)
    - How is AI used in different areas of business (Porter’s Value Chain model/framework)
    - Use of AI by business decision makers (Human-in-the-loop framework)
- Industry insights into the current use of AI in Business

Inspired to learn about AI

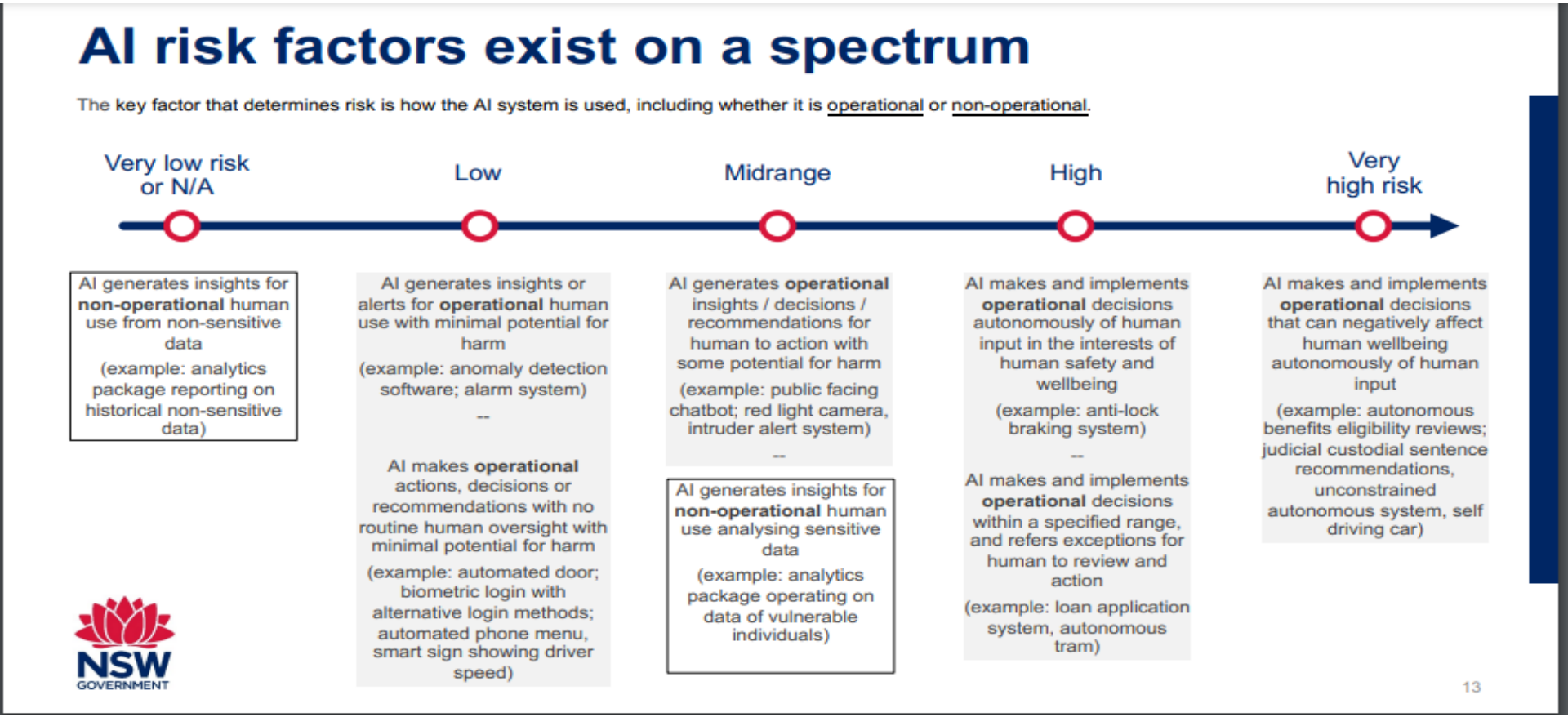
- Video: AI combined with traditional Indigenous knowledge



MACQUARIE BUSINESS SCHOOL

MACQUARIE University

Week 1 revision: AI risk – different frameworks, different consequences



NSW Government AI Assurance framework (March 2022)

EU AI Act (June 2023)

Title II (Article 5) of the proposed AI act explicitly **bans harmful AI practices** that are considered to be a clear threat to people's safety, livelihoods and rights, because of the 'unacceptable risk' they create. Accordingly, it would be prohibited to place on the market, put into services or use in the EU:

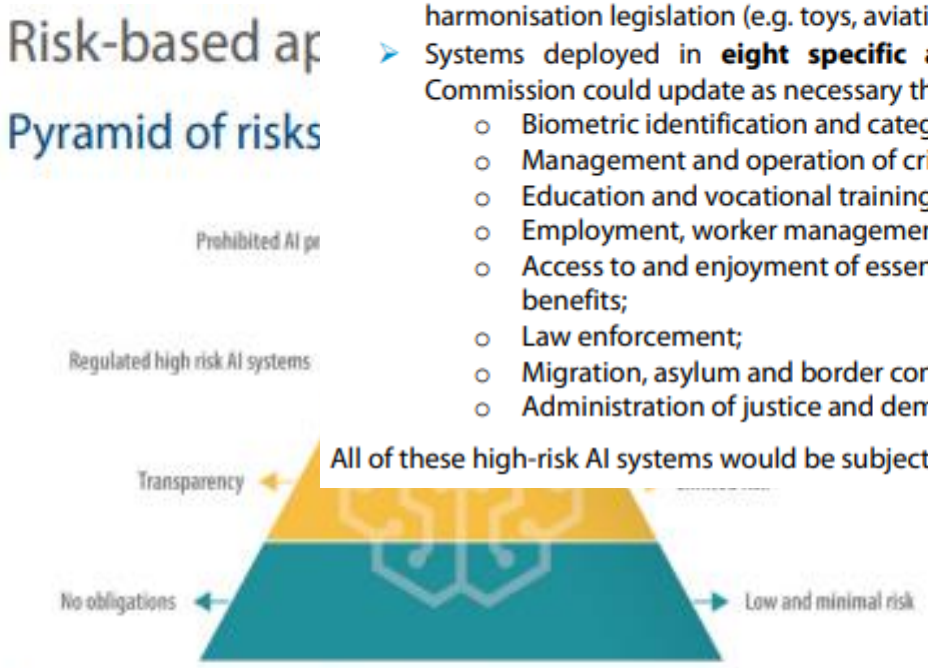
- AI systems that deploy harmful manipulative 'subliminal techniques';
- AI systems that exploit specific vulnerable groups (physical or mental disability);
- AI systems used by public authorities, or on their behalf, for social scoring purposes;
- 'Real-time' remote biometric identification systems in publicly accessible spaces for law enforcement purposes, except in a limited number of cases.[18]

Risk-based approach

Pyramid of risks

Data source: European Commission.

EU AI Act (June 2023)



High risk: Regulated high-risk AI systems

Title III (Article 6) of the proposed AI act regulates 'high-risk' AI systems that create adverse impact on people's safety or their fundamental rights. The draft text distinguishes between two categories of high-risk AI systems.

- Systems used as a safety component of a product or falling under EU health and safety harmonisation legislation (e.g. toys, aviation, cars, medical devices, lifts).
- Systems deployed in **eight specific areas** identified in Annex III, which the Commission could update as necessary through **delegated acts** (Article 7):
  - Biometric identification and categorisation of natural persons;
  - Management and operation of critical infrastructure;
  - Education and vocational training;
  - Employment, worker management and access to self-employment;
  - Access to and enjoyment of essential private services and public services and benefits;
  - Law enforcement;
  - Migration, asylum and border control management;
  - Administration of justice and democratic processes.

All of these high-risk AI systems would be subject to a set of new rules including:

Data source: European Commission.

Recent update - EU AI Act (Feb 2025)

Pedagogical foundations of this unit: Pattern thinking

FUNDAMETAL META-COGNITIVE SKILL FOR 'LEARNING HOW TO LEARN'

- "Pattern thinking" – developing an ability to observe interconnected patterns across different concepts (i.e. the ability to 'connect the dots') to help you to grasp new concepts much quicker
- **Important for:**
    - **Transfer of your learning to other contexts and (future) technologies**
    - Creative thinking
    - Making connections among unrelated concepts and ideas (e.g. from different contexts, problems and disciplines)
    - Self-regulated learning – recognising patterns in our own learning
    - **Critical Thinking**

Human pattern recognition

FUNDAMETAL SKILL FOR BUSINESS APPLICATIONS OF AI

- Pause and reflect: Why?

IMPORTANT: In this unit we use different frameworks as ‘thinking tools” to help you to further develop an ability to think in patterns

Let’s use different frameworks to guide your thinking about AI in Business

MACQUARIE
BUSINESS SCHOOL

MACQUARIE
University

Topic 2

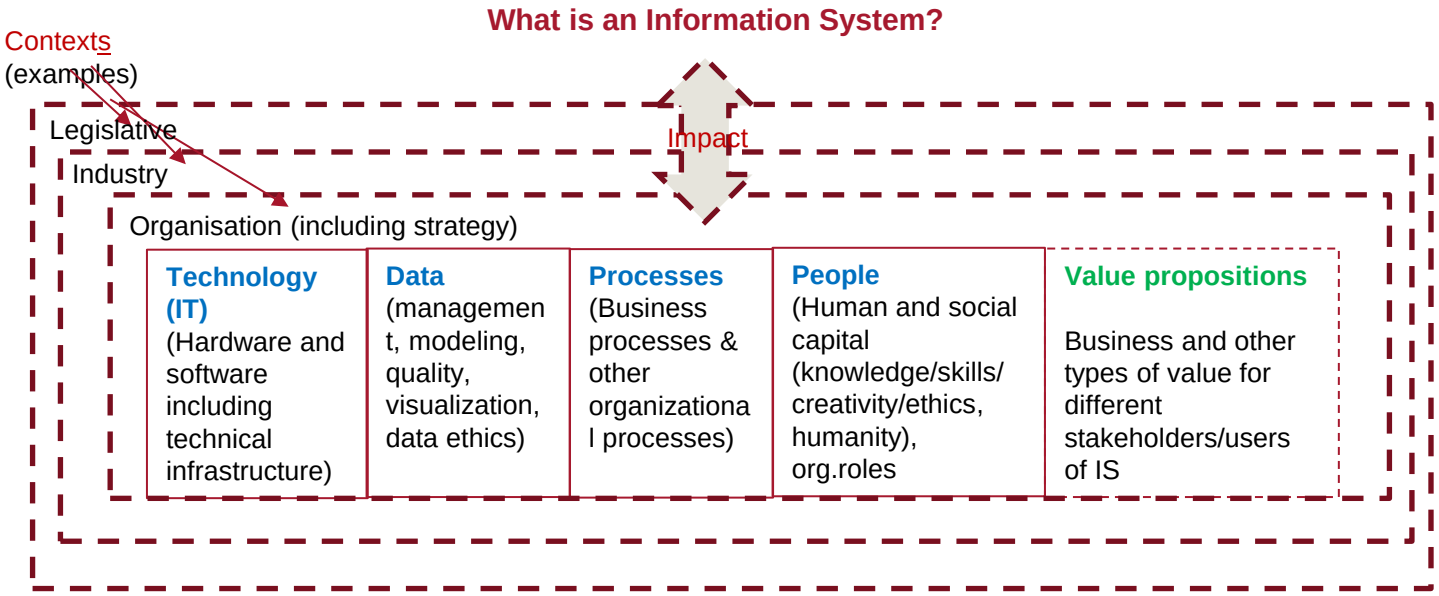
AI IN BUSINESS

MACQUARIE BUSINESS SCHOOL

MACQUARIE University

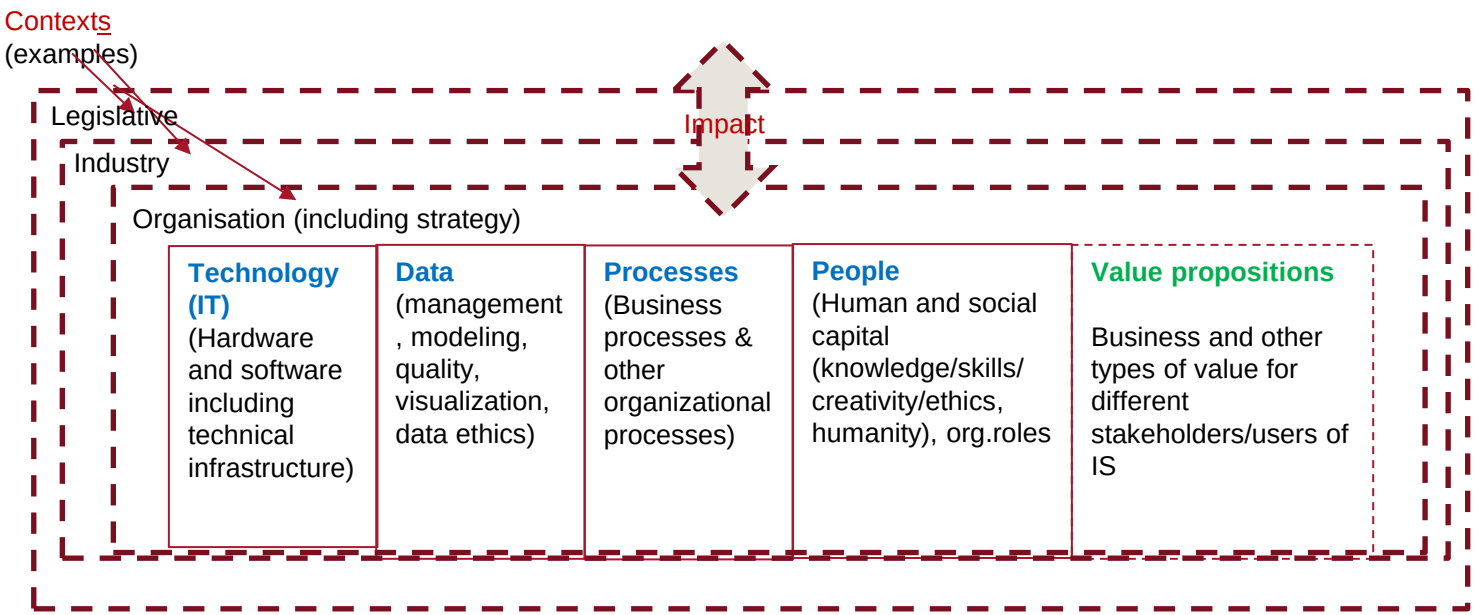
AI for Business: The socio-technical view of AI

The socio-technical view: AI as an Information System (IS)



Let’s discuss some examples

Activity:

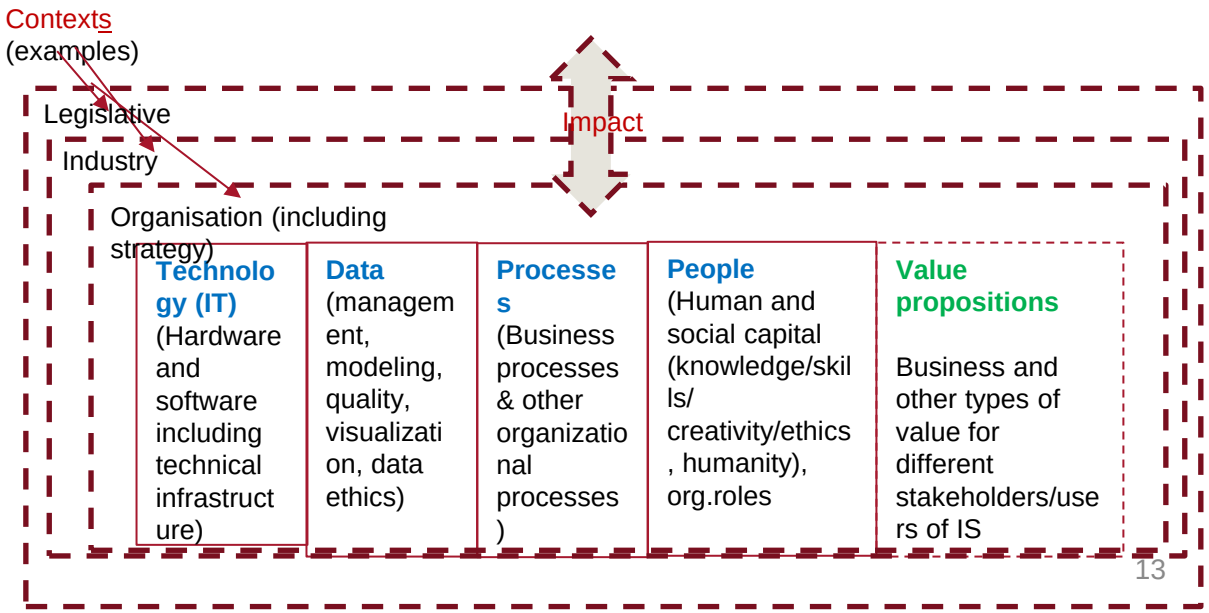


Let's analyse some example:

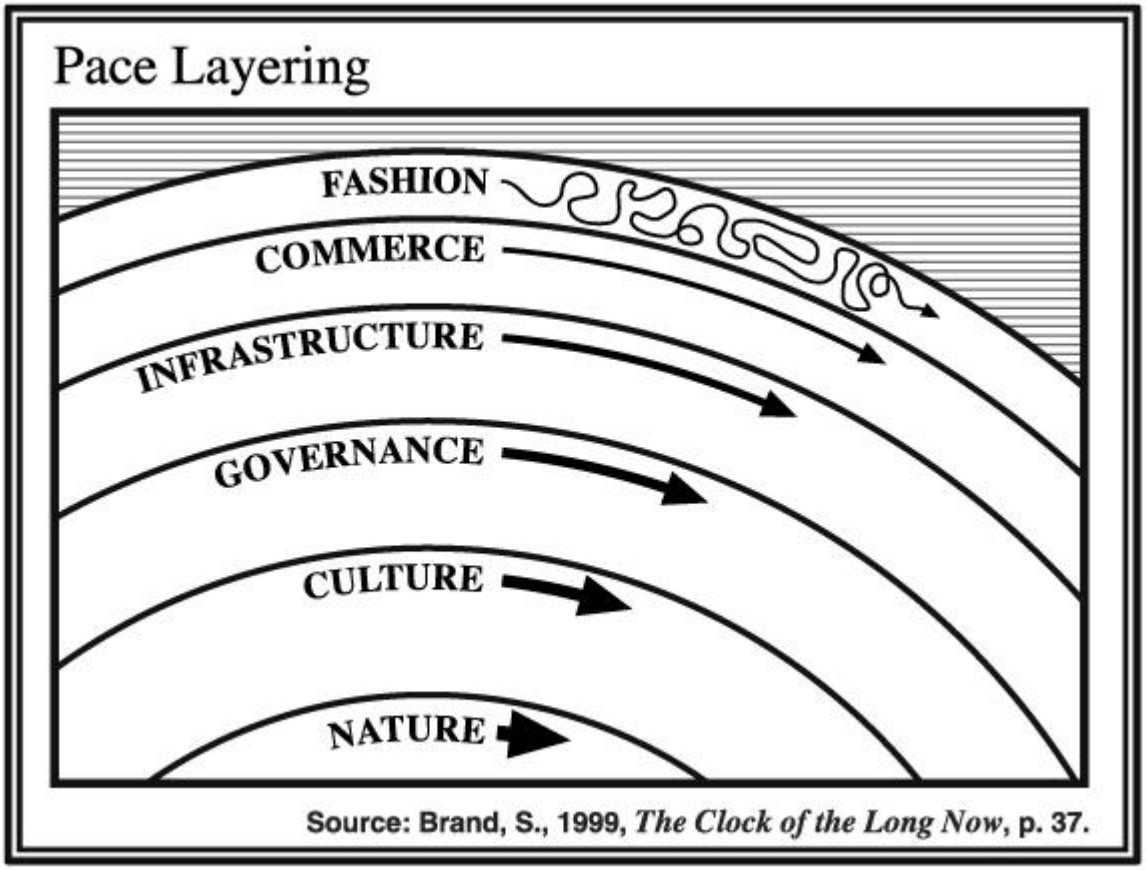
- AI-supported screening of job applications
- Generative AI use in T&L
- Your examples?

Let's start 'connecting the dots"

Can you apply the socio-technical view to Ai risk?



AI for Business: Looking at deeper impact of change



Let's apply the PACE framework to AI

"The fast layers innovate; the slow layers stabilize. The whole combines learning with continuity."

“Fashion” – Application Layer

- The application layer consists of specific AI applications and use cases deployed within businesses and industries.
- This layer often experiences rapid innovation and iteration as organizations develop and deploy AI solutions to address various business challenges. Examples include chatbots for customer service, recommendation systems for e-commerce, and predictive analytics for demand forecasting.

- Warning – This layer has nothing to do with fashion!

“Commerce” – Business layer

- In the original framework, the Commerce Layer refers to the layer focused on transactions, markets, and business models. This layer deals with how goods and services are exchanged and how economic activities are conducted.

- In the contemporary interpretation this layer relates to “business” in the form of new business models, new markets, new ways of working

- Changes in this layer could be caused by AI disruptions resulting in business models becoming obsolete, professions changed or becoming obsolete;

Infrastructure Layer

- This layer represents the foundational elements of AI, including hardware infrastructure, cloud computing, networking technologies, and other type of infrastructure.
- Changes in this layer tend to be slow-moving but have profound implications for AI development. For example, advancements in hardware technology, such as GPUs and TPUs, enable faster processing speeds and support more complex AI models.

- Caution: This layer is much broader than computing/IT/data infrastructure

Governance Layer

- The governance layer involves policies, regulations, and ethical considerations surrounding the development and deployment of AI
- Changes in this layer may encompass efforts to address concerns related to bias, misinformation, privacy, and security in AI language models. This may include the development of guidelines, standards, and best practices for responsible AI development and deployment.

Culture level

- Long-standing societal attitudes, norms, and ethical considerations surrounding human-computer interaction and AI
- Changes in this layer may involve shifts in public perception, ethical frameworks, and cultural expectations regarding the use of AI in communication and decision-making processes.

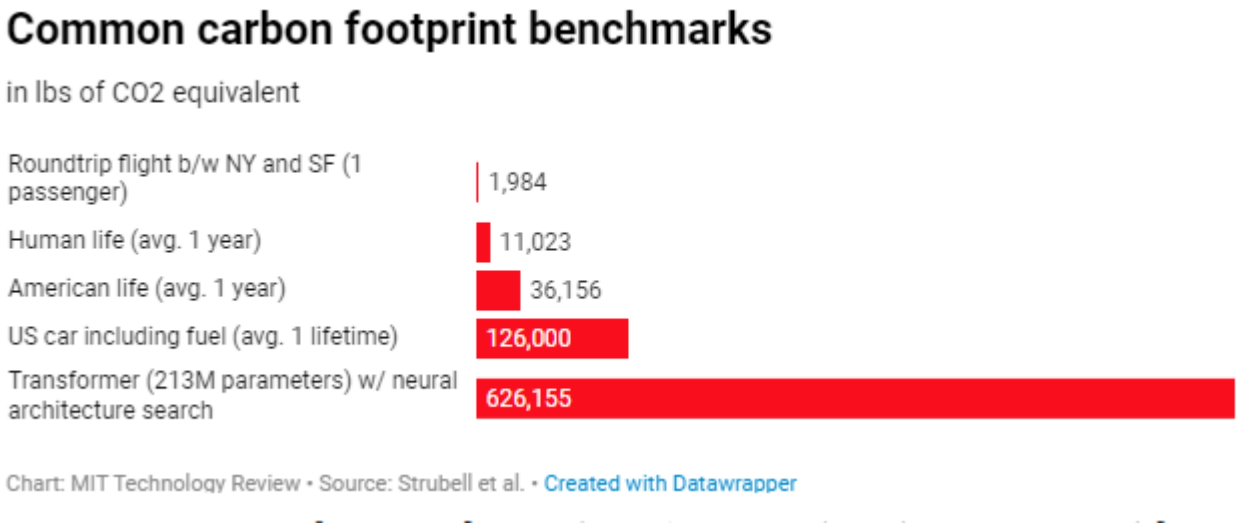
Nature Layer: Environmental Impact

- The Nature Layer typically refers to environmental and ecological factors that shape the broader context in which a system operates.
- Changes in this layer may include shifts in societal preferences and understanding of the environmental impact; even nature itself can create a shift in this layer
- Examples of AI impact:
  - Energy consumption
  - Carbon Emission
  - Hardware Production
  - Data Centre Cooling
  - E-Waste

Nature Layer: Environmental Impact

SOME LESSER-KNOWN EXAMPLES

- Some examples:
- “Training a single AI model can emits as much carbon as five cars in their lifetimes” Hao (2019) – AI MIT technology Review



Nature Layer: Environmental Impact

SOME LESSER-KNOWN EXAMPLES

- Some examples:
- “Training GPT-3 would consume as much energy as an average Dutch household does in 109 months, or nearly 9 years.” (Bollaart, 2023)

- “to train a single large language model like ChatGPT-3. This is on average roughly equivalent to the yearly electricity consumption of over 1,000 U.S. households” (McQuate, 2023) – University of Washington

BUSINESS • TECHNOLOGY

Exclusive: OpenAI Used Kenyan Workers on Less Than $2 Per Hour to Make ChatGPT Less Toxic

ChatGPT's creator, OpenAI, is now reportedly in talks with investors to raise funds at a $29 billion valuation, including a potential $10 billion investment by Microsoft. That would make OpenAI, which was founded in San Francisco in 2015 with the aim of building superintelligent machines, one of the world's most valuable AI companies.

But the success story is not one of Silicon Valley genius alone. In its quest to make ChatGPT less toxic, OpenAI used outsourced Kenyan laborers earning less than $2 per hour, a TIME investigation has found.

TIME, Jan 18, 2023

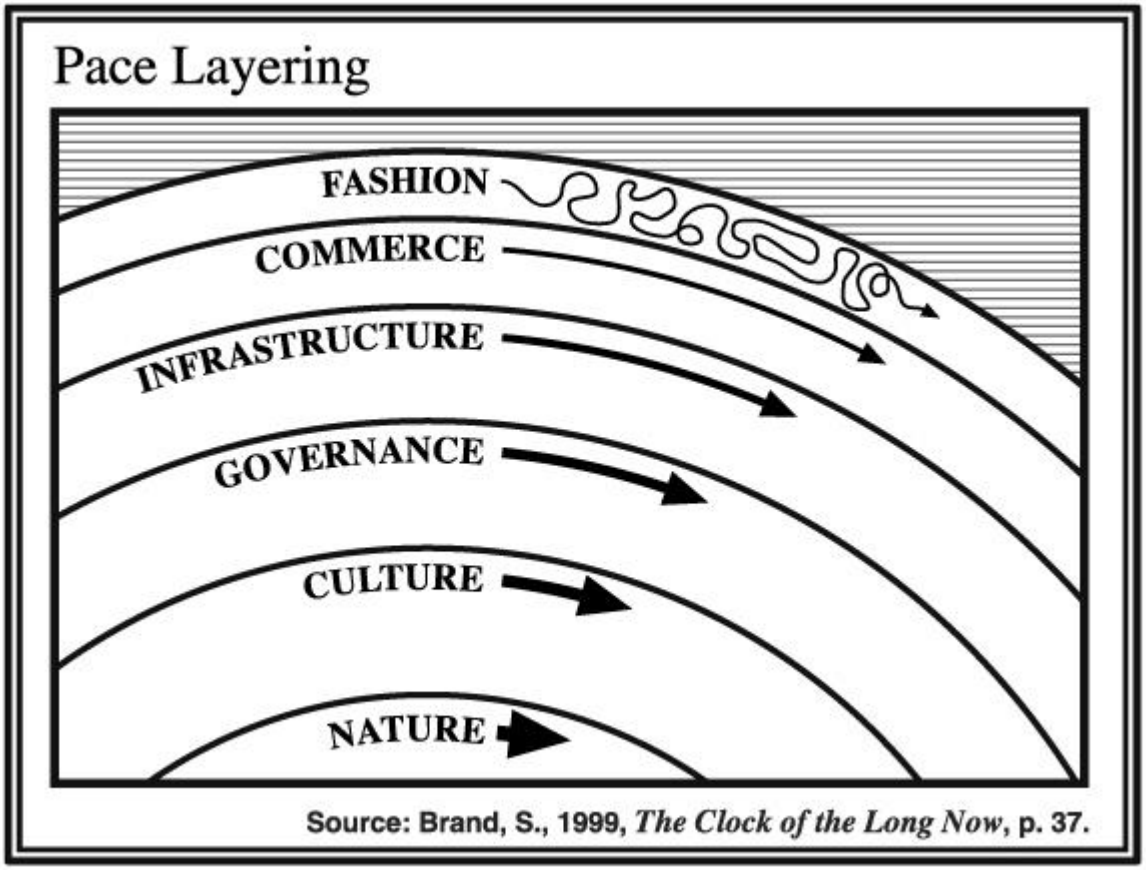
THE WALL STREET JOURNAL.

Cleaning Up ChatGPT Takes Heavy Toll on Human Workers

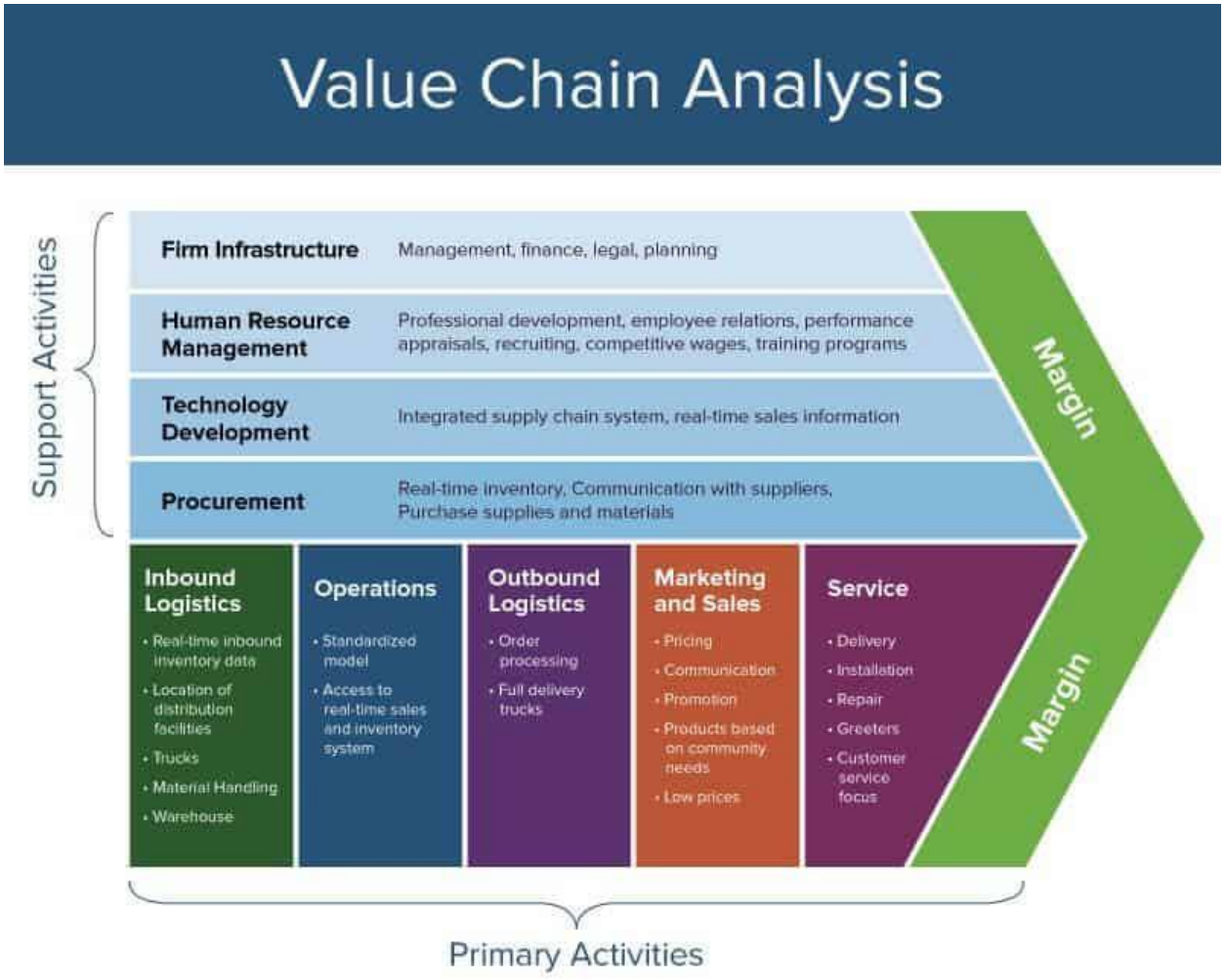
Contractors in Kenya say they were traumatized by effort to screen out descriptions of violence and sexual abuse during run-up to OpenAI's hit chatbot

Wall Street Journal
July 24, 2023 12:01 am ET

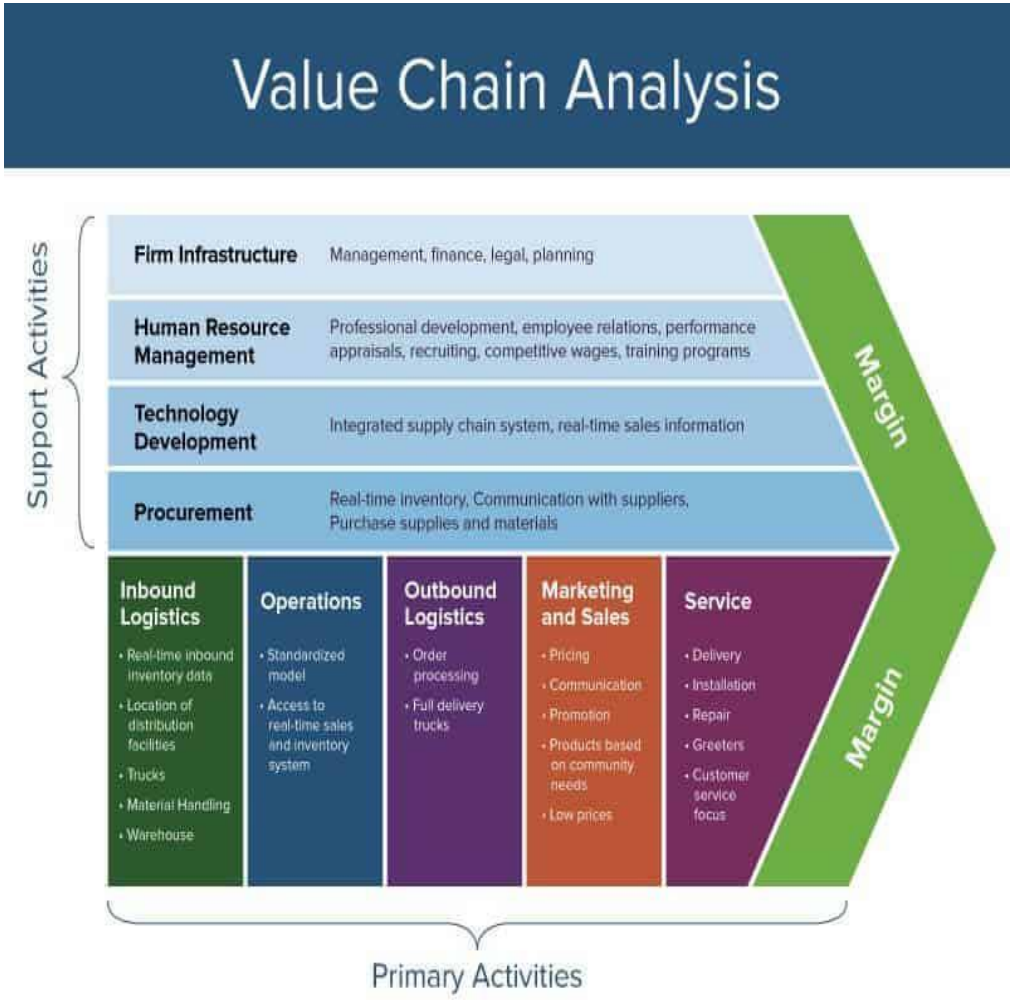
Pause and Reflect: Why is this a “thinking tool”?



AI for Business: Porter's Value Chain



Let's look at AI applications (in general) across different components



- **Inbound Logistics**:

AI applications such as predictive analytics and demand forecasting optimize inventory management and streamline the procurement process, thereby enhancing inbound logistics efficiency.

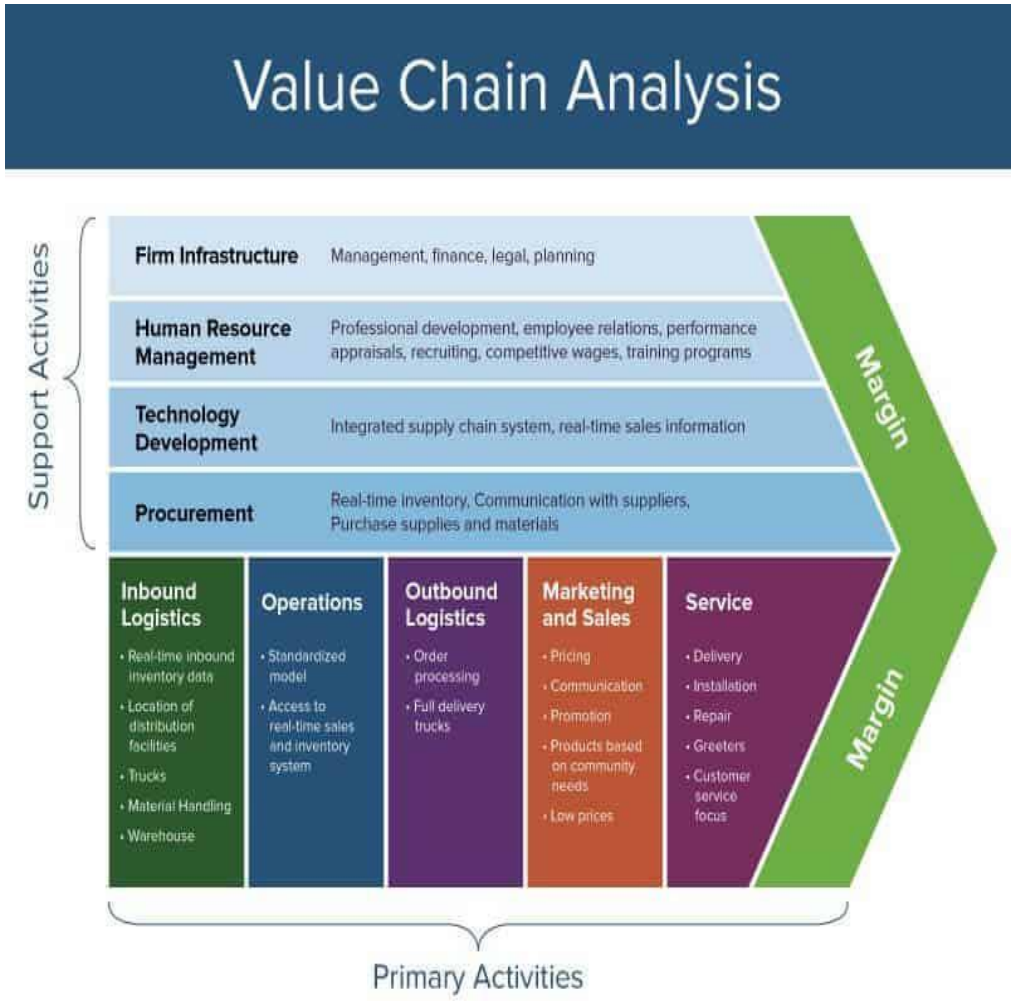
- **Operations**:

AI-driven automation and process optimization tools improve manufacturing efficiency, quality control, and resource utilization, contributing to operational excellence.

- **Outbound Logistics**:

AI-powered route optimization algorithms and predictive maintenance systems enhance delivery scheduling, reduce transportation costs, and ensure timely product distribution, thereby optimizing outbound logistics.

Let's look at AI applications (in general) across different components



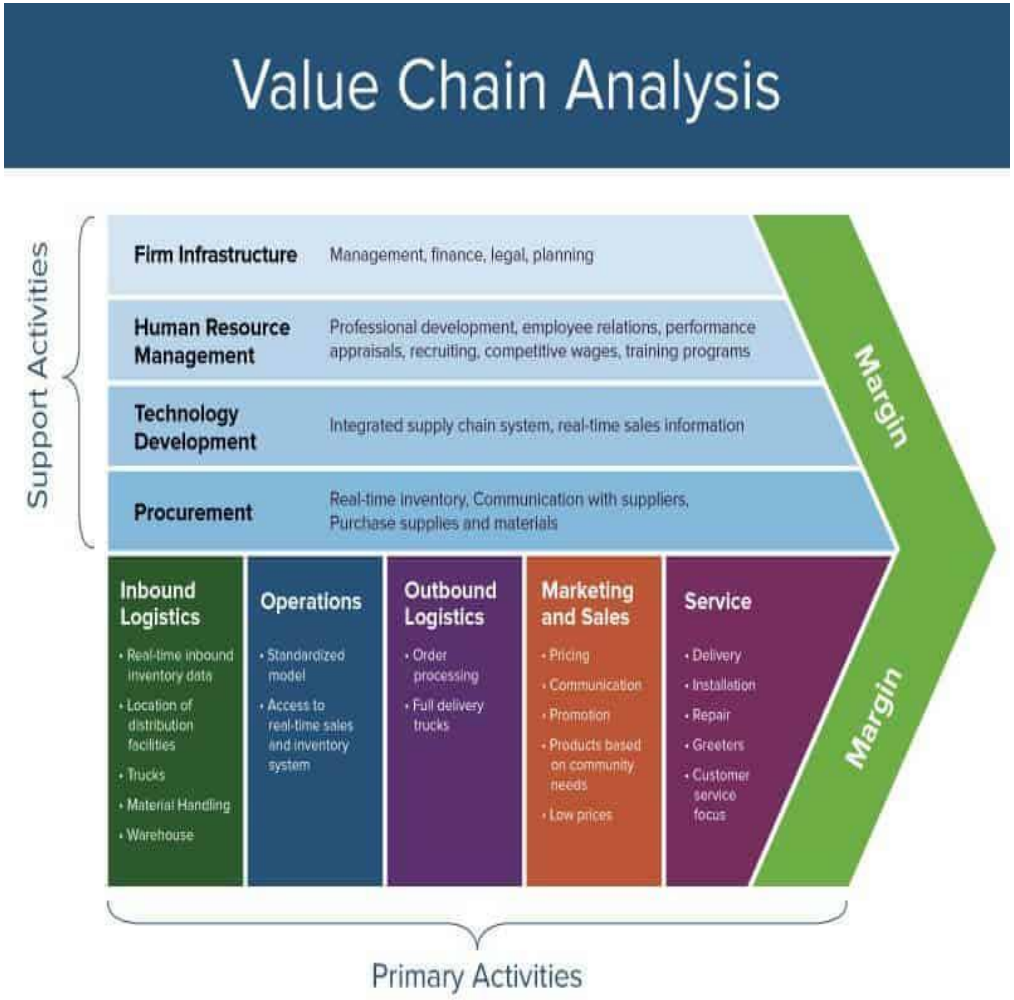
Marketing and Sales:

AI enables personalized marketing campaigns, targeted advertising, and customer segmentation, which enhance the effectiveness of marketing efforts and drive sales growth.

Service:

AI-driven chatbots, virtual assistants, and recommendation engines enhance customer service by providing timely support, personalized recommendations, and efficient problem resolution, thereby improving customer satisfaction and loyalty.

Let's look at AI applications (in general) across different components



Procurement:

AI-powered supplier analytics and risk assessment tools help companies identify reliable suppliers, negotiate better terms, and mitigate supply chain risks, thereby optimizing procurement processes.

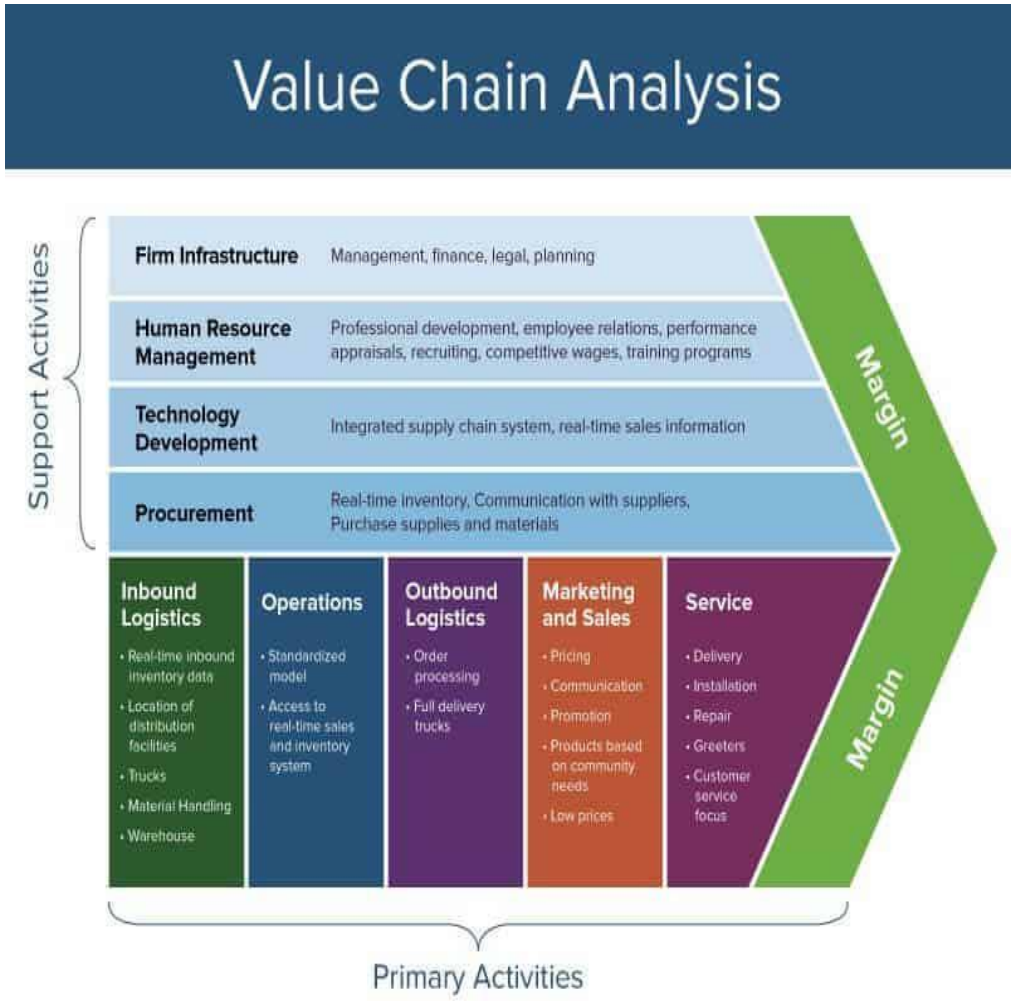
Technology Development:

AI accelerates innovation by enabling advanced research, product development, and process optimization, thereby enhancing a company's technological capabilities and competitiveness.

Human Resource Management:

AI applications such as predictive analytics for talent acquisition, employee performance evaluation, and workforce planning optimize HR processes, improve employee engagement, and facilitate talent development, contributing to organizational success.

Let's look at AI applications (in general) across different components



Human Resource Management:

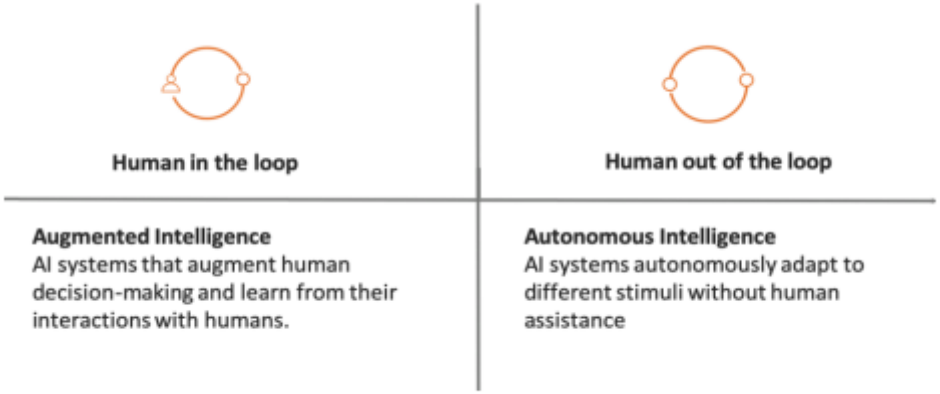
AI applications such as predictive analytics for talent acquisition, employee performance evaluation, and workforce planning optimize HR processes, improve employee engagement, and facilitate talent development, contributing to organizational success.

Firm Infrastructure

AI applications used in strategic management and planning

AI for Business: Human-in-the-loop framework

How business decision-makers use AI?



Relate these concepts to different levels of AI risk (from Week1)

Source: OECD – Centre for Responsible Business Conduct (Nov. 2019)

Week 2 overview

Part 1: A brief Week 1 revision

Part 2: Topic 2: AI in Business/Organisations

- Importance of human “pattern thinking” skills for AI
- Understanding AI for Business at different levels (from higher to more granular):
    - Use of AI in business from the socio-technical perspective (Information Systems framework)
    - Impact of AI change at deeper level (PACE Layers Framework)
    - How is AI is used in different areas of business (Porter’s Value Chain model/framework)
    - Use of AI by business decision makers (Human-in-the-loop framework)
- Industry insights into the current use of AI in Business

To do list for Week 3

- Find your own examples of AI applications and go through these frameworks again to understand how they could be applied.

- Coming up in Week 3:
  - A practice quiz
  - Data foundations for AI