

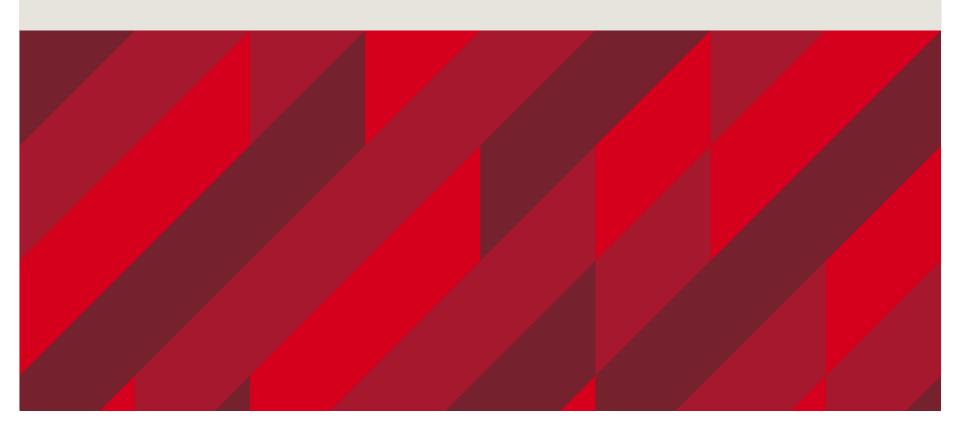
### **WELCOME TO**



## BUSA3430 and BUSA6430: Business Applications of Al

S1 2025

Week 2: Al for Business – Frameworks and their applications





# Week 2 agenda

Part 1: A brief Week 1 revision

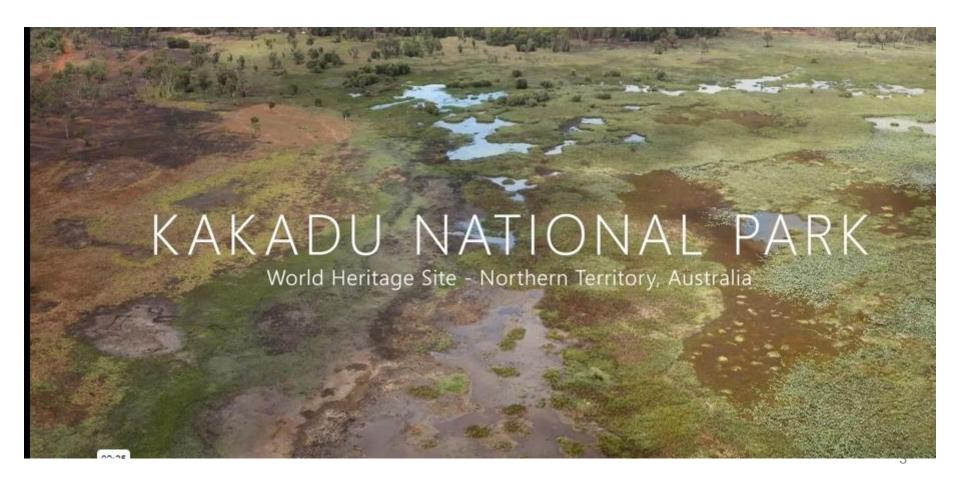
Part 2: Topic 2: AI in Business/Organisations

- 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 Al

Video: <u>Al combined with traditional Indigenous knowledge</u>





# Week 1 revision: Al risk – different frameworks, different consequences

### Al risk factors exist on a spectrum

The key factor that determines risk is how the AI system is used, including whether it is operational or non-operational.

Very low risk or N/A

Low Midrange High Very high risk

Al generates insights for non-operational human use from non-sensitive data

(example: analytics package reporting on historical non-sensitive data) Al generates insights or alerts for **operational** human use with minimal potential for harm

(example: anomaly detection software; alarm system)

Al makes operational actions, decisions or recommendations with no routine human oversight with minimal potential for harm

(example: automated door; biometric login with alternative login methods; automated phone menu, smart sign showing driver speed) Al generates operational insights / decisions / recommendations for human to action with some potential for harm

(example: public facing chatbot; red light camera, intruder alert system)

Al generates insights for non-operational human use analysing sensitive data

(example: analytics package operating on data of vulnerable individuals) Al makes and implements operational decisions autonomously of human input in the interests of human safety and wellbeing

(example: anti-lock braking system)

Al makes and implements operational decisions within a specified range, and refers exceptions for human to review and action

(example: loan application system, autonomous tram) Al makes and implements operational decisions that can negatively affect human wellbeing autonomously of human input

(example: autonomous benefits eligibility reviews; judicial custodial sentence recommendations, unconstrained autonomous system, self driving car)



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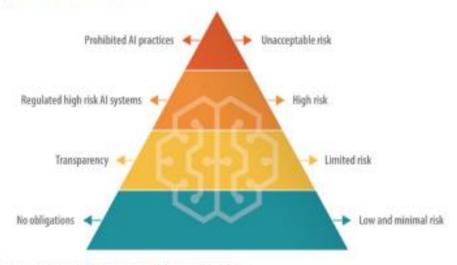


# EU Al Act (June 2023)

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:

- Al systems that deploy harmful manipulative 'subliminal techniques';
- Al systems that exploit specific vulnerable groups (physical or mental disability);
- Al 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.<sup>18</sup>

# Risk-based approach Pyramid of risks



Data source: European Commission.



# EU Al 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 Al systems would be subject to a set of new rules including:

No obligations

Low and minimal risk

Data source: European Commission.

# Risk-based ar Pyramid of risks

Prohibited Al pr

Regulated high risk Al systems



# Recent update - EU AI Act (Feb 2025)

These Al practices are prohibited from	Subliminal, manipulative or deceptive techniques
2 February 2025	Exploitation of vulnerabilities of individuals due to age, disability, or social or economic situation
	Social scoring leading to detrimental or unfavourable treatment
	Predictive policing
	Facial recognition databases through image scraping
	Emotion inference in workplace or education institutions (except for medical or safety reasons)
	Biometric categorisation to deduct or infer certain characteristics
	Real-time biometric identification systems in public spaces for law enforcement (except for targeted search, prevention of substantial and imminent threat or identification of serious aspect)



# 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 Al in Business





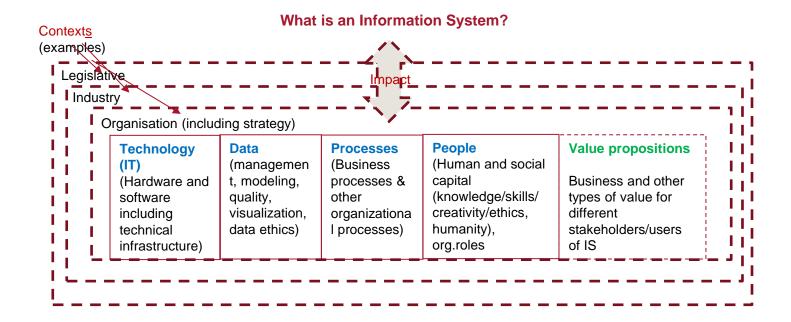
# **Topic 2**

AI IN BUSINESS



### Al for Business: The socio-technical view of Al

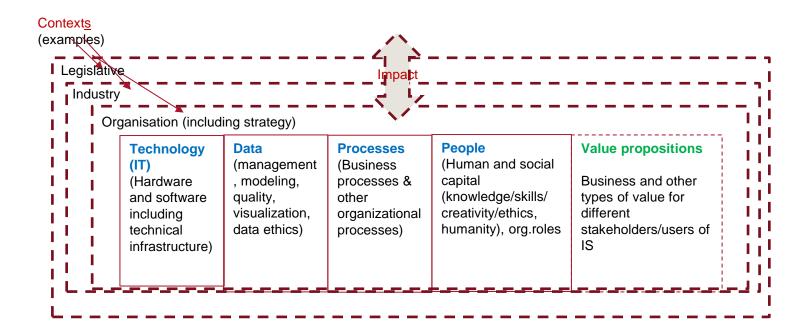
The socio-technical view: Al as an Information System (IS)



Let's discuss some examples



# **Activity:**



### Let's analyse some example:

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

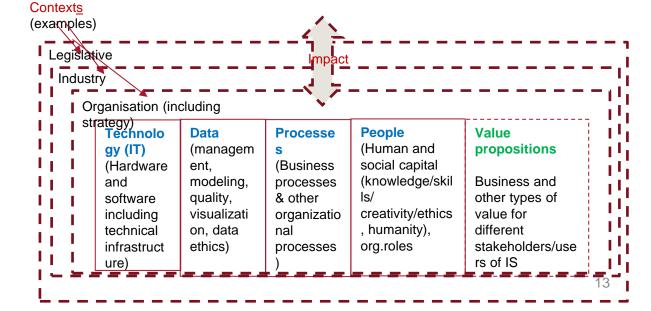




# Let's start 'connecting the dots"

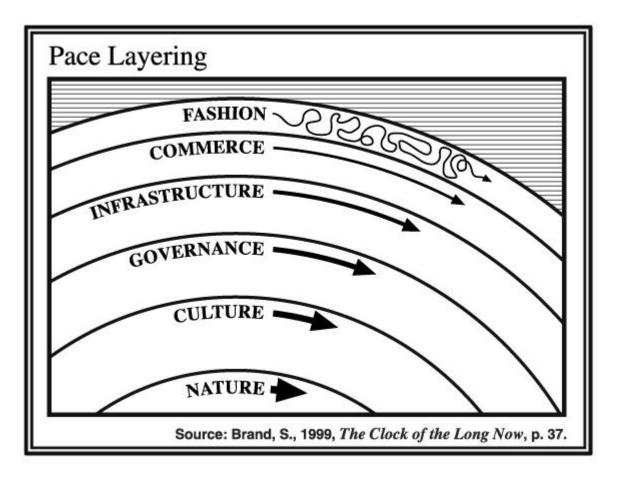


Can you apply the socio-technical view to Ai risk?





# Al 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 decisionmaking 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

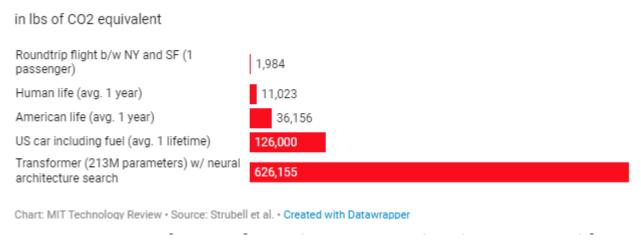


# Nature Layer: Environmental Impact

SOME LESSER-KNOWN EXAMPLES

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

### Common carbon footprint benchmarks





# **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



## Cleaning Up ChatGPT Takes Heavy Toll on Human Workers

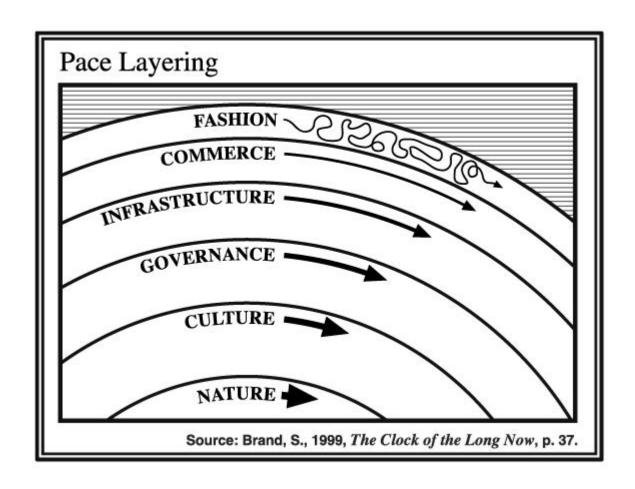
Contractors in Kenya say they were traumatized by effort to screen out descriptions of violence and sexual abuse during run-up to OpenAl's hit chatbot



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



# Pause and Reflect: Why is this a "thinking tool"?





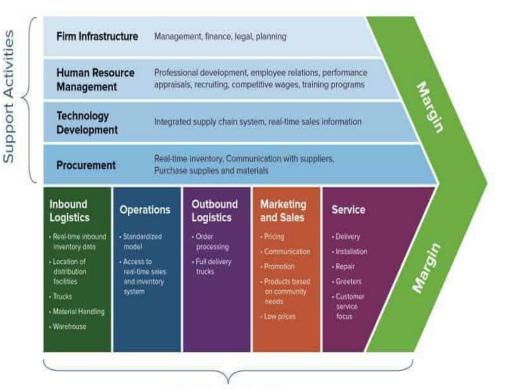
### Al for Business: Porter's Value Chain

#### Value Chain Analysis Support Activities Firm Infrastructure Management, finance, legal, planning **Human Resource** Professional development, employee relations, performance appraisals, recruiting, competitive wages, training programs Management Technology Integrated supply chain system, real-time sales information Development Real-time inventory, Communication with suppliers, Procurement Purchase supplies and materials Inbound Outbound Marketing Operations Service Logistics Logistics and Sales · Real-time inbound Order Delivery inventory data model processing Installation Location of Access to Full delivery Repair distribution real-time sales trucks facilities Greeters • Trucks Customer Material Handling focus Warehouse



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

## Value Chain Analysis



### Inbound Logistics:

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

### Operations:

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

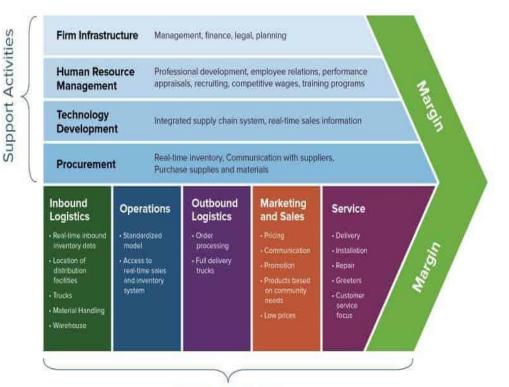
### Outbound Logistics:

Al-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 Al applications (in general) across different components

# Value Chain Analysis



### **Marketing and Sales:**

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

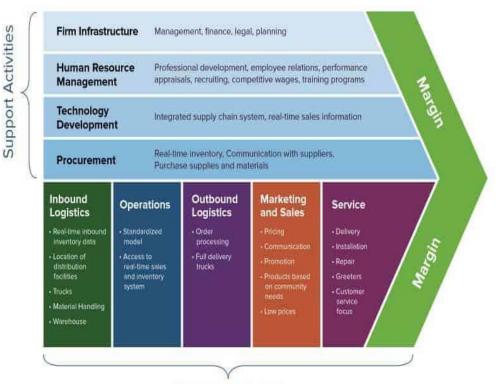
#### Service:

Al-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 Al applications (in general) across different components

## Value Chain Analysis



#### **Procurement:**

Al-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:**

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

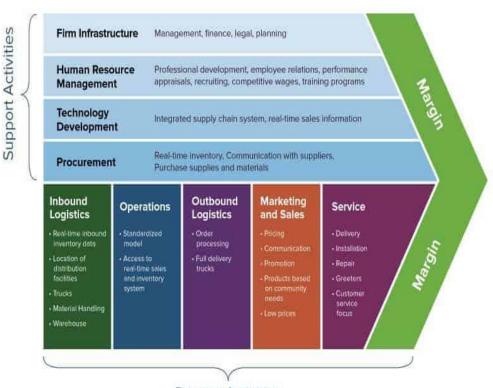
#### **Human Resource Management:**

Al 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 Al applications (in general) across different components

## Value Chain Analysis



### **Human Resource Management:**

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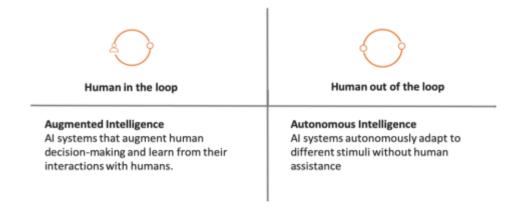
#### Firm Infrastructure

Al applications used in strategic management and planning



# Al 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

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### 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