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Generative AI and Healthcare Organizational Transformation

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June 5, 2025

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Attribution

*We gratefully acknowledge the contributions of Rotman School of Management whose research and initiatives in **Generative AI** have informed and supported our efforts.*

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AGENDA

- Generative AI - Introduction
- AI Strategy for Executives
- Preparing and Planning for GenAI Adoption
- Barriers to Adoption: Understanding and Planning for Resistance
- GenAI Types
- Organizational Design Challenges in AI Implementation
- Risk & Ethical Consideration and Implications for Digital Transformation
- Next Steps

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What is Artificial Intelligence

Artificial Intelligence (AI) refers to the simulation of human intelligence in machines that are programmed to think, reason, learn, and act like humans. These systems can perform tasks that typically require human intelligence, such as:

- Understanding natural language (e.g., chatbots)
- Recognizing images or speech (e.g., facial recognition)
- Making decisions (e.g., self-driving cars)
- Learning from data (e.g., recommendation systems)

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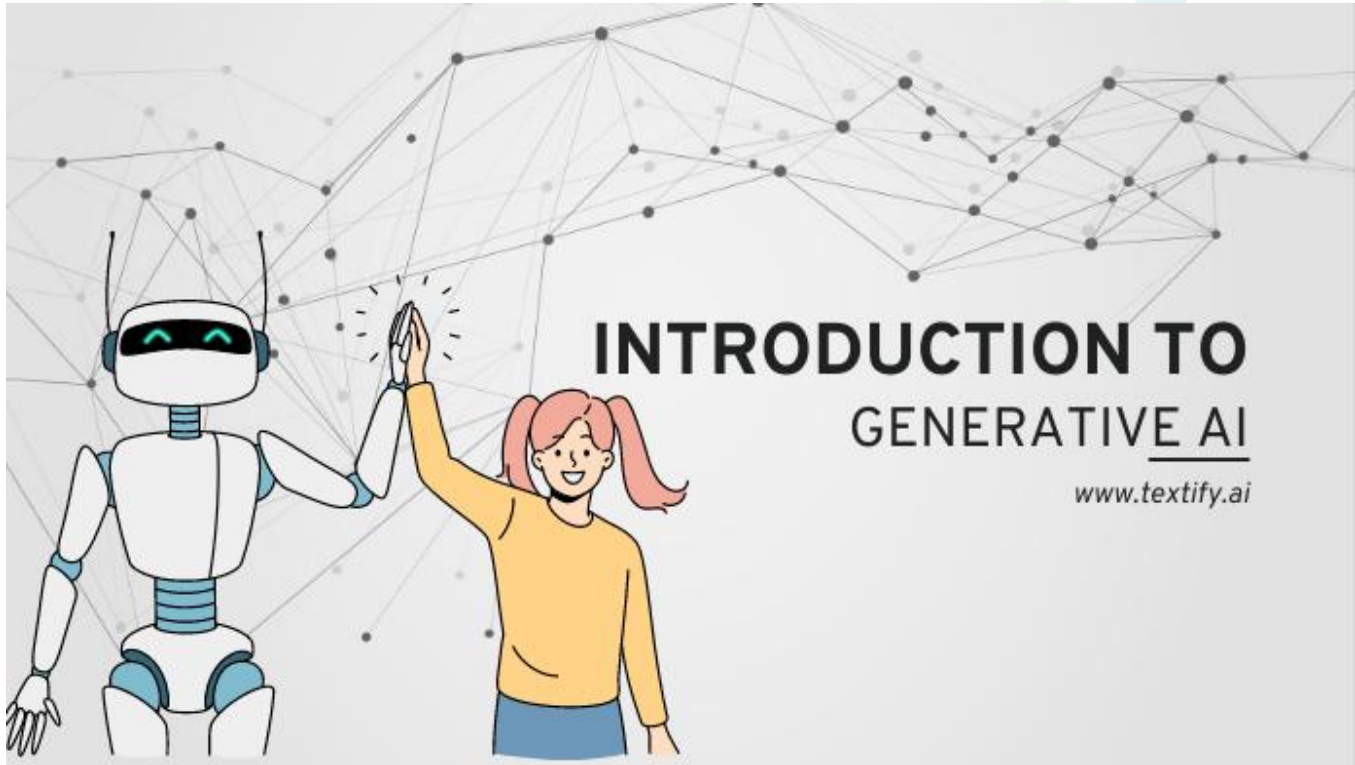
Generative AI - Introduction

Generative AI is a type of artificial intelligence that can create new content, such as text, images, audio, and video, based on user prompts or requests. It uses sophisticated machine learning models to learn patterns in data and then generate novel outputs.



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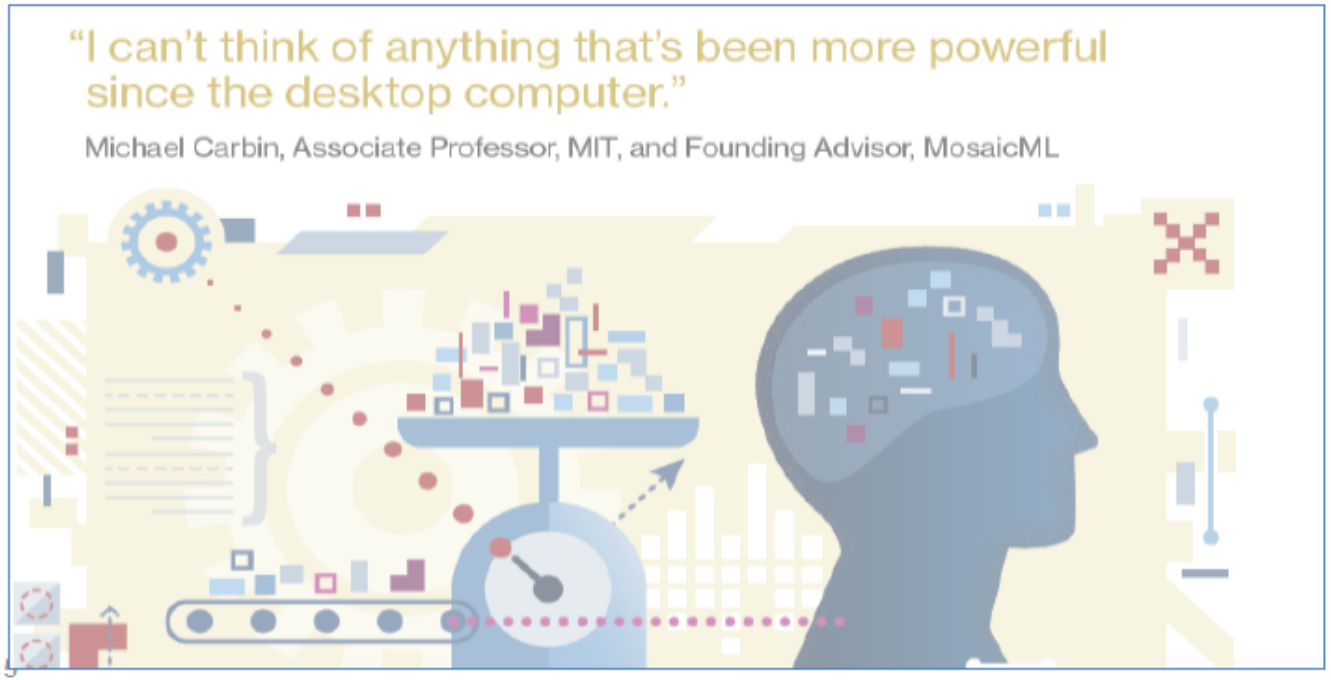
The New York Times

How Does It Feel to Win a Nobel Prize? Ask the 'Godfather of A.I.'

The computer scientist Geoffrey Hinton spoke with The Times shortly after learning he had won the Nobel Prize for Physics.

- McKinsey Global Institute estimates
  - that generative AI will add between $2.6 and $4.4 trillion in annual value to the global economy
  - AI will automate half of all work between 2040 and 2060,
    - with generative AI pushing that window a decade earlier than previous estimates.
- Goldman Sachs predicts a 7%—or nearly $7 trillion—increase in global GDP attributable to generative AI, and expects two-thirds of U.S. occupations will be affected by AI-powered automation



Although AI was recognized as strategically important before generative AI became prominent, our 2022 survey found CIOs' ambitions limited: while 94% of organizations were using AI in some way, only 14% were aiming to achieve "enterprise-wide" AI by 2025. By contrast, the power of generative AI tools to democratize AI – to spread it through every function of the enterprise, to support every employee, and to engage every customer – heralds an inflection point where AI can grow from a technology employed for particular use cases to one that truly defines the modern enterprise.

The great acceleration: CIO perspectives on generative AI

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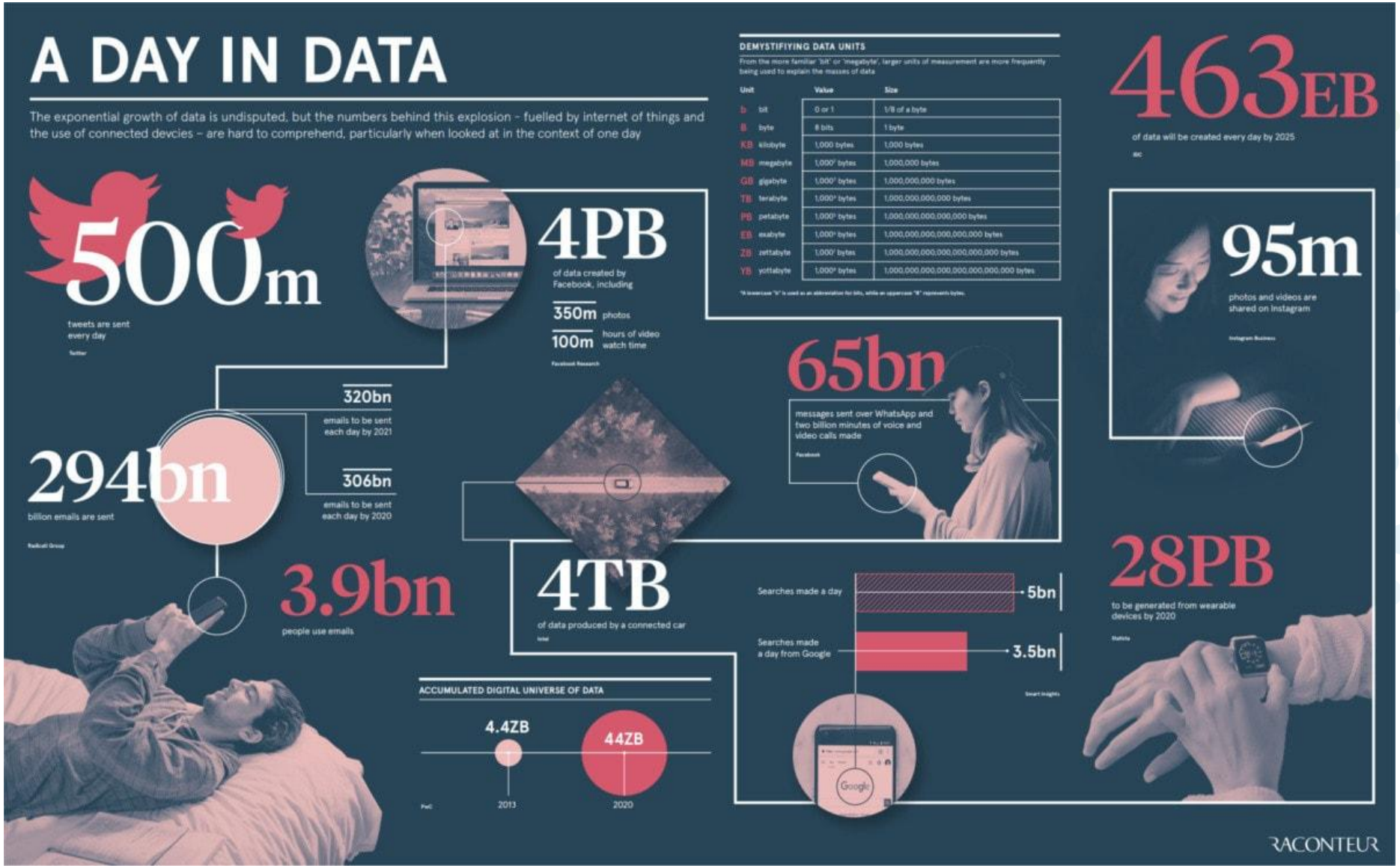

https://www.weforum.org/stories/2019/04/how-much-data-is-generated-each-day-cf4bddf29f/

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Measurement Units

Abbreviation	Unit	Value	Size (in bytes)
b	bit	0 or 1	1/8 of a byte
B	byte	8 bits	1 byte
KB	kilobyte	1,000 bytes	1,000 bytes
MB	megabyte	$1,000^2$ bytes	1,000,000 bytes
GB	gigabyte	$1,000^3$ bytes	1,000,000,000 bytes
TB	terabyte	$1, 000^4$ bytes	1,000,000,000,000 bytes
PB	petabyte	$1,000^5$ bytes	1, 000,000,000,000,000 bytes
EB	exabyte	$1,000^6$ bytes	1,000,000,000,000,000,000 bytes
ZB	zettabyte	$1,000^7$ bytes	1,000,000,000,000,000,000,000 bytes
YB	yottabyte	$1,000^8$ bytes	1,000,000,000,000,000,000,000,000 bytes

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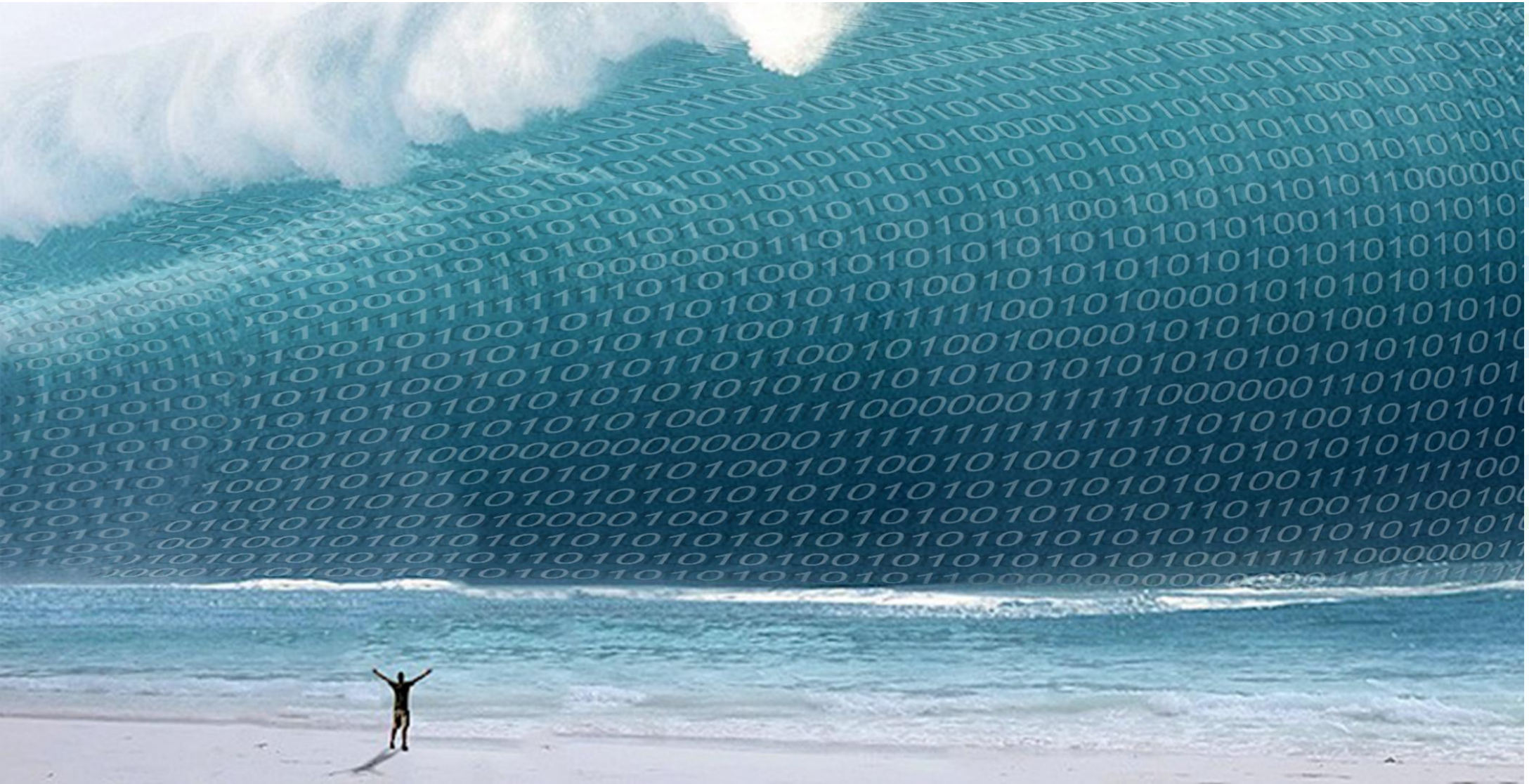
The Big Data Tsunami



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AI Strategy for Executives

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AI can be categorized into two main types:

1. **Narrow AI** – Designed for a specific task (e.g., voice assistants).

2. **General AI** – A theoretical concept where a machine has the ability to understand and learn any intellectual task a human can do.

PREDICTION:

Using information that you do have to generate information that you don't have

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Key Elements

1. Today's AI is **prediction** technology.

2. AI increases the importance of human **judgment**.

3. The transformational opportunities for AI are from developing **system-level solutions**, not point solutions.

4. **Disruption** comes organizations that fail to serve their mission.

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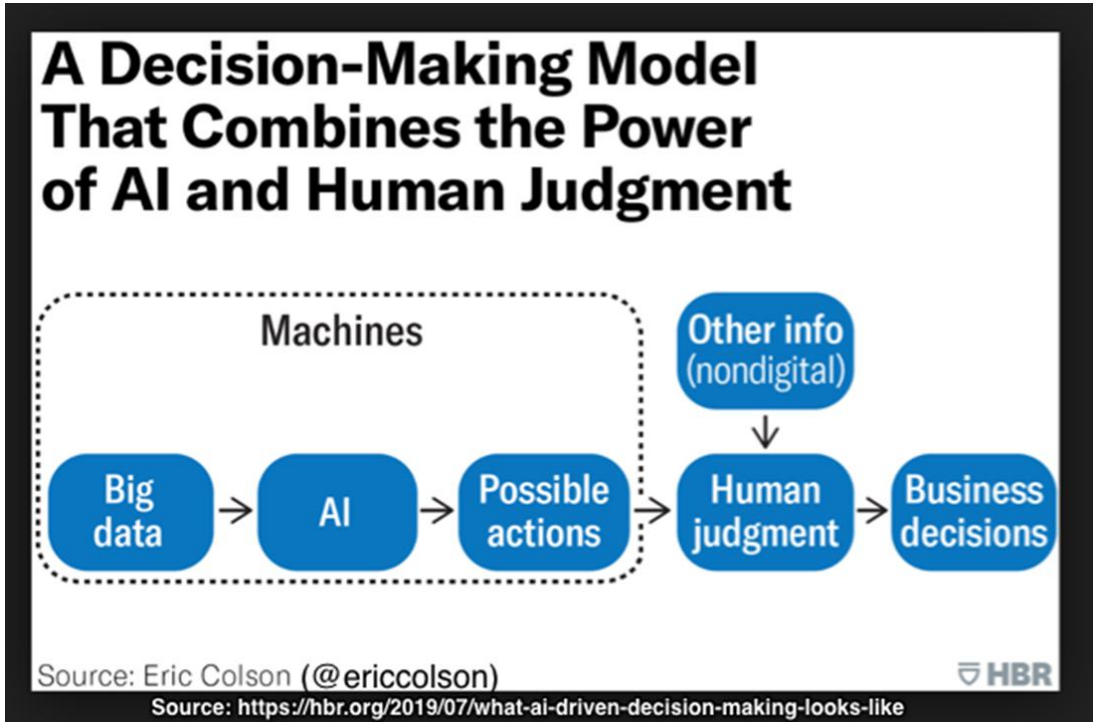
AI Strategy



Source: https://hbr.org/2019/07/what-ai-driven-decision-making-looks-like

When we focus on technology rather than business objectives, then strategy becomes distracted by inputs rather than outputs.

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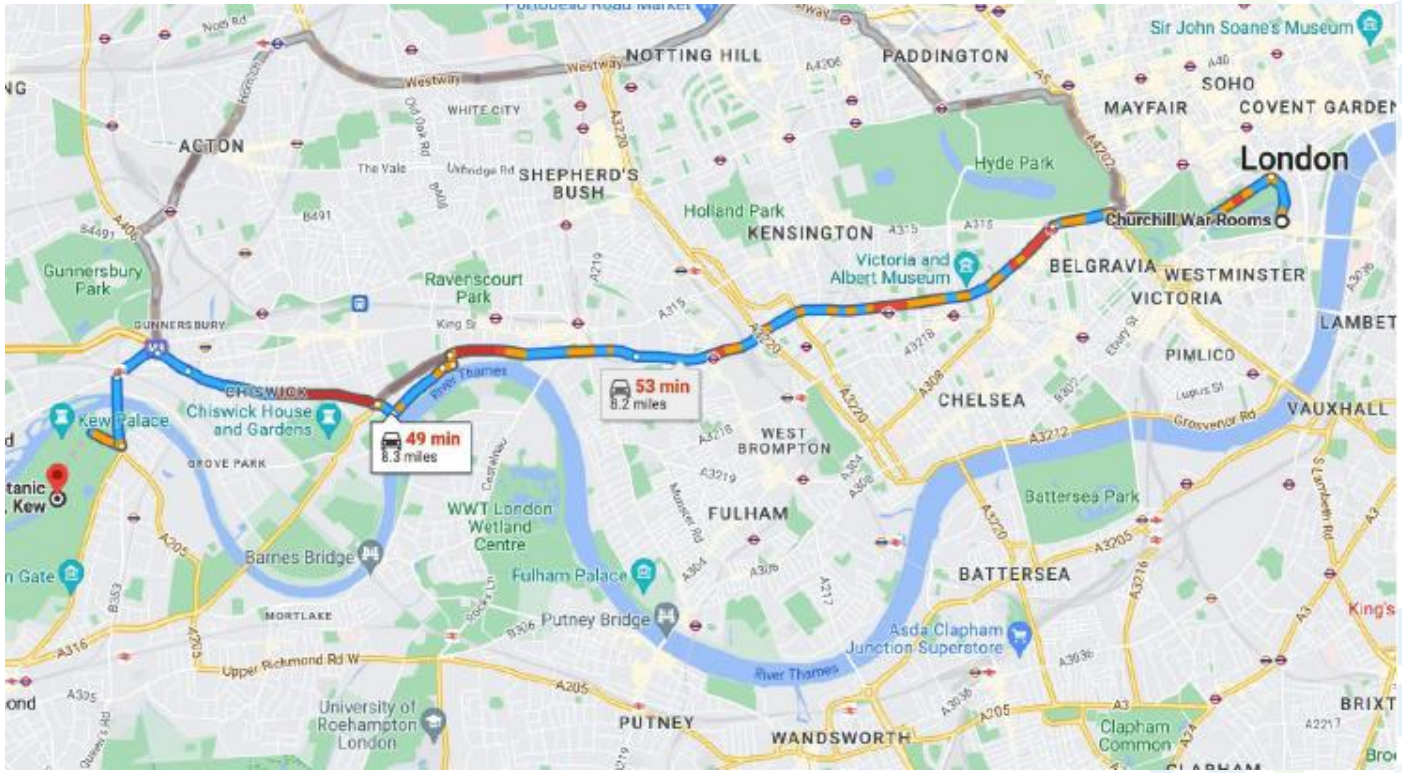
THE BETWEEN TIMES



amazon.ca

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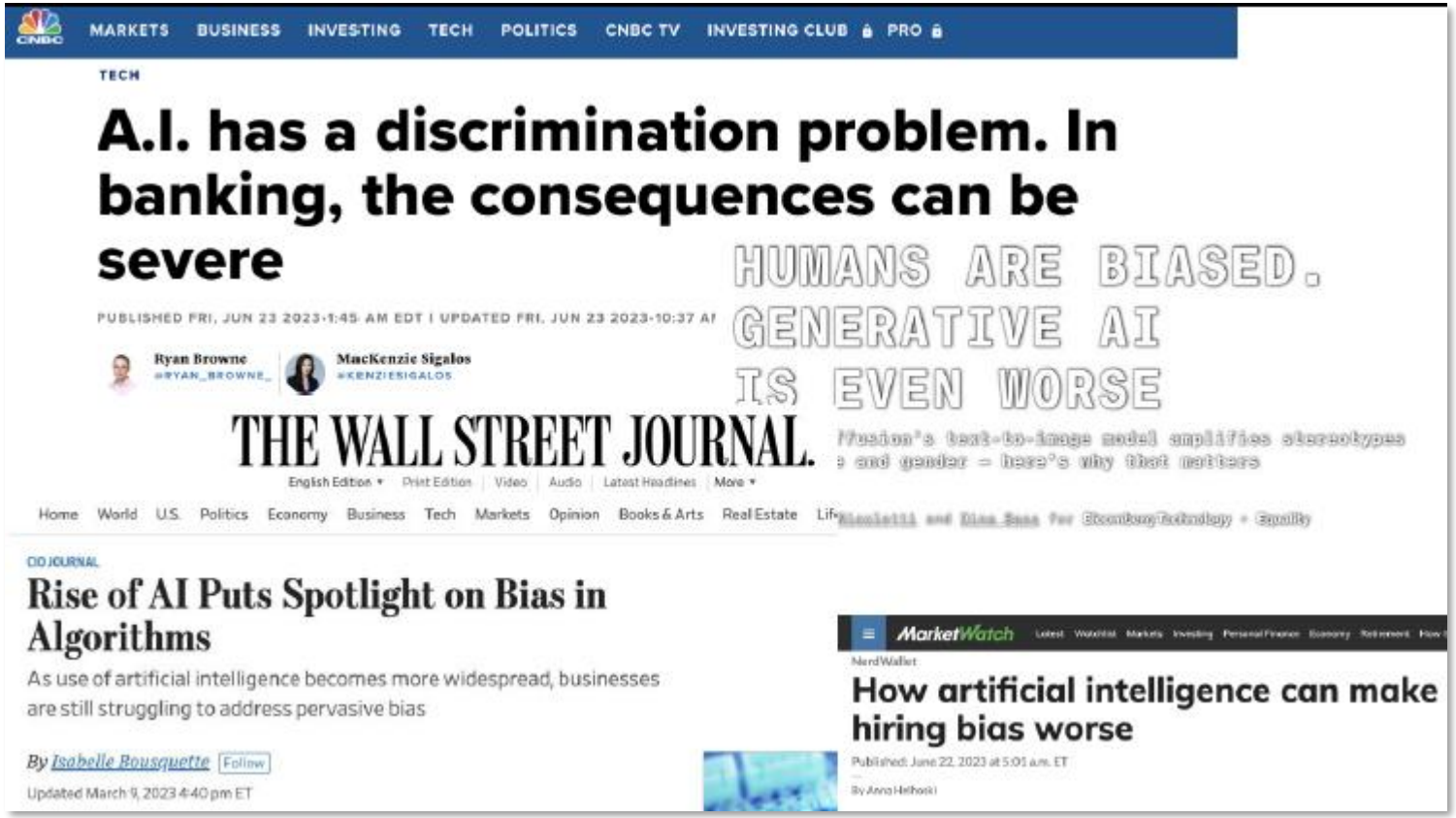
WHEN MACHINES ARE POOR AT PREDICTION: THEY FAIL WITHOUT DATA

BIAS



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Preparing and Planning for AI Adoption

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Benefits of Gen AI

Knowledge Work

Productivity gain
- Automation
- Fast retrieval
- Upskilling (e.g., coding)

Creativity boost
- Fast prototyping
- Orchestration

Organization

Operations
- Cross-functional teams
- Operations model innovation
- Improved employee and customer experience

Competition
- Cost reduction for repetitive tasks

Data & Technology

- Complex signal extraction
- Single source of truth
- Accelerated content output
- Increased amount of decision-making inputs

Poulos, Z. (2025). *Integrating Gen AI in products, services and workflows* [PowerPoint slides].

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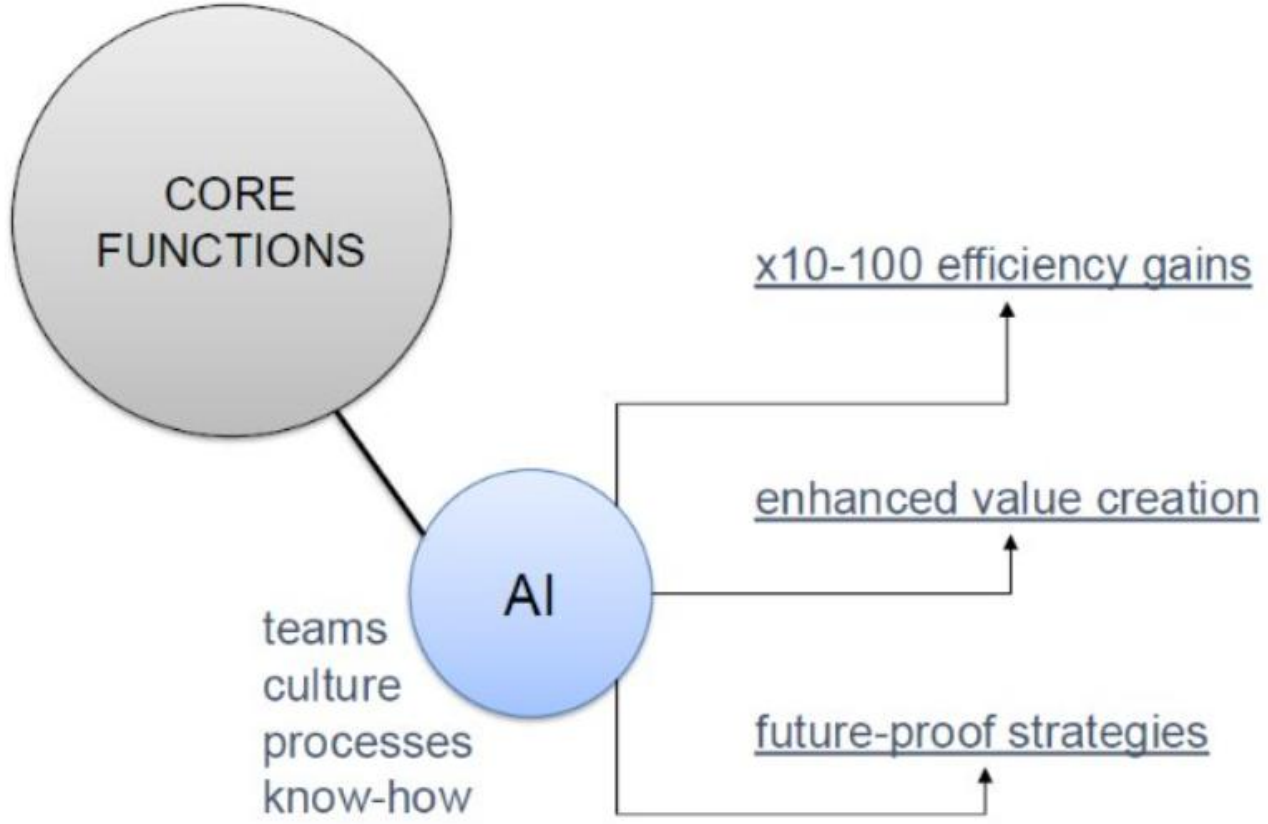
Human-AI Bridge



Poulos, Z. (2025). *Integrating Gen AI in products, services and workflows* [Powerpoint slides].

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Generative AI-Translational Path

01 Acceptance and Adoption

Improving awareness and education of stakeholders increases the chances of acceptance and adoption of generative AI

02 Data and Resources

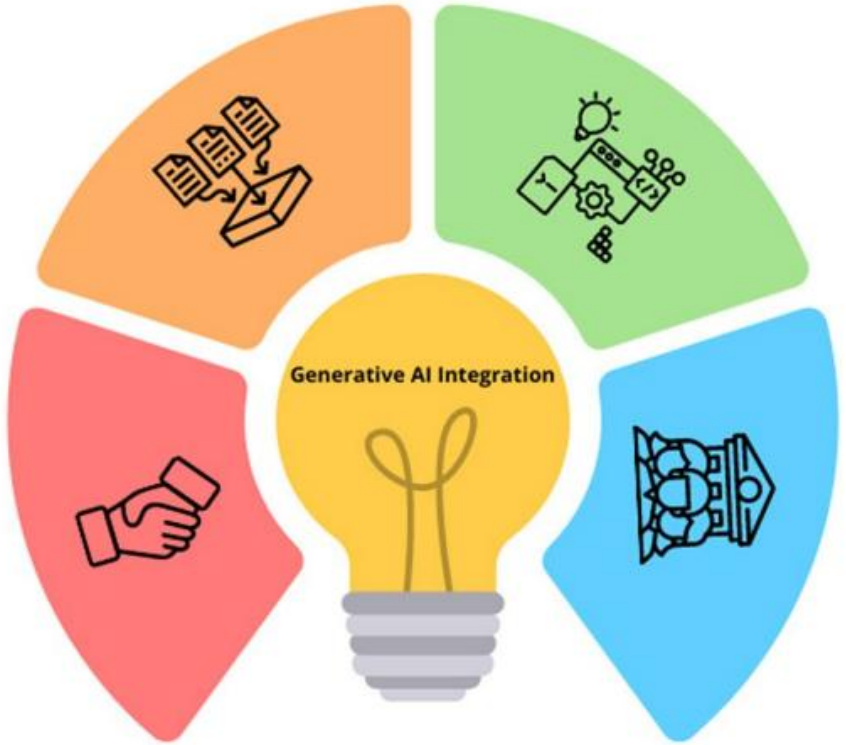
Appropriate preparation of data and resources are required for effective use of generative AI

03 Technical Integration

Effective integration involves understanding of the organisation's needs and infrastructure

04 Governance

Enabling a governance structure ensures mitigation of risks arising of integrating generative AI in healthcare



Reddy, S. Generative AI in healthcare: an implementation science informed translational path on application, integration and governance. *Implementation Science* 19,27 (2024). https://doi.org/10.1186/s13012-024-01357-9

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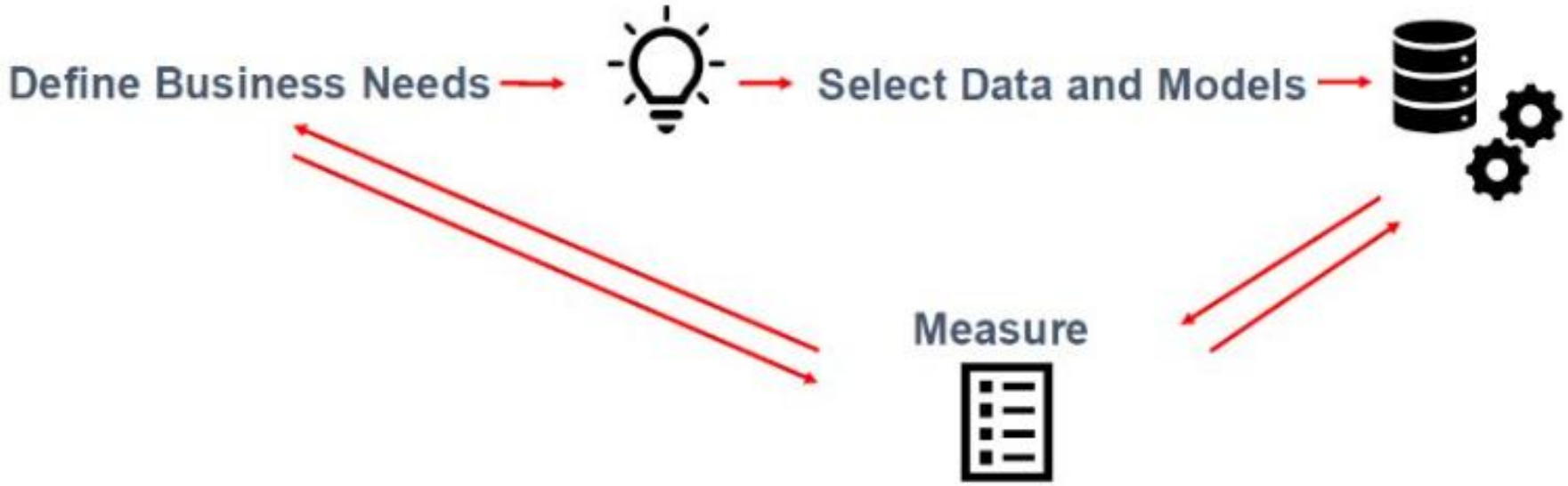
Is AI a good fit?

- Identify and Understand the Problem



Poulos, Z. (2025). *Integrating Gen AI in products, services and workflows* [PowerPoint slides].

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Use Case Examples

Natural Language Processing (NLP), Automation AI
CHC integrates a bot with their EMR system and appointment scheduling software to help manage appointment booking requests.

Predictive analytics, Machine Learning
Patient health records, vitals, and lab results are analyzed to identify individuals at high risk for developing heart disease. An automated alert is placed in the patient's chart to support early intervention.

NLP, Generative AI
An AI scribe tool supports providers by automatically transcribing, summarizing, and generating an encounter note from their conversation with a patient.

NLP, Machine Learning
A virtual assistant is employed to engage with patients via chat, voice, or smart devices to gather symptoms and medical history, then actively advises if an ER visit is appropriate.

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Generative AI-Translational Path

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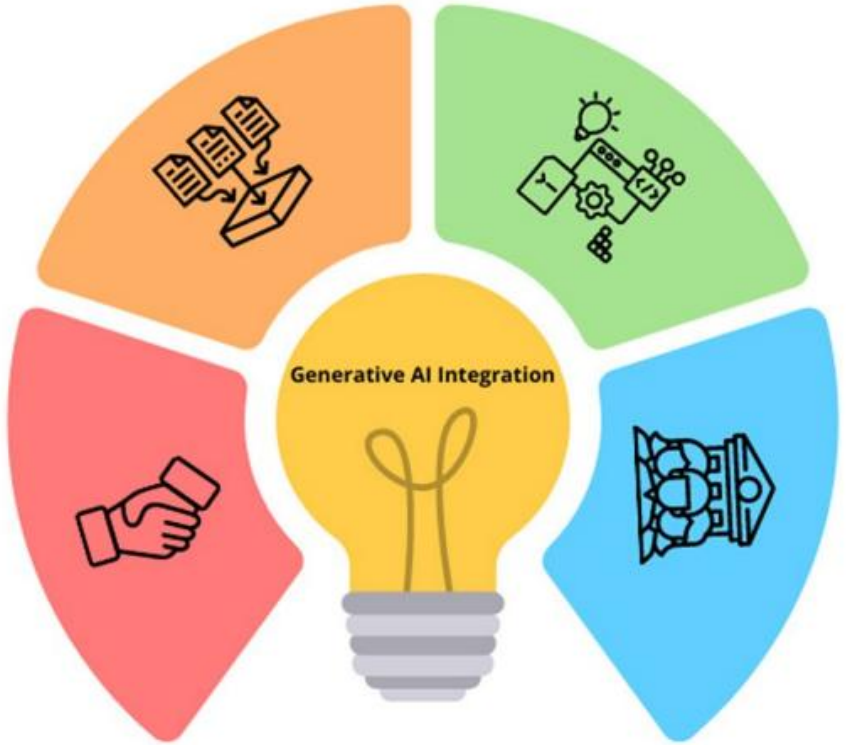

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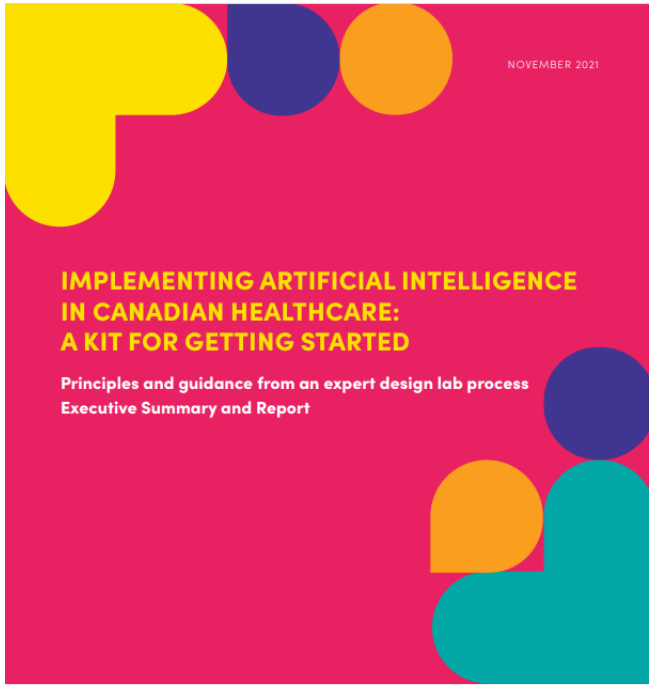
Getting Started Guide



Healthcare Excellence Canada | Excellence en santé Canada

Tools:

- Decision matrix
- Readiness assessment
- Risk assessment

https://www.healthcareexcellence.ca/media/qdmn0p3b/20211208_aireport_en.pdf

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Example:

Problem: Providers complaining of administrative burden, leaving less time for patient care.

Tool: AI Scribe

Benefits:
- reduced admin burden
- improved quality & timeliness of notes
- improved provider-client interaction

Challenges:
- >1 issue addressed
- multiple speakers
- multi-lingual conversations

Implementation Considerations:
- training and technology
- policies and guidelines
- cost

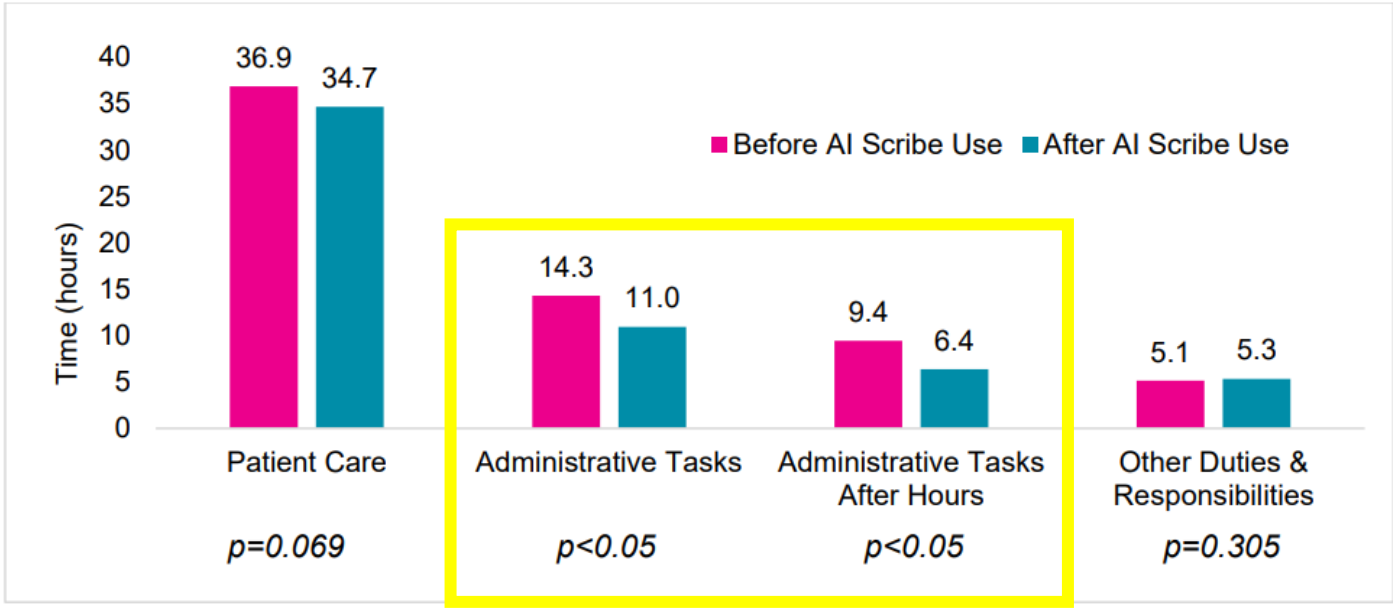

Figure 2. Average time, in hours per week, spent on various tasks before and after implementation of an AI scribe (n=152).

Source: ai scribe evaluation_final report_vf.pdf

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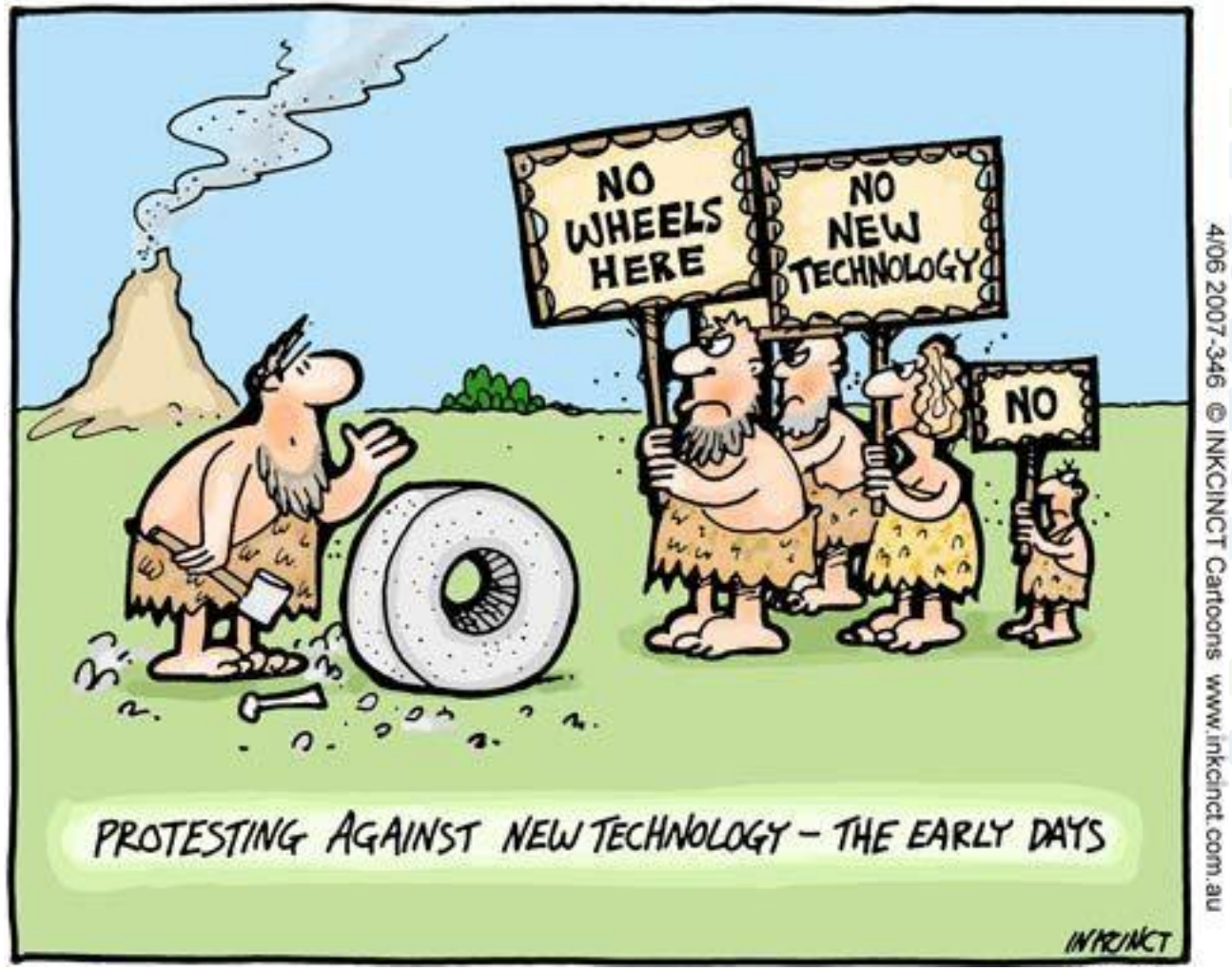
Barriers to Adoption

Understanding and Planning for Resistance



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Potential Barriers to Adoption

1
Data Privacy & Security Regulations

2
Fragmented Health IT Infrastructure

3
Workforce Resistance & Cultural Barriers

4
Lack of AI Literacy

5
High Costs & Limited Funding

6
Limited Real-World Evidence

7
Ethical & Legal Uncertainty

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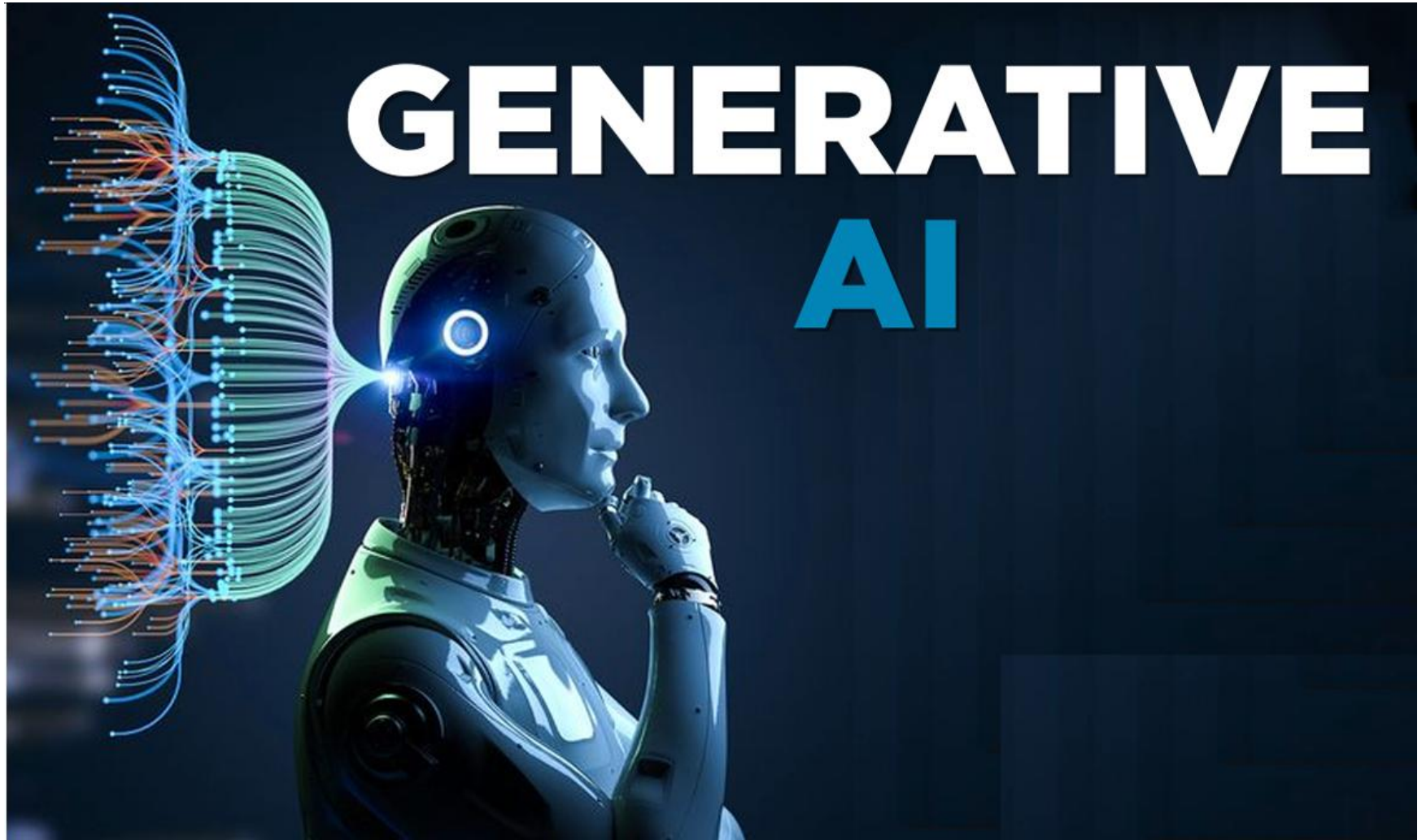
"GenAI Types" — Referring to Types of Generative AI



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1. **Text Generation**

   - **Examples**: ChatGPT, Google Gemini
   - **Use Cases**: Writing articles, summarizing text, answering questions, generating code.

2. **Image Generation**

   - **Examples**: DALL·E, Midjourney, Stable Diffusion
   - **Use Cases**: Creating artwork, product design, marketing visuals.

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3. Audio Generation

- **Examples**: ElevenLabs, Google AudioLM
- **Use Cases**: Voice cloning, music composition, sound effects.

4. Video Generation

- **Examples**: Runway, Pika Labs
- **Use Cases**: Short video creation, animation, synthetic media.

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5. Code Generation

- **Examples**: GitHub Copilot, CodeWhisperer
- **Use Cases**: Auto-completing code, generating scripts, debugging assistance.

6. 3D Content Generation

- **Examples**: NVIDIA Omniverse, Luma AI
- **Use Cases**: Game design, AR/VR content, digital twins.

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Principles of Effective Prompt Engineering

- **Clarity:** The prompt should clearly define what you want the model to do. Avoid ambiguity. For instance, instead of "Tell me about dogs," use "Provide a detailed description of the characteristics, behaviour, and care required for domestic dogs."

- **Context:** ChatGPT responds to the immediate context of the prompt. So, establishing a clear context is crucial.
  For example, the prompt "Translate the following English text to French: 'Hello, how are you?'" provides clear context and instructions.

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Principles of Effective Prompt Engineering

- **Precision:** Precise prompts yield precise responses. For example, if you want a list, specifically ask for it: "List the top 10 most populous countries in the world."

- **Role-play:** ChatGPT responds well to role-play. You can set it in a role to guide its responses: "As a historian, explain the significance of the American Civil War

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Prompt Engineering Techniques

- **Zero-shot Prompting:** This technique refers to the use of the AI model's generative skills without providing extra data.
- **Few-shot Prompting:** Adding examples that the AI model can take as a sample to the input.
- **Chain-Of-Thought Prompting:** It refers to breaking complex and larger tasks into sub-tasks. This ensures that the AI model performs complex tasks better and more accurately.

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Case Example: ChatGPT

"Can you please calculate the net income when I am 60 years old where, I receive a private pension $5,000 per month in Ontario, Canada?"

✅ Net Income Calculation:

Description	Amount
Gross Income	$60,000
Less Federal Tax	-$6,571.57
Less Ontario Tax	-$2,674.73
Net Income	**$50,753.70**

✅ Net Monthly Pension Income:

$50,753 ÷ 12 = $4,229/month (approx.)

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Case Example:

"If I am 65 of age, what will be the net income?"

✅ Final Net Income

Category	Amount
Gross Income	$78,560
Less Federal Tax	-$9,676
Less Ontario Tax	-$4,099
Net Income	**$64,785**

✅ Net Monthly Income:

$64,785 ÷ 12 = ~$5,399/month

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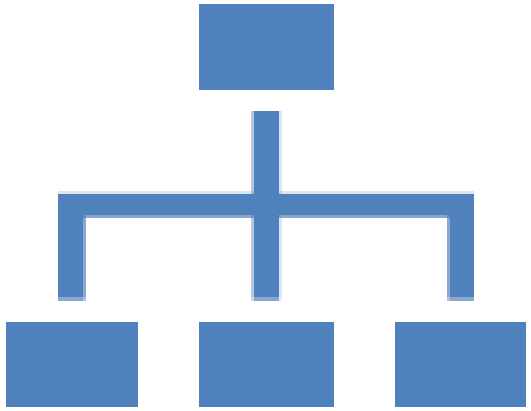
AI Innovative Process



- Goal-setting
- Incentives
- Outcomes measurement
- Individual performance assessment
- Value improvement
- Experimentation
- Scaling
- Stages of change

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1. **Lack of Clear AI Strategy or Vision**
   - Many healthcare organizations do not have a **defined roadmap** for AI.
   - Uncertainty over goals, outcomes, or ROI leads to scattered or stalled efforts.

2. **Siloed Departments and Decision-Making**
   - Hospitals and health networks often operate in **functional silos** (IT, clinical, admin).
   - Lack of collaboration prevents integrated AI adoption across the system.

3. **Insufficient Leadership Support**
   - AI needs **executive-level champions**.
   - Without leadership buy-in, initiatives lack funding, legitimacy, and long-term commitment.

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4. **Inadequate Change Management**
   - Organizational culture may be resistant to digital transformation.
   - Staff need **training, communication, and support** to adopt AI tools confidently.

5. **Unclear Roles and Governance Structures**
   - No consensus on **who owns or manages AI projects**.
   - Overlapping responsibilities between IT, clinical informatics, and operations create confusion.

6. **Mismatch Between Clinical Needs and Tech Solutions**
   - AI tools are often developed without **deep clinical input**.
   - Results in solutions that don’t align with workflows or solve real pain points.

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7. **Poor Integration with Existing Workflows**
   - If AI adds complexity or interrupts normal routines, clinicians may reject it.
   - Effective implementation requires **user-centered design** and workflow alignment.

8. **Limited Data Infrastructure and Analytics Capacity**
   - Many healthcare orgs lack the **technical backbone** to support AI (data lakes, pipelines, cloud environments).
   - This hinders experimentation and scaling.

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Risk & Ethical Consideration and Implications for Digital Transformation

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CHALLENGES AND ETHICAL CONSIDERATIONS

In today's rapidly changing business landscape, the imperative for organizations to pursue digital transformation is undeniable. This pursuit is crucial for staying competitive and meeting the evolving needs of customers. However, this journey is not without challenges and ethical considerations. As businesses navigate the complex terrain of integrating technology and utilizing data, addressing these challenges while upholding ethical standards becomes essential to ensuring optimal customer satisfaction.

Digital Transformation Strategies

Crafting effective digital transformation strategies poses one of the primary challenges, particularly in the intricate process of migrating from traditional systems to advanced digital platforms.

Enhanced Customer Satisfaction

In the pursuit of enhanced customer satisfaction, organizations must grapple with the ethical implications of artificial intelligence (AI) and automation.

The authors believe

The authors believe, the journey toward crafting effective digital transformation strategies for optimal customer satisfaction is challenging and laden with ethical considerations.

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Objectives

1. Not engaging is not an option

2. Understanding Ethical Considerations of deploying Generative AI, including Explainability, Transparency, Fairness, Robustness and Data Privacy

3. Recognizing the Potential Risks associated with the deployment of Generative AI

4. Understanding Organizational Responsibility to all stakeholders associated with the deployment of Generative AI

5. How to prepare organizations for Ethical Innovation as they pursue their digital transformation journey (guardrails …)

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⚠️ AI Risk & Ethical Considerations

🤖 And Their Implications for Digital Transformation in Healthcare

1. Bias and Fairness

- **Risk**: AI systems may reflect and amplify existing biases in training data (e.g., racial, gender, socioeconomic).
- **Implication**: Unequal treatment or misdiagnosis can erode trust and widen health disparities.
- **Response**: Use diverse datasets, conduct fairness audits, and involve equity advisors.

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2. Transparency and Explainability

- **Risk**: Many AI models (e.g., deep learning) are “black boxes” — hard to explain or justify.
- **Implication**: Clinicians and patients may distrust decisions made by opaque systems.
- **Response**: Prioritize explainable AI (XAI), require models to provide reasoning or evidence for outputs.

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4. Accountability and Liability

- **Risk**: Who is responsible when AI makes an error — the developer, hospital, or clinician?
- **Implication**: Legal ambiguity may slow down adoption and innovation.
- **Response**: Establish clear legal frameworks and clinical governance models.

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5. Overreliance and Automation Bias

- **Risk**: Clinicians may blindly trust AI outputs without questioning accuracy.
- **Implication**: Missed diagnoses or inappropriate treatments.
- **Response**: Promote human-AI collaboration and decision support, not replacement.

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6. Workforce Disruption

- **Risk**: Fear of job loss or deskilling among healthcare staff.
- **Implication**: Resistance to digital transformation and morale issues.
- **Response**: Focus on **AI augmentation**, upskilling, and inclusive change management.

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7. Inequitable Access to AI

- **Risk**: Wealthier institutions may benefit disproportionately from advanced AI.
- **Implication**: Worsening health inequities across regions and populations.
- **Response**: Advocate for public investment, equitable AI access, and shared infrastructure.

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Form an AI working group/committee - *Satisfying AI Ethical Needs*

- ✓ **THE PROBLEM:** Bias will find its way into AI and machine-learning models no matter how strong your technology is or how diverse your organization may be.
- ✓ **THE REASON:** There are many sources of biased AI, all of which can easily fly under the radar of data scientists and other technologists.
- ✓ **THE SOLUTION:** An AI ethics committee can identify and mitigate the ethical risks of AI products that are developed in-house or procured from third-party vendors.

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Form an AI working group/committee - *Satisfying AI Ethical Needs*

- ✓ **Top to Bottom approach.**
- ✓ **Representation from each department or division.**
- ✓ **Should be a Subject Matter Expert (SMC).**
- ✓ **Should report to the Management Team.**
- ✓ **Should meet at least once a month.**

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An accident in 1979 at the Three Mile Island nuclear power station that was the most serious in the history of the American nuclear power industry.

NATIONAL

Three Mile Island nuclear plant will reopen to power Microsoft data centers

SEPTEMBER 20, 2024 · 1:40 PM ET

By C Mandler

The Three Mile Island nuclear plant is seen in March 2011 in Middletown, Pa.

Jeff Fusco/Getty Images

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Key Takeaways

- ✓ Top-bottom approach
- ✓ Identify objectives that align with organization's mission and vision
- ✓ Form an AI working group/committee
- ✓ Importance of the evaluation process

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