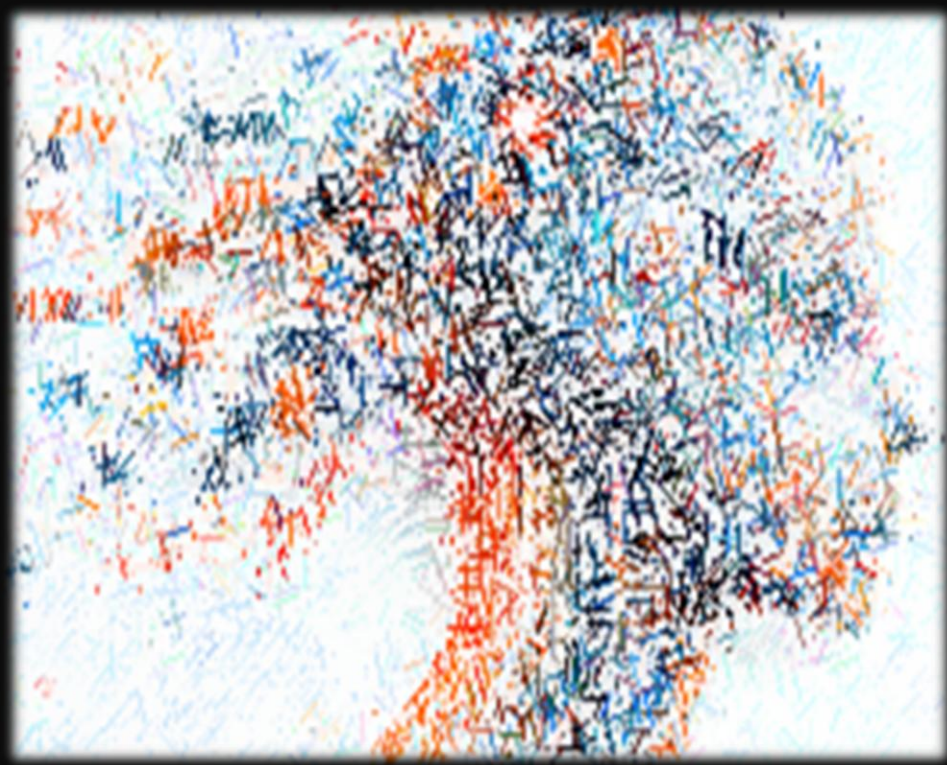


# Adopting and Adapting AI



Synergistic Collaboration for  
Preparing the Future  
Workforce and Enhancing  
Productivity



Shalini R. Urs

# Agenda

I am going to touch upon AI and Productivity in the following three scenarios:

1. AI and Economic Productivity
2. AI and Healthcare
3. AI and Scientific research

And then transition to:

4. Preparing for the Future: Augmenting Human Intelligence with AI



# Introduction

---

AI is transforming productivity across industries.

---

The convergence of AI, robotics, and automation is enhancing productivity and redefining efficiency.

---

This presentation explores AI's role in enhancing productivity, drawing from key research.





## The Age of AI

marked the year Artificial Intelligence (AI) came of age, as noted by *The Guardian*.

2016

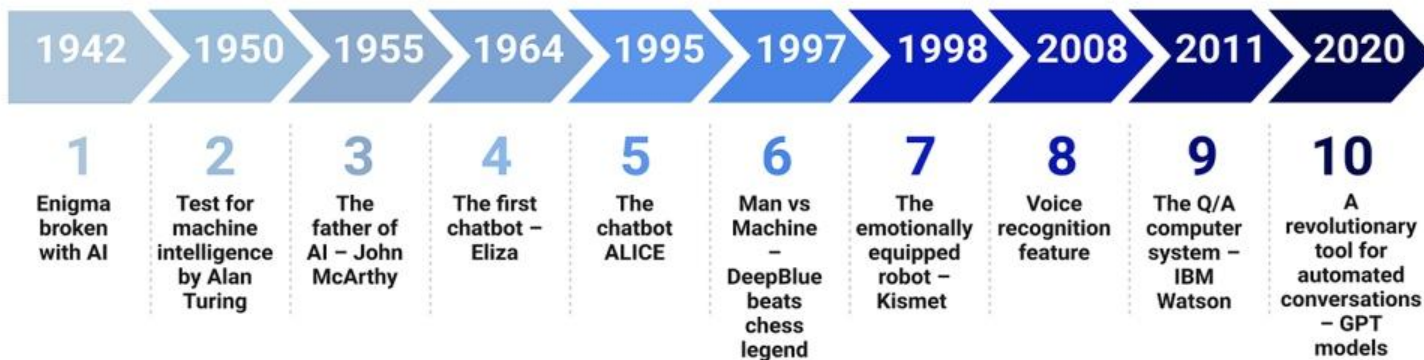
2025


In 2025, it would be an understatement to say that AI has profoundly impacted organizations, societies, and individuals.

# Journey of AI



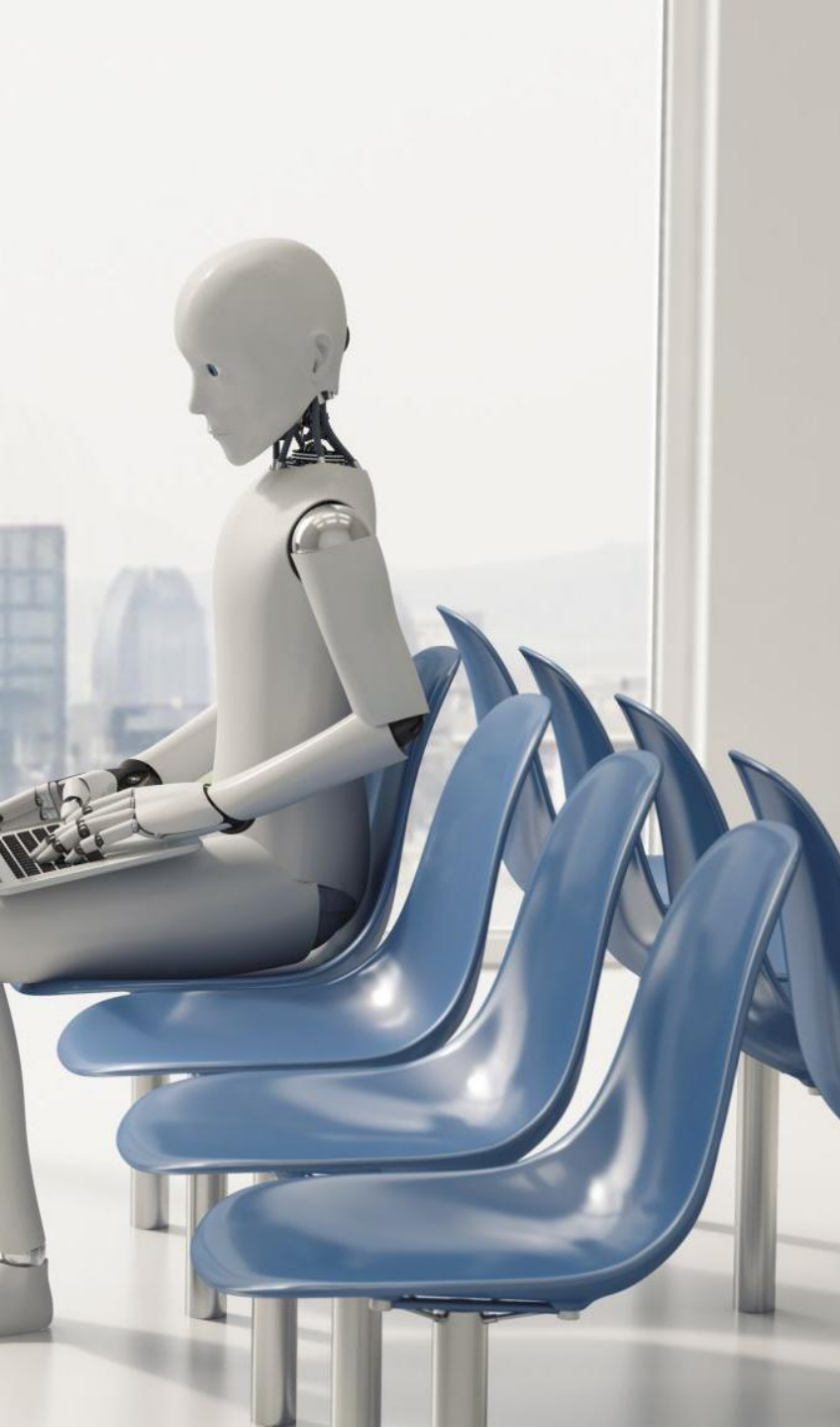
## Exploring the Historical Journey of Artificial Intelligence



A close-up photograph of a person's hands operating a boat's winch. The person is wearing a dark jacket and is pulling on a white rope with blue stripes. The winch is a polished metal device with a central roller. The background shows the blue sea and a white boat structure under a clear sky.

# AI and Productivity Enhancement

Exploring AI's Impact on Economic  
Growth and Efficiency



# AI's Role in Economic Productivity

- AI streamlines repetitive tasks, optimizing efficiency.
- Robotic Process Automation (RPA) reduces operational costs.
- AI enhances decision-making through data analytics.
- Governments leverage AI for better public service delivery.

# The Economics of AI

- AI as a general-purpose technology reshaping labor and capital.
- AI's impact on wages, job markets, and inequality.
- AI-driven automation shifts human labor toward complex, creative tasks.
- New economic models emerge around AI adoption.





# Key Themes

## AI as a Prediction Technology

- AI enhances **prediction capabilities**, making decision-making more efficient.
- As prediction costs decline, complementary skills like judgment and human expertise become more valuable.

## Impact on Labor and Employment

- AI **automates routine cognitive tasks**, shifting labor demand toward tasks requiring **creativity, social intelligence, and adaptability**.
- While AI displaces some jobs, it also creates new opportunities by augmenting human capabilities.

## Market Structures and Economic Growth

- AI's influence on economic growth depends on **data access, market competition, and regulatory frameworks**.
- Large firms with vast datasets may gain a competitive edge, potentially leading to **market concentration**.

## Ethical and Policy Considerations

- The book discusses **bias in AI models**, privacy concerns, and the role of **public policy** in ensuring fair AI adoption.
- Governments must balance **innovation with regulation** to promote equitable economic benefits.

## AI in Innovation and Scientific Discovery

- AI accelerates **R&D, automation in knowledge work, and scientific progress**, leading to faster breakthroughs in fields like **medicine and materials science**.



National  
Bureau of  
Economic  
Research

## THE ECONOMICS OF ARTIFICIAL INTELLIGENCE

### *An Agenda*

Edited by Ajay Agrawal,  
Joshua Gans, and Avi Goldfarb

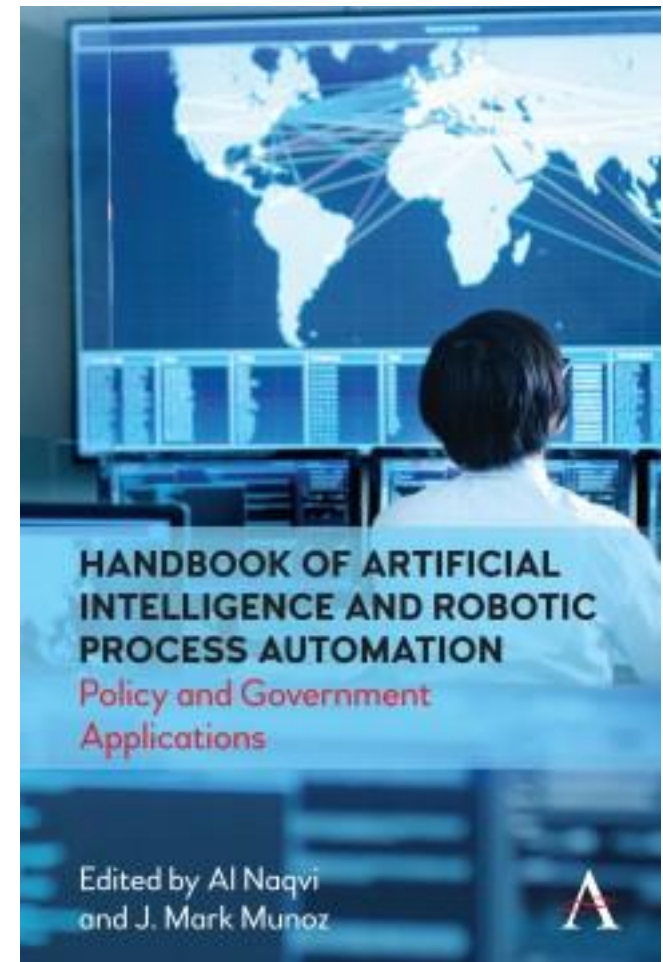


This book (2019) presents AI as an **economic disruptor** that lowers prediction costs, shifts labor dynamics, and reshapes market structures. While it brings efficiency and growth, it also raises challenges related to inequality, regulation, and market concentration. Policymakers and businesses must **adapt strategies to harness AI's benefits while mitigating risks**.

# Key Themes

## AI and RPA's Impact on Economic Productivity:

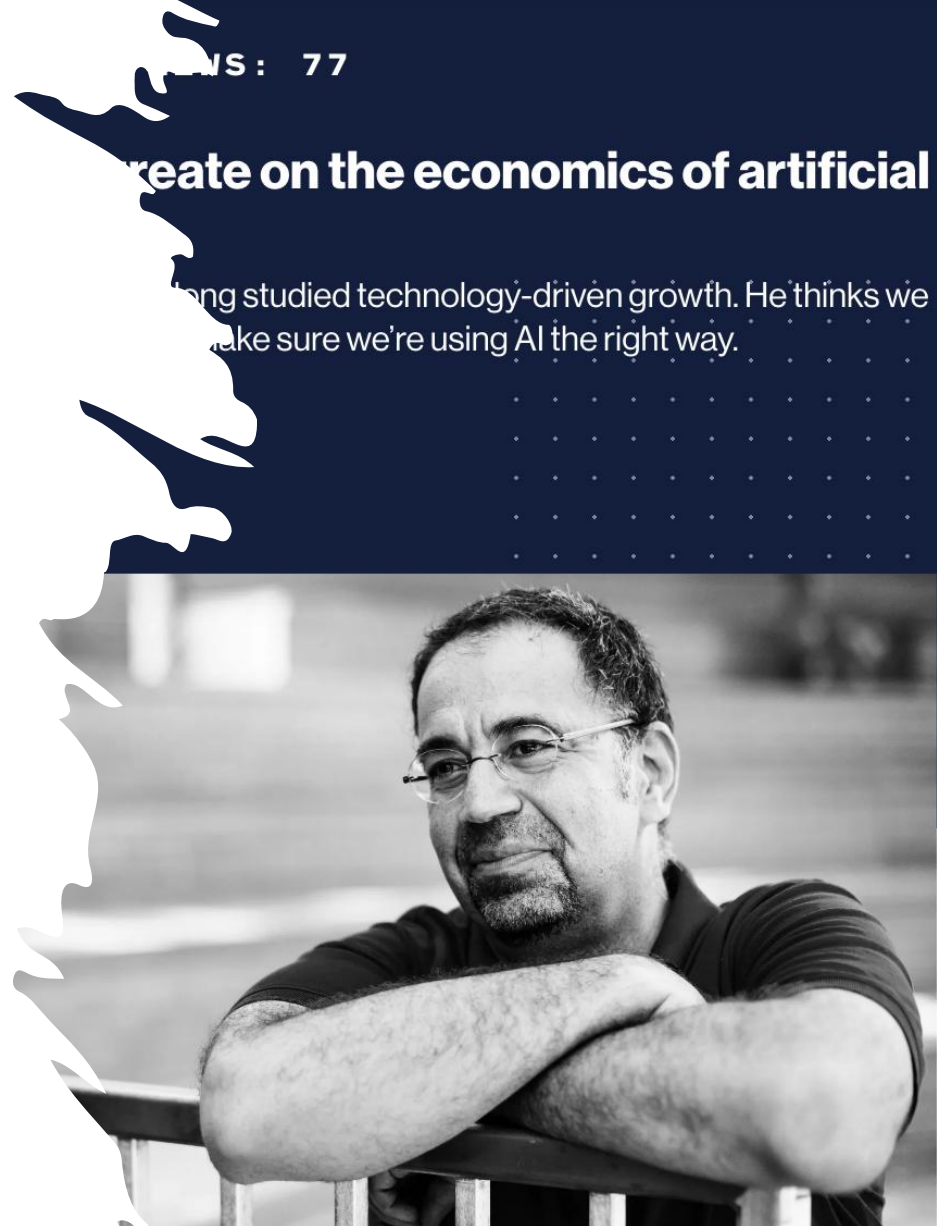
- **Efficiency and Cost Reduction:**
  - AI and RPA streamline repetitive tasks, leading to faster operations and reduced errors. This automation decreases operational costs and reallocates human resources to more strategic roles.
- **Innovation and New Business Models:**
  - The integration of AI fosters innovation, enabling the development of new products and services. Businesses can leverage data analytics to identify market trends and customer preferences, leading to more personalized offerings.
- **Enhanced Decision-Making:**
  - AI systems analyze vast amounts of data to provide insights, supporting informed decision-making. This capability allows organizations to respond swiftly to market changes and optimize strategies.
- **Labor Market Dynamics:**
  - While automation can displace certain jobs, it also creates opportunities in tech development, maintenance, and oversight. The workforce may shift towards more complex and creative tasks, necessitating upskilling and education.
- **Public Sector Applications:**
  - Governments implementing AI and RPA can improve public services, enhance policymaking through data analysis, and increase transparency, thereby boosting public trust and engagement.



Handbook of Artificial Intelligence and Robotic Process Automation: Policy and Government Applications Edited by Al Naqvi & J. Mark Munoz ( 2020)

# Economics of AI: A Different Take

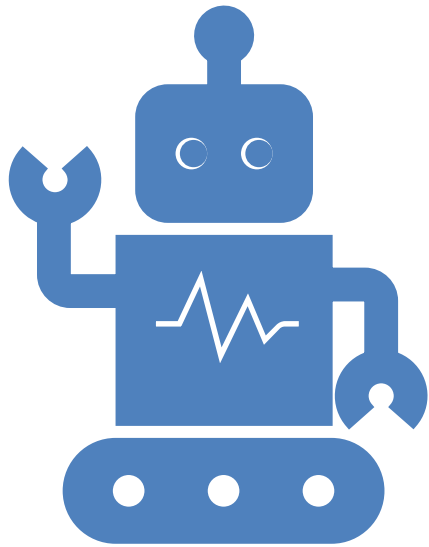
- Despite some predictions that AI will double US GDP growth, Acemoglu expects it to increase GDP by 1.1% to 1.6% over the next 10 years, with a roughly 0.05% annual gain in productivity.
- Given this mix of benefits and drawbacks, Acemoglu and his colleagues think it may be best to adopt AI more slowly than market fundamentalists might like. While government regulation is one way to promote that measured pace, he also thinks that if the cycle of “hype” around AI diminishes, then the rush to use it “will naturally slow down.”
- Course Correction will be tough if we drive its growth fast.



ADAM GLANZMAN

artificial intelligence upending the world, its  
gain uncertain. But Institute Professor and 2024

# Robots and Workplace Productivity



- Automation increases manufacturing efficiency.
- AI-powered robots in logistics, healthcare, and customer service.
- Enhanced productivity leads to cost savings and higher output.
- Human-robot collaboration augments workers rather than replacing them.

# THE ECONOMIC JOURNAL

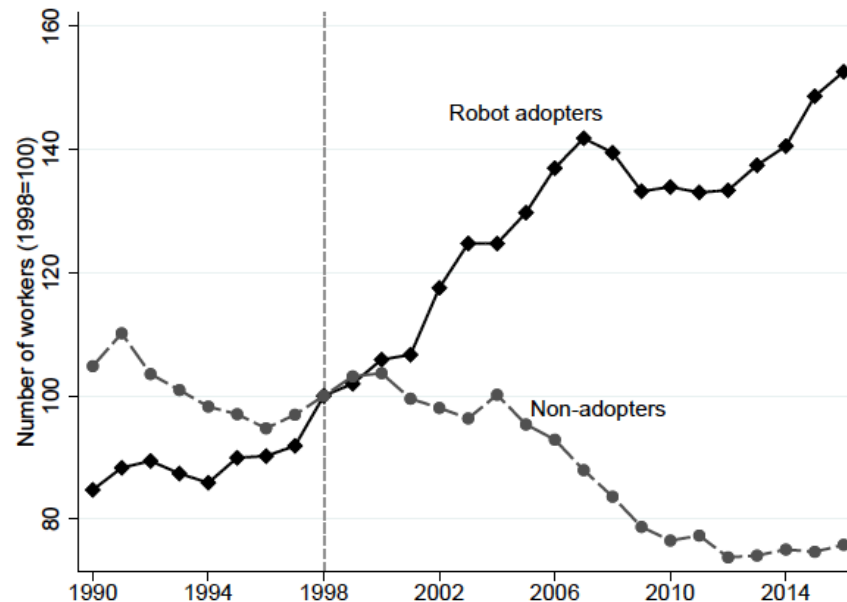
A JOURNAL OF THE ROYAL ECONOMIC SOCIETY

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OXFORD  
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Robots and Firms: A study based on firm-level data from Spain, a country with one of the highest robot density levels per worker in Europe.



It reveals a productivity-enhancing reallocation of labour and market shares across firms, with robot-adopting firms creating new job opportunities and expanding their scale of operations, while non-adopters experience negative output and employment effects in the face of tougher competition.

The data demonstrate that firms that adopted robots between 1990 and 1998 (“robot adopters”) increased the number of jobs by more than 50% between 1998 and 2016, while firms that did not adopt robots (“non-adopters”) reduced the number of jobs by more than 20% over the same period





# AI in Business – Case Studies

1. Amazon: AI-driven demand forecasting and personalized recommendations.
2. UPS: AI-powered route optimization saves fuel and delivery time.
3. IBM Watson: AI accelerates drug discovery in healthcare.

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Proficiency Industrial Software  
**PREDICTIVE ANALYTICS**

Predictive Analytics | Overview | Where to Buy? | Resources | Customer Stories

Using Digital Twin Technology: Analyze, Monitor, Predict, Simulate, Optimize & Control Setpoints in Real Time

Companies around the world are turning to predictive analytics to stay competitive in their industries. Using Artificial Intelligence and Machine Learning, predictive analytics can help you learn patterns, identify anomalies, and troubleshoot asset and process performance issues quickly. With the right powerful predictive analytics solution, companies can do everything from mining insight from data (historical and current) to reducing variation, downtime and waste, and improving operations and productivity, and much more.

## General Electric (GE) – AI-Driven Predictive Maintenance

Using Artificial Intelligence and Machine Learning, predictive analytics can help you learn patterns, identify anomalies, and troubleshoot asset and process performance issues quickly.

- **Outcome:**
  - Reduced maintenance costs by 10-20%.
  - Increased machine uptime, leading to a 20% boost in productivity.
  - Enhanced operational efficiency by optimizing resource allocation.
- **Challenge:** GE needed to reduce downtime and maintenance costs in its industrial machinery.
- **AI Implementation:** GE adopted AI-driven predictive maintenance using machine learning algorithms to monitor equipment health and predict failures before they occurred.





WBC2025  
Purdue University, USA

CIB WORLD BUILDING CONGRESS  
19–23 MAY 2025



Table 4: Advantages experienced by users across four case studies

Advantages	Australia	India	South Africa	UK
Improved accessibility	78%	75%	82%	77%
Enhanced user experience	73%	77%	81%	71%
More useful information about the facility and its services	76%	79%	85%	72%
Real-time Information	75%	70%	78%	70%
Saving time	67%	65%	85%	69%
Saving cost	63%	55%	65%	50%
Ease of use	70%	69%	60%	68%
Improved efficiency and reliability of services	71%	64%	75%	69%
Enhanced safety and security	60%	60%	77%	50%
Reduced congestion	68%	59%	56%	67%
Facilitate communication with the authority	60%	53%	65%	61%
Personalized Services	62%	64%	75%	65%

Time service benefits were highest in South Africa (95%), but lowest in Australia (67%) and India



ITS aims to improve passenger safety, fleet efficiency, services, and traffic situation by providing real-time information on the traffic system, deploying advanced display and communication technologies, a Central Control Station (CCS), and intelligent display boards.



The ITS covers 500 buses at 105 bus stops, six bus stands, and 45 columns of the city bus stand to facilitate passengers to get real-time information.

## Digitalized Urban Public Facilities

### Unlocking Social Sustainability and Inclusivity of Digitalised Urban Public Facilities

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#### Abstract

The swift integration of digitalisation into urban environments has reshaped societal interactions and facility utilisation. At the heart of this transformation lie digital twins, pivotal in facilitating a plethora of services and applications. Despite their potential, empirical evidence delineating the impact of digital twins on social sustainability and inclusivity within urban public facilities remains sparse. This study addresses this gap by scrutinising the interplay among urban public facility characteristics, the degree of digitalisation, and the availability of information in relation to social sustainability and inclusivity. Leveraging insights from an extensive literature review, a causal model of digitalised urban public facilities was constructed. The model and its inherent causal relationships were validated through a survey encompassing users from four diverse case studies spanning the UK, India, South Africa, and Australia to encompass global perspectives. Structural equation modeling results reveal that digital twin technology positively influences the social sustainability of urban public facilities, especially by improving inclusivity for marginalized users who face barriers such as low digital literacy and limited access to technology. Additionally, a significant correlation was found between higher levels of digitalization, accessible information, and enhanced social sustainability. The findings conclude that digital twins not only optimize the functionality of urban facilities but also promote inclusivity and social sustainability across diverse communities and cities.

#### Keywords

Digital Twin, Digitalised Urban Public Facilities (DUPF), Inclusivity, Social Sustainability, Users.

#### 1 Introduction

Urban public facilities (UPFs) play a vital role in city life, providing essential services that significantly influence the quality of life for urban residents (Mouratidis 2019). With increasing urbanization, managing these facilities to ensure efficiency, inclusivity, and social sustainability has become a growing challenge (Mouratidis 2019). Traditionally, UPFs have been assessed based on their physical infrastructure, functionality, and economic performance. However, the integration of digital technologies, particularly digital shadows and twins, has revolutionized how these facilities are

The screenshot shows the website for the Karnataka State Road Transport Corporation (KSRTC) Mysore Intelligent Transport System (MITRA). The header includes the KSRTC logo and the text 'Karnataka State Road Transport Corporation Mysore Intelligent Transport System'. Below the header is a navigation menu with links: HOME, ABOUT, COMMITTEE, TRACK YOUR BUS, OPEN DATA POLICY, FAQs, IMAGE GALLERY, CONTACT, and SITEMAP. The main content area is titled 'Mysore ITS-An Overview' and contains a list of bullet points:

- Real-time monitoring and tracking of buses and help reduce road congestion and other transport issues.
- ITS solution provides dynamic passenger information system (PIS) based on Geographical Positioning System (GPS)
- ITS applies advanced display and communication technologies, Central Control Station (CCS) and intelligent display boards.
- ITS improves passenger safety, fleet efficiency, services and traffic situation through transmission of real time information.

To the right of the text is a video player showing a bus with a digital display board.

## RAE Project: Urban Infrastructure Study in India

Case Study: Karnataka State Road Transport System (KSRTC) Mysore Intelligent TRANsport System (MITRA), also known as Mysore ITS.

THE LEARNING HEALTH SYSTEM SERIES

# Artificial Intelligence in Health Care

The Hope, the Hype, the Promise, the Peril

Michael Matheny,  
Sonoo Thadaney Israni, Mahnoor Ahmed,  
and Danielle Whicher, *Editors*

 NATIONAL ACADEMY OF MEDICINE

# Artificial Intelligence in Health Care

The Hope, the Hype, the Promise, the Peril

Digital Learning Collaborative  
Consortium on Value and  
Science-Driven Health Care  
National Academy of Medicine  
(NAM)

# Premise

---

AI creates a virtuous cycle of data with every patient encounter is captured into a “collective memory” of health services to inform and improve patient care and the health system.

---

Enormous datasets generated, both in the formal health care setting, and from from medical and consumer devices, wearables, patient-reported outcomes, as well as environmental, community and public health sources.

---

The landscape include structured data as well as text, images and sounds. also includes data “mash-ups” from commercial, legal, and online social records.

---

AI offers the most promise in harvesting knowledge from that collective memory and to maximize the value of electronic health records (EHRs).

---

AI will be the “payback” for the investment in EHRs and their use for tasks such as monitoring a patient for emergencies





# Key Takeaways from the Report

- AI can enhance patient care, reduce costs, and assist clinical teams.
- High-quality, standardized, and representative data is crucial.
- Ethical concerns: AI must prioritize health equity and inclusivity.
- Trust depends on transparency, but requirements vary by use case.
- AI should augment human decision-making, not fully automate it.

# Recommendations for AI in Health Care



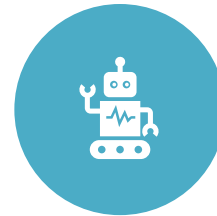
Invest in AI education for healthcare professionals.



Implement AI best practices, focusing on real-world needs.



Develop regulatory frameworks balancing innovation and safety.



Use post-market monitoring to ensure AI tools remain effective.



Prioritize AI solutions that truly enhance patient outcomes.

# Key Applications



# Clinical Decision Support

A growing body of evidence suggests that AI-supported mammography screening is feasible and safe and can reduce workload.

A recent German study called the PRIAM (2025) demonstrated that AI-supported mammography screening led to a 17.6% higher breast cancer detection rate compared to standard methods.

## Artificial Intelligence In Breast Cancer

- Radiology, one of the first areas that saw a lot of AI applications.
- Aiding doctors in speedier diagnosis with higher precision.
- Cancer screenings, like a mammogram or lung cancer screening, leverage AI to help produce results faster.
- Studies have shown that radiologists had improved diagnostic performance for detection of breast cancer at mammography when using an AI computer system for support, done with no additional reading time, independent of the type of cancer lesion or quality of diagnostic image.





# Personalized Medicine

- AI customizes treatments based on genetic, clinical, and lifestyle factors.
- 1. **Proteomics and AI for Disease Treatment:**
  - The UK Biobank, in collaboration with 14 pharmaceutical companies, has launched a proteomics initiative utilizing AI to understand and treat diseases. By analyzing extensive genetic data, AI models can identify precise disease subtypes, allowing for tailored treatments

# Personalized Medicine

AI customizes treatments based on genetic, clinical, and lifestyle factors.

## Proteomics and AI for Disease Treatment:

The UK Biobank, announced in 2025, in collaboration with 14 pharmaceutical companies, has launched a **proteomics initiative** utilizing AI to understand and treat diseases.

By analyzing extensive genetic data, AI models can identify precise disease subtypes, allowing for tailored treatments

### UK Biobank Supercharges Medicine with Gene Data on 500,000 Brits

A database of DNA and health measurements is offering new clues into everything from who gets diabetes to who likes a pint of beer.

By Antonio Regalado

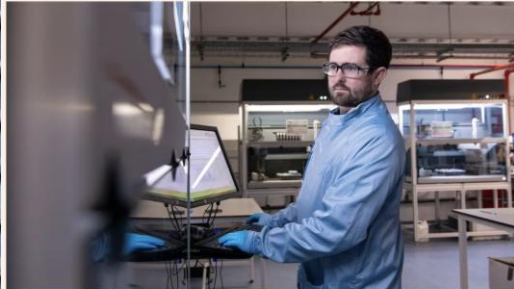
November 15, 2017



Digital health + Add to myFT

### Protein project uses AI to boost disease treatment

UK initiative to harness big biological data sets and look deeper into how the human body works and malfunctions



Samples donated by UK Biobank participants being processed at a lab in Stockport, England © UK Biobank

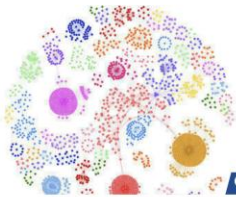
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<https://www.ukbiobank.ac.uk/>



# AI-Driven Predictive Modeling

- AI algorithms process vast amounts of data, including genomics, proteomics, microbiomics, and clinical information, to provide precise diagnoses, treatment recommendations, and prognoses.
- This integration offers a holistic view of patient health, enabling personalized and effective interventions.
- One example from SIEMENS Healthineers.

Insights Series

## Innovating Personalized Care

Perspectives on how more nuanced diagnosis and more precise treatment can dramatically improve patient outcomes



Issue 47  
siemens-healthineers.com/  
innovating-personalized-care

# Innovative Aging Solutions For Predictive & Preventative Care

Empowering caregivers and operators to reduce falls and enhance the quality of life for seniors.



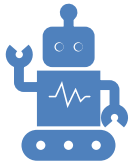
Mark Maybury, Former Executive Director of MITRE and SBD's first Chief Technology Officer, discusses the humungous potential of commercializing AI in healthcare. SBD built an extensive pipeline of ecosystems and invested in corporate venture capital in companies that would potentially realize new, innovative solutions.



Cites the example of Foresite, which provides patient care and eldercare consisting of the actual sensors and makes use of a variety of inputs, including depth-sensor technology, under-mattress pads, and motion detectors to continually capture a range of information, such as respiratory rate, bed restlessness, gait, motion, and activity. For example, based on gait analysis, the platform could predict whether someone is going to trip or fall over in a period of time. While preserving privacy, we want to encourage people to live safely at home, said Mark.Maybury in my podcast

# Telemedicine & Virtual Assistants

AI-powered chatbots and remote monitoring improve accessibility to healthcare.



Applying artificial intelligence (AI) in remote patient monitoring (RPM) can help streamline healthcare delivery for patients at home.



FDA-cleared remote patient monitoring devices allow clinicians to monitor vital signs, including heart rate, heart rate variability, blood pressure, blood oxygen level, and more. With AI, monitoring and managing patients' health conditions without geographical barriers provides precise, personalized care and early detection of complications.

## AI in Telemedicine: Ways AI is Transforming Remote Patient Care



## How is AI Used in Remote Patient Monitoring?



# Robotic Surgery

- The robotic technique increases total production at the hospital level between 21% and 26%, coupled with a 29% improvement in labor productivity

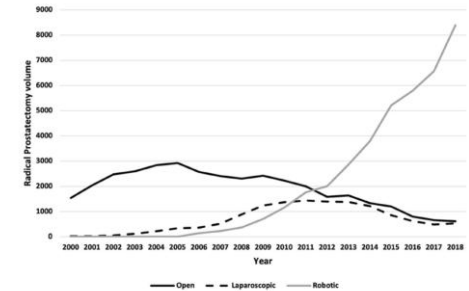
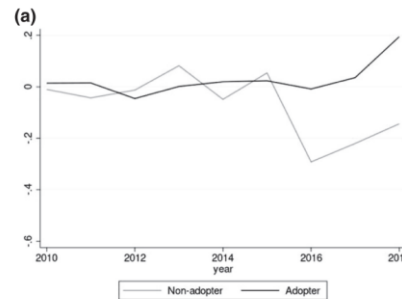
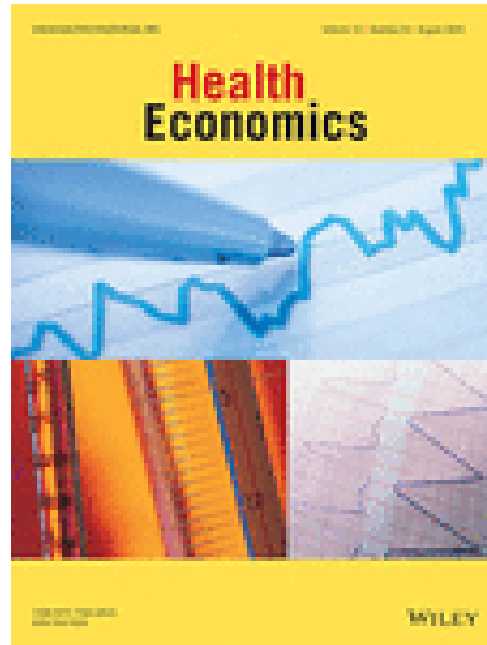


FIGURE 1 Radical prostatectomy volume. Source: Hospital Episode Statistics data 2000–2018.

Received: 29 March 2023 | Revised: 10 March 2024 | Accepted: 8 April 2024  
DOI: 10.1002/hec.4638

RESEARCH ARTICLE

Health Economics WILEY

## Efficiency and productivity gains of robotic surgery: The case of the English National Health Service

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**Funding information**  
Health Foundation, Grant/Award Number: 7432; Spanish Ministry of Science, Innovation and Universities, Grant/Award Number: PGC2018-10660-B-I00, CEX2023-146521

### Abstract

This paper examines the effect of new medical technology (robotic surgery) on efficiency gains and productivity changes for surgical treatment in patients with prostate cancer from the perspective of a public health sector organization. In particular, we consider three interrelated surgical technologies within the English National Health System: robotic, laparoscopic and open radical prostatectomy. Robotic and laparoscopic techniques are minimally invasive procedures with similar clinical benefits. While the clinical benefits in adopting robotic surgery over laparoscopic intervention are unproven, it requires a high initial investment cost and carries high on-going maintenance costs. Using data from Hospital Episode Statistics for the period 2000–2018, we observe growing volumes of prostatectomies over time, mostly driven by an increase in robotic-assisted surgeries, and further analyze whether hospital providers that adopted a robot see improved measures of throughput. We then quantify changes in total factor and labor productivity arising from the use of this technology. We examine the impact of robotic adoption on efficiency gains employing a staggered difference-in-difference estimator and find evidence of a 50% reduction in length of stay (LoS), 49% decrease in post-LoS and 44% and 46% decrease in postoperative visits after 1 year and 2 years, respectively. Productivity analysis shows the growth in radical prostatectomy volume is sustained with a relatively stable number of urology surgeons. The robotic technique increases total production at the hospital level between 21% and 26%, coupled with a 29% improvement in labor productivity. These benefits lend some, but not overwhelming support for the large-scale hospital investments in such costly technology.

### KEYWORDS

efficiency gains, labor productivity, robotic surgery, staggered difference-in-differences, total factor productivity

### JEL CLASSIFICATION

I33, I32, C41, C35, J2

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[onlinelibrary.wiley.com/doi/10.1002/hec.4638](https://onlinelibrary.wiley.com/doi/10.1002/hec.4638) | 1831

# AI and Drug Discovery and Development

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Review Article | Published: 20 January 2025

## Artificial intelligence in drug development

[Kang Zhang](#) , [Xin Yang](#), [Yifei Wang](#), [Yunfang Yu](#), [Niu Huang](#), [Gen Li](#), [Xiaokun Li](#), [Joseph C. Wu](#) & [Shengyong Yang](#) 

*Nature Medicine* **31**, 45–59 (2025) | [Cite this article](#)

17k Accesses | 7 Citations | 177 Altmetric | [Metrics](#)

### Abstract

Drug development is a complex and time-consuming endeavor that traditionally relies on the experience of drug developers and trial-and-error experimentation. The advent of artificial intelligence (AI) technologies, particularly emerging large language models and generative AI, is poised to redefine this paradigm. The integration of AI-driven methodologies into the drug development pipeline has already heralded subtle yet meaningful enhancements in both the efficiency and effectiveness of this process. Here we present an overview of recent advancements in AI applications across the entire drug development workflow, encompassing the identification of disease targets, drug discovery, preclinical and clinical studies, and post-market surveillance. Lastly, we critically examine the prevailing challenges



AI is revolutionizing drug discovery by accelerating the process, improving efficiency, and potentially leading to better, faster, and more effective treatments by analyzing vast datasets, predicting drug properties, and identifying potential drug targets.

Paul D, Sanap G, Shenoy S, Kalyane D, Kalia K, Tekade RK. Artificial intelligence in drug discovery and development. *Drug Discov Today*. 2021 Jan;26(1):80-93.

# AI and Scientific Research



## AI as a Muse and a Maverick Co-Scientist?

- Physicist Mario Krenn describes AI as a *muse*, inspiring novel scientific discoveries, while others see it as a *maverick co-scientist*.
- The National Academies of Sciences, Engineering, and Medicine released a report (2022) advocating Automated Research Workflows (ARWs) to accelerate discovery by closing the knowledge Discovery Loop.
- ARWs integrate computation, laboratory automation, and tools from AI in the research process – designing experiments, observations, and simulations; collecting and analyzing data; and learning from the results to inform further experiments, observations, and simulations to accelerate scientific knowledge generation, by orders of magnitude, while achieving greater control and reproducibility in the scientific process.

Dan Atkins, Chair, Expert Committee discusses how these innovations can propel research and scientific discoveries into new frontiers at an accelerated pace in an episode of *InfoFire*.

- This book (2023) is a unique collection that introduces the AI, Machine Learning (ML), and deep neural network technologies that are leading to scientific discoveries from the datasets generated both by supercomputer simulations and by modern experimental facilities.
- The book sets the scene with articles on Data-Driven Science and diverse application domains from astronomy, energy, health, and others.
- Tony Hey in an episode of InfoFire with me (2023) emphasizes the significance of curated, large-scale scientific datasets encompassing both experimental and simulated data.
- He talks about Turning data to discovery and hence the critical importance of data in every discipline to help advance research highlighting for example the Surveillance, Epidemiology, and End Results (SEER) Program of NIH
- And calls for adopting open data and developing a robust infrastructure for **Managing Big Data in Science**

# Artificial Intelligence for Science

A Deep Learning Revolution

editors

Alok Choudhary, Geoffrey Fox & Tony Hey



The image shows the top portion of the AlphaFold website. At the top left, there is a navigation menu with links for 'About', 'Research', 'Technologies', and 'Discover'. Below this, the 'AlphaFold' logo is prominently displayed in a large, bold, blue font. Underneath the logo, the tagline 'Accelerating breakthroughs in biology with AI' is written in a smaller, grey font. A blue button with white text that says 'Explore the AlphaFold Database' is positioned below the tagline. To the right of the main text, there are decorative 3D protein structure models in blue and yellow. The overall design is clean and professional, with a focus on the scientific nature of the project.

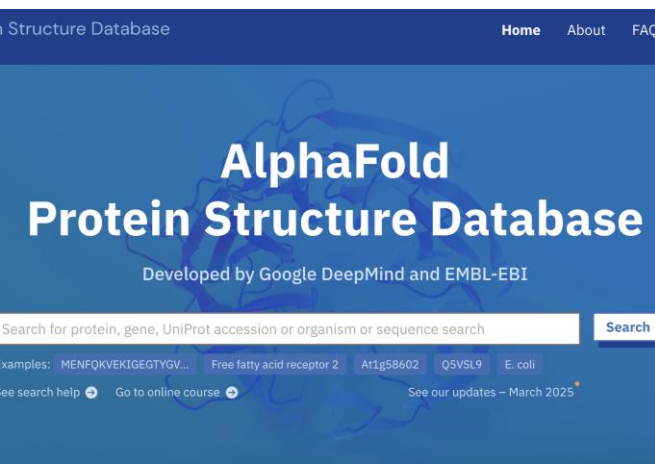
AlphaFold

Accelerating breakthroughs in biology with AI

Explore the AlphaFold Database

Over 2 million researchers in over 190 countries are using the AlphaFold Protein Structure Database to inform their research

Explore the database

The image shows the header of the AlphaFold Protein Structure Database website. The top navigation bar includes 'Home', 'About', and 'FAQ'. The main heading 'AlphaFold Protein Structure Database' is written in a large, bold, white font against a dark blue background. Below the heading, it says 'Developed by Google DeepMind and EMBL-EBI'. A search bar is located at the bottom of the header, with the text 'Search for protein, gene, UniProt accession or organism or sequence search' and a 'Search' button. Below the search bar, there are several search examples: 'MENFOKVEKIGEGTYGV...', 'Free fatty acid receptor 2', 'A1g58602', 'Q5VSL9', and 'E. coli'. At the bottom left, there are links for 'Free search help' and 'Go to online course'. At the bottom right, there is a link for 'See our updates - March 2025'. The background features a large, stylized 3D protein structure in blue.

Structure Database

Home About FAQ

AlphaFold  
Protein Structure Database

Developed by Google DeepMind and EMBL-EBI

Search for protein, gene, UniProt accession or organism or sequence search

Search

Examples: MENFOKVEKIGEGTYGV... Free fatty acid receptor 2 A1g58602 Q5VSL9 E. coli

Free search help Go to online course See our updates - March 2025

# AlphaFold to OpenFold

- In late 2020, DeepMind, a London-based artificial intelligence (AI) company now under Google's parent company, Alphabet Inc., announced the success of its AlphaFold 2 program.
- Talking about Tony joined the chorus of scientists who have hailed remarkable achievements of AlphaFold and credits David Baker, for insisting on the scientific openness of these initiatives.
- One must highlight the commendable initiatives of keeping the code open and launching the AlphaFold Protein Structure Database in 2021
- OpenFold, a fast, memory efficient and trainable implementation of AlphaFold2, is remarkably robust at generalizing even when the size and diversity of its training set is deliberately limited,



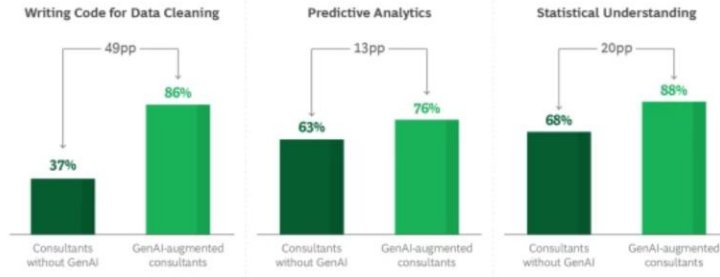


## Future Trends in AI and Productivity

- AI-driven innovation in new industries.
- Hyper-automation: AI, RPA, and IoT integration.
- AI-powered augmentation of human intelligence.
- Global economic shifts due to AI adoption.

## Exhibit 2 - GenAI Significantly Improved Performance in Three Data-Science Tasks

Performance of consultants on tasks outside their capabilities<sup>1</sup>



Sources: Boston University; OpenAI's Economic Impacts research team; BHI analysis.

<sup>1</sup>All scores are normalized so that 100% is equivalent to the benchmark set by the average scores of participating data scientists.



## GenAI Doesn't Just Increase Productivity. It Expands Capabilities.

SEPTEMBER 05, 2024

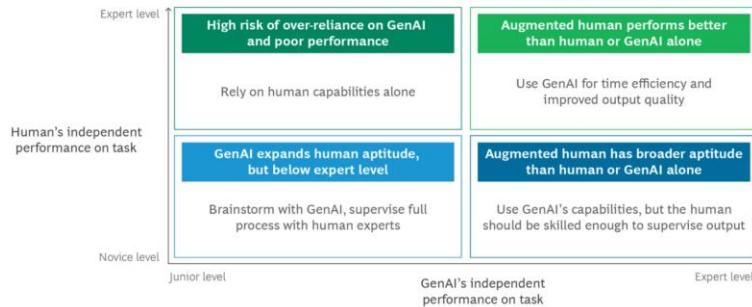
By Daniel Sack, Lisa Krayer, Emma Wiles, Mohamed Abbadi, Urvi Awasthi, Ryan Kennedy, Cristián Arnolds, and François Candelon

READING TIME: 12 MIN

*This is the second major field experiment led by the BCG Henderson Institute designed to help business leaders understand how humans and GenAI should collaborate in the workplace. Our previous study assessed the value created—and destroyed—by GenAI when used by workers for tasks they had the*

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## Exhibit 1 - When and How to Pair Humans and GenAI



Source: BHI analysis.

This Report based on their experiment evidences that AI Augmented Knowledge Workers expanded their capabilities and concluded that **AI is A Powerful Brainstorming Partner**

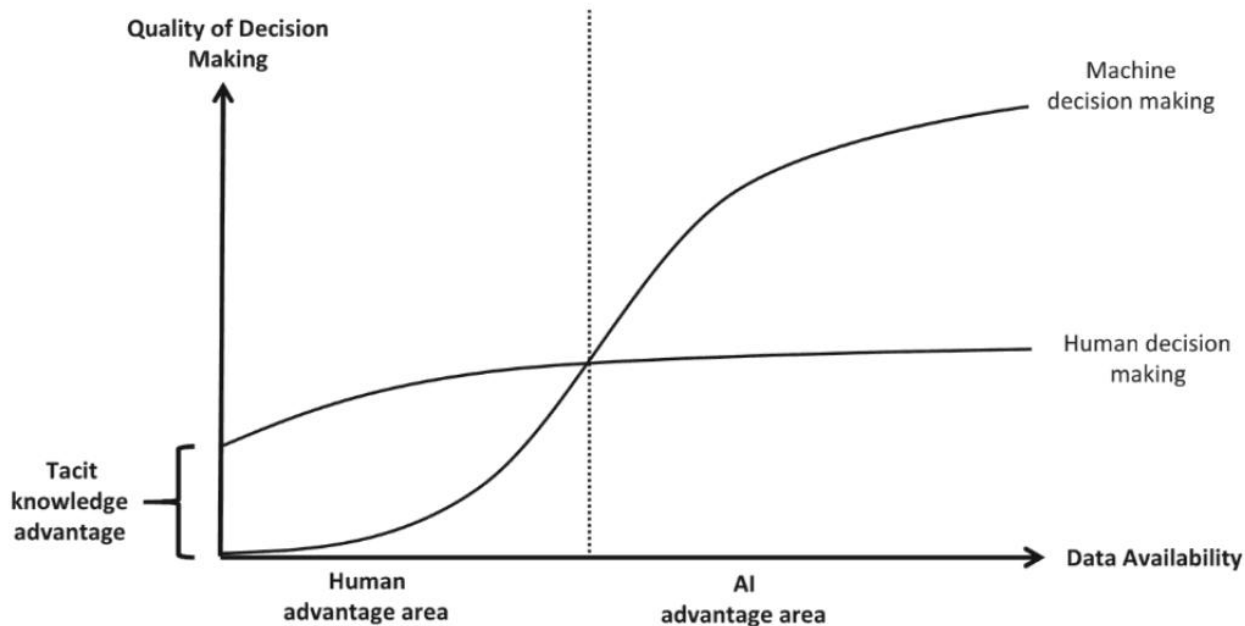


# Adopting and Adapting to AI

Approaches and Evidences

# To AI or Not to AI? Not Even 'When'—But 'Now' and 'How'

- Amidst the data deluge we face, the sheer volume of information needed for decision-making exceeds human processing capabilities.



**Figure 6.2** The impact of data availability on quality of machine and human decision-making.

# Gen AI and Productivity

Working Paper 24-013

## Navigating the Jagged Technological Frontier: Field Experimental Evidence of the Effects of AI on Knowledge Worker Productivity and Quality

Fabrizio Dell'Acqua  
Edward McFowland III  
Ethan Mollick  
Hila Lifshitz-Assaf  
Katherine C. Kellogg

Saran Rajendran  
Lisa Kraymer  
François Candelon  
Karim R. Lakhani

### Key Findings

- *Productivity Enhancement:* Consultants using AI completed 12.2% more tasks on average and finished tasks 25.1% faster compared to the control group
- *Quality Improvement:* AI-assisted consultants produced outputs rated over 40% higher in quality than those without AI assistance



Harvard  
Business  
School

Electronic copy available at: <https://ssrn.com/abstract=4573321>

- A new study on the impact of generative AI on highly skilled workers finds that when artificial intelligence is used within the boundary of its capabilities, it can improve a worker's performance by nearly 40% compared with workers who don't use it.

# Two Approaches to AI Adaptation

## WHAT'S YOUR AI BEHAVIORAL STYLE: CYBORG OR CENTAUR?



**Cyborg behavior**, named for the science fiction human-machine hybrids, describes the way users “intertwine their efforts with AI at the very frontier of capabilities. This strategy might manifest as alternating responsibilities at the subtask level, such as initiating a sentence for the AI to complete or working in tandem with the AI.”

**Centaur behavior**, named for the mythical half-human, half-horse creatures, describes when users “switch between AI and human tasks,” based on their determination of what tasks are best suited for human intervention and which can be handled by AI.



Credit: “Navigating the Jagged Technological Frontier: Field Experimental Evidence of the Effects of AI on Knowledge Worker Productivity and Quality.” Fabrizio Dell’Acqua, Karim Lakhani, Edward McFowland III, Ethan Mollick, Hila Lifshitz-Assaf, and Kate Kellogg.

## Choose your style

# Adapting to Technological Change

- How do we prepare the Workforce for future Productivity challenges ?
- In my view the answer lies in the key findings of the HBS Working paper.
- Workforce has to remember couple of key points from the Two reports:
- AI doesn't just increase productivity but expands it.
- Highly skilled ones can improve their performance 40% more
- So, one needs to deploy to augment their Intelligence, expand capabilities and **AI is A Powerful Brainstorming Partner**

40%

Share

*Generative AI can improve a highly skilled worker's performance by nearly 40% compared with workers who don't use it.*

# Adapting to Technological Change

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AI significantly enhances productivity across industries.



Need for responsible AI policies and workforce adaptation.



The future of productivity depends on human-AI collaboration.



# Data and Collaboration: The Key to the Future

- Strengthen research and innovation by making data openly accessible.
- Open Data and Open Science accelerate discovery and drive productivity.
- Collaboration across disciplines and industries is essential for navigating technological change.



An aerial photograph of a multi-lane highway bridge spanning a large body of turquoise water. The bridge has several lanes in each direction, with white lane markings and a central divider. Several vehicles, including cars and trucks, are visible on the bridge. The water is a vibrant greenish-blue color with visible ripples.

Thank you

Questions?