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AI Adoption in the Business World: Current Trends and Future Predictions

April 2023

Agenda

1. Background and focus areas
2. Current state
3. Risk and Obstacles
4. Future state
5. Key Takeaways & Implementation Guideline

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Background

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Terms & Definitions

“**Artificial intelligence**” - Coined by emeritus Stanford Professor John McCarthy in 1955, was defined by him as “the science and engineering of making intelligent machines”. In other words - AI is the ability of a machine to perform cognitive functions typically associated with human minds, such as learning, reasoning, interacting with the environment, and solving problems.

“**Machine learning**” Machine Learning (ML) is the part of AI studying how computer agents can improve their perception, knowledge, thinking, or actions based on experience or data. For this, ML draws from computer science, statistics, psychology, neuroscience, economics and control theory

“**Automation**” is the conversion of a work process, a procedure, or equipment to automatic rather than human operation or control. Automation does not simply transfer human functions to machines, but involves a deep reorganization of the work process, during which both the human and the machine functions are redefined.

“**Synthetic Data**” is a class of data that is artificially generated rather than obtained from direct observations of the real world. Data can be generated using different methods, such as statistically rigorous sampling from real data, semantic approaches and generative adversarial networks or by creating simulation scenarios where models and processes interact to create completely new datasets of events.

“**Digital Twins**” is a dynamic virtual copy of a physical asset, process, system or environment that looks like and behaves identically to its real-world counterpart. A digital twin ingests data and replicates processes so you can predict possible performance outcomes and issues that the real-world product might undergo.

Sources: Professor Christopher Manning, September 2020 (Stanford University), Michael R. Lowery, Massachusetts Institute of Technology, PwC US, Gartner

Caveats

- There is a lot of hype surrounding AI, and it is crucial to approach the topic with a critical eye. AI is not a panacea for all business problems, and it is essential to have realistic expectations about what it can and cannot do.
- Not many people and companies that claim to use AI actually use AI. Many companies do so as a marketing tactic in order to appear innovative, even if they don't have any actual AI technology in use, or from lack of understanding of what AI is and how it works. We acknowledge the data presented in this study may involve the participation of such companies which could impair the accuracy of the results.
- The study does not offer real distinction between off-the-shelf AI tools (e.g. pre-built software packages such as NLP) that comes with pre-trained models and AI models that require extensive customization and development to work for a specific business use case.
- The data used for this study may not be reflective of current trends, as certain tools were not available when the data was collected (e.g. ChatGPT, Midjourney etc). Also certain trends may shift or change in the intervening years, making the data less relevant or less reflective of the current state of the market as this industry is changing very rapidly.
- Findings from this study may not be generalizable to all contexts, as AI adoption can vary widely depending on the industry, business size, and other factors
- It can be challenging to establish causality in a study such as this, as other factors could be influencing the outcome, so our advice is to treat the outcomes of this study with a degree of caution.

Sources: PwC US, Forrester

Background

> AI is the big one. I don't think Web3 was that big or that metaverse stuff alone was revolutionary but AI is quite revolutionary
>
> **- Bill Gates**

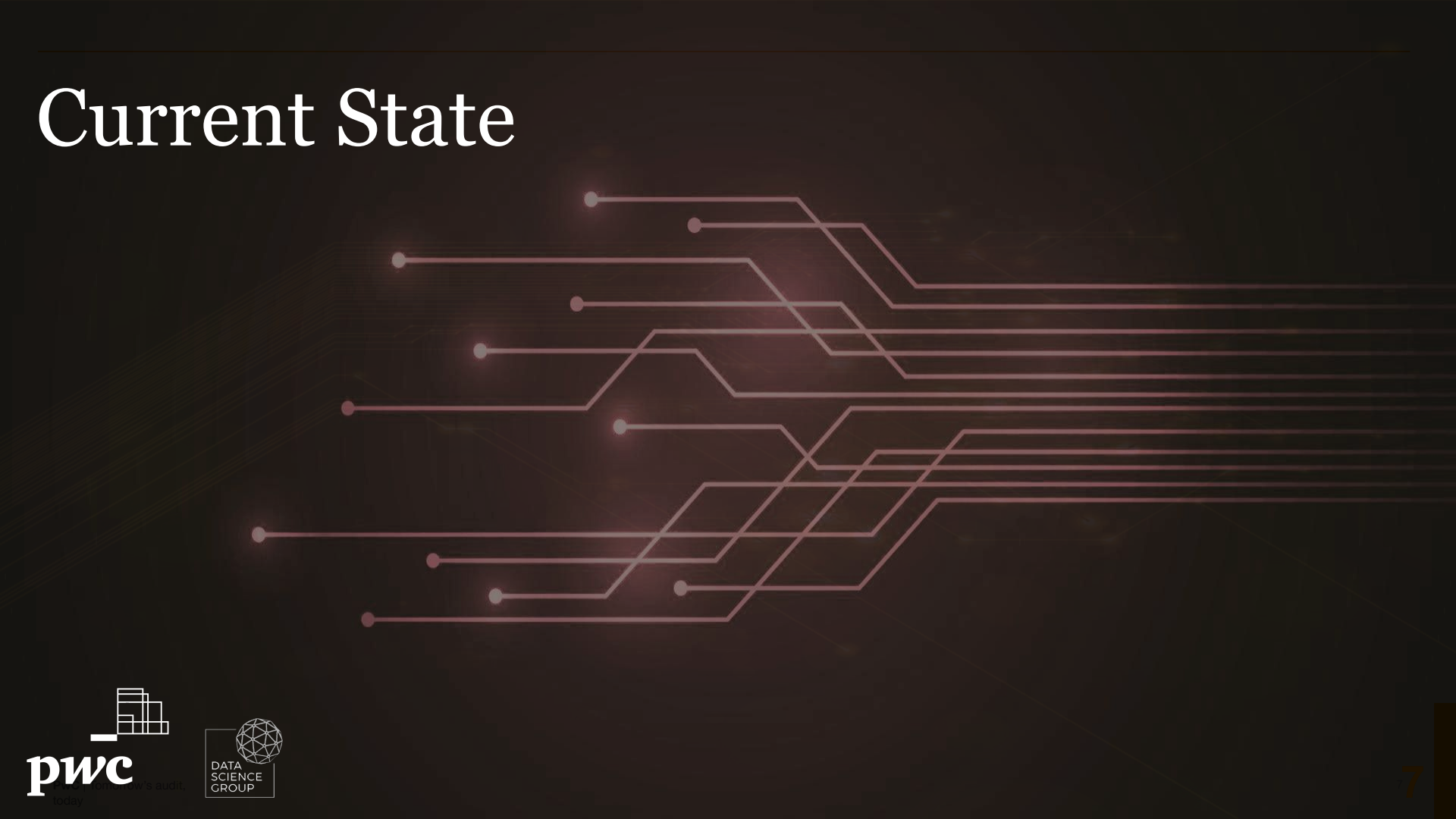
We are all aware of the paradigm shift in the use of AI. Examples such as Netflix recommendations systems, ChatGPT and other chatbots, Generative Art (Text-to-Image/Video), chatbots that impersonate customer services agents online are rising and taking over our day-to-day lives, and companies constantly looking for new ways to exploit the new paradigm. These efforts are the new value creation engines of many leading companies in almost every industry.

The adoption of AI was low during last years because technology and infrastructure supporting technology were adequate and not very useful. However, the tides have changed and we are witnessing increasing adoption in current days. According to Forrester's Data and Analytics Survey (2022) 73% of data and analytics decision makers are building AI technologies and 74% seeing a positive impact from AI technologies in their organization. AI is definitely been starting to be adopted in a wide range of industries, including healthcare, finance, transportation, manufacturing, marketing, education and retail.

We believe that we stand at a very important time in history where AI will play a big role in companies' transformation and daily operation, and the faster companies will be able to embrace the change the more advantage they will have versus their competitors. Given the enormous potential of AI, it is not surprising that adoption of the technology is growing rapidly, so we went to find what is the current and future state of adopting AI technology. The study aims to provide an overview of the current state of AI adoption, the benefits and challenges, and the future trends and predictions for AI adoption.

Sources: PwC US, Forrester

Current State



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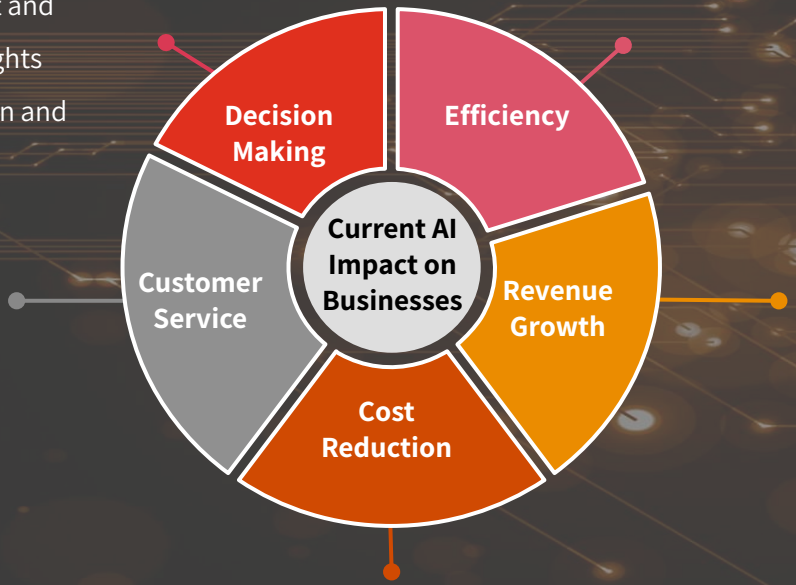
Current Impact Of AI In the Business World

Data analysis efforts improvement and provision of better and faster insights that can promote strategic decision and overall performance

Scaling and supporting companies' customer services, from chatbots and virtual assistants which are equipped with NLP techniques, to predictive and sentiment analytics



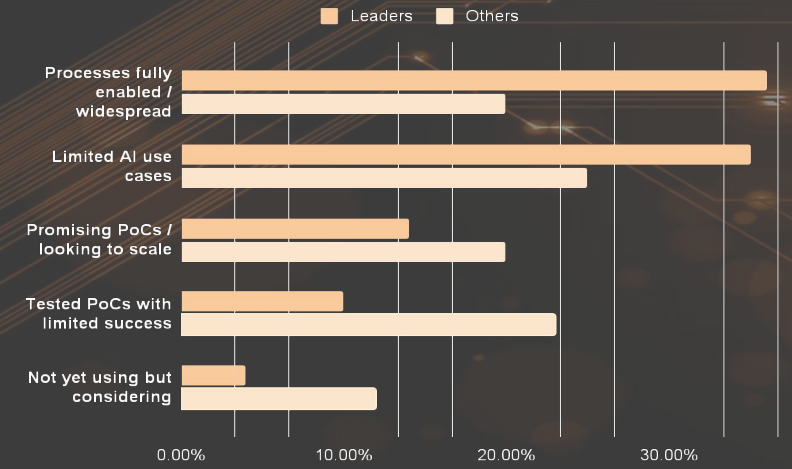
Cost reduction made available by automating manual tasks and reducing redundant labor costs

Streamlining processes and reducing the time and resources required to complete certain tasks

Business are able to develop new products and services faster, or enter new markets. Companies may be able to upsell in more efficient ways with personalized offers or suggestions

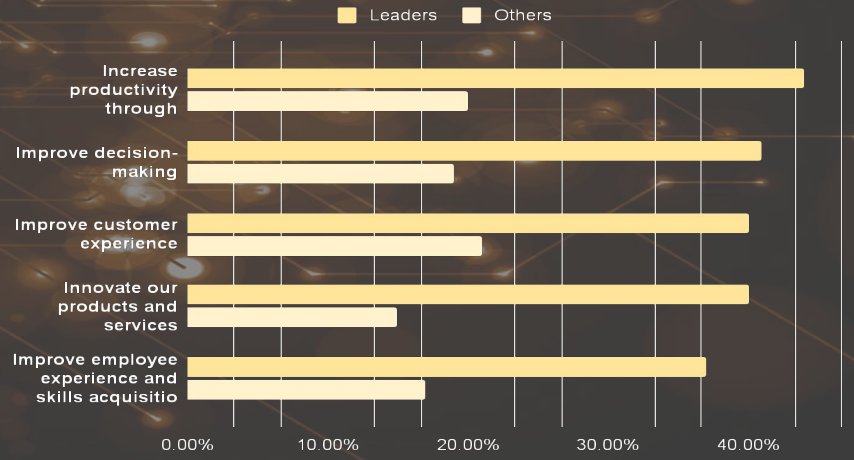
AI Adoption and Areas Of Focus

Companies that are advanced with AI (“Leaders”) are pioneering widespread adoption of AI in comparison to other companies in the market



Q. To what extent is your company looking to integrate AI technologies into its operations? Source: PwC 2022 AI Business Survey, March 2022: Leader base of 364; Other base of 631

Companies are more focused on leveraging AI for productivity, decision making, customer experience, product/services innovation and employee experience



Q. To what extent is your company looking to integrate AI technologies into its operations? Source: PwC 2022 AI Business Survey, March 2022: Leader base of 364; Other base of 631

Sources: PwC US

Which Industries Currently Utilize AI the most?

Companies reported they are exploring AI

Companies reported using AI in their business

Financial Services

Fraud detection, risk management, and investment analysis

Tech

Machine learning, cognitive computing, and robotics

Healthcare

Patient diagnosis, treatment planning, and drug development

Automotive & Assembly

Route optimization, demand forecasting, and autonomous vehicles

Retail

Personalized recommendations, and automated inventory management

Sources: PwC US, Forrester, IBM

Adoption Rate

Industry/Function	HR	Manufacturing	Sales & Marketing	Product/service development	Risk	Service operations	Strategy & corporate finance	Supply chain management
Automotive & Assembly	11%	26%	20%	15%	4%	18%	6%	17%
Retail	2%	18%	22%	17%	1%	15%	4%	18%
Financial services	10%	4%	24%	20%	32%	40%	13%	8%
Healthcare/pharma	9%	11%	14%	29%	13%	17%	12%	9%
High tech/telecom	12%	11%	28%	45%	16%	34%	10%	16%
Cross Industry average	9%	12%	20%	23%	13%	25%	9%	13%

Companies that use AI are motivated by three factors: the ability to **cut expenses, develop faster**, and **grow profitability**. However, each industry's approach to AI applications, as well as its problems and outcomes, may differ

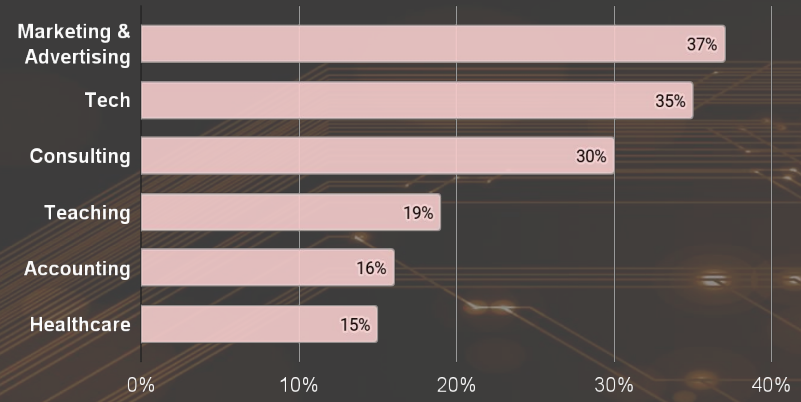
66% Plan/execute applying AI for sustainability goals

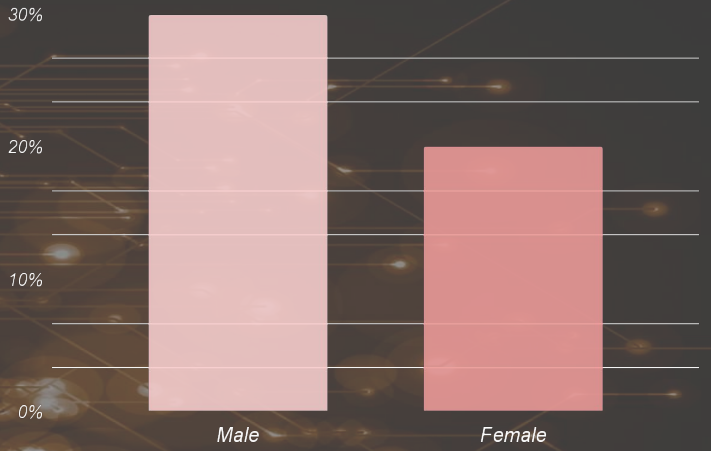
53% Utilizing AI tools for better customers experience

54% Benefits from using AI to automate IT, business or network processes, including cost savings and efficiencies

Sources:
Statista 2023

AI Adoption In Practice By Categories (1/2)





Gen Z

29%

Gen X

28%

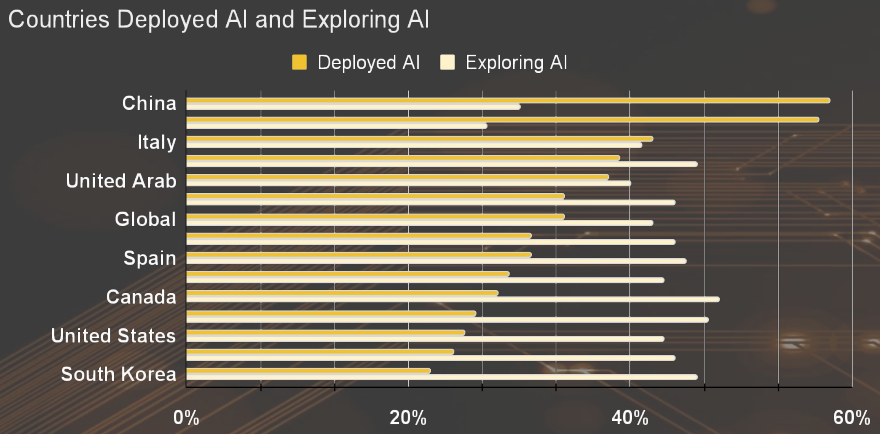
Millennials

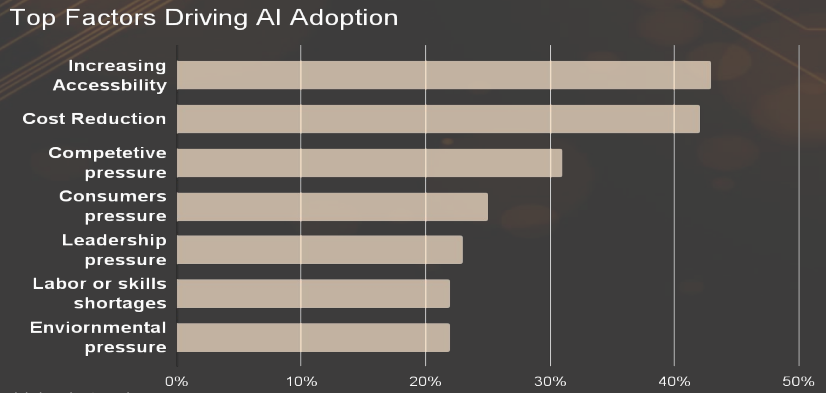
27%

Younger generations tend to adopt AI technology in their professional life **easier and faster**

Sources: Fishbowl

AI Adoption In Practice By Categories (2/2)





Sources: IBM Global AI Adoption Index 2022, Forrester

Key Adoption Considerations

Companies are currently or planning to apply AI to address their sustainability goals

66%

Companies see benefits from using AI to automate IT, business or network processes

54%

Global AI spending coming from the US

74%

AI spend out of the global total software spend by 2025

6%

The Global AI Index

Country	Talent	Infrastructure	Operating Environment	Research	Development	Government Strategy	Total Rank
USA	1	4	35	1	1	17	1
China	24	1	6	2	2	2	2
United Kingdom	3	23	24	5	11	11	3
Canada	7	15	5	10	10	1	4
Israel	5	29	14	7	9	45	5
Singapore	4	8	55	4	14	15	6
South Korea	28	6	32	12	3	7	7
The Netherlands	6	9	10	15	8	33	8
Germany	11	13	30	6	12	10	9

Sources: "Israel Innovation authority"

Current availability of AI technology

Perception-based AI

Computer Vision	Analyze and understand visual data (e.g. images)	viso.ai
NLP	Understand and analyze human language (e.g. text)	the Gist
OCR	Recognize and extract text from an image or scanned document	Adobe
Advanced Recognition	Build interfaces for applications to understand text or speech	amazon LEX

Cognition-based AI

Decision Making	Analyze and interpret data to support business strategy decisions	Aladdin by BlackRock
Predictive	Understand, learn and percept data to make predictions and trends	GONG
Optimization	Find best solutions to problems with various techniques (e.g. ML models)	google/vizier
Generative	Create and generate new information and context based on user input and large datasets	OpenAI ChatGPT

Current Benefits

Customer Experience
Improved customer experience with faster delivery

Scale and Efficiency
New levels of productivity and cost savings through automated processes

New Ways of Working
Re-thinking of the operating model to enable intelligent delivery

AI, in its current state, **is primarily at the feature level rather than at the infrastructure level**. AI technologies are being used to add new features to existing products and services, such as voice recognition or image recognition. These features are built on top of existing infrastructure and use AI algorithms to perform specific tasks. While there have been some attempts to integrate AI more deeply into the infrastructure level, such as with edge computing, the majority of AI usage is still at the feature level.

Current Prominent Local AI Use Cases

- Automation of IT processes
- Security and Threat Detection
- Marketing and Sales
- Business Analytics or Intelligence
- Fraud Detection
- Financial Planning & Analysis
- AI Monitoring & Governance
- Conversational AI or Virtual Assistants

Sources: IBM Global AI Adoption Index 2022

Risks and Barriers

Biggest Challenges when Adopting AI

Fragmented Technology Stack No standard for deploying AI systems. The AI community has not converged yet on formats and interfaces across the AI/ML stack

Misguided Strategy Performance cannot be guaranteed on an ongoing basis. Lack of clear definitions of business goals and inflated expectations

Evolving AI Regulation The technology environment is rapidly changing. Lack of GRC (government, risk & compliance) standards

AI Methodology The definition of AI's proven playbooks, including designs, best practices, and technology pipelines.

AI-Business Alignment Clear definitions of KPIs and KRis which are subject to ongoing assessment, evaluation and re-design

New Business Requirements Identifying new requirements and insights as they evolve. Embrace uncertainty

Source – Data Science Group

Current Regulation Highlights

Regulation	EU AI Act / GDPR	US Regulation	Future Regulation
Status and Objective	Proposed legislation, which aim to accelerate the development and uptake of AI, and to ensure that its use is according to EU values	No direct legislation as of now. Initial approach to AI regulation emerge, focused on specific AI-use cases	Future regulation may emerge in 2023-2024, mainly pertaining to model bias, user rights, transparency and AI governance
Highlights	➔ The focus is on ethical, legal, and technical aspects of its use. ➔ For high-risk AI applications there are additional requirements also for a conformity assessment. However, the AI Act has no specific guidelines on how such conformity shall be demonstrated in practice. ➔ The GDPR requires heightened compliance when companies use technology like AI to solely make automated decisions that produce "legal … or similarly significant" impacts on a consumer	➔ New York joined a number of states, including Illinois and Maryland, in regulating automated employment decision tools (AEDTs) that leverage AI to make, or substantially assist, candidate screening or employment decisions ➔ The Equal Opportunity Employment Commission (EEOC) launched an initiative on "algorithmic fairness" in employment	➔ Several states in the US have passed general data privacy legislation that goes into effect at various times in 2023. These laws contain provisions governing "automated decision-making," which includes technology that facilitates AI-powered decisions ➔ AI-focused bills have been introduced in Congress ➔ AI regulation appear to be potentially emerging from the Federal Trade Commission (FTC)

Types of Risks

- Lack of accountability
- Rogue AI detection

- Adversarial attacks
- Privacy protection

- Reputational
- Financial performance
- Legal compliance

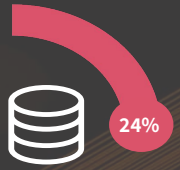
- Errors
- Bias & Discrimination
- Opaqueness / Lack of traceability

- Missinformation
- Public manipulation

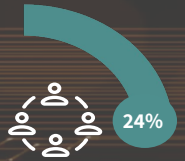
- Job displacement
- Enhancing inequality

What's Hindering AI Adoption?

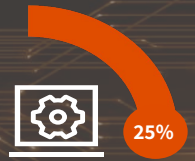
Main barriers of AI adoption reported by companies



Too much data complexity

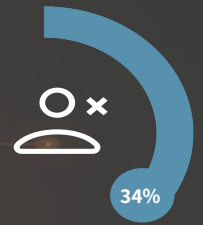


Projects are too complex or difficult to integrate and scale



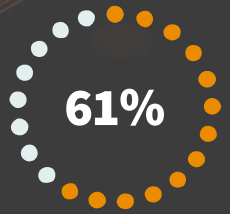
Lack of tools or platforms to develop models

Price is too high



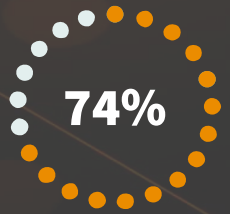
Limited AI skills, expertise or knowledge

Majority of organizations haven't taken steps to ensure trustworthiness and responsible AI adoption



Can't explain their AI-powered decisions

Not tracking performance variations and model drift



Not making enough efforts on reducing data bias

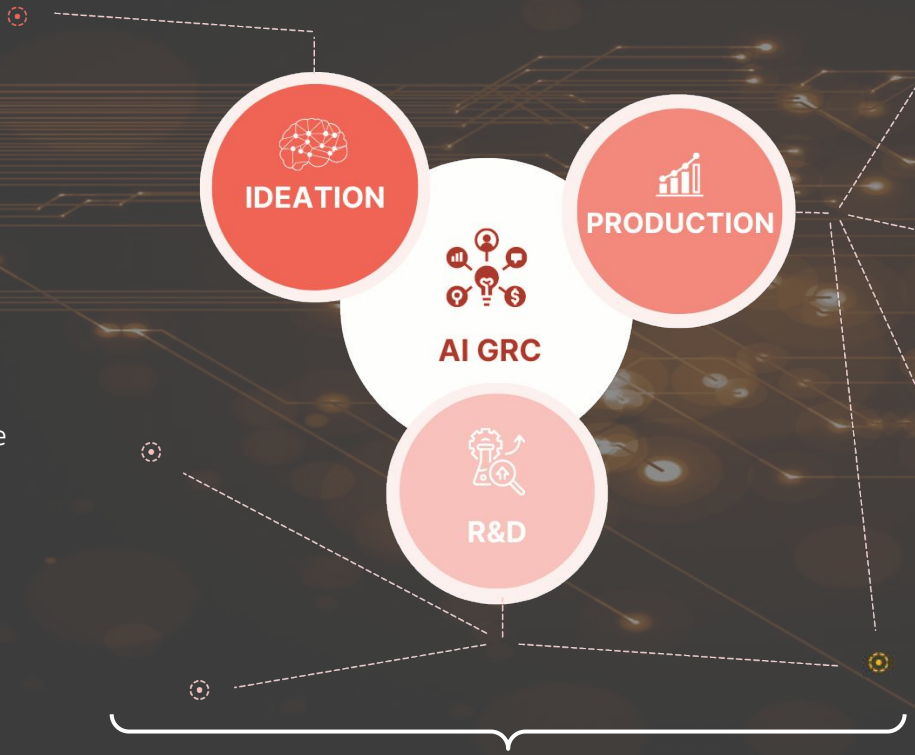
Sources: IBM Global AI Adoption Index 2022

AI Risk Categorization

- Business Problem
- Formulation Anatomy of DS Process
- Uncertain Realm
- Experimental/Exploration

- Data Quality Dimensions & Granularity
- Imbalanced Datasets
- Data Lineage & Provenance
- Data Preprocessing & EDA

- Model Selection/Architecture
- Model Inference latency
- Model Hyperparameters Tuning
- Overfitting/Generalization (OOD)



- Datasets shift/skew
- Patterns of Drifts
- Structural Changes
- Generative Changes

- Datasets versioning
- Models versioning
- Pipeline versioning
- Evaluation measures versioning

- Regulation
- Fairness / Bias
- Auditability
- AI Cybersecurity

- Algorithm Aversion
- Transparency
- Causality

Source – Data Science Group

How to Mitigate Potential Risks?

Identify unique vulnerabilities

Determine where bias could creep into your datasets and algorithms and where it could cause major damage

Control your data

Pay special attention to issues in historical data and data acquired from third parties. This includes biased correlations between variables.

Keep governance up to speed

Governance should be continuous and enterprise-wide. Set frameworks, toolkits and controls to help spot problems before they may proliferate.

Validate independently - and continuously

You can use wither an internal independent team or a third party to analyze your algorithms for fairness.

Diversify your team

Building diverse teams helps reduce the potential risk of bias falling through the cracks. People from different racial and gender identities and economic backgrounds will notice different biases.

Sources: "Understanding algorithmic bias and how to build trust in AI" - PwC US

Auditing & QA of AI Models for Verified Development & Deployment

AI Audit Modeling

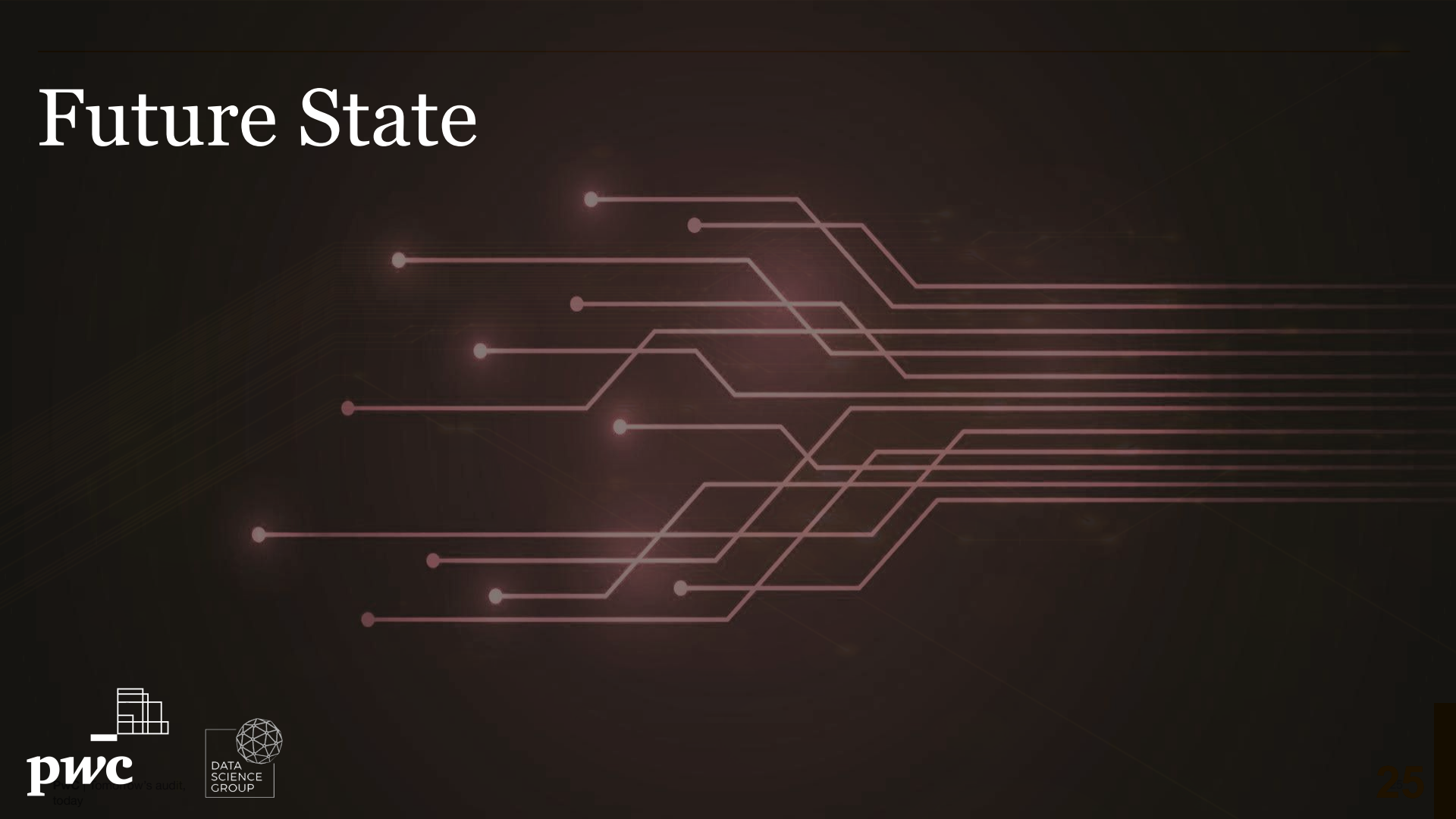
Auditing AI models before deployment is **crucial** to avoid unintended consequences. As organizations deploy AI systems for core functions, they face new risks due to **statistical uncertainty**, which can result in dire consequences and business failures. Without clear **AI standards, audits, risk management strategies, and GRC standards**, organizations can mitigate major AI disasters, as already seen in many major institutions.

AI Audit Process

The AI auditing process formalizes a pipeline to **minimize potential AI risks and human error** in decision-making processes. It leverages domain expertise to validate AI systems, applications, technology infrastructure, and standards for quality, reliability, and consistency. The process ensures **alignment with business and governance standards**, generating human-readable specifications that are useful to end-users.

Source – Data Science Group

Future State



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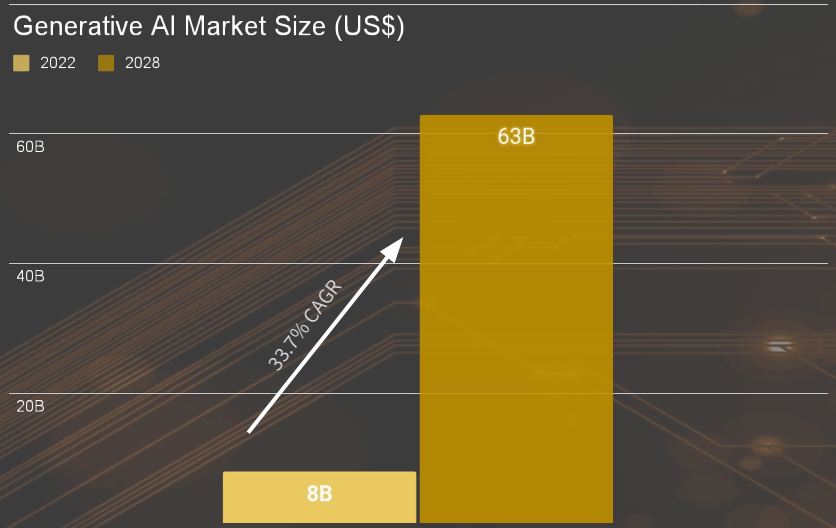
The Rise of Generative AI



Three major areas that will be deeply impacted by generative AI in the near future

- New Drug Discovery
- Material Science
- Financial Services

Companies growth opportunities in the AI generative space: what's next?

New product and services creation

- Idea generation
- Prototyping
- Market Research
- Customization
- Process Optimization

Faster decision making

- Predictive Analytics
- Customer Insights
- Risk Assessment
- Processes Automation

Enhanced customer demand forecasting

- Inventory Optimization
- Sales Forecasting
- Supply Chain Optimization

Improve efficiency of marketing campaigns

- Personalization
- Better Customer Segmentation
- Ad Optimization
- Faster Content Generation

Sources: Forrester

Near-Future Value Capture Opportunities

Decision Making

Computer-based processes that uses AI to mimic and simulate real-world scenarios or system, allowing for the testing and optimization of various strategies, outcomes, and performances.

Simulation

The ability to process significant amount of historical data and produce and analyze future optional decision trees scenarios. Adoption rates are significant when it comes to areas of technology, operations and maintenance, and also CX and strategy.

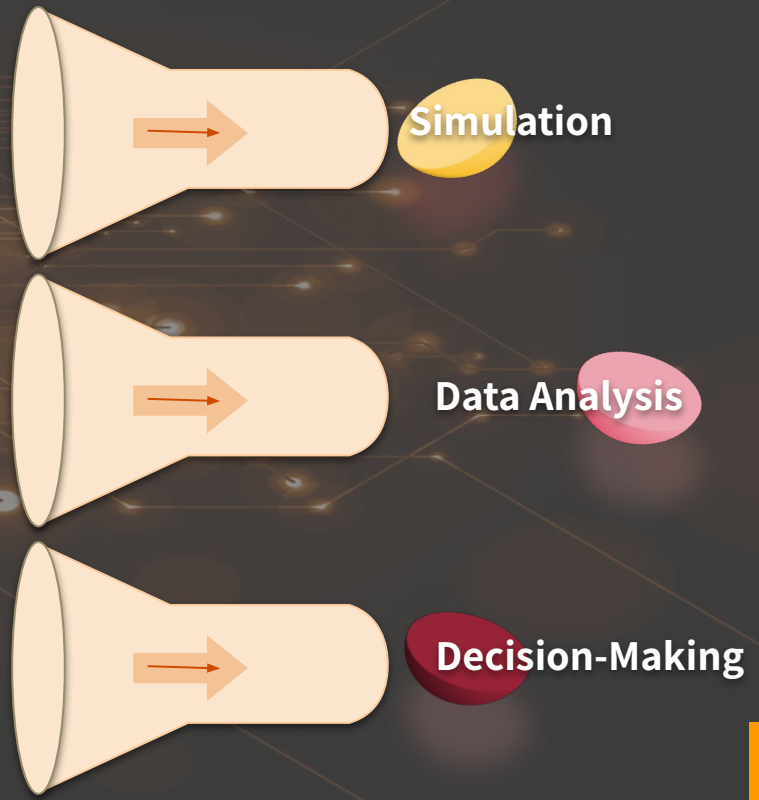
Data Analysis

AI nowadays can help automate and streamline the data analysis process (e.g. cleansing) as well as significantly improve predictive models and analysis of unstructured data.

Sources: PwC US

Seize Current AI Value

Subject Matter	Value Capture Proposal
Synthetic data	ML models require huge amounts of data, which simulation models can create. Synthetic data can turbocharge other AI and analytics initiatives.
Digital Twin	To help make sense of your various data sets in the context of your business, consider making Digital Twins a platform capability.
Predictions and Scenario modeling	Simulating real-world scenarios or systems, allowing for the testing and optimization of various strategies, outcomes, and performances.
Labor cost	Utilize AI abilities to clean and organize your data which can save you time and resources put into this effort.
Data Specialist	Bring your data specialists (e.g. Data Scientists, Engineers) together before initiating any endeavour in order to align methodology and goals.
Other immersive technologies	Consider combination between AI and other immersive technologies and especially Blockchain related technology which can help overcome data related problems (e.g. bias, privacy, security).

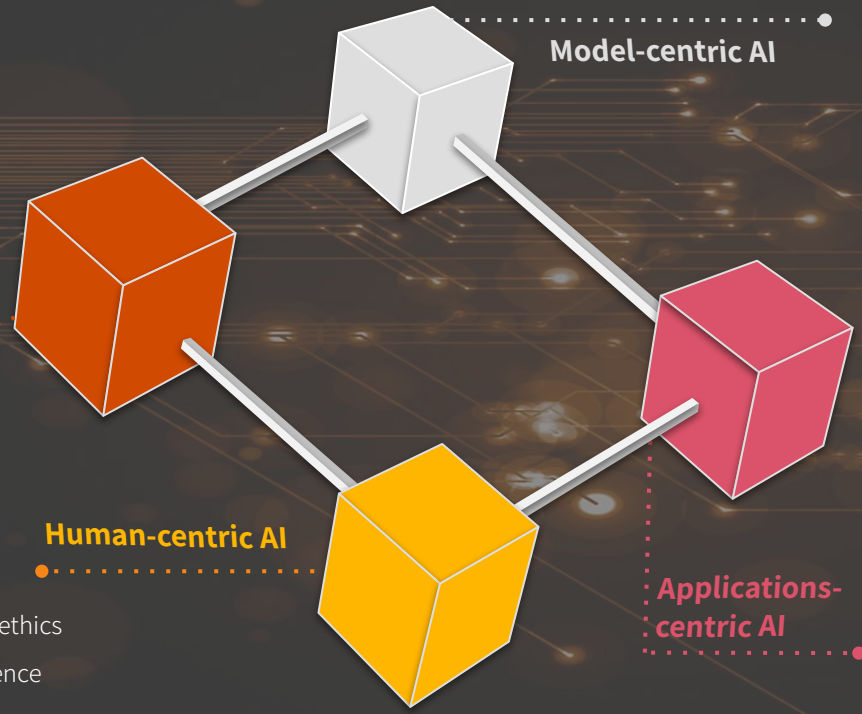


Sources: PwC US

Where Will Adoption Increase Most?

Synthetic Data

Massive increase in adoption as synthetic data, mainly to tackle cost and timing problems pertaining to ML development.



Fusion of AI techniques (composite AI)

Expected to reach mainstream adoption in two to five years, the business benefits of composite AI are likely to be transformational, enabling new ways of doing business across industries that will result in major shifts in industry dynamics.

AI trust, risk and security management

Organizations will need to integrate digital ethics into their AI strategies to bolster their influence and reputation among customers, employees, partners and society.

Improved Business Cases

Decision intelligence and edge AI are both expected to reach mainstream adoption in two to five years and have transformational business benefits.

Sources: Gartner

Key Takeaways & Implementation Guideline

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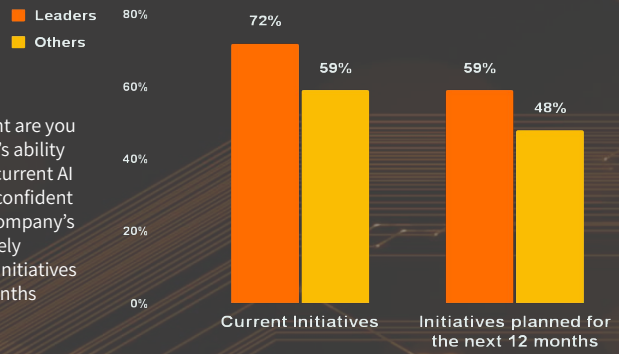
ROI Measurement Considerations



Qs. How confident are you in your company's ability to Assess ROI of current AI initiatives? How confident are you in your company's ability to accurately Predict ROI of AI initiatives in the next 12 months

Companies are now increasingly able to predict AI implementation ROI thanks to new assessment methods. These can capture not just "hard" returns, such as increased productivity, but also "soft" costs, such as new hardware spending

Hard Returns

- ❑ Time Savings
- ❑ Cost Savings
- ❑ Productivity Increase
- ❑ Revenue Increase

$$ROI = \frac{\text{Benefits / Returns}}{\text{Investment Costs}}$$

Soft Returns

- ❑ Better Experience
- ❑ Talent Retention
- ❑ Team Agility (capabilities)

Hard Costs

- ❑ Licenses
- ❑ Resources

Soft Costs

- ❑ Data Investments
- ❑ Compute and Storage
- ❑ SME (Subject Matter Experts)
- ❑ Data Science training

Sources: "Solving AI's ROI problem. It's not that easy" - PwC US

Labor Considerations – Human-Centric AI

Despite AI talent shortage, companies that take **holistic approach to AI** are far more advanced than those taking a piecemeal approach. Such companies also 1.5x more likely than other companies to plan on leveraging more third-party vendors with their scalable AI workforce.

Highest value use of AI in the labor market today is to **help people to do better work**, reducing the press to fill hard-to-fill positions

Reducing the need for rote work will make employees life more easier and more engaging

The AI talent shortage can be mitigated by taking in-house specialists that possess some of the skills you need, and provide them with the rest

Organizations will use AI to address labor or skill shortages in three main ways

65% Reducing manual or repetitive tasks

50% Increasing employee Learning & Development

45% Improving recruiting and human resources processes

Sources: IBM Global AI Adoption Index 2022, PwC US

The Future of Working with AI - Key Takeaways

Ethics & Governance

- Algorithmic and data biases will likely be regulated in the near future and will create uncertainty regarding usage of certain AI models
- Increased AI models regulations will force change in many companies' systems and infrastructure
- Applications of AI will not be fully implemented into enterprises until business cases and expected ROI will be fully understood
- Industries with more consumer regulatory pressure will have lower AI adoption rates
- AI governance will likely join cybersecurity as a board-level topic

Trends

- AI is recession-resilient and continued AI investments will continue in 2023, particularly among business impacted by economic and supply chain disruptions
- In 2023 low/no code AI tools will be more involved in the software development lifecycle
- Image editing is going to be changed dramatically

Workforce

- In the short term - AI will free up employees to focus on value-add tasks and will improve job satisfaction
- AI applications still require human supervision and therefore it is unlikely that we will see dramatic HR changes in the near future, except certain functions

Sources: World Economic Forum. IBM Global AI Adoption index 2022, Source:The state of Machine Learning at the end of 2022 (cnvrg.io)

The Future of Working with AI - Key Takeaways

Management

- Management's decision making processes will not change significantly in the short term
- 25% of tech executives (e.g. CTO/CIO) will report to board/committee on AI governance

Additional Opportunities

- Big opportunities of utilizing AI exist in M&A, the process itself and also ESG matters which companies invest a vast amount of time and resources into them both
- AI can improve and transform the way companies manage their databases and documentation

Adoption

- AI adoption will probably still remain low in 2023
- 10% of Fortune 500 enterprises will generate content with AI tools in 2023
- Company's ability to completely change its processes will be hard, and therefore we expect adoption to be slow. It will be likely to be easier for companies to integrate AI into their core processes if they can spin off certain functions or form brand new business units
- AI models still considered as black box for non-technological employees which will require training and upskilling
- AI infrastructure challenges will surpass data associated issues as the biggest challenge for scaling AI/ML

Sources: Experts Interviews, PwC Israel, Forrester Predictions 2023: Artificial Intelligence, run:ao 2023 state of AI Infrastructure

Implementation Do’s and Don'ts

AI tools tend to be highly accurate, but they are definitely not perfect and can make bizarre mistakes. Maintaining **human oversight** during the implementation and afterwards is crucial to **ensuring quality,** both for model training and for the final correction of the output in downstream processes. Leaders must stay vigilant about the potential risks and cognizant of the need for proper training and corporate governance

Action	Implementation Guidelines
Define the Problem	• Relevant **data requirements** should be identified as a first step, then evaluate the sources currently available • **Success criteria** should be clearly defined and be as measurable as possible • Stakeholders should be involved in the process of defining the problem (inc. external stakeholders and customers)
Develop Training Program	• The program should be focused on digital and analytic understanding, awareness and understanding of the flaws and advantages of the tools • **All employees will need to be upskilled (inc. CEO)** • Make sure employees understand **basic concepts of AI technologies** • Companies should ensure that employees are conversant with current technologies and this transformation will take hold only if the entire workforce is brought along
Anticipate Impact	• Anyone for whom a substantial portion of daily tasks will essentially be eliminated should be monitored (*that is the reality of automation) • The message to communicate to such employees is that **AI will free them to focus on harder-to-solve** problems which demand human judgement or creativity

Sources: PwC US

Implementation Do’s and Don'ts

Action	Implementation Guidelines
Offer Incentives	• **Tactical level incentives** to use AI tools and the new platform can create **better engagement** • Incentives are dependant on **corporate culture**, but should include **KPIs for performance reviews**, bonuses or coupons • Employees will be compelled when they start seeing their **productivity enhanced**
Promote Cultural Change	• Appoint **top-down champions** who consistently communicate the benefits of the AI implementation • Communicate the message that using AI tools is not only good for customers but also for the **company’s growth** • **Build trust** by focusing on competence, consistency, dependability and transparency
Ensure Safe and Trustworthy Use	• Make sure **compliance with relevant regulations** and appropriate requirements • Understand the **background technology** behind the AI tools • Develop **ethical** and user policies • Establish **internal audit** team to monitor abusive, illegal and/or inappropriate usage
Establish Platform	• The platform should combine data management, automation tools, and AI applications, and **keep people at the loop** • The platform could be **enterprise-level portal**, wherein data could be stored and exchanged, and applications uploaded and downloaded • The platform should be **accessible to all employees** and be receptive to employee-led innovations • Make sure the democratization of these powerful technologies are **utilized responsibly**

Sources: PwC US