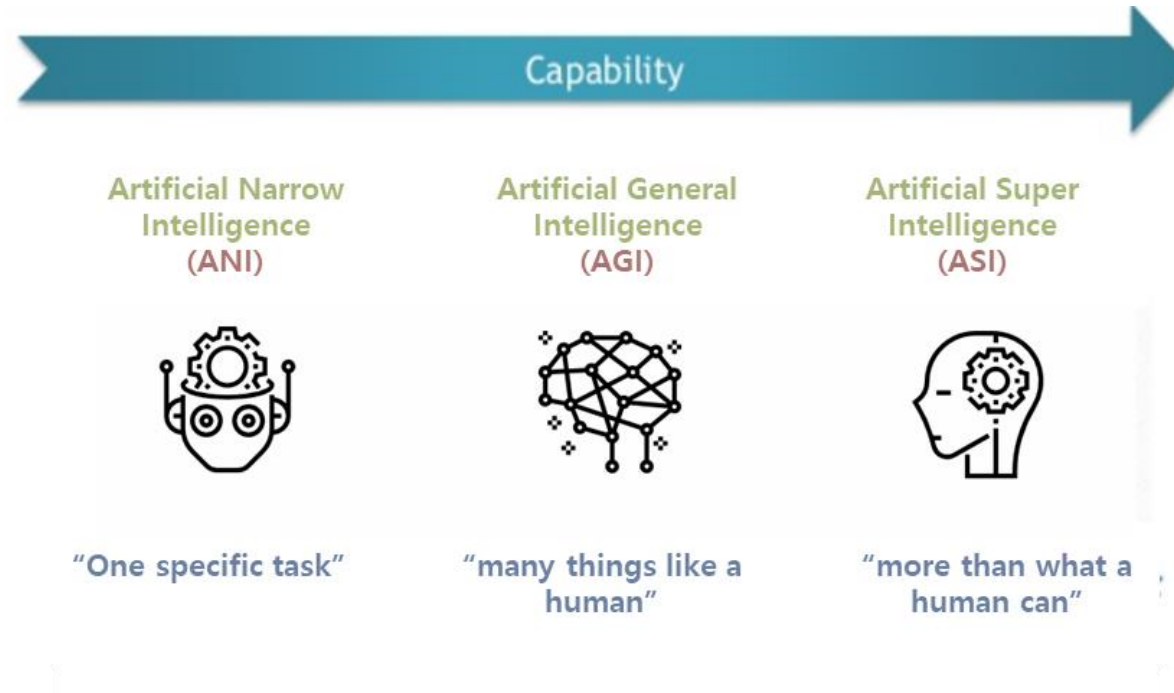


I. AI 개요와 확산

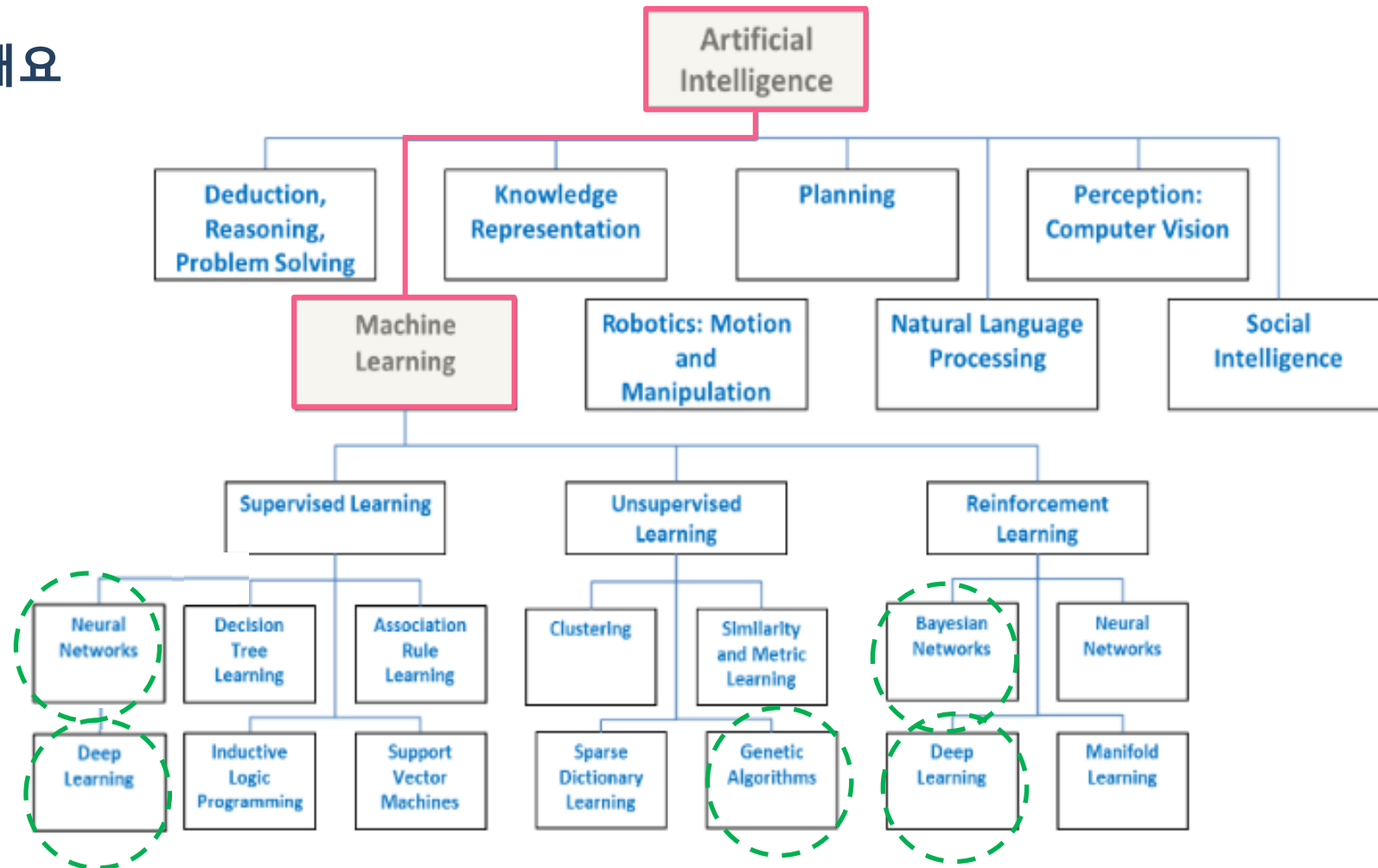
- AI 개요



- '약인공지능(ANI)', '범용인공지능(AGI)', '초인공지능(ASI)'
- ANI: 주어진 데이터 내에서 주어진 문제를 해결하는 AI
- AGI로의 진입 가속화 중

I. AI 개요와 확산

- AI 개요



- 참고: 딥러닝은 AI기법의 한 종류, Feature 추출 등에 비선형 정보 처리 layer를 다수로 이용하는 테크닉
- 2006년, Jeffrey Hinton 교수, "A fast learning algorithm for deep belief nets"

I. AI 개요와 확산

- Scaling Laws (Open AI, 2020)

- 컴퓨팅 리소스, 데이터, 모형 크기를 늘릴 수록 성능 개선
- 새로운 능력이 생겨남 (Emergent Abilities)

Scaling Laws for Neural Language Models			
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Abstract

We study empirical scaling laws for language model performance on the cross-entropy loss. The loss scales as a power-law with model size, dataset size, and the amount of compute used for training, with some trends spanning more than seven orders of magnitude. Other architectural details such as network width or depth have minimal effects within a wide range. Simple equations govern the dependence of overfitting on model/dataset size and the dependence of training speed on model size. These relationships allow us to determine the optimal allocation of a fixed compute budget. Larger models are significantly more sample-efficient, such that optimally compute-efficient training involves training very large models on a relatively modest amount of data and stopping significantly before convergence.

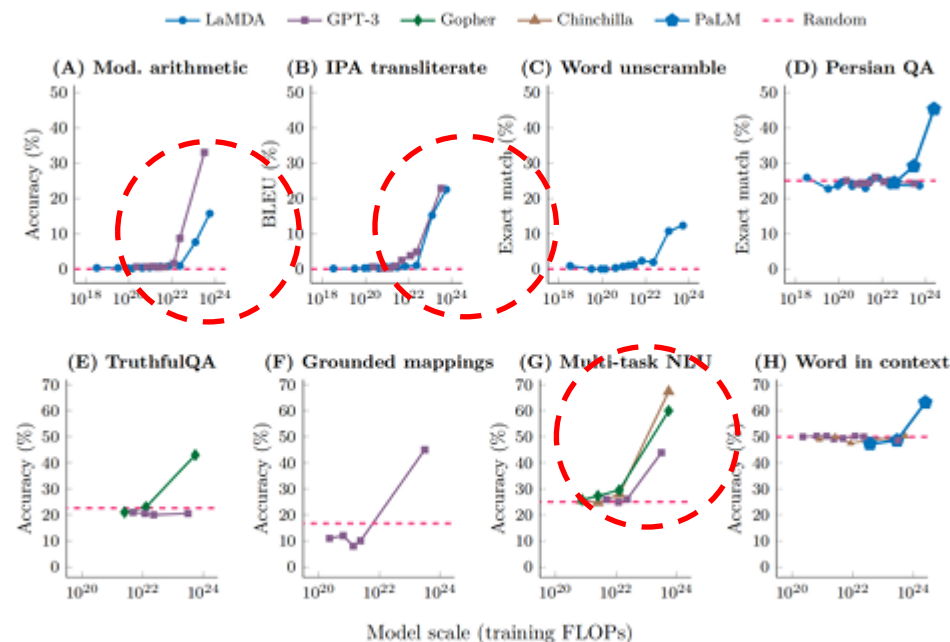


Figure 1: Emergent abilities of large language models. Model families display *sharp* and *unpredictable* increases in performance at specific tasks as scale increases. Source: Fig. 2 from [33].

I. AI 개요와 확산

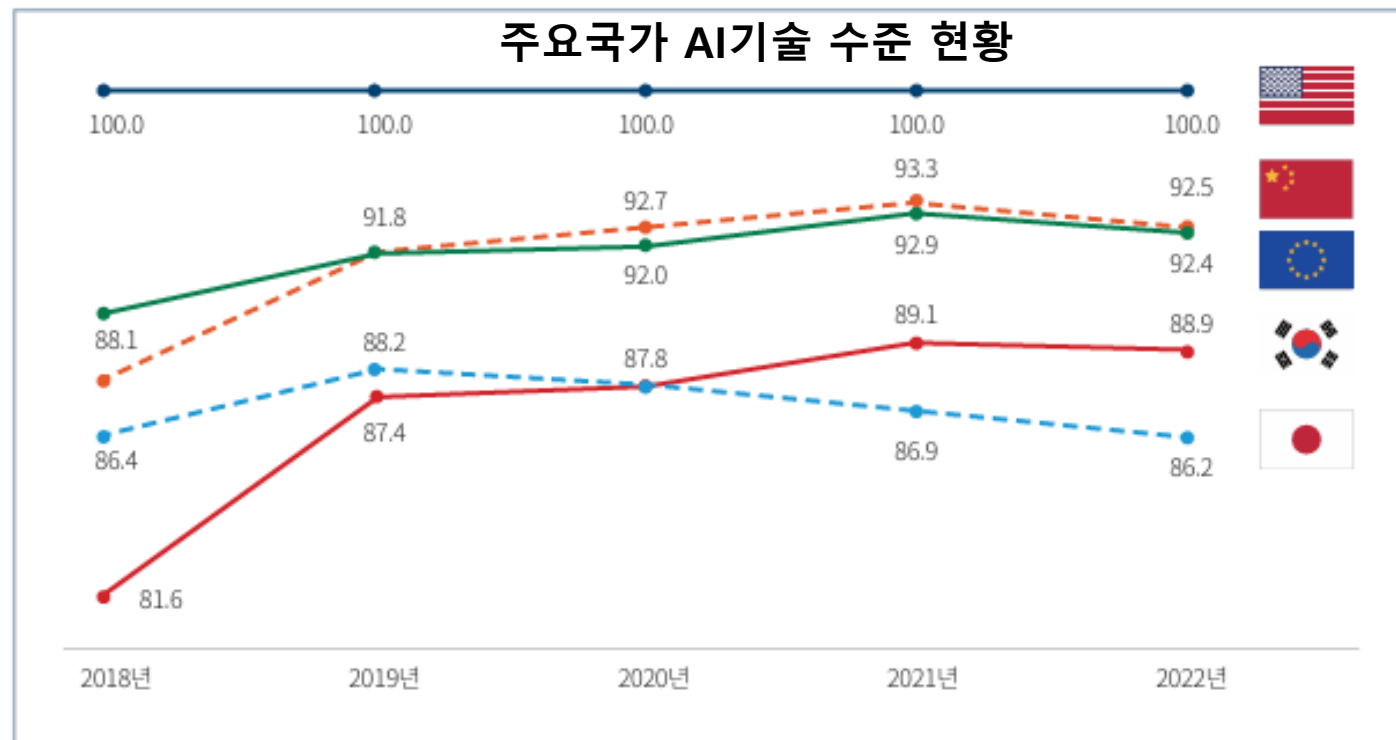
• AI 역량 비교

- 주요 국가 중 기술 수준이 빠르게 높아지고 있음
- 주요 국가 대비 여전히 기술 격차 존재

(단위: %)

국가	2018년(A)	2019년	2020년	2021년	2022년(B)	증감치(B-A)
한국	80.5	86.2	87.2	87.7	88.0	7.5
미국	100.0	100.0	100.0	100.0	100.0	0.0
일본	86.4	87.2	87.2	85.6	85.7	-0.7
중국	86.8	90.8	92.0	92.0	92.0	5.2
유럽	92.0	93.3	94.3	95.7	95.7	3.7

출처: 정보통신기획평가원, 「ICT 기술수준조사 및 기술경쟁력분석 보고서」 및 「ICT 기술수준조사 보고서」, 각년도 연구자 재구성.



출처: 정보통신기획평가원, 「ICT 기술수준조사 및 기술경쟁력분석 보고서」 및 「ICT 기술수준조사 보고서」, 각년도 연구자 재구성.

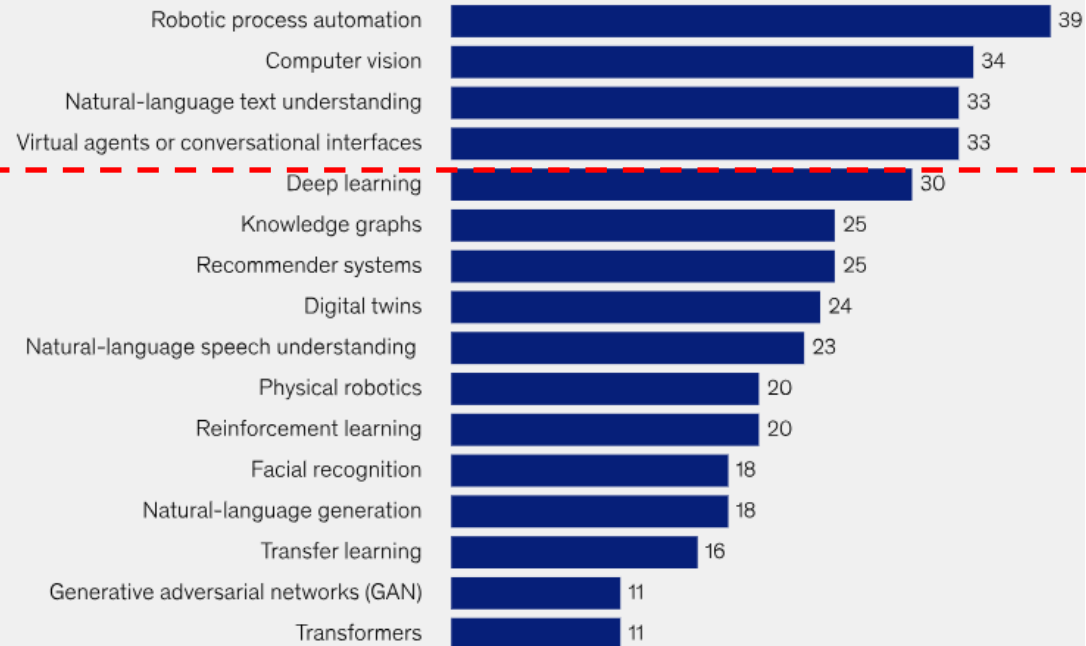
Source: 우리나라 및 주요국 인공지능(AI) 기술수준의 최근 변화 추이 (SPRI,2023)

I. AI 개요와 확산

- Brain drain의 문제

- “The state of AI in 2022—and a half decade in review, McKinsey, 2022”

Percentage of respondents who say given AI capability is embedded in products or business processes in at least one function or business unit²



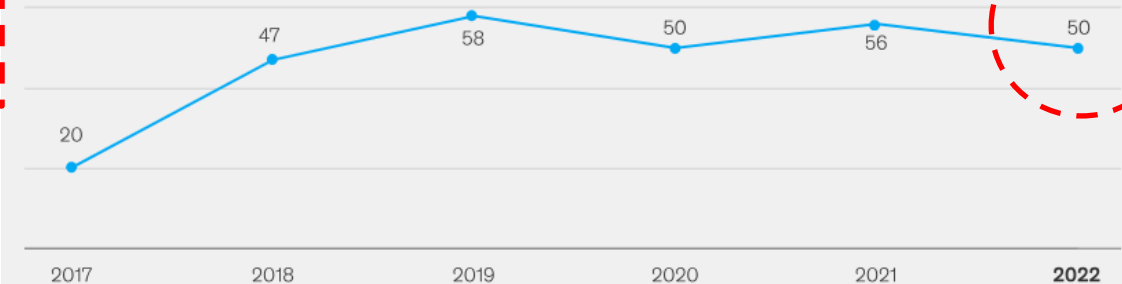
¹The number of capabilities included in the survey has grown over time, from 9 in 2018 to 16 in the 2022 survey.

²Question was asked only of respondents who said their organizations have adopted AI in at least one function.

McKinsey & Company

While AI adoption globally is 2.5× higher today than in 2017, it has leveled off over the past few years.

Share of respondents who say their organizations have adopted AI in at least one business unit or function, %



McKinsey & Company

I. AI 개요와 확산

- Brain drain의 문제

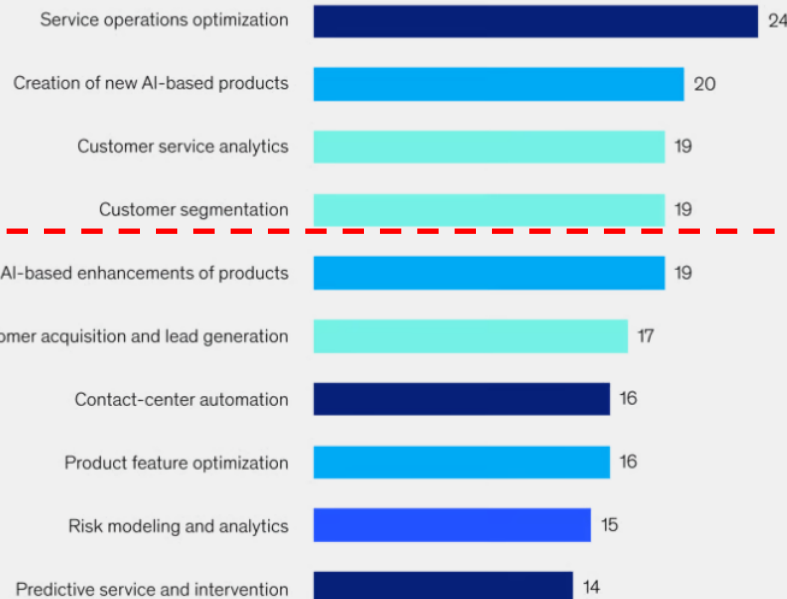
- “The state of AI in 2022—and a half decade in review, McKinsey, 2022”

The most popular AI use cases span a range of functional activities.

Top use cases Use cases by function

Most commonly adopted AI use cases, by function, % of respondents¹

■ Service operations² ■ Product and/or service development ■ Marketing and sales ■ Risk



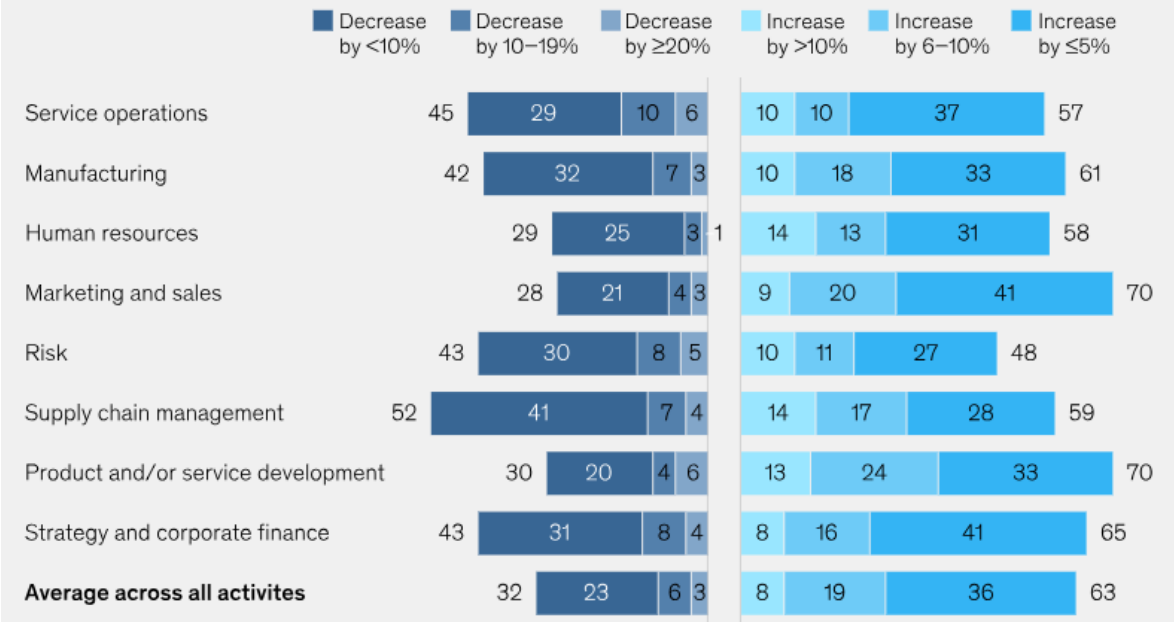
¹ Out of 39 use cases. Question was asked only of respondents who said their organizations have adopted AI in at least one function.

² Eg. field services, customer care, back office.

McKinsey & Company

AI-related cost decreases are most often reported in supply chain management and revenue increases in product development and marketing and sales.

Cost decrease and revenue increase from AI adoption in 2021, by function, % of respondents¹



¹ Question was asked only of respondents who said their organizations have adopted AI in a given function. Respondents who said “no change,” “cost increase,” “not applicable,” or “don’t know” are not shown.

McKinsey & Company

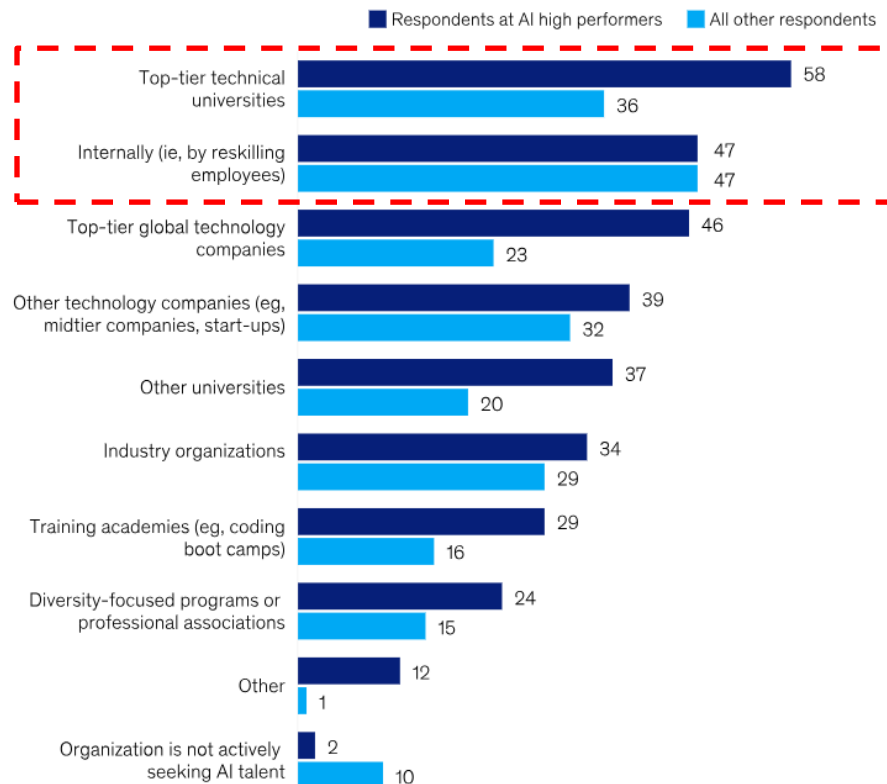
I. AI 개요와 확산

• Brain drain의 문제

- “The state of AI in 2022—and a half decade in review, McKinsey, 2022”

Respondents from AI high performers report sourcing AI-related talent in a broader variety of ways than other respondents.

Sources that respondents' organizations are using for AI-related talent, % of respondents¹



¹Only asked of respondents whose organizations have adopted AI in at least one function. For respondents at AI high performers, n = 51. For all other respondents, n = 413.

Stanford's 2021 Artificial Intelligence Index Report

“... the number of new AI PhD graduates in North America entering the AI industry post-graduation grew from 44.4% in 2010 to around 48% in 2019. By contrast, the share of new AI PhDs entering academia dropped from 42.1% in 2010 to 23.7% in 2019....”

- AI 확산과 함께, 산업 분야에서의 AI 인력 급증
- 연구기관/대학에서의 Brain drain

I. AI 개요와 확산

- KIST 스마트 실험실



<https://www.youtube.com/watch?v=6E80FO8yXYc>

I. AI 개요와 확산

• DX to AX: AI Transformation

• AI도입과 관련한 기업 의견 및 기술 활용도 인식

(단위: %, N=1,000)

구분	비중	구분	비중
기업 수요에 맞는 AI 기술 및 솔루션 부족	35.8	데이터 활용(개인정보 및 데이터 접근)	15.6
AI 기술 및 솔루션 개발 비용	20.6	성과 창출의 불확실성	11.2
전문인력 및 역량 부족	15.7	기타	1.0
		모름/무응답	0.1

* 자료: KDI(2020)

(단위: %, N=738)

ID	세부 기술(토픽)	기술 활용도		수용도	기술 유용성		개발 시급성 정도	
		현재 활용도	미래 전망	수용 의사	성과 도움	경쟁력 제고	R&D 시급	국고 지원
1	자연어 이해 및 인식 처리 기술	54.7	64.8	51.9	60.3	64.6	58.1	56.5
2	인간 감정 분석 기술	49.2	58.8	45.5	54.2	57.9	51.4	50.1
3	지식 추론 기술	56.9	67.2	54.3	60.8	60.6	55.6	58.7
4	생성형 인공지능 기술	70.1	76.0	62.2	74.9	75.6	70.5	73.8
5	인공지능 신뢰성 기술	64.2	76.2	62.1	70.7	76.3	67.8	71.5
6	경로 탐색 및 모델 최적화	68.6	73.2	64.9	71.5	73.6	72.8	72.2
7	객체 감지 및 추적을 위한 비전 딥러닝 기술	66.8	77.5	65.9	70.7	71.7	73.4	74.1
8	그래프 분석 기반 진단 및 예측 기술	66.0	74.3	62.7	63.7	68.6	67.3	69.8
9	강화학습 기술	66.0	74.7	65.9	68.0	71.3	68.6	70.6
10	머신러닝 기반 데이터 보안 및 보호 기술	68.7	76.8	68.4	75.1	76.3	72.9	72.6
11	딥러닝 기반 이미지 분석 및 처리 기술	73.3	78.3	70.1	74.4	76.8	75.2	73.2
12	딥러닝 모델 알고리즘 및 성능 최적화	71.1	82.8	66.0	76.4	78.0	73.3	75.9

* 주: 각 토픽별 최고값과 최저값의 항목을 각각 파란색, 주황색으로 표시함