

Now Hiring: Firm-Level Adoption of Generative AI in China

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September 2026

This study serves as a background paper for the World Development Report 2026: The Promise of Artificial Intelligence. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the International Bank for Reconstruction and Development/World Bank and its affiliated organizations, or those of the Executive Directors of the World Bank or the governments they represent.

Outline

- ① Motivation
- ② Data & Method
- ③ Stylized Facts
- ④ What Predicts Adoption? (Regression)
- ⑤ Conclusion

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Motivation

- China has emerged as one of the world's leading AI powers, yet **systematic firm-level evidence** on the speed and depth of AI adoption among its firms remains scarce.
- Existing studies draw predominantly on **advanced economies** (U.S., Europe), where market structure and firm features differ markedly from emerging markets.
- China's distinctive features may shape both the *capacity* and the *incentives* for AI adoption (e.g., a large manufacturing base, a prominent state presence, and well-developed digital infrastructure).
- Given China's growing role in the AI value chain, filling this gap is vital to understanding how AI diffuses across firms in a **developing economy**.

This paper

It provides the first comprehensive **job-posting-based** picture of GenAI adoption among Chinese firms, covering both listed and non-listed firms.

Ways to Measure AI Adoption

Approach	Capture	Main limitation	Examples
Survey-based	Self-reported AI use by firms or workers	Sensitive to scope, wording, sampling, weighting, respondent	McElheran et al. (2024 and 2025); Bick et al. (2025); Bonney et al. (2026); Yotzov et al. (2026)
Patent-based	AI invention / commercialization	Identifies developers, not ordinary adopters	Cheng et al. (2023); Calvino et al. (2022)
Self-disclosure	Strategic orientation, signaling	May reflect rhetoric, not realized use	Calvino et al. (2022); Yao et al. (2024)
Chat-based / conversation-log-based	Realized chatbot use in human–AI interactions; message-level tasks	Platform-specific; may miss API, embedded, offline, or competing-tool use; hard to infer downstream effects	Chatterji et al. (2025); Chatterji et al. (2026)
Job-posting	Investment in AI human capital, actual costly adjustments (timely), applicable to all types of firms	May miss off-the-shelf / external adoption; intended vs. realized	Calvino et al. (2022); Alekseeva et al. (2025); Shi et al. (2025); Hosseini and Lichtinger (2025)

- **Focus on firm-level adoption:**
 - A firm is defined as a *GenAI adopter* once it first posts a vacancy explicitly requiring GenAI applications or technical skills.
 - Posting intensity, measured as the share of postings requiring GenAI skills over total postings, is computed as an alternative measure to address the size bias.
- **Data:** 72 million unique job postings (2015–2025) from three major Chinese job boards (51job, Zhaopin, Liepin), matched to 5,000 listed firms and 2.5 million non-listed firms.
- **Approach:** a keyword-based approach with three categories — GenAI tools, GenAI technical terms, and earlier (pre-GenAI) AI.
- **Methodological improvements:** cross-platform deduplication, China-tailored keywords, false-positive mitigation (*in progress*), and LLM-based business-function classification.

Preview of Findings

- ① GenAI adoption rose steadily after the release of ChatGPT (Nov 2022) and **accelerated sharply after DeepSeek-R1 became available (Jan 2025)**.
- ② Adoption is **rapid yet highly uneven**: 21% of listed firms vs. 0.2% of non-listed firms by the end of 2025. Similarly, GenAI-related posting intensity is also higher in listed firms than in non-listed firms.
- ③ **Firm size, market-service sectors, and the presence of earlier AI talent** are positively associated with propensity and intensity of GenAI adoption.
- ④ **Adoption sophistication** is highest among listed firms and in market services.
- ⑤ An analysis of GenAI-related job titles with rising demand indicates that these skill requirements have spread beyond ICT specialists to non-ICT roles as well.

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Job Posting Data

- Three major online job boards in China: **51job**, **Zhaopin**, **Liepin** (2015–2025).
- Full access to 51job: 67M unique postings; 63M matched to the business registry (~2.5M non-listed firms).
- Listed firms: pool all three boards $\Rightarrow$ 16.9M raw $\rightarrow$ **14.7M** unique after (3-step) deduplication (~5k listed firms; see [Annex](#) for details).
- **72 million** unique postings in total (listed + non-listed).
- Each posting covers the firm name, posting time, location, job title, job requirements, and responsibilities.

Two matched samples

- 1] Listed-firm sample (3 boards, stock-ID matched);
- 2] Non-listed-firm sample (51job, name-matched to SAIC registry).

Job Posting Data Holds Rich Information.

更新于 7月17日

Job posting time

APP

举报

项目助理实习生

Job title: project assistant intern

150-200元/天

收藏

立即投递

武汉-江夏区 | 本科 | 实习 | 招1人 | 6个月 | 5天/周

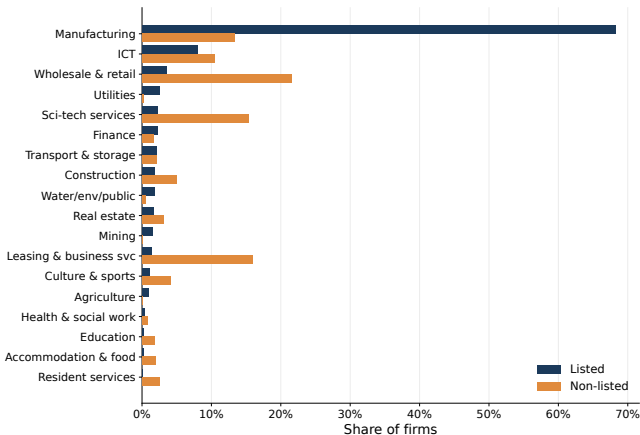
职位描述

活动策划 | 项目实施 | CHATGPT | 计算机软件

岗位职责:
1. 协助项目经理进行日常项目跟进, 包括任务协调、进度追踪及资源调配。
2. 负责项目相关文档的撰写、整理及优化, 确保信息清晰准确, 符合团队要求。
3. 参与会议记录并输出结构化纪要, 提炼关键行动项, 推动问题闭环。
4. 独立完成行业或管理方向的资料搜集与分析, 辅助决策参考。
5. 在指导下完成小型子项目的全流程执行, 包括规划、落地及复盘。
岗位要求: Job requirement
1. **逻辑清晰, 沟通高效**
- 具备社团/学生组织管理经验者优先, 能快速理解需求并精准传递信息。
- 擅长用结构化思维拆解问题, 举例说明如何通过沟通推动团队达成共识。
2. **强执行力与结果导向**
- 提供1-2个过往案例 (如活动策划、项目落地), 说明如何克服阻力完成目标。
- 对“优先级管理”有实操方法, 能在多任务中保持交付质量。
3. **文档功底与AI工具应用**
- 熟练使用Office/Xmind等工具, 有撰写方案报告等经验。
- 熟悉AI辅助写作 (如ChatGPT), 能结合人工判断输出逻辑严谨的文档。
4. **行业思考与学习能力**
- 对科技/互联网/管理等领域有基础认知, 能简述近期关注的行业趋势。
- 对“如何协调资源达成目标”有自己的方法论 (如敏捷思维、PDCA等)。
**加分项: **

职位发布者
张梓萌/人事经理
立即沟通
飞渡科技
Freedo
Firm name 北京飞渡科技股份有限公司
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飞渡科技是以数据引擎、渲染引擎、AI引擎为基础的自主创新、国产可控的数字孪生PaaS平台公司。总部在北京, 旗下设深圳飞渡数字孪生科技有限公司及武汉、南京、成都、上海、长沙、天津、杭州等办事处。飞渡科...
公司主页

Sectoral Distribution: Listed vs. Non-listed



- **Listed** firms are highly concentrated in **manufacturing** (68%).
- **Non-listed** firms are more evenly spread, with a stronger **services** presence:
 - wholesale & retail (22%),
 - leasing & business services (16%),
 - sci-tech services (15%).
- Manufacturing only accounts for 13% of **non-listed** firms.

The Keyword Approach: Three Categories

A meaningful skill hierarchy

GenAI Tool: Specific GenAI products (e.g., ChatGPT, Gemini, Claude; DeepSeek, Qwen, Ernie, Doubao) to capture entry-level, cross-functional skills.

GenAI Tech: Specialized methods (such as transformers, fine-tuning, RAG, prompt engineering) to capture advanced skills concentrated in technical functions.

Earlier AI: Pre-ChatGPT terms (such as deep learning, computer vision, NLP) to capture earlier AI skills.

- Lists tailored to China: domestic tools + English *and* Chinese terms.
- Applied to 72M postings $\Rightarrow$ $\sim$ 0.5M postings with related keywords.
- **Adopter:** posts its first GenAI tool/tech vacancy. **Intensity:** share of postings requiring GenAI skills.
- Reduce false positives (e.g., *LLM* = Master of Laws; *work in progress*).

See [here](#) for the lists.

Classifying Postings by Business Function

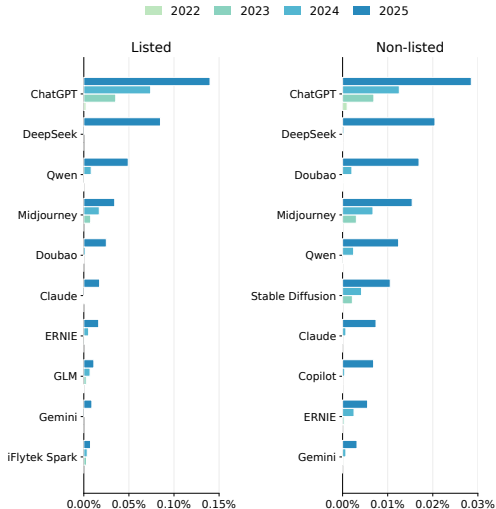
A cascaded **three-tier** pipeline is adopted to assign each posting to one of five functions — *technical*, *production*, *sales*, *administrative*, *financial*:

- ① **Tier I — Rule-based**: deterministic keyword matching on job titles (high precision, handles the majority).
- ② **Tier II — Semantic embeddings**: text2vec-base-chinese; cosine similarity to category centroids (≥ 0.75).
- ③ **Tier III — LLM reasoning**: Qwen-Plus with a structured expert system for the most ambiguous cases (title + full description).

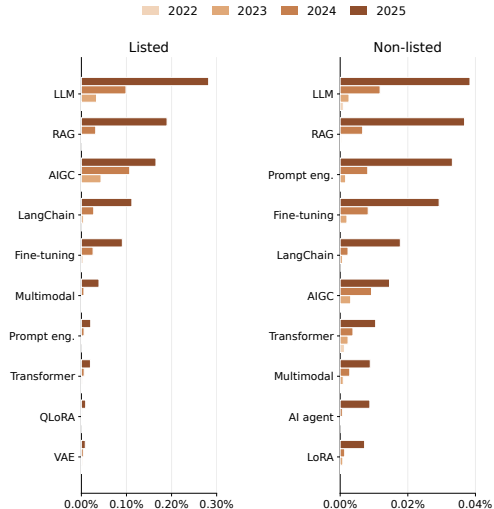
See details [here](#).

Emerging Keyword Trends

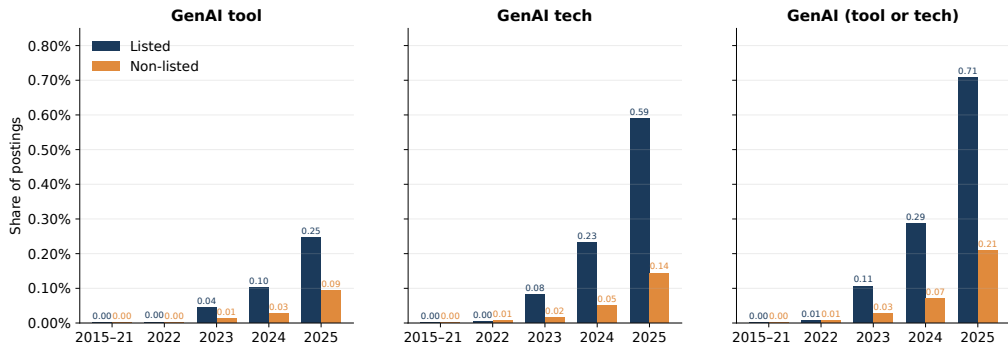
GenAI tool



GenAI tech



The Intensity of Posting Requiring GenAI-related Skills Is Rising Fast

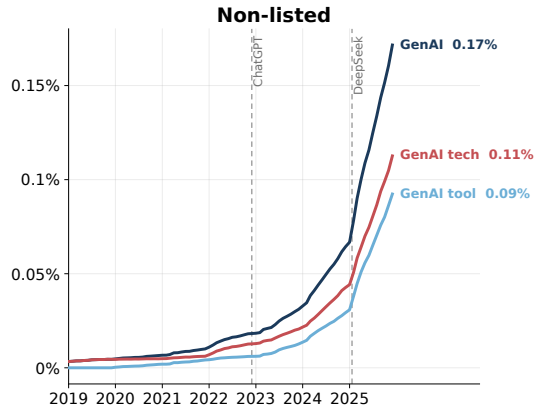
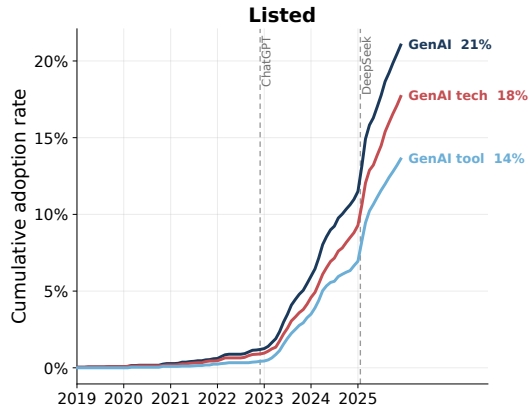


By end-2025, GenAI-skill postings reach **0.7%** of listed-firm postings and **0.2%** of non-listed; the 2025 surge is driven more by **technical** skills, widening the listed–non-listed gap to ~0.5 pp. As the demand for GenAI skills increases, the demand for earlier-AI skills is also on the rise ([Chart](#)).

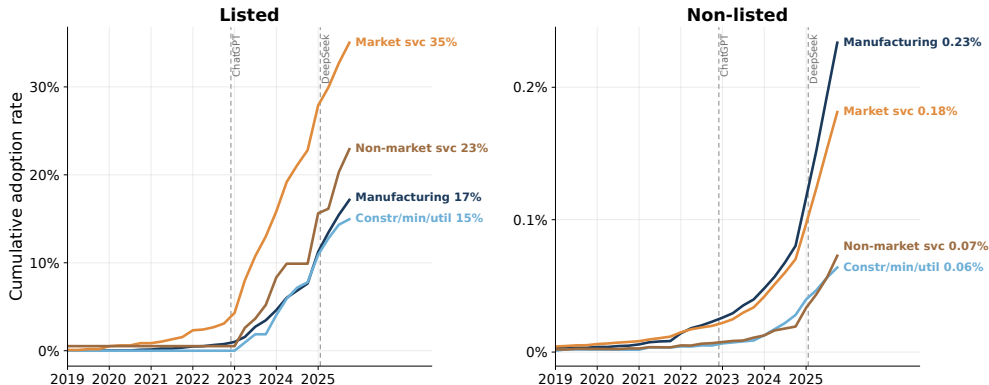
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Fact 1 — Cumulative Adoption & the “DeepSeek Moment”



Fact 2 — Adoption by Broad Sector

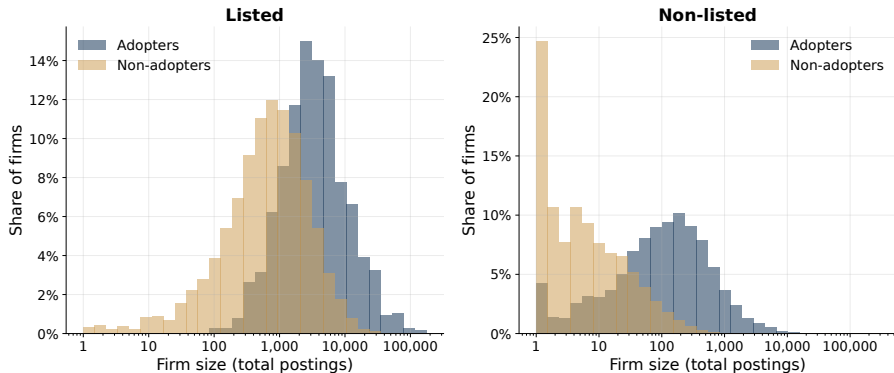


Listed: market services lead (35%) > non-market (23%) > manufacturing (17%) > construction/mining/utilities (15%).

Non-listed: manufacturing highest (0.3%), then market services (0.2%). Market-service jobs are more exposed to GenAI.

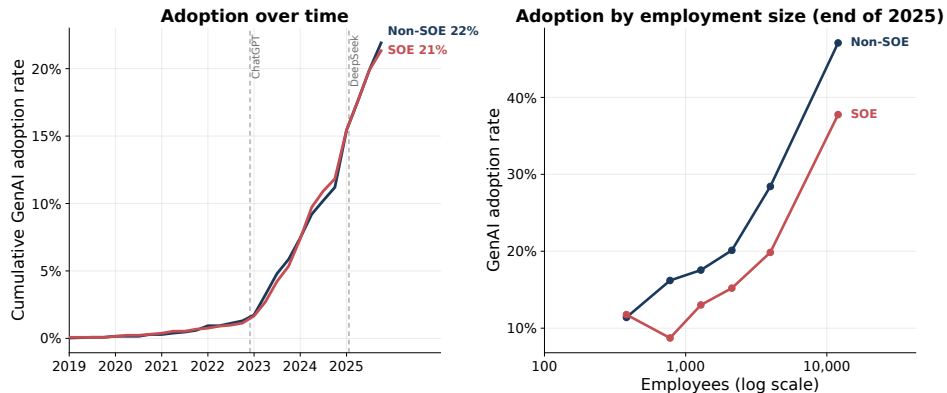
In both groups, the ICT industry has the highest adoption rate by the end of 2025 ([Chart](#)).

Fact 3 — Adopters Are Larger Firms



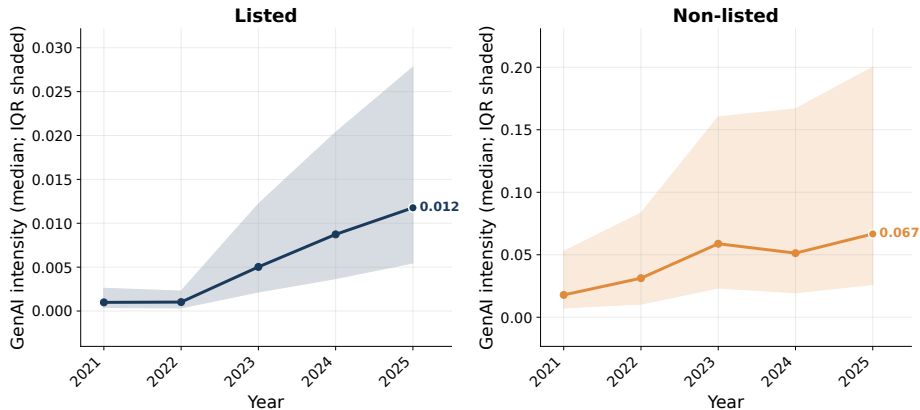
Adopters skew right in the size distribution (Firm size = proxied by total postings). The size effect is observed across sectors ([Chart](#)).

Fact 4 — Adoption by Ownership (Listed Firms)



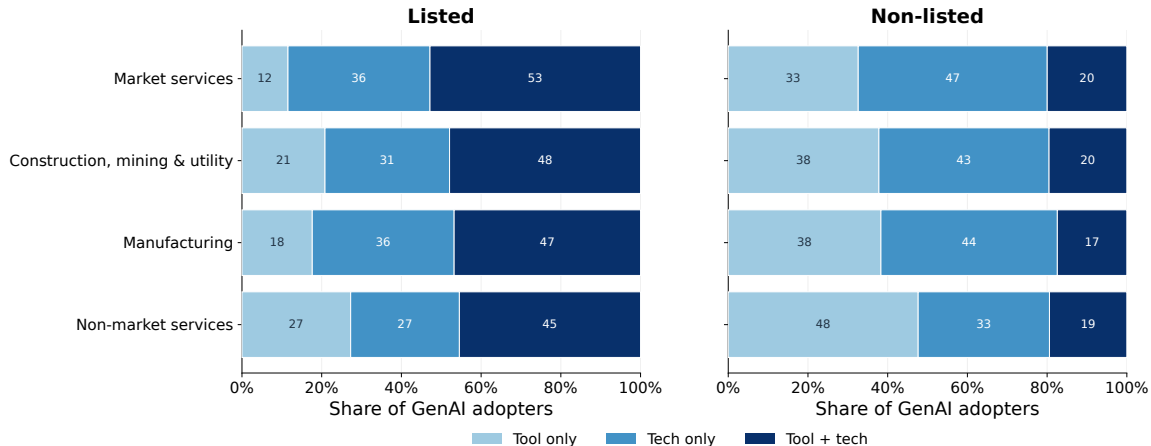
SOEs and non-SOEs adopt GenAI at similar *overall* rates (21% vs. 22%). But **at the same employment level**, more non-SOEs have adopted GenAI than SOEs.

Fact 5 — Adoption Intensity Over Time (Among Adopters)

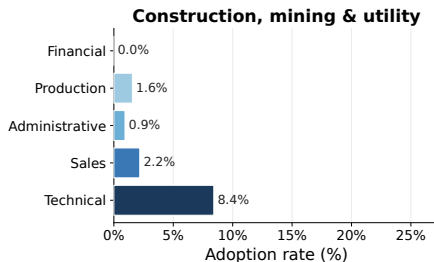
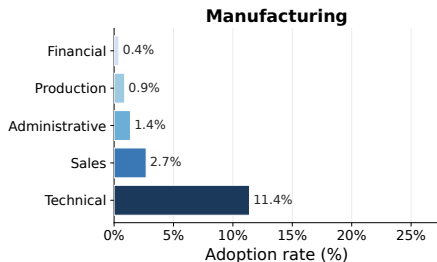
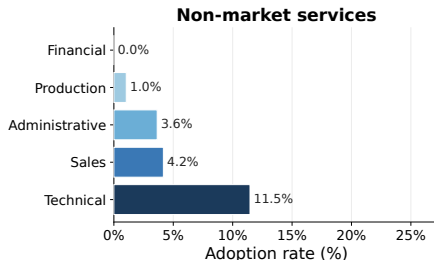
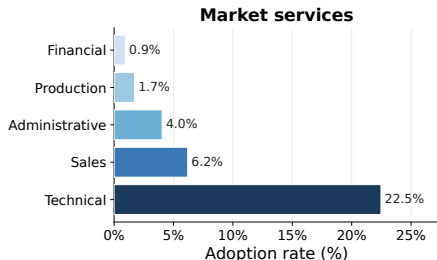


Median GenAI intensity rises steadily, with the top quartile rising faster than the median.
The intensity is higher among non-listed firms as they are notably smaller than listed firms.

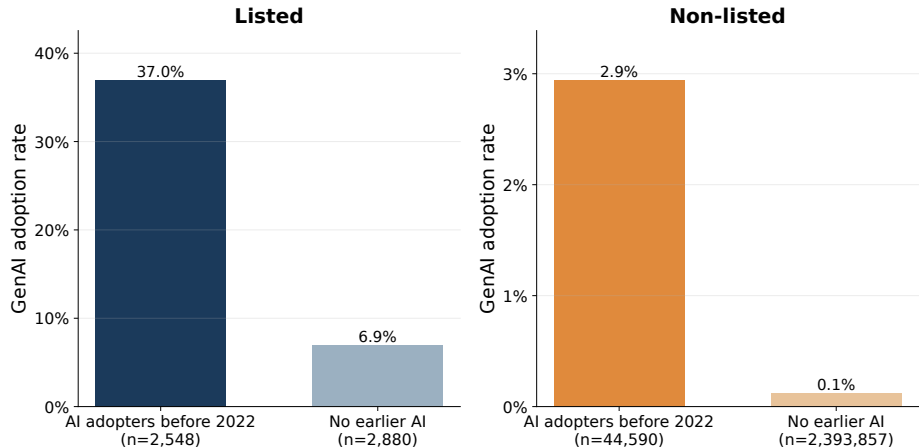
Fact 6 — Adoption Sophistication



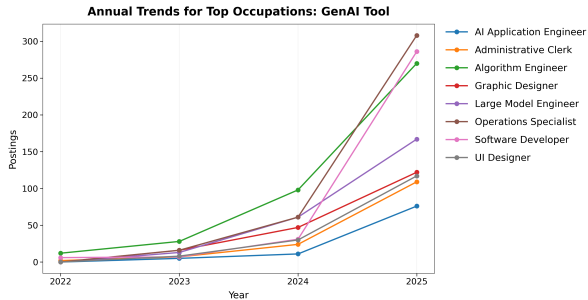
Fact 6 — Adoption by Business Function (Listed Firms)



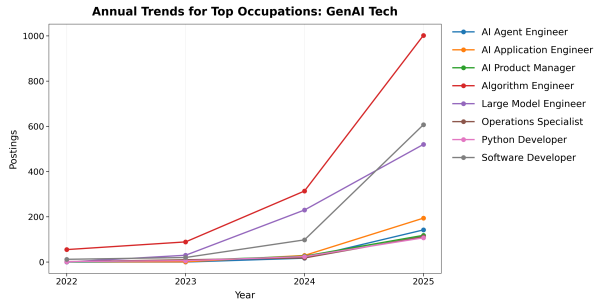
Fact 7 — Prior AI Experience Predicts GenAI Adoption



Fact 8 — Adoption and Potential Job Creation



(a) GenAI Tool



(b) GenAI Tech

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Panel A. Listed Firms

Dependent Variable	(1) GenAI Tool (=1)	(2) GenAI Tech (=1)	(3) GenAI (=1)	(4) GenAI postings (PPML)
SOE	-0.915 (1.110)	-1.159 (1.177)	-0.931 (1.248)	0.153 (0.212)
Market services	6.576*** (1.297)	10.593*** (1.402)	10.474*** (1.451)	0.705*** (0.173)
Non-market services	3.690 (2.645)	-0.228 (2.671)	2.368 (2.904)	-0.403 (0.288)
Construction, mining & utility	1.613 (1.577)	0.932 (1.767)	1.641 (1.873)	-0.675** (0.268)
Log total postings	4.018*** (0.242)	4.772*** (0.265)	5.614*** (0.286)	1.108*** (0.090)
Log employment	3.890*** (0.403)	4.192*** (0.430)	4.203*** (0.448)	0.092 (0.082)
Earlier-AI adopter by 2022	9.203*** (0.988)	13.361*** (1.097)	14.632*** (1.206)	0.845*** (0.157)
Constant	8.204*** (0.623)	9.879*** (0.680)	12.510*** (0.750)	-1.906*** (0.159)

Notes: The table shows the results from a set of cross-sectional firm-level regressions. Cols (1)–(3): linear probability models with the dependent variable capturing GenAI adoption by the end of 2025. Col (4): PPML estimator for the number of GenAI postings. Manufacturing is the omitted sector. Robust SEs.

Panel B. Non-listed Firms

Dependent Variable	(1) GenAI Tool (=1)	(2) GenAI Tech (=1)	(3) GenAI (=1)	(4) GenAI postings (PPML)
Market services	-0.004 (0.007)	0.015** (0.007)	0.003 (0.009)	0.185** (0.072)
Non-market services	-0.001 (0.008)	0.001 (0.008)	-0.008 (0.010)	-0.383*** (0.116)
Construction, mining & utility	-0.029*** (0.008)	-0.016* (0.009)	-0.046*** (0.011)	-0.310 (0.254)
Log total postings	0.111*** (0.003)	0.143*** (0.003)	0.207*** (0.004)	0.984*** (0.043)
Earlier-AI adopter by 2022	1.032*** (0.053)	2.368*** (0.075)	2.790*** (0.083)	1.465*** (0.061)
Constant	0.078*** (0.006)	0.067*** (0.006)	0.129*** (0.008)	-7.203*** (0.142)

Notes: The table shows the results from a set of cross-sectional firm-level regressions. Cols (1)–(3): linear probability models with the dependent variable capturing GenAI adoption by the end of 2025. Col (4): PPML estimator for the number of GenAI postings. Manufacturing is the omitted sector, and SOE and other sector dummies are included. Robust SEs. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

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Thank you!

Questions and comments are welcome.



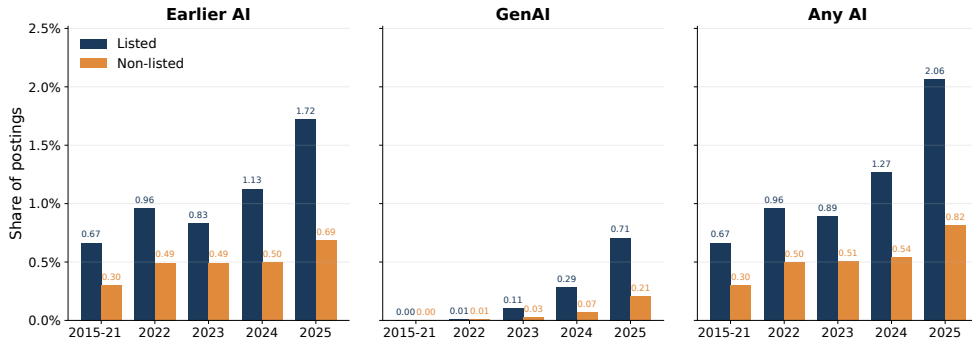
Scan for the paper

Annex

Annex: Keyword List

Category	Keyword List
GenAI Tool	ChatGPT, DeepSeek (深度求索), Gemini, Perplexity, Grok (格罗克), Claude, Copilot, Suno, Eleven Labs, Doubao (豆包), DeepAI, Poe, Kimi chatbot (Kimi智能助手), Blackbox AI, Tencent Yuanbao (腾讯元宝), Midjourney (MJ绘图), PixVerse, Meta AI, Leonardo, Ideogram, Zapier Chatbots, KREA, Prezi, Sora, NotebookLM, Le chat, v0.dev, Pixai, Nightcafe, OpusClip, Ernie Bot (文心一言), Youchat, ChatPDF, Synthesia, Pictory, Canva AI, Craiyon, Tongyi Qianwen (通义千问), Nano AI Search (Nano AI搜索), MaxAI, Playground, Easy-peasy, Writesonic, Liner, Murf AI, Stable Diffusion, DALL-E 3, Jasper AI, Phind, Artbreeder, Fliki, Luma Dream Machine, Designs.AI, Iflytek Spark (讯飞星火), Sparkdesk (星火大模型), Genmo AI, InVideo, 10Web AI Website Builder, Meta Image, StepFun (阶跃星辰), MiMo, GPT, GLM, Pangu Model (盘古大模型), Hunyuan Model (混元大模型), Zhipu AI (智谱), Baichuan (百川大模型), Minimax, Qwen (千问), 国产大模型, 自研大模型, Mistral, Falcon, 使用大语言模型, 使用生成式人工智能, 使用生成式AI, 使用代理式AI, 使用智能体AI
GenAI Tech	Fine-Tuning (模型微调), LangChain (LangChain框架), Prompt Engineering (提示工程), 提示词, Diffusion Model (扩散模型), Multimodal Model (多模态模型), AIGC (人工智能生成内容), 开发生成式人工智能, 开发生成式AI, Reinforcement Learning from Human Feedback (人类反馈强化学习), Reinforcement Learning from AI Feedback (AI反馈强化学习), PEFT (参数高效微调), CLIP (CLIP模型), RAG (检索增强生成), Retrieval-Augmented Generation, MultiModal Machine Learning (多模态机器学习), Diffusers (Diffusers库), LoRA (低秩适配), QLoRA, Multi-turn Dialogue (多轮对话), GAN (生成对抗网络), VAE (变分自编码器), Transformers (Transformer模型), LLM (大语言模型), Large Language Models, 开发大语言模型, AI-Generated Content (AI生成内容), 开发代理式AI, 开发智能体AI, Crowdsourcing Annotation (众包标注), Mixed Precision Training (混合精度训练), Hallucination (幻觉检测)
Earlier AI	Deep Learning (深度学习), Computer Vision (计算机视觉), Chatbot (聊天机器人), Machine Learning (机器学习), Machine Vision (机器视觉), Virtual Agents (虚拟智能体), Natural Language Processing (自然语言处理), NLP, Speech Recognition (语音识别), Pattern Recognition (模式识别), Object Recognition (目标识别), Neural Networks (神经网络), Supervised Learning (监督学习), Unsupervised Learning (无监督学习), Text Mining (文本挖掘), Mahout, Recommender Systems (推荐系统), Support Vector Machines (支持向量机), SVM, Random Forests (随机森林), Latent Semantic Analysis (潜在语义分析), Sentiment Analysis (情感分析), Opinion Mining (观点挖掘), Latent Dirichlet Allocation (潜在狄利克雷分配), Predictive Models (预测模型), Kernel Methods (核方法), Keras, Gradient Boosting (梯度提升), OpenCV, XGBoost, Libsvm, Word2Vec (词向量模型), Machine Translation (机器翻译), Sentiment Classification (情感分类), Decision Tree (决策树), Bayes (贝叶斯), Bayesian Methods (贝叶斯方法), 大数据处理框架, Large-scale Training (大规模训练), Distributed Training (分布式训练), Open-source Dataset (开源数据集), Parallel Training (并行训练), ImageNet

Annex: The Rise of GenAI *also* Raised Demand for Earlier-AI Skills



← Back

Annex: Deduplication of Job Postings

For listed firms, the same vacancy may appear on multiple boards.

A three-stage algorithm is carried out here to detect and drop duplicates:

- ① **Text preparation:** extract & standardize responsibilities, titles, location, date.
- ② **Strict deduplication:** remove exact repeats (same firm, city+county, title, raw description) within ± 3 -day windows, *across platforms*.
- ③ **Loose deduplication:** catch near-duplicates via Jaccard similarity on character bigrams.

$$J(A, B) = \frac{|A \cap B|}{|A \cup B|}$$

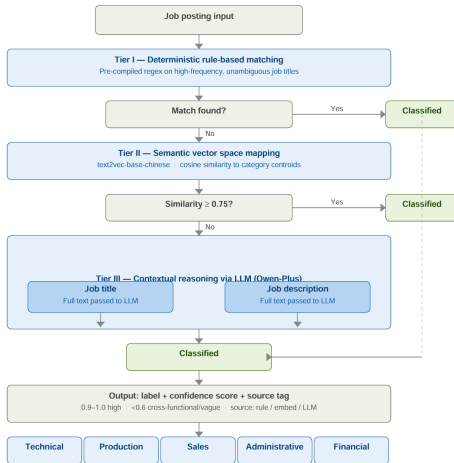
We flag duplicates if title similarity > 0.8 or responsibility similarity > 0.6 and keep earliest-dated posting per cluster.

Result: 2.2M (13%) duplicates removed $\Rightarrow$ 14.7M unique postings for listed firms. [← Back](#)

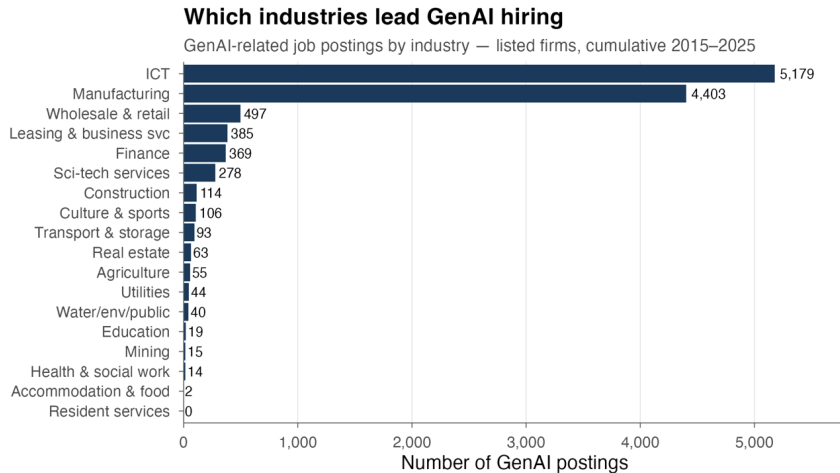
Annex: Classifying Postings by Business Function

Multi-Tier Automated Functional Classification of Job Postings

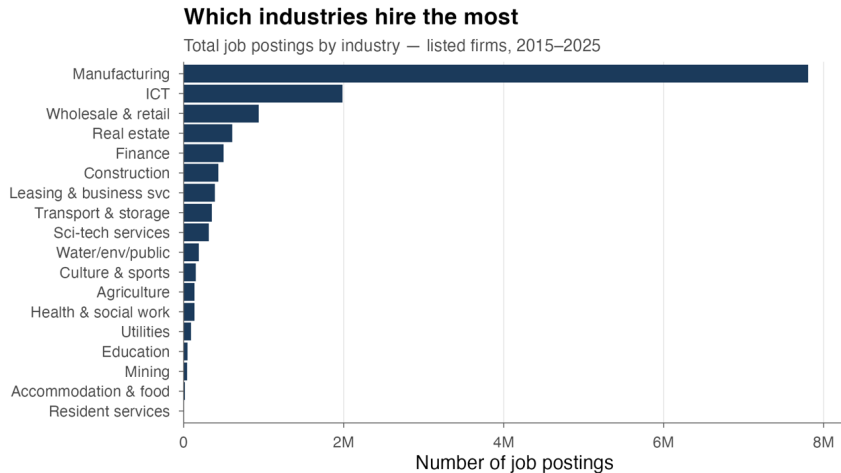
Three-Tier Cascaded Architecture



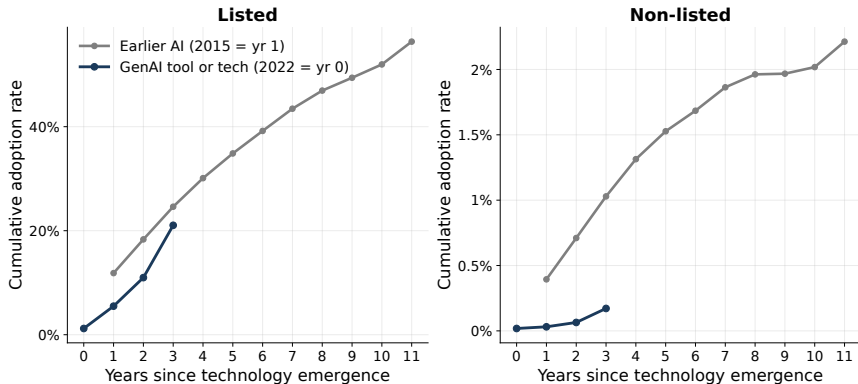
Annex: GenAI Job Postings by Industry (Listed Firms)



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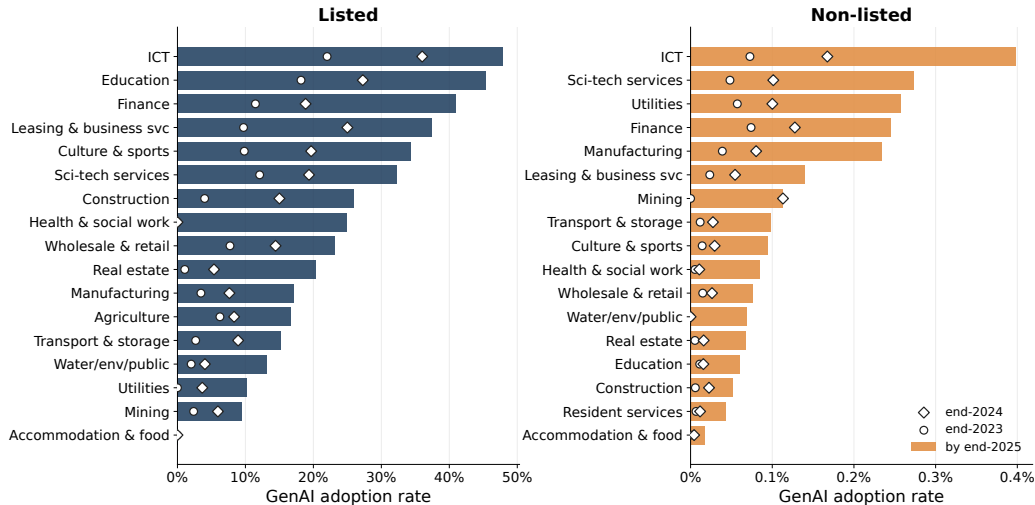


Annex: GenAI Diffuses Faster Than Earlier AI (Yet Only in Listed Firms)

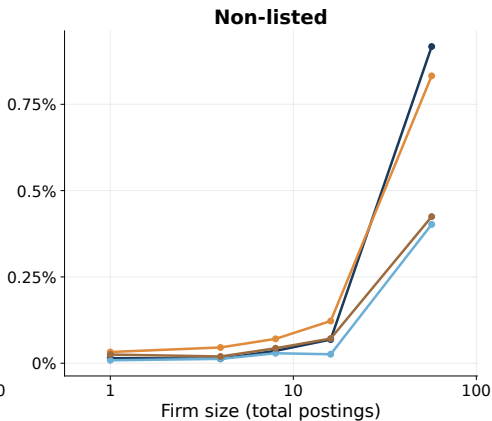
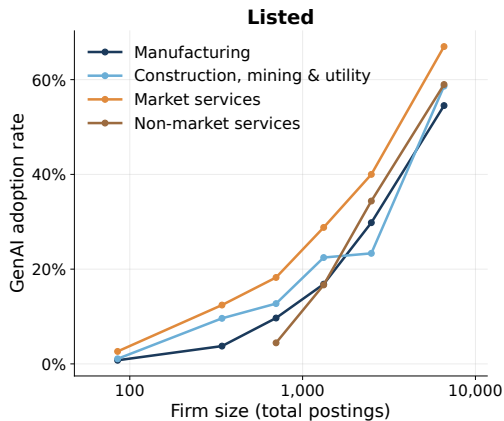


Among listed firms, if we take 2010 as the start year for earlier AI, it took about 7 years for earlier AI to reach a level of adoption that GenAI reached in 3 years (2022-2025, to 21%). The same surge is *not* seen among non-listed firms.

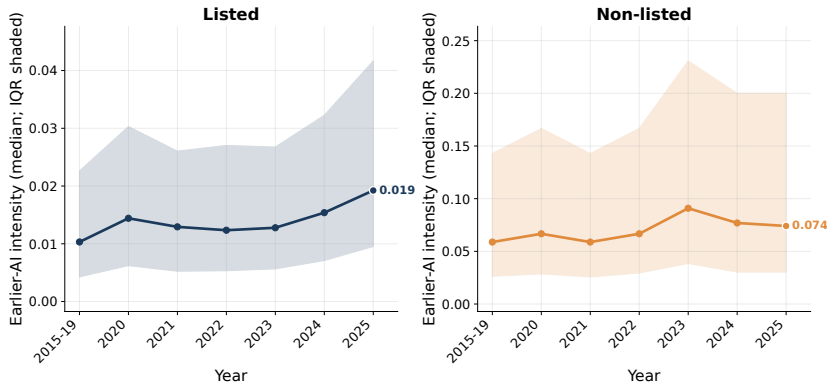
Annex: Adoption by Industry (End-2025)



Annex: Adoption Rates Rise with Size, by Sector



Annex: Earlier-AI Intensity Is Stable



Earlier-AI intensity is largely flat over a decade (mature technology). It was higher than GenAI intensity in early 2021 but **comparable by end-2025**.