Market Guide for AI Software, China

Published 30 October 2023 - ID G00772995 - 19 min read

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Initiatives: Digital Technology Leadership for CIOs in China

Since the launch of ChatGPT, investment in AI has become prioritized as a strategic initiative, but the diverse AI software market in China can be challenging to navigate. Data and analytics leaders in China can use this guide to understand the market and achieve better business outcomes.

Overview

Key Findings

- Generative AI is igniting the Chinese AI software market in 2023. Most AI software vendors in China have promoted generative AI (GenAI) as the key capability on their product roadmaps, although most of these solutions are not yet generally available.
- Mature Chinese organizations tend to embrace an “AI-first” delivery approach. After the launch of ChatGPT, 59% of enterprises surveyed by Gartner plan to increase investment in GenAI.
- Chinese enterprises are looking for best-of-breed AI software to scale their businesses and make trustworthy decisions. As related AI regulations, software localization needs and enterprise requirements evolve, more specialized vendors will enter the Chinese AI software market.

Recommendations

Data and analytics leaders responsible for AI initiatives in China should:

- Maximize business value from ongoing AI initiatives by establishing AI engineering practices such as ModelOps, composite AI and GenAI that streamline the data, model and implementation pipelines to standardize AI delivery processes.
- Start the AI software investment process by developing an understanding of the various types of AI software available and the extent to which they differ. This avoids silos and overlaps.

- Work closely with the lines of business and the legal team to execute relevant, responsible, transparent and resilient decisions by leveraging best-of-breed and composable AI software.

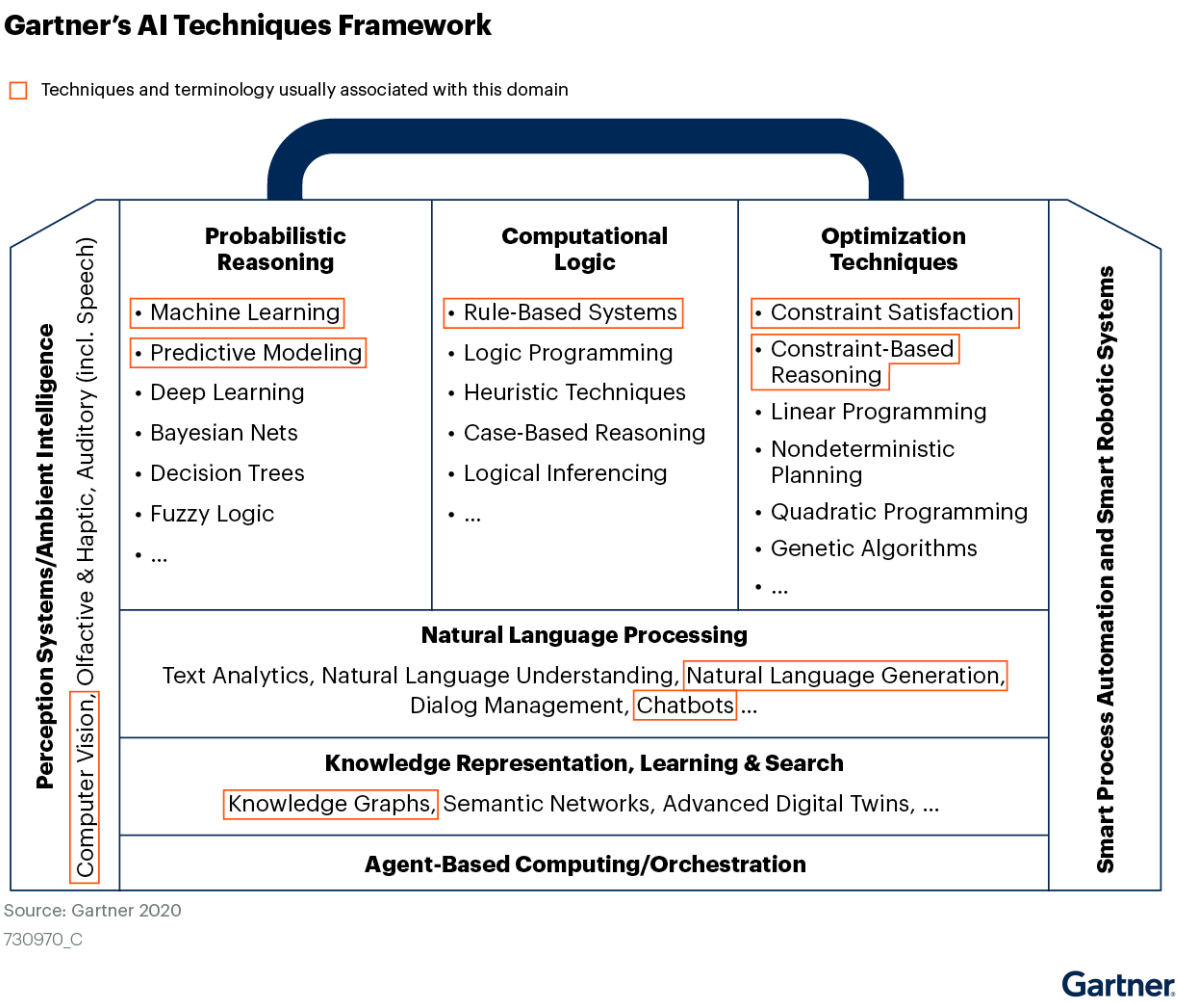
Market Definition

The AI software market in China is defined as the regional market in which the vendors have their headquarters in China and provide AI software technologies, solutions and applications to enterprises both inside and outside China (see Note 1). Artificial intelligence is defined as the application of advanced analysis and logic-based techniques, including machine learning (ML), to interpret events, support and automate decisions, and take action.

Market Description

AI software companies leverage one or several AI techniques (see Figure 1) to assist enterprises in interpreting events, supporting and automating decisions, and taking actions (see What Is Artificial Intelligence? Ignore the Hype; Here's Where to Start). Their solutions help address part or all of a life cycle of AI value chains, ranging from ideation, use-case identification, data collection, data enhancement and AI development to AI deployment, monitoring and recalibration.

Figure 1: Gartner's AI Techniques Framework



Source: Gartner 2020
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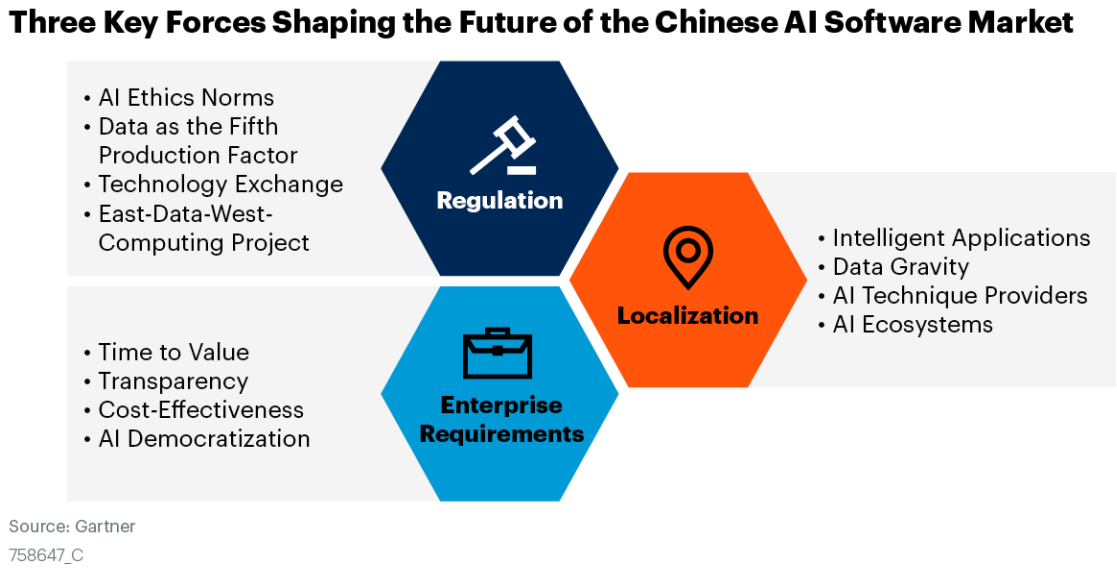
Gartner

Market Direction

As shown in Figure 2, three key forces will shape the future of the Chinese AI software market:

- Regulation
- Localization
- Enterprise requirements

Figure 2. Three Key Forces Shaping the Future of the Chinese AI Software Market



Regulation Will Drive Sustainable Market Development

AI has become one of China's national strategies to boost economic development and social governance. [1] Newly published laws and regulations affecting the market include:

- Interim Measures for the Management of Generative Artificial Intelligence Services [2]
- The Ethical Norms for the New Generation Artificial Intelligence, China — the country's set of ethical norms for the new generation of artificial intelligence in China [3]
- Data Security Law of the People's Republic of China [4]
- Personal Information Protection Law of the People's Republic of China [5]
- Rules regulating the use of recommendation algorithms [6]

In this regulatory landscape, data privacy, AI ethics and responsible AI will be key success factors. These regulations will also shape the entire AI software industry to develop in a more sustainable and healthy way.

Chinese academies are heavily involved in various AI research. In 2019, China surpassed the U.S. and Japan for the number of worldwide AI-related patent applications. [7] The Shanghai Technology Exchange, which opened in 2020, helps transfer these innovations from the academic realm to the business world so that enterprises can better leverage state-of-the-art AI techniques. [8] Various Chinese institutes and universities (Fudan University, Zhipu AI, BAAI, etc.) are also launching large language models (LLMs).

Per a guideline set by the Chinese government, data is a fifth production factor in addition to land, labor, capital and technology. [9] To support AI initiatives at the national level, data and analytics leaders should follow directives to accelerate the cultivation of the data market by prioritizing data exchange, data quality and data governance. [10] This guideline will create further opportunities for those vendors focusing on data integration, labeling and annotation from the AI value chain. In addition, the establishment of the data exchanges in Shanghai, Shenzhen and Beijing will promote the AI industry significantly with more secure and easily accessible data. [11]

The Eastern Data, Western Computing project was officially launched in February 2022. [12] This project will significantly improve the efficiency of the computing power that AI demands.

Localization Requirements Will Drive Differentiation in the AI Software Market

AI is starting to be vertically embedded into various business applications, causing the market to evolve with two types of intelligent applications.

First are **the more traditional software vendors** in China (for example, ERP and Industry 4.0) that benefit from localization. These have started to invest in embedding AI into applications, such as:

- Embedding chatbots for a better user experience
- Automating the reconciliation of banking payments and accounts receivable records to improve efficiency
- Leveraging AI algorithms to define the best customer segmentation for targeted marketing

This trend accelerated after the launch of ChatGPT, which prompted high expectations from enterprises. Most of the traditional software vendors understand that they need to redesign their solutions to enable or upgrade GenAI capabilities such as natural language conversational interface.

Second are **vendors that focus on certain domains or vertical industries.** The following are a few examples of embedded AI from these vendors:

- Computer vision to support pathologists in medical image diagnostics
- Fraud detection in banking
- Proposed complete retrosynthesis routes for organic compounds
- Localized solvers for operational research
- Agent-based modeling, such as simulation

There are more than 100 open-source or commercial LLMs from the vendor landscape. (Tool: Vendor Identification for AI Foundation Models, China captures some of the most popular models.) Due to the increased localization, we expect more adoptions of these AI solutions by customers in China, which are quickly reaching maturity in various vertical industries.

AI algorithms have become commodities. The key differentiator of any AI solution is your data (see Three Steps to Boost Data for AI). The data landscape in China has shifted from global vendors to more localized data management platforms. Local data management vendors will benefit from the changing data gravity and from leveraging data-centric, end-to-end solutions to manage the entire ML life cycle.

With all these opportunities from localization (such as intelligent applications, AI techniques and data gravity), there will also be more opportunities for local AI ecosystems. More enterprises are leveraging “localized” open-source tools to promote their AI ecosystems. In addition, Chinese academies are heavily involved in state-of-the-art research for certain areas of AI, including reinforcement learning, causal inference and knowledge graphs. Thus, we expect more startups to attract attention from the capital market while these techniques mature to supplement the ecosystems.

Enterprise Requirements Will Push Enterprise AI From Operational to Strategic

As enterprises adopt AI more widely, instead of proving the value of AI solutions, more IT leaders are working toward AI-native enterprises by building mission-critical solutions with AI (see Chinese AI Survey Analysis: AI Trends Wave 3.0 — From Operational to Strategic).

As organizations mature through digital transformation, they should be leveraging more data and context to execute favorable and outcome-driven decisions. More Chinese enterprises are expecting fast time to value from their AI investments. The growing complexity of the business environment requires Chinese enterprises to reengineer their decision-making process for competitive advantage, leveraging multiple traditional and advanced AI techniques (see Reengineer Your Decision-Making Processes for More Relevant, Transparent and Resilient Outcomes). A single AI software vendor cannot provide the solutions needed to address both business complexities and technical inefficiencies. To support better decision making, enterprises are starting to look for a composed solution made up of best-of-breed software.

AI applications are becoming business-critical for more enterprises. To avoid sunk costs from AI software investments, enterprises in China are increasingly rational in their approach to designing and implementing AI applications.

In addition, most enterprises are starting to treat AI as a key competency during their digital transformation journey. As a result, instead of relying purely on traditional service-provider-based services, enterprises are looking to build and operate AI applications themselves. Their goal is to avoid black boxes through enhanced transparency, control and risk management (see Top Strategic Technology Trends for 2023: AI Trust, Risk and Security Management).

Chinese enterprises are accustomed to investing heavily in data scientist talent to build solutions via open-source platforms. However, despite all the flexibility and innovation that open source provides, advanced data scientist skill sets may be required to implement the resulting solutions. Labor costs are increasing rapidly in China, especially for higher-skilled roles such as senior data scientists. Thus, more enterprises in China are choosing to adopt commercial software rather than develop solutions from scratch via open-source stacks (see How to Choose the Right AI Solution Path: From Off-the-Shelf to Custom-Made and How to Choose an Approach for Deploying Generative AI).

At the same time, however, enterprises need a labor force to scale AI applications into production to realize business value faster. Thus, they are enlisting software developers, citizen data scientists, data engineers and machine learning engineers toward this effort (see Pathways to Enable Efficient Delivery of AI and ML Projects as a Chief Data Scientist).

Market Analysis

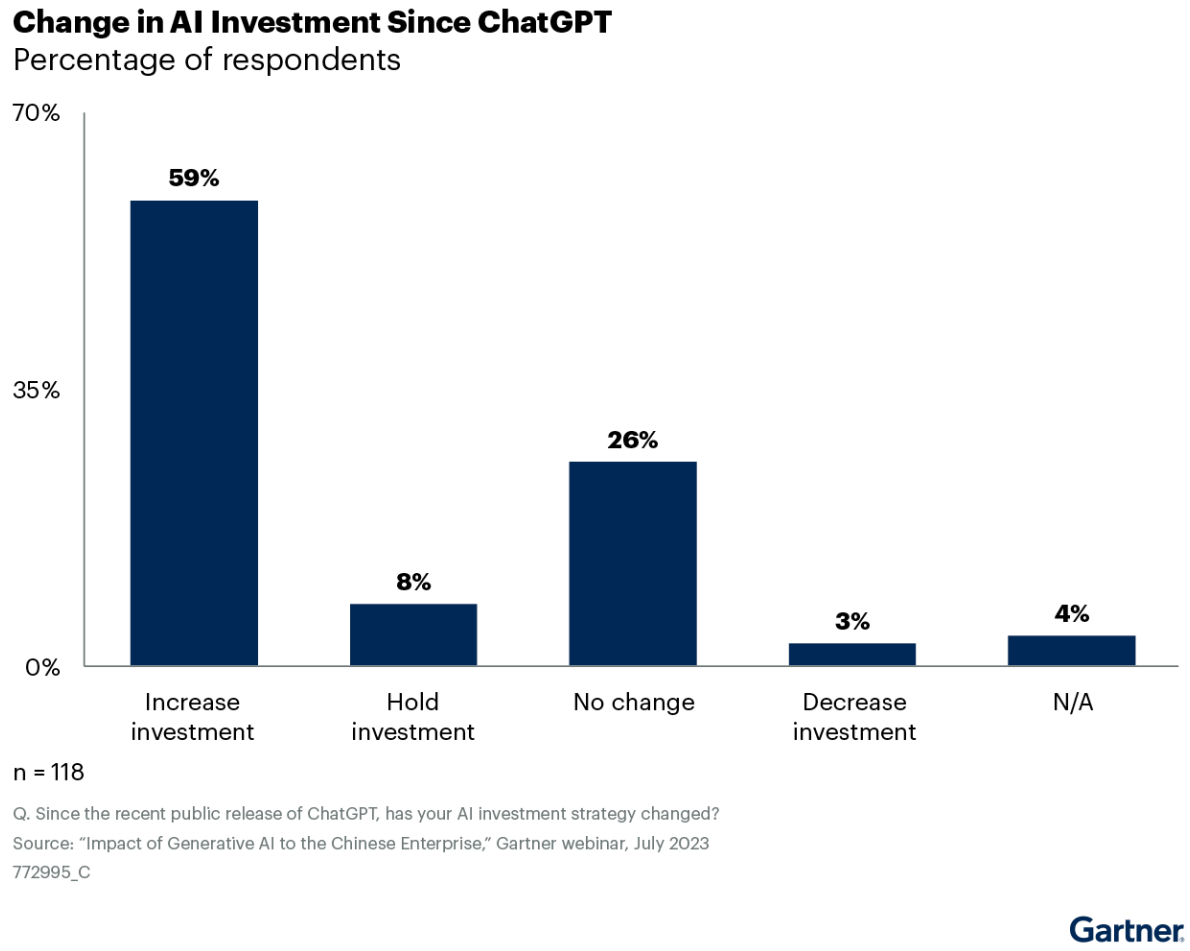
Generative AI Ignites the Chinese AI Software Market in 2023

The AI software market in Greater China will continue to be one of the fastest-growing markets. We expect it to grow from $5.737 billion to $15.472 billion in the next five years at a compound annual growth rate (CAGR) of 21.9% (see Forecast Analysis: Artificial Intelligence Software, 2023-2027, Worldwide).

The Chinese AI software market features more than 3,000 vendors, most of which are technology generalists providing natural language processing (NLP), computer vision (CV) and ML techniques to their clients independently. They provide end-to-end customized enhancements, consulting services and operations services to address clients' specific business issues. As the market continues to expand, the number of Chinese AI software companies will increase. However, a startup's survival space will be narrow if it functions as a technology generalist that provides only a commodity product.

Generative AI is a new paradigm for delivering AI more strategically. After ChatGPT's launch, 56% of enterprises made plans to increase their AI investments, according to participants surveyed in the Gartner "Impact of Generative AI to the Chinese Enterprise" webinar held in July 2023 (see Figure 3). [13]

Figure 3: Change in AI Investment Since ChatGPT



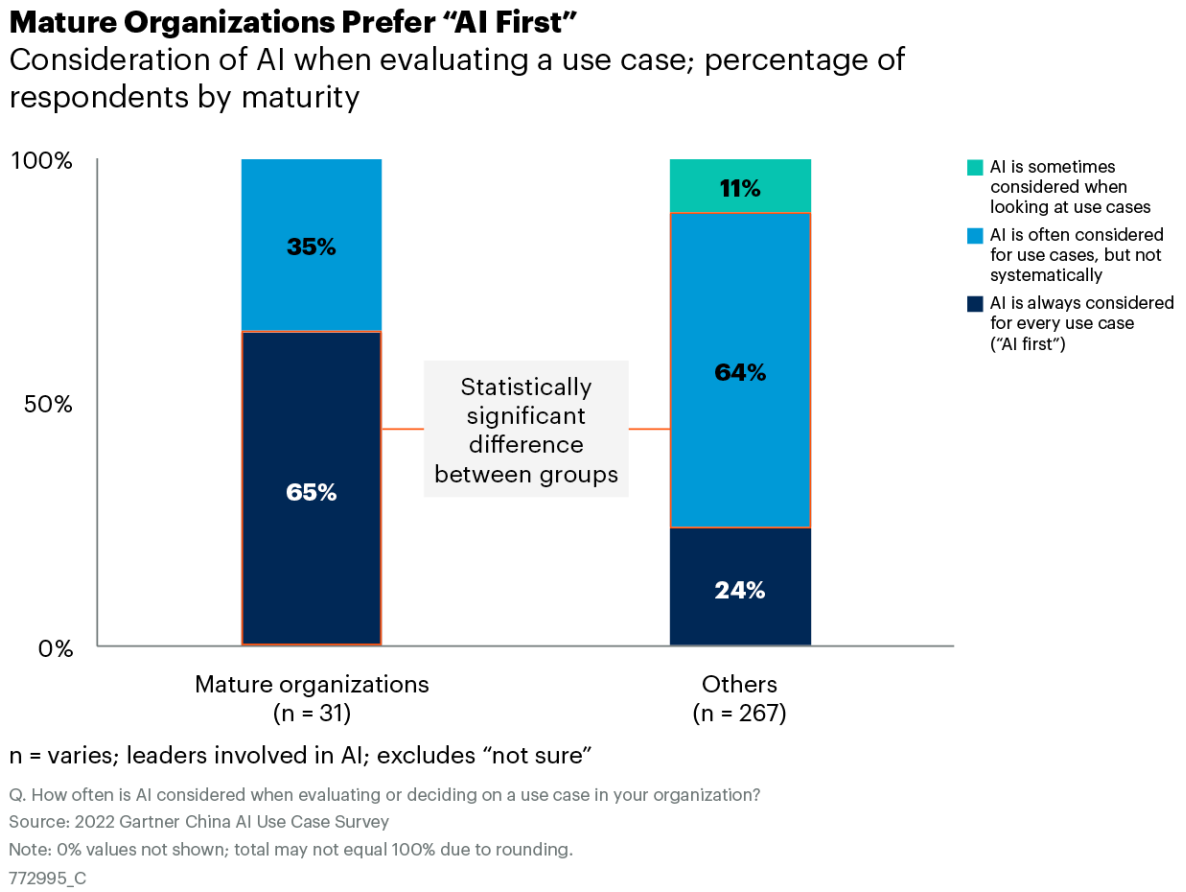
Many AI software solutions build upon large language models that are not yet fully mature, so enterprises must carefully evaluate the available solutions. See Quick Answer: China Perspective — How Do I Compare LLMs?

A large amount of capital concentrated in generative AI has further intensified competition. For more typical AI cases, see Use-Case Prism: Generative AI in China.

Translate "Generative AI" Hype Into an AI Engineering Practice to Embrace AI 3.0

According to the 2022 Gartner China AI Use-Case Survey, mature AI organizations are gravitating toward an AI-first policy compared to those who are less mature in AI when evaluating a use case (see Figure 4).

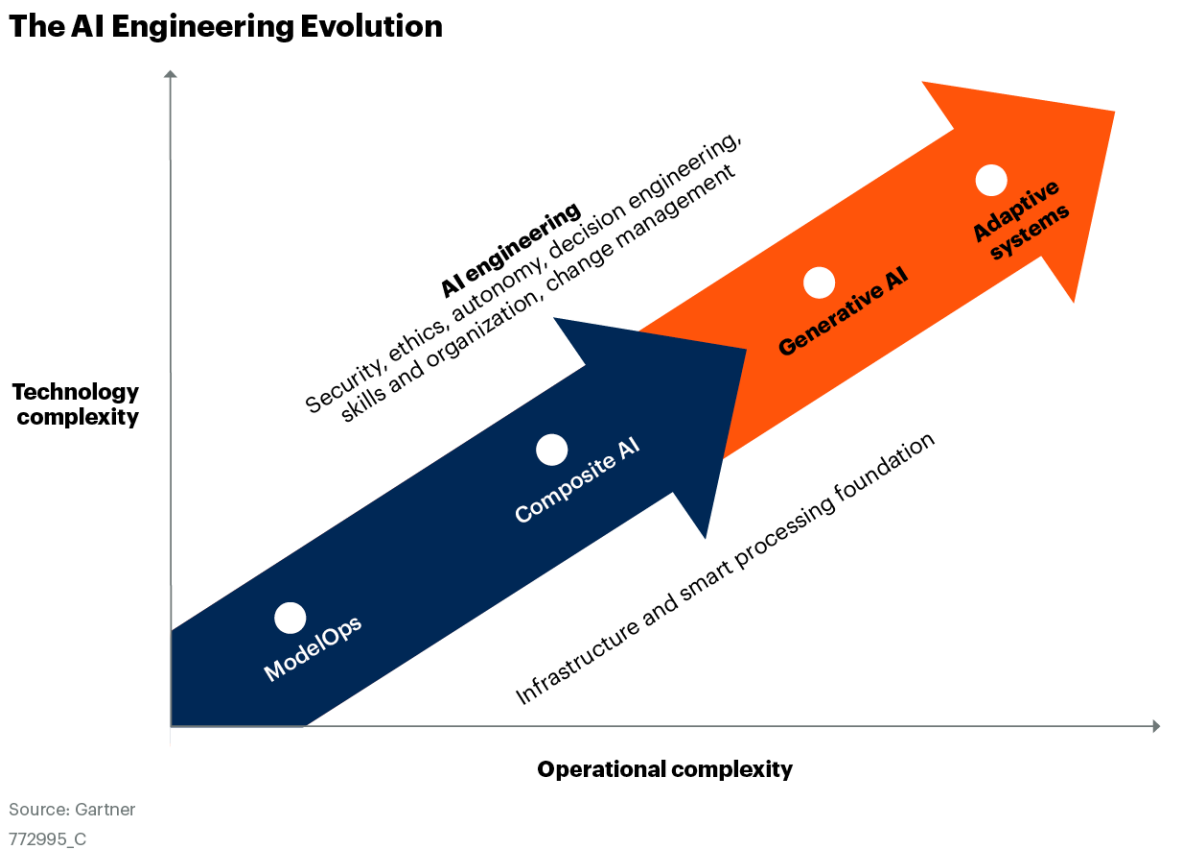
Figure 4: Mature Organizations Prefer "AI First"



In Chinese enterprises, the use of MLops was poised to increase from 17% to 28% from 2022 to 2023, according to the 2023 CIO and Technology Executive Survey. [14] While MLOps adoption has increased, it is still at a low level of AI engineering maturity in Chinese enterprises. Generative AI requires more effort from AI engineering as it increases in complexity — both in terms of technology and operational efficiency — so it requires more AI maturity from Chinese enterprises, as shown in Figure 5.

An AI engineering practice leveraging the collective offerings of AI platform vendors and technology specialists is required to support strategic AI implementation. See Top Strategic Technology Trends for 2022: AI Engineering and Innovation Guide for Generative AI Technologies.

Figure 5: The AI Engineering Evolution

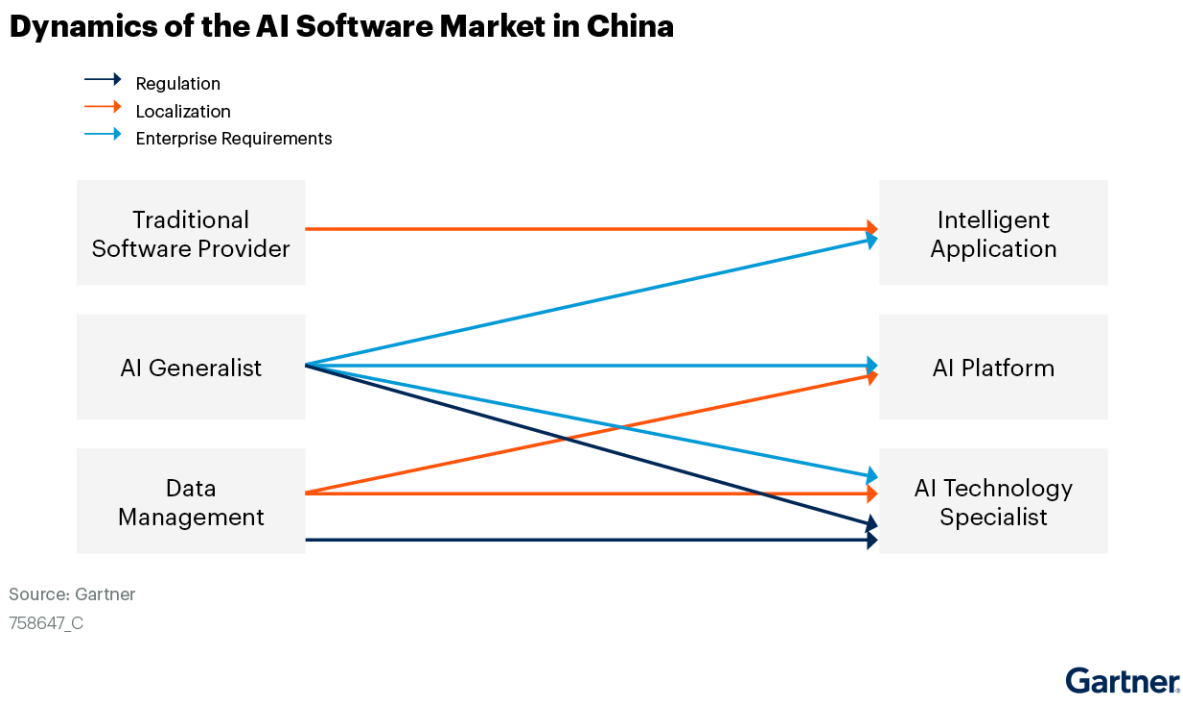


The AI software market has evolved through vendors adding many capabilities based on multiple AI techniques. An increasing number of client queries and associated use cases are moving beyond single AI technique problems. The composite AI trend is already augmenting and transforming many existing software platforms; it is the precursor to the advent of decision intelligence platforms (see Innovation Insight for Decision Intelligence Platforms). The streamlining of decision modeling throughout organizations will be preparation for the next stage of AI software as it moves toward autonomous systems and software agents.

The Market Is Shifting From AI Generalists to More Specialized AI Software Providers

Figure 6 illustrates the dynamics of the AI software market in China, which is shifting from more general-purpose providers to more specialized providers (as shown on the right).

Figure 6: Dynamics of the AI Software Market in China



Intelligent applications embed packaged, off-the-shelf AI solutions, enabling business users to address specific issues. They don't require experimentation and data exploration during implementation and deployment.

Localization will accelerate the transition of traditional Chinese software providers as they shift from ERP and Industry 4.0 platforms to intelligent applications that leverage AI. Some AI generalists will also evolve into providers of intelligent applications to meet enterprise demands for quicker time to value and vertical solutions.

AI technology specialist vendors are usually AI-platform-agnostic. They specialize in parts of the AI value chain, such as data preprocessing, data labeling and annotation, explainable AI and ModelOps. Partially due to regional regulations, there will be more technology specialists, such as for data privacy protection, vector database evolving from the current data management vendors, as well as more AI TRISM vendors that were previously AI generalists. Driven by localization, some data management vendors will evolve to become AI technology specialists focusing on data preprocessing. They are composable with the AI platform vendors to increase efficiency and best-breed experience.

AI platforms help enterprises develop, scale and operationalize AI workloads covering one or several AI techniques, such as:

- Computer vision
- Natural language processing
- Machine learning
- Agent-based modeling
- Operational research
- Expert systems
- Knowledge graphs

AI platform vendors provide full life cycle management services — spanning from ideation, use-case identification, data collection, data enhancement and AI development, to AI deployment, monitoring and recalibration — enabling enterprises to operate and orchestrate their own large-scale intelligent services. AI generalists that can scale AI into production most efficiently will evolve into AI platform vendors. Because localization will shift the data gravity, some data management platforms that accumulate large amounts of data for AI workloads may also evolve into AI platforms.

Some AI platform vendors offer their customers and ecosystems "AI as a service" — aka APIs from their AI open platforms. Those APIs, such as optical character recognition (OCR), sentiment analysis and video analysis APIs, could be leveraged to build intelligent applications.

Intelligent applications, AI technology specialists and AI platforms complement one another. Table 1 compares the three.

Table 1: Specialized AI Software Segments Complement One Another

(Enlarged table in Appendix)

Category	Intelligent application	AI technology specialist	AI platform
Business strategy	Commodity	Efficiency	Differentiation
Build/buy	Buy	Mixed	Build
Time to value	Fast to moderate	N/A	Moderate to slow
Implementation cost	Low	Low to medium	High
Maintenance cost	Low	Low to medium	Medium to high
Scalability	Low to high	Medium to high	High
Customization	Low to medium	Low to medium	High
Strength	Business vertical depth	Platform-agnostic, providing efficiency and synergy	Strong technical coverage and ecosystem
Flexibility	Low to medium	Medium to high	High
Data requirements	Predefined	Exploratory; predefined	Exploratory; predefined
User persona	Citizen data scientist; developer; business user	Citizen data scientist; developer; data scientist	Citizen data scientist; developer; data scientist

Source: Gartner (October 2023)

Representative Vendors

The vendors listed in this Market Guide do not imply an exhaustive list. This section is intended to provide more understanding of the market and its offerings.

Vendor Selection

This list represents Chinese local vendors that provide AI software at different levels of maturity. We selected these vendors based on input from our secondary research team and feedback from client inquiries.

Table 2: Representative List of Vendors in the Chinese AI Software Market

(Enlarged table in Appendix)

Vendor Name in English	Headquarters	Sample Product Name
1data.info	Shanghai	CubeCognition
4Paradigm	Beijing	Sage HyperCycle
AI Indeed	Hangzhou	Indeed IDP
Alibaba Cloud	Hangzhou	Machine Learning Platform for AI
Baidu AI Cloud	Beijing	BML
BaseBit	Shanghai	XDP
BasicFinder	Beijing	Data Labeling&annotation
Cardinal Operations	Beijing	COPT Solver
DataCanvas	Beijing	DataCanvas
DataGrand	Shanghai	IDP
Datatang	Beijing	Dataplus Pro AI Data Annotation Platform
Data Grand	Shanghai	IDP
ExtremeVision	Shenzhen	AI vision model marketplace
Fudata	Shanghai	FMPC secure computing platform
Huawei Cloud	Shenzhen	Modelarts
iFLYTEK	Hefei	openplatform
Insightone	Beijing	insightone
JD Cloud	Beijing	Yanxi AI development platform
Laiye	Beijing	Intelligent automation platform
Netease	Hangzhou	Machine learning platform
nvxclouds	Hangzhou	Privacy protection computing platform
PERCENT Technology	Beijing	Knowledfge fusion analysis system
Rcrai	Beijing	Sales insight
SenseTime	Shanghai	SenseFoundry Enterprise
Sobot AI	Beijing	Chatbot
Speechocean	Beijing	Off-the-shelf Datasets
Stargraph	Beijing	Knowledge graph platform
Voicecomm	Shanghai	Voicecomm Suites
Tencent Cloud	Beijing	Cloud TI platform
Transwarp	Shanghai	Sophon
Tustbe	Hangzhou	GAIA
UHAlean	Shanghai	Collabrative supply planning
Ultipa	Beijing	Ultipa Graph
Volcengine	Beijing	Intelligent creative cloud
Zhipu AI	Beijing	Open platform
Zilliz	Shanghai	milvus

Source: Gartner (October 2023)

Market Recommendations

- Maximize business value from ongoing AI initiatives by establishing AI engineering practices such as ModelOps, composite AI and GenAI that streamline the data, model and implementation pipelines to standardize AI delivery processes:
  - Ensure that your AI software portfolio can provide multipersona functionality to fulfill the various requirements of citizen data scientists, data engineers, machine learning engineers, software developers, AI model validators and data scientists.
  - Choose the right AI software portfolio to scale your AI delivery, both from the technology side and from the business side.
- Avoid siloed or overlapping AI software investments by developing a strategy for the adoption of various types of AI software available and the extent to which they differ from one another:
  - Establish your enterprise AI strategy — based on your business strategy, organizational readiness, skills, data availability and technical architecture — before you start to choose AI software.
  - Explore immediate time-to-value use cases today, and invest in competitive business differentiation by adopting AI techniques.
- Work closely with the lines of business and the legal team to execute relevant, transparent and resilient decisions by leveraging best-of-breed composable AI software:
  - Leverage the Gartner Decision Intelligence (GDI) model to identify and accommodate uncertainty factors and evaluate the contributing decision-modeling techniques (see Reengineer Your Decision-Making Processes for More Relevant, Transparent and Resilient Outcomes).
  - Determine the requirements for privacy, security and explainability (including diversity and bias mitigation), by consulting with lines of business and legal teams before you start AI delivery.

Evidence

2022 Gartner China AI Use-Case Survey. This survey was conducted to understand AI implementations in China, and to understand where organizations have been most successful in deploying AI use cases. The research was conducted online from 14 November through 16 December 2022 among 300 respondents from organizations in China. Quotas were established for company sizes (in terms of annual revenue) and industries to ensure a good representation across the sample. Quotas included 45 small businesses (less than $50 million), 105 midsize enterprises ($50 million to less than $500 million), 120 large enterprises ($500 million to less than $10 billion), and 30 global enterprises (over $10 billion). Organizations were required to have developed AI to participate. Respondents were required to be in a manager role or above and have a high level of involvement with at least one stage of the life cycle from ideating to measuring AI use cases. *Disclaimer: The results of this survey do not represent global findings or the market as a whole, but reflect the sentiments of the respondents and companies surveyed.*

[1] Full Translation: China's 'New Generation Artificial Intelligence Development Plan' (2017), New America.

[2] Interim Measures for the Management of Generative Artificial Intelligence Services, China Law Translate.

[3] The Ethical Norms for the New Generation Artificial Intelligence, China, International Research Center for AI Ethics and Governance.

[4] Data Security Law of the People's Republic of China, The National People's Congress of the People's Republic of China.

[5] Personal Information Protection Law of the People's Republic of China, The National People's Congress of the People's Republic of China.

[6] Provisions on the Administration of Algorithm Recommendations for Internet, Cyberspace Administration of China.

[7] China's AI Patent Explosion, Deacons.

[8] Shanghai Technology Exchange Opens to Drive Innovation, People's Daily Online.

[9] See the following:

- Opinions of the Central Committee of the Communist Party of China and the State Council on Building a More Complete System and Mechanism for Market-Based Allocation of Factors, The Chinese Central Government's Official Web Portal.
- New Guideline to Better Allocate Production Factors, China Daily.

[10] The General Office of the State Council on Printing and Distributing the Market-Oriented Allocation of Factors, The Chinese Central Government's Official Web Portal.

[11] China's Data Exchanges, Explained, TechNode.

[12] Telecom Operators React Vigorously to Nation's East-West Plan, China Daily.

[13] Impact of Generative AI to the Chinese Enterprise: This webinar was held on 27 July 2023 with 118 respondents to the polling. Results of these polls should not be taken to represent all executives, as the survey responses come from a population that had expressed interest in AI by attending a Gartner webinar on the subject.

[14] **2023 Gartner CIO and Technology Executive Survey:** This survey was conducted to help CIOs and technology executives overcome digital execution gaps by empowering and enabling an ecosystem of internal and external digital technology producers. It was conducted online from 2 May 2022 through 25 June 2022 among Gartner Executive Programs members and other CIOs. Qualified respondents are each the most senior IT leader (e.g., CIO) for their overall organization or some part of their organization (for example, a business unit or region). The total sample is 2,203 respondents, with representation from all geographies and industry sectors (public and private), including 75 from China.The survey was developed collaboratively by a team of Gartner analysts and Gartner's Research Data, Analytics and Tools team. *Disclaimer: Results do not represent global findings or the market as a whole, but reflect sentiment of the respondents and companies surveyed.*

Note 1: Gartner's Initial Market Coverage

This Market Guide provides Gartner's initial coverage of the market and focuses on the market definition, rationale for the market and market dynamics.

Document Revision History

Market Guide for AI Software, China - 16 May 2022

Recommended by the Authors

Some documents may not be available as part of your current Gartner subscription.

What Is Artificial Intelligence? Ignore the Hype; Here's Where to Start

Top Strategic Technology Trends for 2022: AI Engineering

Tool: Vendor Identification for AI Foundation Models, China

Innovation Guide for Generative AI Technologies

Quick Answer: How Do I Compare LLMs?

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Cardinal Operations	Beijing	COPT Solver
DataCanvas	Beijing	DataCanvas
DataGrand	Shanghai	IDP
Datatang	Beijing	Dataplus Pro AI Data Annotation Platform
Data Grand	Shanghai	IDP
ExtremeVision	Shenzhen	AI vision model marketplace
Fudata	Shanghai	FMPC secure computing platform

Huawei Cloud	Shenzhen	Modelarts
iFLYTEK	Hefei	openplatform
Insightone	Beijing	insightone
JD Cloud	Beijing	Yanxi AI development platform
Laiye	Beijing	Intelligent automation platform
Netease	Hangzhou	Machine learning platform
nvxclouds	Hangzhou	Privacy protection computing platform
PERCENT Technology	Beijing	Knowledfge fusion analysis system
Rcrai	Beijing	Sales insight
SenseTime	Shanghai	SenseFoundry Enterprise
Sobot AI	Beijing	Chatbot
Speechocean	Beijing	Off-the-shelf Datasets
Stargraph	Beijing	Knowledge graph platform
Voicecomm	Shanghai	Voicecomm Suites
Tencent Cloud	Beijing	Cloud TI platform
Transwarp	Shanghai	Sophon
Tustbe	Hangzhou	GAIA
UHAlean	Shanghai	Collabrative supply planning

Ultipa	Beijing	Ultipa Graph
Volcengine	Beijing	Intelligent creative cloud
Zhipu AI	Beijing	Open platform
Zilliz	Shanghai	milvus

Source: Gartner (October 2023)