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WHAT'S HOT

The next frontier for AI in China could add \$600 billion to its economy

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INDUSTRY FOCUS

HOW AI WILL CHANGE THE FUTURE OF SEARCH ENGINE OPTIMIZATION



THE NEXT FRONTIER FOR AI IN CHINA COULD ADD \$600 BILLION TO ITS ECONOMY

Overview

By 2030, AI could disrupt transportation and other key sectors in China, adding significant economic value—but only if strategic cooperation and capability building occur across multiple dimensions.

In the past decade, China has built a solid foundation to support its AI economy and made significant contributions to AI globally. Stanford University's AI Index, which assesses AI advancements worldwide across various metrics in research, development, and economy, ranks China among the top three countries for global AI vibrancy.¹ On research, for example, China produced about one-third of both AI journal papers and AI citations worldwide in 2021. In economic investment, China accounted for nearly one-fifth of global private investment funding in 2021, attracting \$17 billion for AI start-ups.

Today, AI adoption is high in China in finance, retail, and high tech, which together account for more than one-third of the country's AI market. In tech, for example, leaders Alibaba and ByteDance, both household names in China, have become known for their highly personalized AI-driven consumer apps.

In fact, most of the AI applications that have been widely adopted in China to date have been in consumer-facing industries, propelled by the world's largest internet consumer base and the ability to engage with consumers in new ways to increase customer loyalty, revenue, and market valuations.

Five types of AI companies in China

In China, we find that AI companies typically fall into one of five main categories:

1. **Hyperscalers** develop end-to-end AI technology capability and collaborate within the ecosystem to serve both business-to-business and business-to-consumer companies.
2. **Traditional industry companies** serve customers directly by developing and adopting AI in internal transformation, new-product launch, and customer services.
3. **Vertical-specific AI companies** develop software and solutions for specific domain use cases.
4. **AI core tech providers** provide access to computer vision, natural-language processing, voice recognition, and machine learning capabilities to develop AI systems.
5. **Hardware companies** provide the hardware infrastructure to support AI demand in computing power and storage.

So what's next for AI in China?

In the coming decade, our research indicates that there is tremendous opportunity for AI growth in new sectors in China, including some where innovation and R&D spending have traditionally lagged global counterparts: automotive, transportation, and logistics; manufacturing; enterprise software; and healthcare and life sciences. In these sectors, we see clusters of use cases where AI can create upwards of \$600 billion in economic value annually.

(To provide a sense of scale, the 2021 gross domestic product in Shanghai, China's most populous city of nearly 28 million, was roughly \$680 billion.) In some cases, this value will come from revenue generated by AI-enabled offerings, while in other cases, it will be generated by cost savings through greater efficiency and productivity. These clusters are likely to become battlegrounds for companies in each sector that will help define the market leaders.

Unlocking the full potential of these AI opportunities typically requires significant investments—in some cases, much more than leaders might expect—on multiple fronts, including the data and technologies that will underpin AI systems, the right talent and organizational mindsets to build these systems, and new business models and partnerships to create data ecosystems, industry standards, and regulations. In our work and global research, we find many of these enablers are becoming standard practice among companies getting the most value from AI.

To help leaders and investors marshal their resources to accelerate, disrupt, and lead in AI, we dive into the research, first sharing where the biggest opportunities lie in each sector and then outlining the core enablers to be tackled first.

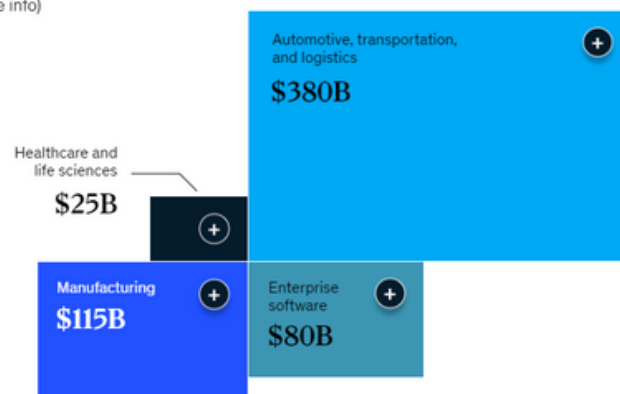
Following the money to the most promising sectors

We looked at the AI market in China to determine where AI could deliver the most value in the future. We studied market projections at length and dug deep into country and segment-level reports worldwide to see where AI was delivering the greatest value across the global landscape. We then spoke in depth with experts across sectors in China to understand where the greatest opportunities could emerge next. Our research led us to several sectors: automotive, transportation, and logistics, which are collectively expected to contribute the majority—around 64 percent—of the \$600 billion opportunity; manufacturing, which will drive another 19 percent; enterprise software, contributing 13 percent; and healthcare and life sciences, at 4 percent of the opportunity.

Within each sector, our analysis shows the value-creation opportunity concentrated within only two to three domains. These are typically in areas where private-equity and venture-capital-firm investments have been high in the past five years and successful proof of concepts have been delivered.

In key sectors, specific domains offer China the highest potential economic value from AI.

Total estimated economic value: \$600B
(click for more info)



Source: Expert interviews and McKinsey analysis, October–November 2021

McKinsey
& Company





Automotive, transportation, and logistics

Top unlocks: Technology, data

Total of high-value domains:

\$380B

1 Autonomous driving

\$335B

Use computer vision, machine learning, and neural networks to enable vehicles to map surroundings, detect and predict road traffic, and make real-time driving decisions, reducing number of accidents and costs.

2 Personalized updates

\$30B

Apply recommendation techniques on connected-car data (vehicle operations, driver behavior, entertainment interaction) to tailor recommendations for hardware and software updates and driving experience.

3 Fleet asset management

\$15B

Apply operations-research optimizers on connected fleet's IoT data to optimize fleet operations and route planning, reducing fuel consumption and maintenance cost.

Manufacturing

Top unlocks: Technology, data, talent

Total of high-value domains:

\$115B

1 Product R&D

\$15B

Leverage digital twins and machine learning in new-product-design testing and validation, rapidly predicting product-design outcomes, reducing R&D costs, and potentially creating new products and improving product quality.

2 Process-design R&D

\$100B

Leverage digital twins and machine learning to simulate, test, and validate manufacturing-process outcomes before commencement of mass production, reducing significant R&D costs in manufacturing-process design.

Enterprise software

Top unlocks: Talent, regulation

Total of high-value domains:

\$80B

1 Data & middleware

\$45B

Adopt cloud data warehouses to reduce operations and maintenance costs; leverage AI algorithm APIs to streamline production of core AI models; and adopt MLOps to automatically deploy and maintain optimal models.

2 SaaS applications

\$35B

Apply facial recognition, computer vision, and natural-language processing to process images and voice data, and use machine learning algorithms to make predictions and decisions across enterprise functions in finance and tax, human resources, supply chain, and cybersecurity.

Healthcare and life sciences

Top unlocks: Technology, data, regulation

Total of high-value domains:

\$25B

1 Drug discovery

\$10B

Use AI technology for rapid target discovery and novel molecules design for different identified drug targets, speeding up new-drug discovery and time to market and reducing cost of drug R&D.

2 Clinical-trial optimization

\$10B

Use natural-language processing and machine learning to collect and analyze data to predict clinical-trial outcomes and optimize clinical-study design, reducing time and cost of clinical trials and speeding up time to market of new drugs.

3 Clinical-decision support

\$5B

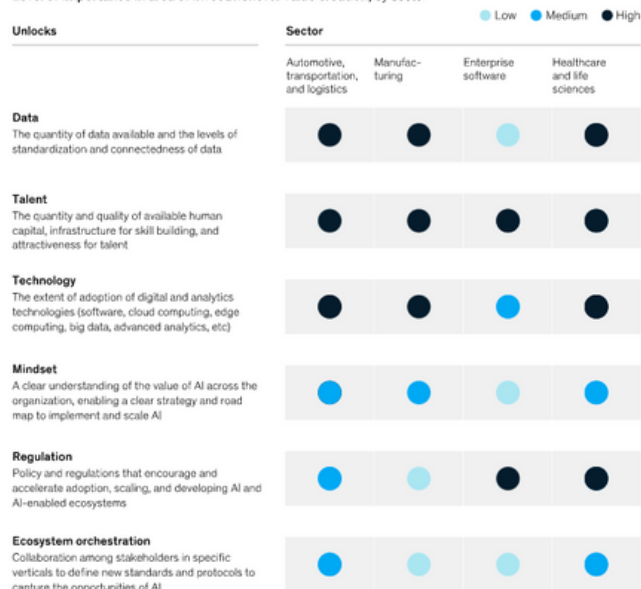
Apply machine learning algorithms to medical images or medical data to predict diagnostic outcomes and support clinical decisions, reducing cost of diagnostics while improving reliability and accuracy.

How to unlock these opportunities

During our research, we found that realizing the value from AI would require every sector to drive significant investment and innovation across six key enabling areas (exhibit). The first four areas are data, talent, technology, and significant work to shift mindsets as part of adoption and scaling efforts. The remaining two, ecosystem orchestration and navigating regulations, can be considered collectively as market collaboration and should be addressed as part of strategy efforts.

All four sectors must make investments in six key areas to unlock the full economic value potential from AI, but their level of importance varies.

Level of importance in area of investment for value creation, by sector



Source: Expert interviews and McKinsey analysis, October–November 2021

McKinsey
& Company

Some specific challenges in these areas are unique to each sector. Broadly speaking, four of these areas—data, talent, technology, and market collaboration—stood out as common challenges that we believe will have an outsized impact on the economic value achieved. Without them, tackling the others will be much harder.

Source: McKinsey & Company



HEADLINE NEWS IN A FLASH

A NEW TOOL FROM GOOGLE SHOWS HOW THE PLANET IS CHANGING IN NEAR REAL TIME

A new tool from Google Earth Engine and the nonprofit World Resources Institute pulls from satellite data to build detailed maps in near real time. Called Dynamic World, it zooms in on the planet in 10-by-10-meter squares from satellite images collected every two to five days. The program uses artificial intelligence to classify each pixel based on nine categories that range from bare ground to trees, crops, and buildings. Researchers, nonprofits, and other users can "explore and track and monitor changes in these terrestrial ecosystems over time," says Tanya Birch, senior program manager for Google Earth Outreach. As the tool was being built last year, Birch used it in the days after the Caldor Fire, a wildfire that burned more than 200,000 acres in California.

Source: *fastcompany.com*

WHY AI CUSTOMER JOURNEYS NEED MORE FRICTION

In marketing circles, friction has become synonymous with "pain point." Eradicating it, conventional wisdom goes, is crucial to building a customer-centric strategy that yields competitive advantage. Taking a cue from policy applications of behavioral economics, marketers seek to "nudge" people along the customer journey and remove friction in the battle against "sludge." At many firms, "artificial intelligence" has become the go-to tool for creating frictionless experiences and removing impediments that slow down efficient customer journeys. While this was true before the pandemic, Covid-19 has only hastened this digital transformation trend by creating demand for more contactless customer experiences that reduce points of potential friction, like in-person human interactions.

Source: *Harvard Business Review*

FEEDBACK CAN IMPROVE EMPLOYEE PERFORMANCE—BUT THE SOURCE IS JUST AS IMPORTANT AS THE ADVICE

In a 2021 study published in *Strategic Management Journal*, researchers used A.I. to track employee behaviors and recommend performance improvements. The resulting feedback was more accurate, more individualized, and more relevant for individual employees. Employee performance improved dramatically. Until the employees were told the feedback they received had been generated by A.I. Then their performance actually dropped below pre-study levels – even though the "computer" feedback provided "higher quality feedback in terms of greater breadth and depth than do human managers, which in turn increases employees' learning and performance." And even though the job performance of employees who received "computer" feedback improved by 12 more than those who received "human" feedback.

Source: *Inc.com*

HOW AUTONOMOUS BOATS COULD HELP SAVE THE ENVIRONMENT

A self-piloted ship designed to recreate the Mayflower's journey across the Atlantic 400 years ago has crossed the ocean. It's part of a growing number of boats that use artificial intelligence (AI) to guide themselves in a trend that could make ocean shipping and transportation greener and more efficient. "From a sustainability perspective, having an unmanned vessel allows for slower, more fuel-efficient routes," Marc Taylor, a logistics specialist at TheoremOne, an innovation and engineering company, told Lifewire in an email interview. "The onboard AI technology can analyze real-time sea conditions to allow the engine to operate in the most efficient way." In a voyage lasting 40 days across 3,500 miles at sea, the Mayflower Autonomous Ship arrived in North America in Halifax, Nova Scotia, on June 5. On board the ship, there are 6 AI-powered cameras and more than 30 sensors, which help the AI Captain to interpret and analyze sea conditions.

Source: *Lifewire*

HOW A.I. IS BEING USED AS A TOOL FOR INNOVATION, NOT JUST EFFICIENCY

Of the 1,600-plus companies surveyed, only 12% were considered to have achieved "A.I. Maturity," which Accenture defines as having "mastered A.I.-related capabilities in the right combination to achieve high performance for customers, shareholders, and employees." They expect that number to increase to 27% by 2024, mainly because these businesses have seen, on average, 50% higher growth in revenue over firms that are slower to develop their artificial intelligence capabilities. Many of the executives participating in the roundtable emphasized the ways that A.I. is allowing them to go beyond efficiency-improving and time-saving tasks to predict and avoid issues that could negatively impact their customers.

Source: *Fortune*

ARTIFICIAL INTELLIGENCE TOOLS TO DETECT BURNOUT

While many tools and tests exist on the Internet to try to figure out if you are suffering from burnout or not, a new method based on artificial intelligence and the use of natural language processing may well offer new perspectives. Natural Language Processing (NLP) is a technology that automatically analyses sentences formulated by a human in order to make a decision or identify a specific behaviour. In order to detect burnout indicators in texts, a large amount of data must be accumulated. The construction of this model was done by collecting 13,568 samples of anonymous texts through the Reddit platform. In this pile of stories, 352 were related to burnout and 979 to depression. The goal of the model is to automatically detect burnouts so that they can then be prevented. So far, the method has a success rate of about 93% in identifying burnout cases.

Source: *The Brussels Times*

HOW AI WILL CHANGE THE FUTURE OF SEARCH ENGINE OPTIMIZATION

AI will completely change SEO as we know it. From optimization to link building, it will significantly impact every aspect of SEO. - SEO Vendor

As artificial intelligence (AI) becomes more sophisticated, search engine optimization will have to adapt. AI can already analyze data at a rate that humans can't, so it's only a matter of time until it starts to dominate SEO strategies.

The SEO industry is always in a state of flux. Google is constantly changing its algorithms, and new technologies are emerging all the time. Ever since Google's announcement in 2015 that they would be using RankBrain, an artificial intelligence (AI) system, to help process search results, the SEO community has been discussing the impact that AI will have on the industry.

RankBrain is not the only AI system that Google is using. In 2017, they announced that they were also using machine learning to fight spam. Since Google's Search Liaison, Danny Sullivan, confirmed in 2019 that RankBrain was now being used for every search query, several companies have started to experiment with AI and machine learning to try and get ahead of the curve. This gave rise to a whole new plethora of AI-based SEO tools. Some of the prominent ways in which AI tools have proven their effectiveness are SEO keyword research, content creation, traffic and site growth analysis, voice search, and SEO workflows. Here's how AI is already changing SEO and how we can expect it to change even more in the future.

Keywords and anchor management

SEO keyword research is one of the most important aspects of SEO. It has always been a time-consuming and tedious task, but AI tools have made it much easier. AI-based keyword capabilities like SEO Vendor's AI Analysis assist in analyzing anchor text usage, keyword variations and semantic keywords.

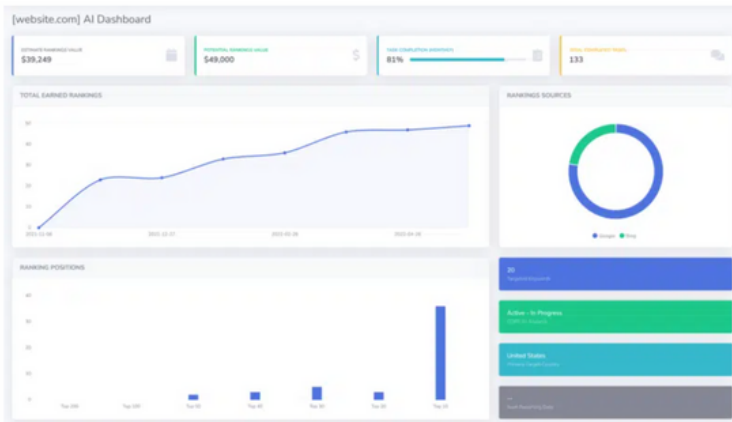
Content creation and analysis

Content is still the king when it comes to SEO. Google's algorithm uses natural language processing (NLP) to understand the content on a webpage and match it with the user's query. This means that creating high-quality, relevant content is more important than ever before. In spite of heated debates over Google's reaction to generated content, we continue to see a greater introduction of tools based on GPT-3, and GPT-4 development is well underway.

Traffic and ranking growth analysis

Understanding your website's rankings and traffic growth is essential for SEO. Google Analytics is a great tool for this, but it can be time-consuming to interpret the data.

AI-based developments like SEO Vendor's "Eye In the Sky" and "Rankings Analyzer" can predict and also warn about rankings growth so that it can automate the identification of issues and provide corrective measures.



SEO workflows

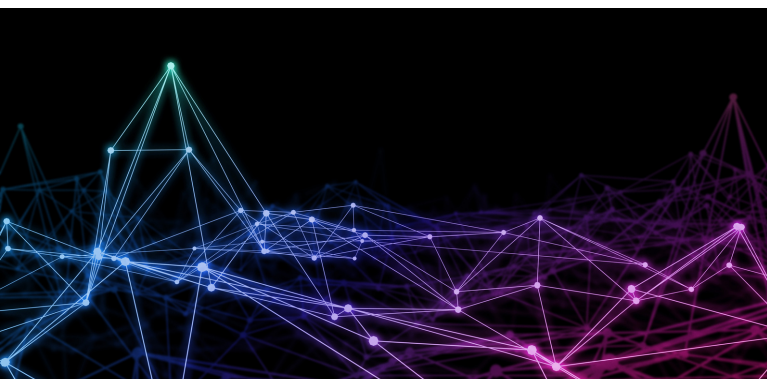
SEO is a complex process with many steps, from keyword research to link building to on-page optimization. AI-based tools help you automate various SEO tasks to focus on other aspects of your business.

Interestingly, AI-based SEO tools that analyze data and workflows are lesser-known. SEO Vendor's CORE AI technology can bridge the AI gap for agencies that lack the technology.

According to Jim Liu, managing partner at SEO Vendor, "Our CORE-AI technology is capable of analyzing websites more effectively and can vastly improve the accuracy of ranking strategies even with search engine algorithm updates. We use artificial neural networks that can learn from more than 100 factors to identify the right direction for a campaign."

It is clear that the SEO industry is getting bolder in applying AI and machine learning. The next few years will be crucial in determining how successful these tools are in helping companies rank higher on SERPs. With the right application of AI tools, the future of SEO looks very bright indeed. "The future of SEO will be heavily influenced by two key factors: the continued rise of mobile search, and the increased use of artificial intelligence in the search industry," said Neil Patel, founder of Crazy Egg and Hello Bar.

With many numerous companies working on AI-first projects, it's hard to predict exactly how AI will change SEO in the future. But here are a few developments that are we can expect from AI in the coming years:



Predict rankings

There are a number of factors that go into ranking a website, including backlinks, social signals, and on-page optimization. With so many variables, it can be difficult to determine which actions will have the biggest impact on your ranking.

AI can analyze all of these factors and predict how each one will impact your ranking. This information can then be used to develop an effective SEO strategy that is more likely to result in a top ranking.

While platforms like SEO Vendor's CORE AI have this capability, it is expected that other companies will also develop new predictive capabilities in the coming years.

Search engines algorithm analysis

Google's algorithms are constantly changing, and it can be difficult to keep up with the latest updates. This often calls for regular site auditing, which can be time-consuming.

In addition, if you make a change to your website that Google doesn't like, you could be penalized or even blacklisted. This can have a devastating effect on your traffic and revenue.

While current audit technology allows you to keep up with the latest changes, in the future, AI will be able to completely analyze your website and identify any potential red flags that could lead to a penalty. This information could then be used to make the necessary changes to your website before it's too late.

Businesses in the future will be able to avoid the costly process of recovering from a Google penalty.

Source: Search Engine Land





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