

Software

AI Evolution: Software's AI moment hasn't arrived (yet)

Industry Overview

Enterprise software's AI optimism vs reality

The US Software sector is up 8% ytd after jumping 58% in 2023, but our client conversations indicate investors expected secular tailwinds from the [newest AI wave](#) to power a continuation of last year's outperformance (Exhibit 1). AI's newest wave represents a paradigm shift in [corporate efficiency](#) and [productivity](#) in line with past disruptive technologies like the personal computer and internet, in our view. However, significant economic implications do not necessarily indicate immediate top- and bottom-line growth for the enterprise software companies producing AI products that enable transformation to occur. We expect [corporate AI adoption](#) to progress rapidly, but AI monetization will likely occur after deliberate and methodical corporate [AI adoption](#).

Our '24 Year Ahead views are playing out

From our [Year Ahead 2024: AI, Consolidation, Cloud](#) report, published Jan 5, 2024:

1. We are balanced on the software sector for '24, particularly in 1H24, given cyclical headwinds and strong '23 performance. Although we are balanced on the sector overall in '24, we expect decelerating headwinds to produce mixed performance in 1H24 before tailwinds accelerate in 2H24 that shift performance positively.
2. A significant number of companies within our coverage universe are rapidly developing AI products. We do not expect AI products to drive significant incremental revenue among our covered companies in '24, but see the potential for meaningful incremental revenue over a multi-year period as AI offerings develop.¹

Skeptics: Where's the killer AI app? Us: Which one?

Past disruptive technologies have historically reached mainstream adoption after 15-30 years, but we expect AI-driven efficiencies and incremental revenue to appear across sectors globally as soon as the next 3-5 years. It's easy to forget that the newest AI apps emerged largely within the last 15 months and remain early in development. However, industry developments appear to be accelerating and in just the last few weeks:

1. OpenAI launched its Sora text-to-video app that generates hyper-realistic videos instantly by entering simple text and enables a diverse list of use cases across marketing, advertising, film, digital art and likely much more (Exhibit 2 & Exhibit 3).
2. Klarna launched a chatbot that does the work of 700 full-time agents, which may boost '24 profits by \$40mn (Exhibit 4 & Exhibit 5).
3. Figure AI raised \$675mn at a \$2.6bn valuation to accelerate development of its enterprise-focused humanoid robots following a commercial agreement with BMW Manufacturing in Jan'24 (Exhibit 6).
4. Microsoft launched its Copilot for Finance app, which may reduce the time needed for data reconciliation to 10 minutes from 1-2 hours.
5. Anthropic released a new version of its Claude chatbot on Mar 4, which may outperform OpenAI's ChatGPT in some areas.
6. A scientific study published in *Cell Genomics*, which leveraged AI systems, identified that there are two distinct subtypes of prostate cancer.

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Equity
Americas
Server & Enterprise Software

Alkesh Shah
Research Analyst
BofAS
+1 646 855 1556
alkesh.shah@bofa.com

Andrew Moss
Research Analyst
BofAS
+1 646 743 2178
andrew.moss@bofa.com

Brad Sills
Research Analyst
BofAS
+1 415 436 1400
brad.sills@bofa.com

Koji Ikeda, CFA
Research Analyst
BofAS
+1 415 913 2106
koji.ikeda@bofa.com

Michael J. Funk
Research Analyst
BofAS
+1 646 855 5664
michael.j.funk@bofa.com

Exhibit 1: S&P Software's '23 outperformance has faded ytd

Software (SSOFT) performance relative to the S&P (SPX) and Nasdaq (CCMP)

Year	Performance		
	S&P SW	S&P	Nasdaq
2024*	8%	8%	8%
2023	58%	24%	43%
2022	-30%	-19%	-33%
2021	41%	27%	21%
2020	44%	16%	44%
2019	46%	29%	35%

Source: BofA Global Research, Bloomberg

*As of 3/7/24. S&P Software measures the performance of the S&P 500 Software Industry GICS3 Index (SSOFT).

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¹ See *Reiterating our SW & AI '24 views* for relevant sections from our '24 Year Ahead report.

AI = Artificial Intelligence

App = Application

SMB = Small and Midsize Business

Sector & AI disappointments don't alter our views

We expect a stronger 2H24...

Disappointing Q4 software earnings do not change our views on our three '24 themes: AI, Consolidation, Cloud. We remain positive on the sector and expect a stronger 2H24 due to improving IT spending, continued shift to the Cloud and secular tailwinds from the newest AI wave that may produce real benefits later this year and next year.

...but we are still in 1H24

However, we remain in 1H24 where multiple issues, including budget prioritization, optimization, ongoing [SMB weakness](#), consolidation and tough comps, led to conservative management outlooks for [Snowflake \(SNOW\)](#), [MongoDB \(MDB\)](#), [Datadog \(DDOG\)](#), [Dynatrace \(DT\)](#) and [GitLab \(GTLB\)](#), among others.

We expect many of our covered companies with AI products in development or production to generate meaningful incremental revenue over the intermediate term, but monetization of AI products will likely occur gradually. Microsoft's Corporate VP for Modern Work & Business Applications, Jared Spataro, noted on Mar 7 that his "job here is to temper your expectations" in response to a question regarding Copilot's current state of functionality. Google discontinued public access to Gemini's image-generating capabilities on Feb 22 after users reported examples of prompts that generated historically inaccurate and offensive images and text responses.

Reiterating our SW & AI '24 views

From our [Year Ahead 2024: AI, Consolidation, Cloud](#) report, published Jan 5, 2024:

Where are we today (and what can we expect in '24)?

2024 outlook – upside risk for undervalued names but balanced on sector overall

We are balanced on the software sector overall for '24, particularly in 1H24, given cyclical headwinds and strong '23 performance, but expect diverging performance across software subsectors with the potential for undervalued names within subsectors we view favorably to produce positive returns.

US Software – secular tailwinds, cyclical headwinds

We expect secular tailwinds to drive software company performance over the long term, but see the potential for shorter-term cyclical headwinds to pressure software company performance in 1H24. The US economy entered the Recovery phase of the business cycle in Jun'23, but our view is that it's likely too early in the economic recovery to be a blind bull. Although we expect undervalued software names within select subsectors to deliver positive performance in the year ahead, it's likely several quarters too soon to expect the software sector to broadly deliver positive returns.

AI: Disruption ≠ Revenue (yet)

Economic and corporate AI implications – a potential disconnect

Companies integrated AI into processes and products over the last few decades, but our view is that AI's newest wave represents a paradigm shift in corporate efficiency and productivity in line with past disruptive technologies like the personal computer and internet. The newest foundation models and AI apps may transform the economy as corporates implement tools into their processes that drive permanent operational efficiency and productivity gains, but significant economic implications do not necessarily indicate top- and bottom-line growth for the Pick & Shovel companies producing the AI products that enable transformation to occur.

Focus: AI product adoption to AI product monetization

It's difficult to overstate how transformative the AI applications that have only just emerged could be, as well as the thousands that have yet to be created. The list of

companies leveraging AI applications to drive efficiencies and increased productivity is expansive and touches firms across every sector globally. We expect software companies to increase AI investments significantly in the year ahead, although it remains unclear whether the newest wave of AI products will produce the next leg of software revenue growth, enable companies to defend their market shares or a mix of both.

Among our software coverage, almost all of them are developing AI products; however, very few have articulated monetization strategies. Some of our covered companies are likely to produce AI products to defend their market shares, but we expect many more to articulate AI product monetization strategies in '24 as focus on adoption shifts to monetization.

Will AI drive significant software revenue growth acceleration in '24? Unlikely

ChatGPT reached 100mn users in record time and AI apps have produced as many images in just one year as all of humanity's photographers have produced in 150 years. However, the companies producing the AI tools that enabled these feats have yet to see a proportional boost in revenue. We do not expect AI products to drive significant incremental revenue among our covered companies in the year ahead and see the potential for AI-driven revenue to fall below expectations over the next five years.

It's only the beginning

Our view is that select companies with monetizable AI products in production may begin to generate incremental revenue in the year ahead, potentially cannibalizing corporate spending on "nice-to-have" software. Although corporate spending for some software segments may decelerate in the short term as focus shifts to AI initiatives, we expect many of the companies developing AI products and features to produce revenue over the longer term that offsets revenue lost due to AI dilution. The newest AI wave is most likely to be net revenue additive for companies that develop substantive AI products and features that leverage large data sets and are sold through formidable sales channels.

Exhibit 2: OpenAI's Sora text-to-video app generates hyper-realistic video instantly by entering simple text

Prompt: "Several giant woolly mammoths approach treading through a snowy meadow, their long woolly fur lightly blows in the wind as they walk..."



Source: OpenAI, BofA Global Research

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Exhibit 3: OpenAI's Sora text-to-video app enables a diverse list of use cases across marketing, advertising, film, digital art and likely much more

Prompt: "Animated scene features a close-up of a short fluffy monster kneeling beside a melting red candle. The art style is 3D and realistic..."



Source: OpenAI, BofA Global Research

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Exhibit 4: Klarna's AI-powered bot does the work of 700 full-time agents
Klarna's chatbot assistant exhibits improved performance vs traditional bots

General questions

What kind of help can you provide that a non-AI powered bot can't?

As an AI-powered assistant, I can provide 24/7 personalized support in any language. I can help you take direct actions within the chat, like initiating a payment, updating your personal details, or reporting an issue. Plus, I have access to your order details, which allows me to provide more accurate and tailored assistance.

For example, I can help you with:

1. Understanding your payment schedule.
2. Reporting a problem with your order.
3. Updating your personal details.
4. Answering general questions about Klarna's services.

And the best part? You don't have to wait in line or on hold. I'm here to help you right away. So, how can I assist you today?

Source: Klarna, BofA Global Research

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Exhibit 5: Klarna expects its AI-powered bot to boost '24 profits by \$40mn
Klarna's chatbot assistant exhibits improved performance vs traditional bots

General questions

Why is Klarna the best

Klarna offers a unique and flexible way to pay and shop online. Here are a few reasons why Klarna stands out:

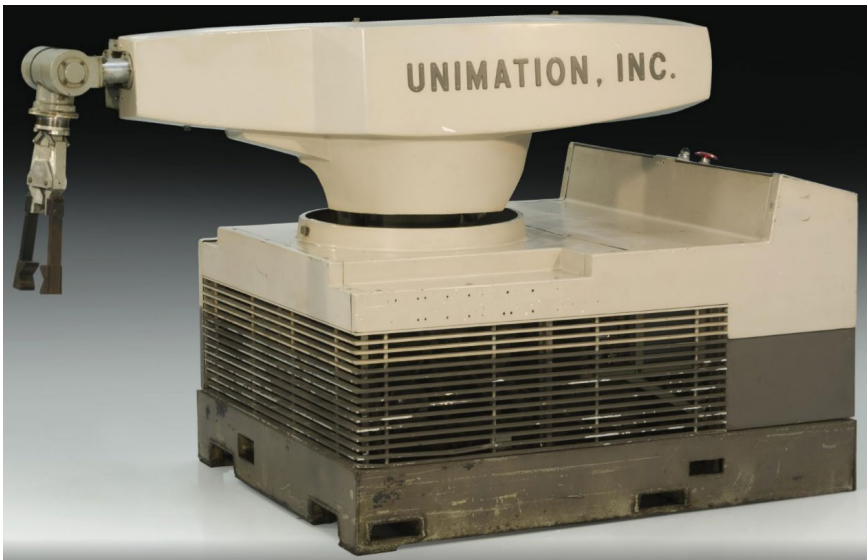
1. ****Flexible Payment Options****: Klarna offers various payment methods such as 'Pay in 4', 'Pay Now', and 'Pay Later', allowing you to choose the one that suits you best.
2. ****No Interest or Fees****: When you pay on time, there are no interest charges or fees with our 'Pay in 4' option.
3. ****Safe and Secure****: Klarna uses advanced security measures to protect your information and provides a zero fraud liability guarantee.
4. ****Smooth Shopping Experience****: With the Klarna app, you can manage your payments, report returns, and get access to exclusive deals and offers all in one place.
5. ****24/7 Customer Support****: Whether it's through our customer service team or this chat, we're always here to help.

Remember, our goal is to make online shopping simpler and stress-free. If you have any other questions or need assistance with something, feel free to ask!

Source: Klarna, BofA Global Research

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Exhibit 6: Humanoid robots today increasingly resemble the robots portrayed in the film *iRobot*
The first Unimate robot weighed 3k lbs and was installed in a GM plant in 1961 to unload a die-casting press



Source: From the Collections of The Henry Ford

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