LIFE SCIENCES INDUSTRY REPORT 2025

PART 3: ARTIFICIAL INTELLIGENCE

Uncover the transformative trends that will drive the life sciences industry ahead, backed by expert commentary and data-driven insights.

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Editors’ introduction

Artificial intelligence (AI) has long promised to transform the life sciences, but today, we stand at a critical juncture where this potential is rapidly becoming a reality. Across every corner of the industry, from research and development to patient engagement, AI, and most recently generative AI (GenAI), is driving profound change. The ability to decode complex biological systems, accelerate drug development, and refine patient care pathways enables us as humans to approach challenges in different ways, opening new avenues for treatment and reshaping the way that we engage and interact with the world around us.

Yet, as the technology takes on increasingly sophisticated roles, it also raises important questions about integration, oversight, and trust. The life sciences sector, by its nature, operates within a landscape of high stakes and rigorous standards, so it is understandable that introducing AI into this environment has raised significant questions about data privacy, algorithmic transparency, and ethical deployment.

As AI grows increasingly complex, so too does the dialogue between cutting-edge technology and regulatory frameworks, underscoring the need for collaborative solutions that uphold both progress and patient welfare.

This booklet delves into these evolving dynamics, offering expert insights into how Gen AI, and AI more broadly, is enhancing efficiency and redefining the foundations of the life sciences sector. From decoding biological software to improving patient care and beyond, this is a pivotal moment for the industry to reflect on how we can responsibly harness AI’s immense potential for meaningful, sustainable impact.

Eloise McLennan
Deep Dive Editor

Nicole Raleigh
Web Editor

Contents

Life Sciences Industry Report 2025 Part 3:
Artificial intelligence

Data privacy concerns

One third of healthcare providers (HCPs) identify data privacy as the primary challenge for AI integration in clinical practice (GlobalData).

Concerns about data bias

87% of healthcare leaders express concern that data bias in AI applications could exacerbate disparities in health outcomes (Philips).

Research surge

In 2024, 5,581 papers on AI in healthcare were published on PubMed, marking a 98% increase from 2,825 papers in 2020.

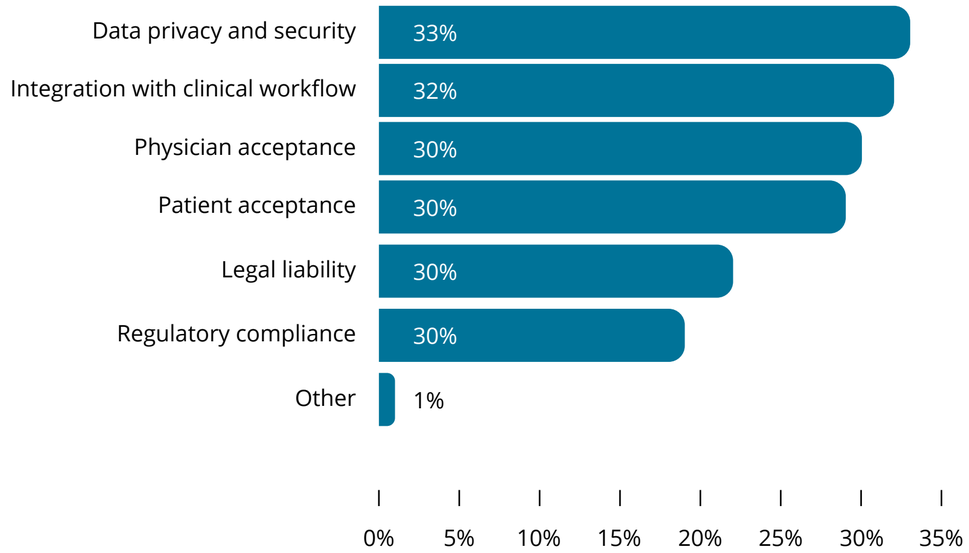
Investment in generative AI

A significant 98% of healthcare leaders globally are either investing in or planning to invest in generative AI (McKinsey).

Market growth

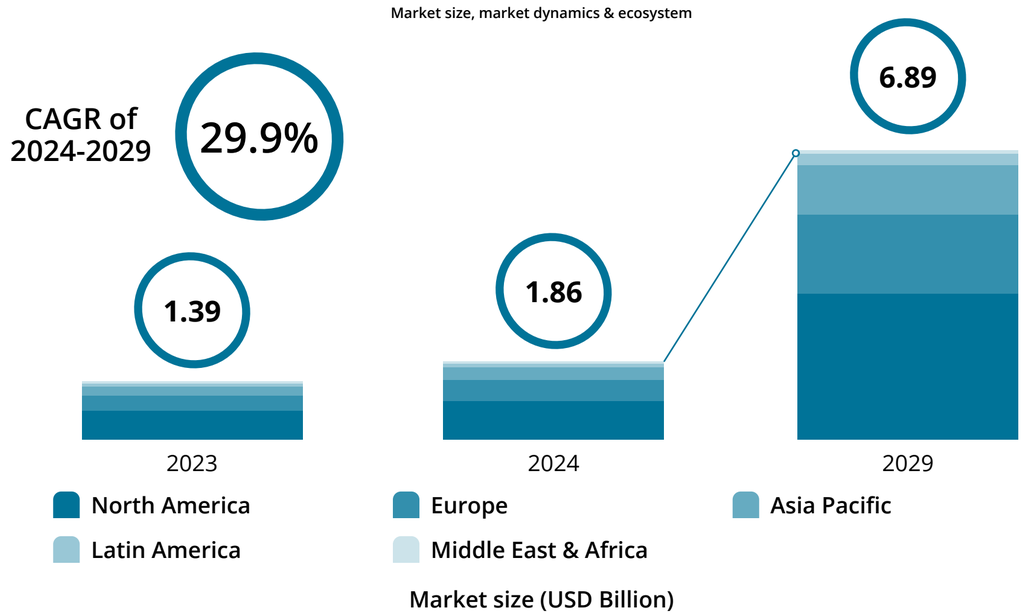
The global AI in drug discovery market is projected to grow from $1.86 billion in 2024 to $6.89 billion by 2029, with a compound annual growth rate (CAGR) of 29.9% (Markets and Markets).

Issues to address before use of AI in clinical practice



Source: GlobalData Thematic Research

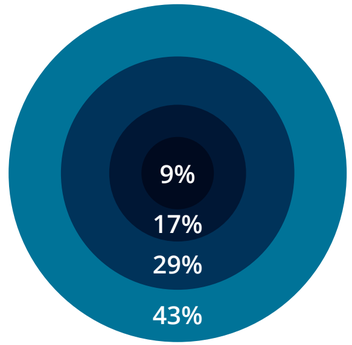
Artificial intelligence (AI) in drug discovery market



Strategies for mitigating risk of data bias in AI applications:

of healthcare leaders are concerned about the possibility of data bias in AI applications widening disparities in health outcomes

Healthcare organisations' plans to use GenAI, % of respondents1 (n=100)



[1]*Respondents include 40 payers, 40 providers, and 20 healthcare services and technology groupds; ~30% are C-level executives and ~30% are from organizations with revenue > $10 billion.*

Source: McKinsey US survey on gen AI in healthcare, 11th-13th March 2024; McKinsey analysis

The big interview:
Inceptive’s Jakob Uszkoreit on the promise of biological software

Biology has long been characterised by its intricate, seemingly unpredictable nature. Yet, a new generation of researchers is challenging this perception. Armed with advanced computational tools and a radical approach to understanding biological systems, innovative researchers are working to change how we conceptualise and interact with the fundamental building blocks of life.

At the forefront of this biological software movement is Inceptive’s CEO Jakob Uszkoreit. A modest giant in the world of deep learning, his work in the realm of transformers (the ‘T’ part of Chat-GPT) has been foundational in driving innovation in recent artificial intelligence (AI) breakthroughs.

In this exclusive interview, Uszkoreit shares his journey from his “dream job” at Google to the “messy” landscape of healthcare, the potential of biological software to revolutionise medicine, and the challenges of bridging the gap between technological ambition and biological reality.

Eloise McLennan:

Jakob, to start with, could you explain what “biological software” means? For many of us, it’s a term that feels abstract and unfamiliar.

Jakob Uszkoreit:

Basically, it is a way of describing a flavour of medicines or a type of medicines in the broadest sense that is very much akin to software. You generate those medicines by supplying, initially, some kind of declarative or other definition of their behaviour – their intended behaviour.

The hope is that we will eventually get to the point where we can have fairly complex definitions or declarations of intended behaviour that are then successfully compiled into descriptions of molecules that exhibit those behaviours inside cells. This is quite different from programmable medicine, where you start with a base that is customised. Instead, this starts from scratch.

An instance of this that we all know is the mRNA vaccines, whether for COVID-19 or otherwise. The mRNA mostly does one thing – it tells cells to translate a given protein. Now, with the mRNA vaccines, it’s evident that that’s not the only thing they do.

The idea behind biological software is that you can design molecules based on a description of their behaviour that have, by and large, only the desired effects.

After a successful 15 years at Google, what motivated you to shift to the field of biological software?

There were three events that happened in rapid succession, within less than three months, in late 2020 – the height of the pandemic. First, my daughter was born. It was an even more special experience to have my daughter around that time; I didn’t know if I could actually be there for the birth due to lockdown restrictions.

There was lots of reading that I did because it was very much unclear at that stage how [COVID-19] could affect pregnancies and newborns.

Shortly after, the CASP14 results were released. AlphaFold2 wiped the table with every other method for predicting protein structure. CASP14 was effectively when AlphaFold2 made it clear that, yes, this problem is maybe not solved per se, but at least that very particular version of protein structure prediction, albeit contrived and maybe not the most practical, now is effectively done.

This was stunning because AlphaFold2 used deep learning methods I had co-invented. It was moving to see this proof that these methods

were ready for prime time in molecular biology, but sobering because I hadn't been directly involved in that work.

A few weeks after that, the first mRNA COVID-19 vaccine efficacy results came out. It was incredible – RNA was effectively saving the world. Yet, there was a clear gap: we couldn't apply deep learning to RNA due to a lack of data.

Those three events left me really questioning what I was doing at Google. It was in so many ways, my dream job. After some months of pondering that and talking to lots of experts in molecular biology, RNA biology, in particular, it became clear that this was almost a moral obligation.

At Frontiers Health, you spoke about standing on the shoulders of giants. Can you elaborate on the incremental nature of scientific progress and where we are with biological software?

In terms of biological software, we're at the earliest days. We're at a point in time where we can see and maybe give examples for why it should be possible, but where our ability to truly execute on it and really implement it is still nascent at best.

Overall, this is a very typical phenomenon where we want to see revolutions. That's to a large extent because that's how we tell stories, but the truth is that almost all the "revolutions" that I've been a witness to are actually incremental progress that eventually reaches some kind of tipping point.

When it comes to understanding life, I don't think we're there yet. We're seeing that with, say, protein structure prediction, there is the potential to do similar things, but it turns out that protein structure prediction, per se, isn't as general of a problem, if you wish, in something like drug development or drug design that just "solving it" will really break it down.

We're making interesting steps, and we can see light at the end of the tunnel, but it's very unclear how far we have to go. One of the reasons there is that we simply don't have the data yet. The data just doesn't exist that could even conceivably inform a large neural network about all the different mechanisms or pathways of life, even if you reduce it to some of its more simple forms, it's not the case so far that we can truly predict their behaviour given an intervention using deep learning. At least now we have a tool that did something we couldn't do for things like language, and so we can definitely try.

What are the biggest challenges to making biological software a practical reality, and how are you addressing them?

The biggest hurdle is the lack of data. We don't just need observations of life, like individual cells, but also systemic phenomena like immunology.

What we're trying to do is make incremental progress toward designing useful or beneficial interventions with the data we can collect today that may or may not also be useful, in the longer term, as we progress towards this more grand vision of something like biological software. It won't be built overnight – it's a gradual process.

The healthcare industry is known for being both risk-averse and slow to adopt new technologies. How has the industry responded to your work?

It's interesting, the reality is that it started out being incredibly open and enthusiastic. A good chunk of that was fuelled by the post-COVID mRNA vaccine excitement.

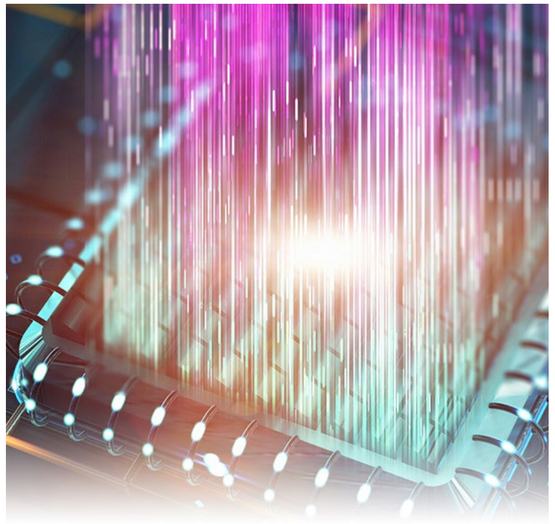
As that subsided, it's been replaced with an incredibly conservative, very methodical, but really also comparatively slow way of making progress. What we're now seeing is that that hype cycle – the en vogue, hype of the day – is now shifting, or has shifted, to a variety of different things.

I guess that's just the way this sector works. and probably for pretty good reasons. Now, could it work in certain areas? Could it work faster? Should it work faster for the benefit of humanity? Absolutely. No question.

You've been modest about your achievements, including your work on transformers. What advice would you give to the next generation of innovators?

I've heard this advice from several people, including one of the AI "godfathers" Geoff Hinton: Never assume that tomorrow will be like today. Sounds trivial, but it's actually really deep. We take so many things not for granted, but as a given. It usually turns out that whatever ways or approaches or directions we have and we pursue might be fine, but they're almost never ideal.

Another quote I like is from Edison: "There's a better way. Find it." That's the essence of innovation – challenging the status quo and always looking for better solutions.



What's the biggest misconception about AI, particularly in healthcare and biological software?

I try to avoid the phrase AI because we don't know what intelligence is. There are many practical definitions, and unless you specify it clearly, I feel it's rather misleading by default.

The biggest misconception today, is that these things "just work". If you look at what it took to really make it work for language, to the extent that it works today, if you go to ChatGPT or similar tools, yes, sure, there's this core of a large-scale, pre-trained model based on some architecture, and it was trained on a giant data centre full of GPUs. But, the reality is, that's not enough. You need a tonne of human-annotated data, product iterations, tweaks, and little tricks to make this work.

There is absolutely zero reason to believe that this shouldn't be the case in the life sciences or in healthcare. In fact, there are many reasons to believe that you need even more of these kinds of tricks.

We have no instance that is able to understand how even just a single cell works. I think we will never, as individuals, because it's too complex, our cognitive capacity just is not a good fit for this phenomenon.

We have to accept that we will have to implement and devise many such tweaks and hacks in order to make it work even remotely as well because it's a harder problem, and we don't have an instance that we can directly learn from, like we do, for language and vision.

It's exciting and frustrating in equal measure.

About the interviewee

Jakob Uszkoreit co-founded Inceptive in 2021 with the goal of enabling a new generation of medicines, reminiscent of software, but running on our cells. Inceptive aims to accomplish this by learning life's languages with a unique combination of cutting-edge deep learning and novel, scalable biochemistry experiments.

Before Inceptive, he conducted research on deep learning, including co-authoring the research papers titled "Attention Is All You Need" and "An Image is Worth 16x16 Words". Widely hailed as foundational documents in modern artificial intelligence, these papers marked a pivotal moment as transformers evolved into the predominant architecture powering large language models and a growing number of leading vision and multimodal models.

About the author

Eloise McLennan is the editor for pharmaphorum's Deep Dive magazine. She has been a journalist and editor in the healthcare field for more than five years and has worked at several leading publications in the UK.

Generative AI and its impact on speed to market for pharmaceuticals

Generative AI (GenAI) is revolutionising the life sciences, and we're just scratching the surface.

On average, it takes about seven years to develop a new drug and bring it to market. For ambitious life sciences businesses, GenAI's ability to generate insights and content in a fraction of the time of a human means wiping months, or even years, off that average. When it comes to clinical development, saving time translates to saving lives, or at least improving them, through faster availability of treatments. It also translates into revenue opportunity - and a significant one at that.

Some industry sources estimate that bringing new treatments to market ahead of schedule can be worth between £500,000 to £6.5 million per day. However, due to uncertain regulatory landscapes, coupled with the rapidly evolving nature of the technology, some companies are taking a wait-and-see approach to adopting GenAI, delaying investments until the course forwards is clearer. While this may seem a prudent approach, it will be one organisation's regret in the long run as they miss out on the opportunities GenAI holds, such as drug discovery and speed to market, and as competitors jump ahead and take the lead.

For life sciences companies looking to seize a competitive edge and supercharge their speed to market, there are a few key areas of the clinical development lifecycle they should focus on first.

Simplifying the research process

Research and development (R&D) is often the most time-consuming part of the drug development process, but AI can accelerate this process by up to 50%, as the technology has a multiplier effect wherever it is applied.

Life sciences can implement GenAI at the very beginning of the R&D cycle, to aid in searching and synthesising available literature on a specific potential drug. Instead of beginning with a manual keyword search and sifting through hundreds of articles across various sources, teams could prompt a generative AI-enabled tool to rapidly search, gather, and distil relevant articles – or even suggest unanticipated information pathways to explore.

Generative AI also has the potential to change how researchers find existing literature. Usually, researchers simply type keywords into the search box. But with a GenAI tool, they could state their goal into the prompt, providing context and intent, for the technology to find reference materials to support that specific ask, saving significant time, while broadening the research horizon.

Automating clinical trial protocol writing

Compiling a clinical trial protocol document is a lengthy process that can take anywhere from a few months to over a year. GenAI technology's capabilities can automate a substantial proportion of the protocol writing process, bringing it down to days or even mere hours.

Generative AI can be trained on thousands of existing protocols in industry databases and each company's own research data, in order to identify the patterns relevant to investigational products, certain conditions, specific patient populations, or other factors. As the GenAI tool identifies relevant patterns, it can combine all the insights to design a baseline study, with a defined narrative that determines eligibility, drafts exclusionary criteria, and provides other necessary details. It can generate a number of draft options that would later be evaluated and refined by a human.

Expediting launch processes in secondary markets

Once a new therapy has been approved to launch in one market, many companies will be looking to expand the launch into others. This process takes a tremendous amount of time and resources, from strategy development and market research to agency engagement, content creation, and material development. Much like in the research and protocol writing processes, a lot of the steps in this part of the process could be automated with GenAI.

For instance, when the drug is close to gaining approval, GenAI could support commercial teams' research and compile strategy documents for secondary markets, taking into account specific regulations the therapy will need to adhere to in the new country. Generative AI can similarly be used to adapt existing content – including website copy, brochures, and other promotional materials – to the language and culture of the secondary market. This could shave up to a year off the go-to-market timeline in new countries and massively reduce marketing and design costs.

Taking the first steps

Introducing GenAI into a business should be done one step at a time. It starts with fostering a culture of AI literacy, where every employee understands how the technology can be used to reshape and empower their role. It is also important to build a solid ecosystem of partners, which includes relationships with academic institutions, data providers, and specialty GenAI vendors that will support the business' knowledge growth and internal capabilities.

[Introducing GenAI] is essential investment for companies that want to stay ahead of their competitors and the market.

Once GenAI is introduced, it is a good idea to establish a body within the business to supervise how the organisation uses the technology and manages the upskilling and development of employees engaging with the tech. This body should also establish best practices and develop frameworks that guide the deployment of GenAI across the business.

A life-saving revolution

Introducing GenAI into a pharmaceutical business is no mean feat and is understandably very daunting. It is, however, essential investment for companies that want to stay ahead of their competitors and the market.

Likewise, it is crucial to ensure employees are provided training on how to best optimise the technology and create a body that supervises how the technology is being deployed across the business to avoid any misuse. As companies continue to experiment with GenAI across its various use cases, they will begin to lay the foundation needed to harness the full potential of this transformative technology, discovering, testing, and bringing their drugs to market sooner. This improves patient outcomes due to safer, more effective, and affordable drug development and increases revenue opportunities in a highly competitive market, driving value and improving patient outcomes at the same time.

About the author

Bryan Hill is VP digital health & innovation at Cognizant Life Sciences, responsible for digital solutions and technology innovation. His focus is how emerging tech can help clients increase innovation to bring new therapies to market faster.

The future of pharmacovigilance – beginning the shift to AI-driven processes

In 2023, the pharmaceutical industry saw a surge in innovation. Propelled by the excitement around advanced technologies such as generative artificial intelligence (GenAI), many organisations turned to advanced automation to improve drug safety processes. Cutting-edge innovations were introduced that show promise to solve the challenges that pharmacovigilance (PV) teams face, enhancing efficiency and increasing the accuracy of operations.

However, it is unlikely that organisations will achieve implementation of these cutting-edge technologies in 2024. Rather, this coming year will be a critical turning point for the industry to revisit their existing PV models, explore potential capabilities and build trust in automated processes.

The current landscape

The traditional, long-lasting pain points of the PV space will persist into 2024. Caseloads will increase, widening the gap between workload and skilled workforce availability. This human-centric model is burdened by increased data volume and reduced workforce, which will make it difficult to meet demand. This can lead to compounding costs, staff burnout, and challenges in data management quality and accuracy.

Patient safety is a priority for drug safety operations, and data inaccuracies pose a substantial risk of harm. As volumes continue to grow and PV experts become scarce, organisations will be forced to re-evaluate their PV models to minimise patient risk and improve patient safety. Automation and advanced technologies will be critical tools to minimise these data quality issues through new methods of safety data processing, analysis, and reporting.

Overall, the industry recognises that automation will not just be a beneficial tool but a necessary one to address inconsistencies in existing processes, especially as requirements from regulators continue to shift and new, increasingly complex markets emerge. AI and machine learning (ML) can manage large data volumes more efficiently than the traditional, human-led PV processes; analytics can provide deeper insights into data that might otherwise be overlooked, enabling more precision in a timely manner. This manages costs and improves patient safety operations. The future of the PV space lies in embracing technologies such as generative AI and ML to improve accuracy and efficiency, and this shift will be evident in 2024.

A learning curve

There will be wide attempts to integrate AI into pharmaceutical safety processes, but full implementation is unlikely. Instead, 2024 will be a year of cautious exploration and advancement into the capabilities of AI and automation. This will be characterised by learning periods and gradual, phased adoption.

There must be a deeper understanding of the impact and change that these systems might bring, so that there are no surprises. This will entail rigorous evaluations in real-world scenarios to view the impact on operations and workflows. There will be trial-and-error experiences as each organisation evaluates the best uses of AI to meet their individual needs. While the excitement around technologies like generative AI will push for immediate integration into current drug safety processes, this will not be viable for sustainable, long-term operations.

Automation is no longer a question of if, but of when.

The adoption of innovative tools into traditional, established PV systems will be challenging. The existing workflows may require an overhaul of processes to enable AI and automation. There are a variety of barriers to implementation, but building use cases and demonstrating the validity of automation is key. There is widespread scepticism of automated processes and caution around potential biases, so trust must be established prior to the incorporation of advanced technologies. Building trust in modern technologies will be a significant theme for the coming year – readiness to embrace innovation is pivotal to success. To properly integrate things like generative AI into drug safety processes, a careful and considered approach is not just highly advisable, but critical.

Organisations must address the concerns around AI-driven systems, while also demonstrating the benefits they bring to PV operations. This will require fostering a new mindset around embracing technologies, while still prioritising the highest standards of patient safety. Forward thinking and proactive risk identification will push the space forwards, driving the move towards a smarter way of working in PV, but this requires a cultural shift.

The future is automated

The PV sector is at an inflection point. The future demands automation and AI, but only as a fundamental aspect of long-term strategy. These tools can efficiently meet regulatory requirements, strengthen drug safety, and improve risk management, but the proper integration approach must be taken so that these technologies function correctly.

The increased innovation in the pharmaceutical industry in 2023 paved the way for the integration of advanced technologies like generative AI and automation in drug safety processes. While complete implementation may not occur in 2024, this year will be an important period for businesses to assess their current PV models and establish trust in automated procedures. Although there are challenges in integrating AI into traditional systems, the benefits in terms of efficiency, accuracy, and patient safety are clear. Automation is no longer a question of if but of when, and businesses that adopt these technologies early will be better positioned for future safe, reliable, and efficient PV systems.

About the authors

Updesh Dosanjh is a practice leader for the Technology Solutions business unit of IQVIA. In his role, Dosanjh is responsible for developing the overarching strategy regarding AI and ML as they relate to safety and pharmacovigilance. He has over 25 years of knowledge and experience in the management, development, implementation, and operation of processes and systems within the life sciences and other industries. Most recently, Dosanjh was with Foresight and joined IQVIA as a result of an acquisition. He holds a Bachelor's degree in Materials Science from Manchester University and a Master's in Advanced Manufacturing Systems and Technology from Liverpool University.

Michael De Jong is a VP and global head of PV and Regulatory Technology Professional Services at IQVIA. He has 30+ years of experience delivering process, technology, and organisational improvements spanning life sciences, technology, aerospace, and government industries. De Jong spent the last two decades working exclusively with pharmaceutical companies to improve the following business units/functions: pharmacovigilance, product labelling and packaging, clinical trial monitoring, and product development governance. Prior to his current role at IQVIA, De Jong led and managed several global process improvement and technology-services client engagements to achieve significant improvements in business performance while employed at Foresight Group International AG, WCI (now Navitas Life Sciences), Accenture, and PricewaterhouseCoopers.

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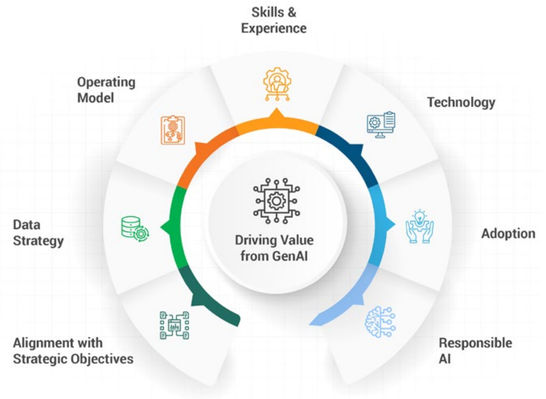
Seven pillars of GenAI for enterprise-level value generation

Today, we live in an age of artificial intelligence (AI); more specifically, the age of generative AI (GenAI). In a recent report, 65% of respondents stated that their organisations are regularly using GenAI, with 75% predicting that GenAI will lead to "significant or disruptive change" in the years ahead.[1] In life sciences, such disruptive qualities hold much potential for R&D and commercialisation and, ultimately, for patients.

To learn more about the true value of AI and GenAI in pharma, pharmaphorum spoke with Sudip Chakraborty, Principal and Head of AI/GenAI at Axtria, and Amanjeet (Aman) Singh, Head of Strategy & Operations and Strategic Business Unit Leader at Axtria.

Axtria helps life sciences companies harness the potential of data and software to improve patient outcomes by connecting the right therapies to the right patients at the right time. Founded in 2010 by the president and CEO Jaswinder (Jassi) Chadha, who recognised a gap in the life sciences market for data-driven solutions, Axtria seamlessly provides enterprise-grade analytics on integrated software technologies.

During their Ignite 2024 event in June in Princeton, New Jersey, Axtria convened senior industry leaders for an exclusive discussion on the key success factors necessary to generate value through GenAI. Those discussions were distilled into a special report, '*Going Beyond Pilots: Implementing GenAI for True Value Generation,*' that outlines a seven-dimensional framework that this group discussed and formulated.



1. How does GenAI align with your strategic objectives?

MarketResearch[2] says GenAI's value in the pharma sector will soar to nearly £1.7 billion GBP ($2.2 billion USD) by 2033. It's clear why getting this framework correct is so important, and it starts with alignment.

"You need two elements to align GenAI initiatives with your company's strategic objectives," said Singh. "First, you need your C-suite to be on board. At Ignite, one thing emerged: everyone acknowledged that executives have no dearth of interest in the potential of GenAI. We even joked that it's more likely to be funded if we attach GenAI to almost any initiative. As a result, many pilots are underway across the commercial, clinical, and R&D areas of pharma."

“Make sure that at every stage, you’re only taking data that is relevant and trustworthy”

- Sudip Chakraborty.

However, as Singh noted, the second element takes more effort. “The leaders told us that GenAI’s value has to be proven before it can be considered properly aligned with objectives,” he added. “And to prove its value, you must measure it in three key areas: the meaningful improvements to your processes, the reduction in operational costs that it brings, and the amount of revenue growth it enables.”

Singh also noted that companies may run into challenges during measurement efforts. “There is a lack of effective toll gates and continuous evaluation mechanisms,” he said. “Solving for that means implementing those checks during new initiatives and consistently engaging C-level leadership with these metrics.” But interestingly, Singh pointed out that it also takes a fair amount of creativity. “Storytelling is key,” he revealed. “Emphasizing the ‘why’ over the raw metrics will drive home the process and highlight successes.”

2. What should your data strategy look like to unlock rapid value creation through GenAI?

Once objectives are identified and lined up, the next step involves having a robust data strategy. Although every industry focuses on their data, this pillar is unique to the pharma industry, thanks to the type of information they see.

“At Ignite, leaders talked about how the vast majority of data pharma companies have access to is unstructured data,” said Chakraborty. “They’re taking in images and video, as well as audio, like dictated notes. How do you deal with that?”

Chakraborty summarised this challenge in four words: volume, velocity, variety, and veracity. “We talk about fast processing of data, but we also want to use GenAI to reduce data latency—the time from when an event happens to when a doctor can use the insight from it to make better decisions about a patient. The latency, for example, in oncology can sometimes be several months.”

The cost of integrating and managing all this data can become significantly higher. That’s also where GenAI shines, according to Chakraborty. “Given the generative capabilities of GenAI, there’s a need to explore ways of generating content automatically, faster, and at lower cost,” he said.

But will the users of this data trust it all, considering the increased speed and sources? Here, too, Chakraborty turns to GenAI. “Veracity is a thread that is linked with all parts of the GenAI app development and deployment and usage phases: you want to make sure you start with trusted data,” he highlighted. “Make sure that at every stage, you’re only taking data that is relevant and trustworthy. You don’t want any toxicity or bias or IP infringement.”

3. To accelerate GenAI value, what needs to change might be your operating model and how work gets done?

Once objectives are aligned and a data strategy is laid out, Singh says the next step is accelerating GenAI value. That often requires a change in how a gets work done…or your operating model. “We’ve seen that GenAI can deliver 30% to 50% gains in efficiency and effectiveness when you effectively reshape processes and functions,” Singh revealed.

He explained what some of those changes may look like. “Some organizations have gone ahead and created what they call AI councils, AI operating committees, and so on, where the governance of all the AI programmes is being run internally,” he said. “We need to strengthen the whole governance mechanism and get it to a level of uniformity across the industry. The whole funding process also needs to be revisited.”

Singh shared another operational change identified by the leaders in the exclusive session. “We need a partnership ecosystem. We must ensure that new technologies, methodologies, and tools can operate with what’s already in place,” explained Singh. “We can’t create a completely siloed parallel track of these technologies and tools and keep them independent of what already exists in the organisation.”

Singh says managing expectations is vital. "We need to manage hype," he continued. "Look at what realistically can be achieved in the short-term versus the long-term when deciding whether a particular GenAI initiative should be continued, pivoted, or completely eliminated."

4. Do you have the skills and experience to get the most out of GenAI?

Singh points out that despite GenAI doing much of the heavy lifting, we need to remember the need for a human in the loop. However, Axtria's executive session identified a unanimous concern: employees' skills do not yet meet the standards required to leverage the full potential of GenAI technologies.

"This isn't about fear of new tech but recognizing the need for a strategic upskilling initiative," revealed Singh. One leader told the session that upskilling should be about fostering a culture of continuous learning and innovation: not just preparing for the future but actively shaping it.

Singh says foundational knowledge is required, such as familiarity with a GPT model, but it goes beyond that. "We aim to prioritize learning areas that promise genuine competitive differentiation," he adds. "This ensures we're not just participants but leaders in harnessing GenAI capabilities."

"Don't be afraid to get your hands dirty. Build a small coalition of leaders who will provide the flexibility to experiment and learn with GenAI and do trials"

- Aman Singh.

Framing the learning process through the lens of business context will help employees understand the 'why.' Singh believes this removes fears of replacement while driving their overall adoption of GenAI. "Encourage experimentation," Singh suggests. "Hands-on learning and integrating GenAI advancements into our operations will enhance productivity and drive towards the organisation's ambitious goals."

5. What is your approach to GenAI technology investments?

"While keeping employees current on skills, organisations must do the same with technology investments," shared Chakraborty. "We asked our executive participants, 'Where do you invest? Why are you investing? How should you invest? How do you keep up with GenAI?'"

"Participants shared that you need to ensure you have a modern data infrastructure that can handle both large volumes and velocities of unstructured data in conjunction with structured data," said Chakraborty. "Knowing how to use and interact with large language models as they show various types of behavior is important," he said.

GenAI's recurring cost is a factor as well. "Many of the models in use, especially the ones pharma companies are using, tend to be pay-per-use," Chakraborty revealed. "As usage explodes, there's a potential for significant cost growth."

There's a final yet critical investment hurdle to clear. Chakraborty calls it the "consumption layer," where the output from GenAI comes into daily workflows. "How do you get your employees to use these LLMs to provide better business outcomes?" he continued. "Our group said that integrating LLMs like GPT in business contexts can be costly. So, we need to ensure this does not require significant technical training to ensure good adoption."

Chakraborty suggests shifting from capital to operational expenditures to help solve these investment questions. He also says many organisations are using "innovation budgets" that often have a longer runway for showing returns on investment.

6. How are you driving GenAI adoption?

You can spend significant effort crafting GenAI strategy, changing processes, and skills, but none of that matters if your employees aren't using the technology. "We've created an adoption framework to propel organisations toward success," said Singh. "To do this, we suggest creating a sense of urgency to stay competitive. Inspire and rally your teams by clarifying the impact of these initiatives, and communicate that vision multiple times across various levels," Singh added.

"Next, don't be afraid to get your hands dirty. Build a small coalition of leaders who will provide the flexibility to experiment and learn with GenAI and do trials," explained Singh. "Trying new things is not just allowed but celebrated."

Singh believes organisations must celebrate short-term wins and early successes of GenAI projects. "They not only validate your efforts but help communicate the value and build momentum, creating a positive feedback loop," he said.

Singh is adamant that sustaining this momentum is one of the most challenging aspects of employee GenAI adoption. "Establish a continuous mechanism to identify the next set of impactful use cases," he said. "This assembly-line approach ensures our momentum never wanes."

7. How can responsible AI practices protect you?

The final part of Axtria's framework for GenAI value creation deals with using GenAI responsibly. As GenAI's abilities advance, more avenues of concern may appear. Chakraborty says the right practices can alleviate those worries.

"Responsible AI means security, respecting privacy, transparency, predictability, being ethical and unbiased, intellectual property protection, and equity and fairness," said Chakraborty. "Many of our clients, many of the top pharma companies, actually, have AI governance councils, which are responsible for making sure that their organisations are using responsible AI practices."

Chakraborty says these councils take a holistic approach by engaging all stakeholders. "This includes patient groups, customer groups, and others directly impacted by these AI systems," he said. "It's also about the responsible use of resources," Chakraborty added. "Governance is crucial to ensure patient and customer data are handled with care and to foster trust in the system."

"However, our executives participants went beyond the industry meaning of responsible AI," he continued. "In a further conversation, one of our clients mentioned, 'How do we make sure that we are neither over-investing nor under-investing?'" Chakraborty says establishing a coherent framework that involves all stakeholders helps solve that and ensures responsible AI principles are integrated effectively.

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About the interviewees

Amanjeet Singh is a seasoned leader in AI, analytics, and cloud software, currently heading strategy and operations at Axtria Inc. Singh has built, scaled, and exited three successful ventures, is the original inventor of a US patent for collection cycle optimisation through advanced analytics, and brings 25 years of experience advising Fortune 500 clients in financial services, life sciences, and medtech on risk management, commercial strategies, and advanced analytics.

Sudip Chakraborty is the Head of AI/GenAI at Axtria, where he advises pharma clients on leveraging AI and GenAI to drive business outcomes, leading to measurable improvements in productivity and efficiency. With over 25 years of experience, his expertise spans developing AI/GenAI strategies and roadmaps, building high-performing teams, and establishing AI/GenAI and MLOps/LLMOps capabilities. Chakraborty's leadership has been instrumental in driving the adoption and monetisation of AI technologies across various business units. Earlier in his career, he co-founded an AI consulting firm, growing it to 250 professionals before a successful exit. Chakraborty also holds two patents in algorithms and data observability and is recognised as a thought leader in the industry. He is passionate about mentoring the next generation of AI leaders and fostering a culture of innovation.

About Axtria

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How AI and predictive analytics are set to transform patient care

The healthcare industry is on the cusp of change, with artificial intelligence (AI) and predictive analytics paving the way for unprecedented advancements in patient care and operational efficiency. This evolution is being driven by the burgeoning amount of healthcare data that is being collected and made available through electronic patient records (EPRs), alongside the urgent need for systems that can analyse and leverage this information in order to improve patient outcomes and resource management.

In the past, clinicians primarily used healthcare data as a decision support resource to pull in basic information on the number of medication errors that had occurred over a given time period, for example, and to use that basic intelligence to shape the clinical choices that were made.

Today, the technological capabilities available to healthcare teams have ramped up several levels. No longer just theoretical concepts in a healthcare context, AI and predictive analytics are now proving themselves to be critically important in tackling some of the most pressing healthcare challenges. From reducing medication errors through advanced decision support systems to predicting antibiotic resistance with sophisticated AI algorithms, these technologies are setting new standards for care quality and safety.

Moreover, their application in public health surveillance and chronic disease management is showing promise in pre-empting health crises, and improving long-term health management.

The benefits of these technologies are increasingly tangible. For example, initiatives that bring together vast volumes of patient data across different healthcare providers have demonstrated significant improvements in operational efficiency, and patient engagement. Equally, they have proven to be beneficial in terms of healthcare coordination. Insights about a particular patient can be made available quickly to help inform a 360-degree treatment plan for the patient, with care and social workers, dietitians, GPs, and hospital doctors all coming to together to discuss the evolution of the plan.

Analytics can also play a key role in patient surveillance, helping to ensure that a patient diagnosed with hypertension, for example, is taking their medication as prescribed, and rapidly analysing the blood pressure readings they take at home to ensure that no dangerous patterns are emerging.

AI in oncology: Enhancing care across the board

No area is perhaps more illustrative of these multiple benefits than oncology, the branch of medicine that deals with the prevention, diagnosis, and treatment of cancer.

AI and predictive analytics are crucial in oncology due to their ability to manage and address the vast complexity and variability inherent in cancer treatment and tumour biology.

Enhancing diagnostic precision

The enhancement of diagnostic precision is a standout application of AI in oncology. AI-powered machine learning models are adept at parsing complex imaging data, identifying subtle patterns that are beyond human visual detection, and pinpointing early signs of malignancy.

This has notably improved the accuracy of diagnostic procedures, such as mammograms in breast cancer screening, significantly reducing both false positive and false negative results. Early detection facilitated by AI not only increases the likelihood of successful treatment, but also substantially improves the survival rates among cancer patients.

Tailored treatment with predictive insights

One of the primary benefits of AI in oncology is its ability to analyse large volumes of data quickly and with high precision. EPRs, which contain detailed patient histories, treatment outcomes, and genetic information, produce an extensive dataset that, when analysed on its own or through AI algorithms, can reveal patterns and correlations that may not be visible to human analysts. This capacity for deep data analysis helps in understanding the unique progression of cancer in each patient and forecasting their response to different therapeutic strategies.

Beyond diagnostics, AI can help in identifying the most effective treatment plans based on historical data from similar cases. This is especially beneficial in oncology, where the effectiveness of treatments can vary widely among patients due to the genetic differences in tumours. By predicting which treatments are likely to be most effective for a specific patient, AI not only enhances the likelihood of successful outcomes, but also minimises the risk and severity of potential side effects.

Furthermore, predictive analytics can anticipate patient responses to certain medications or treatment regimes, based on their genetic makeup, lifestyle, and previous health records, which allows for adjustments to be made before adverse reactions occur.

Improving operational efficiency

AI also boosts operational efficiency in oncology departments. By optimising scheduling and resource allocation through predictive analytics, hospitals can ensure that their operations run more smoothly, reducing patient wait times and increasing satisfaction. This is particularly key with cancer care, where patients will frequently visit multiple different healthcare settings for their treatment; from oncology management to different chemotherapy and radiotherapy sessions that they need to carry out.

Moreover, AI enables continuous monitoring of oncology patients, providing healthcare professionals with real-time updates on patient conditions. This prompt response capability is particularly critical for oncology patients, who may experience rapid changes in health status.

Learning from clinical trials

Another notable application of AI in oncology involves clinical research and trials. AI models expedite the identification of suitable clinical trial candidates and monitor patient responses during trials, allowing for quicker adaptations and potentially speeding up the approval of new cancer treatments. Additionally, AI systems help manage vast amounts of research data, aiding in the discovery of new oncological treatments and therapies.

Expanding the horizon – The future of AI in oncology

The potential of AI and predictive analytics extends beyond current applications, promising to bring about even more sophisticated tools for diagnosis, treatment planning, and patient management in oncology. These tools are expected to increasingly aid in the detection of early-stage cancers, predict disease progression, and personalise therapy to an unprecedented degree.

The integration of AI and predictive analytics into oncology represents a major leap forward in the quest for precision medicine. These technologies offer the promise of significantly improving how cancer care is delivered by enabling more accurate diagnoses, personalised treatments, and efficient resource management.

As healthcare continues to evolve, the role of AI and predictive analytics will only grow, underscoring the need for ongoing investment in these technologies. In light of these ongoing developments, the future of oncology care looks increasingly positive, promising better outcomes for patients worldwide. Through such advancements, the medical community is set to transform the landscape of cancer treatment, making it more effective, efficient, and patient-centred.

About the author

Rami Riman is director of clinical and business improvements at InterSystems. Prior to joining the company, he gained a decade of clinical experience across multiple hospitals in the US, UK, Lebanon, and UAE.

Riman's passion remains in increasing patient engagement to improve community's health and awareness. He holds a BA from the American University of Beirut in Biology, a Doctorate in Medicine from St. George's University School of Medicine and a Master's degree in infectious diseases from the University of London. He is also board certified in Internal Medicine and Medical Oncology.


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