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AI at Scale in Pharma: Sanofi's AI Strategy Explained

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Executive Summary

Sanofi has **boldly declared** its ambition to become “the first biopharma company powered by AI at scale.” This strategic initiative goes far beyond isolated pilots: Sanofi is integrating advanced artificial intelligence into virtually every part of its value chain – from early drug discovery and clinical trial design to manufacturing, supply chain, and enterprise decision-making. The company’s **AI-at-scale approach** is built on a combination of *Expert AI* tools (high-performance computing, machine learning models, and domain-specialized algorithms), *Snackable AI* (easy-to-use analytics and insights embedded in everyday workflows), and *Generative AI* (large language models and AI agents that automate routine tasks and spark creativity) (www.sanofi.com). Early results at Sanofi are striking. For example, the company’s **AI-driven target discovery engine** yielded *seven novel drug targets in one year* (www.sanofi.com). Sanofi’s CodonBERT model, a large language model trained on *10 million mRNA sequences*, cut the time to design new mRNA vaccines by *about 50%* (www.sanofi.com). In manufacturing, AI platforms like **SimplY** and predictive planning have already improved yields and reduced disruptions: one system predicts *80% of potential stock outages*, correlating *65% of risks* with root causes so supply teams can act faster (www.sanofi.com). Internally, a new corporate app called *plai* aggregates data across all functions to give *20,000+ Sanofians* a real-time “360° view” of the business (www.sanofi.com).

Sanofi’s AI strategy also includes **transformative operating models**. It has launched dedicated “digital accelerators” (scrum-like cross-functional teams) for R&D and manufacturing, driven by a Chief Digital Officer and senior leadership. The company has built a *data platform*, partnered with leading AI companies (e.g. OpenAI, Exscientia, Insilico, Atomwise, Owkin, etc.) and startup labs, and created internal tools like the Concierge GenAI chatbot and the Turing recommendation engine for sales. In sum, Sanofi’s roadmap –

documented in its press releases and science magazine – offers a **comprehensive blueprint** for embedding AI: aligning governance and culture, upgrading data infrastructures, training talent, and prioritizing use cases that deliver speed, quality and productivity improvements. Industry analysts note that Sanofi's approach exemplifies the transition from "pilot projects" to **enterprise-scale AI** (www.bain.com).

However, deploying AI at scale in pharma is *complex*. Cultural inertia, stringent regulation, and data quality requirements all pose challenges (www.forbes.com) (www.janeasystems.com). Sanofi's journey so far highlights both opportunities and obstacles: accelerating innovation and operational efficiency, while also grappling with governance, privacy and workforce training. This report synthesizes Sanofi's public disclosures with industry research to deeply analyze **what "AI at scale" means in pharma**. It examines Sanofi's initiatives in R&D, manufacturing, and decision-making, reviews supporting data and expert commentary, compares to broader industry trends, and discusses the implications for other companies' roadmaps and operating models. The result is a **thorough, evidence-based account** of Sanofi's AI transformation and its lessons for the life sciences sector.

Introduction and Background

The pharmaceutical industry has long been characterized by its deep scientific expertise, but also by **lengthy development cycles and high costs**. Historically, discovering and bringing a new drug to market often takes a decade or more of research, clinical trials and manufacturing optimization. In recent years, however, **digital innovations and AI techniques** have promised to accelerate every stage of this value chain. Publications and consulting studies forecast that artificial intelligence could dramatically **improve R&D efficiency, optimize production, and enhance commercial processes** in pharma (www.bain.com) (www.nature.com). For example, in an analysis published on February 12, 2024, *Bain & Company* reported that 40% of pharmaceutical executives were including expected generative AI savings in their 2024 budgets and 60% had set cost-savings or productivity targets (www.bain.com). Indeed, many drugmakers have launched AI initiatives: automated literature review tools, machine-learning models for target identification, conversational agents for regulatory drafting, and more (www.bain.com).

Despite these pilots, analysts caution that **true "AI at scale"** — meaning enterprise-wide, mission-critical deployment of AI systems — is still rare in pharma. Most companies are at the "proof-of-concept" stage or suffer from a *pilot purgatory*, where promising models are developed but never fully integrated into daily operations (www.janeasystems.com). Leading experts argue that the next phase of transformation requires embedding AI into core processes, breaking down data silos, and restructuring organizations to enable continuous improvement (www.janeasystems.com) (www.bain.com). In this context, *Sanofi's vision* of becoming the first large-scale AI-powered biopharma is an instructive case. The company's CEO, Paul Hudson, put it bluntly:

> *"Our ambition is to become the first pharma company powered by artificial intelligence at scale, giving our people tools and technologies that focus on insights and allow them to make better everyday decisions."* (www.sanofi.com)

This statement (from a June 2023 press release) highlights the twin goals of **speed and insight** — accelerating research and optimizing decisions. In this report, we dive into Sanofi's strategy and execution. The analysis covers the **historical context** of AI in pharma, the **current state of Sanofi's programs** (with timeline and data), and expert perspectives on what it all means. We examine Sanofi's approach across the three major domains of R&D, manufacturing/supply, and enterprise decision-making. We then discuss broader **implications** for enterprise roadmaps, operating models, and for other industry players. Finally, we consider future directions as AI technologies (like large language models) and regulations (like AI governance) evolve.

Defining "AI at Scale" in Pharma

The phrase **"AI at scale"** can be interpreted broadly, but in the context of pharma it implies **big, systematic adoption of AI across the organization and value chain**. It goes beyond a few isolated ML projects to transformation of core workflows. Three dimensions are key:

- **Breadth**: AI tools are used in many functions — drug discovery, clinical operations, manufacturing, marketing, etc. In Sanofi's definition, this covers "from research and development to manufacturing and patient engagement" (www.sanofi.com). For example, Sanofi is targeting immunology, oncology and neurology with predictive models (www.sanofi.com), while also embedding AI in its commercial and supply teams.
- **Depth**: AI becomes entrenched in decision-making. Sanofi's description of plai illustrates this: it aggregates internal data "across all Sanofi activities" and enables thousands of managers to run *"personalized 'what if' scenarios"* to make decisions (www.sanofi.com). Similarly, internal GenAI tools let even non-technical staff use AI (e.g. Concierge chatbot or Turing recommendation engine) (www.sanofi.com). Scale means every Sanofi employee has AI-powered aids, not just a central lab.
- **Performance**: The systems are industrial-strength, handling big data volumes and generating real business impact. They leverage cutting-edge models: Sanofi cites large language models for biologics, deep learning for mRNA design, and AI-powered digital twins in factories (www.sanofi.com). These are not toy apps—they aim to deliver significant time-to-market reductions, yield improvements, and productivity gains. For instance, Sanofi expects AI-driven process improvements to reduce new-drug launch timelines by up to *one year per molecule* (www.sanofi.com).

Industry analysts emphasize that "AI at scale" also requires **organizational changes**. Bain & Company notes that companies must move from fragmented pilots to a "structured, scalable enterprise-wide program" for AI, with aligned roadmaps and funding models (www.bain.com). This involves creating an AI governance and operating model – effectively treating AI as an infrastructural capability. Sanofi's framing of its *"3 Pillars"* of AI (Expert AI, Snackable AI, Generative AI) and its network of *digital accelerators* is part of this shift. Academic observers define an "AI-ready" pharma firm in terms of data maturity, cultural readiness, and technical architecture that can support continuous AI deployment (www.janeasystems.com). The goal is a self-reinforcing AI ecosystem where models continuously improve and new use cases roll out quickly.

In summary, **"AI at scale" in pharma means much more than launching a chatbot or a single predictive model**. It implies a **holistic transformation**: seamless data flows across functions, cloud and computing infrastructure, unified AI platforms, cross-functional AI teams, and broad training. We see this reflected in

Sanofi's language: it talks about *"AI-based solutions across our value chain"*, *"data democratisation"*, and *"an AI-first strategy"* (www.sanofi.com). In the sections below, we examine how these concepts play out concretely in Sanofi's initiatives.

Sanofi's Strategic Pillars and Vision for AI

Sanofi has publicly articulated a clear strategy for AI and digital innovation. Its digital leadership and then-CEO Paul Hudson emphasized that AI is not a side project but the core of Sanofi's scientific mission. On its corporate website, Sanofi states: *"We are an R&D-driven, AI-powered biopharma company committed to improving people's lives"* (www.sanofi.com). The company's stated aim is to *"shorten the time between discovery to therapy"* by pioneering an innovative pipeline and launching therapies at scale, all accelerated by AI and data science (www.sanofi.com).

To achieve this, Sanofi builds on **three AI "pillars"** (www.sanofi.com) (Figure 1):

- **Expert AI:** These are advanced machine learning tools and computing resources aimed at tackling complex scientific problems. For example, Sanofi uses high-capacity computing and specialized algorithms in tasks like target discovery and biologics design. In its words, Expert AI *"empowers our teams with massive computing power, machine learning and trained algorithms"* for R&D and manufacturing challenges (www.sanofi.com). Specific Expert AI projects include deep learning target validators and the CodonBERT language model for mRNA design (www.sanofi.com).
- **Snackable AI:** This refers to analytics and AI-driven insights that are **democratized** across the organization. Sanofi describes Snackable AI as *"AI applications that everyone in our organization can use in their daily workflow"* (www.sanofi.com). The idea is to remove data silos and put intuitive dashboards, mobile apps, or chatbots into the hands of scientists, clinicians, supply planners and marketers. For instance, Sanofi's *plai* platform and *Concierge* chatbot fall into this category. They deliver quick answers, recommendations and visualizations so that non-experts can harness AI *in real time* (www.sanofi.com).
- **Generative AI:** Sanofi explicitly distinguishes generative AI (e.g. large language and diffusion models) as a category. Generative AI helps *"streamline processes, relieving the burden of time-consuming, non-value-added tasks"* (www.sanofi.com). This includes using LLMs to generate ideas, draft documents, or design sequences. Sanofi's strategy has embraced generative models – for example, its CodonBERT (an LLM for biological sequences) is one such tool (www.sanofi.com), and the company rolled out an internal GPT-like assistant (Concierge) to *all* employees (www.sanofi.com). The goal is to amplify creativity and decision-making, not just automate.

 Figure 1. Sanofi's digital strategy emphasizes three complementary aspects of AI: Expert AI (advanced ML/analytics for science and ops), Snackable AI (democratized tools for employees), and Generative AI (LLM-powered productivity). These pillars support AI across R&D, manufacturing, and corporate functions (www.sanofi.com).

Sanofi's website and media releases detail many initiatives under these pillars. In R&D, "target discovery engines" combine Expert AI methods with lab validation, yielding rapid insights into disease biology (www.sanofi.com). In manufacturing, yield-optimizing algorithms (Expert AI) and smart apps like SimplY boost

output . Across the enterprise, Snackable AI tools like plai and Concierge empower staff. Generative AI is used to accelerate vaccine code design and automate document drafting. Notably, the company states that since 2022 it has already integrated AI in *disease areas and functions*, and believes it has *"just scratched the surface"* (www.sanofi.com).

This broad, articulated strategy is relatively rare in pharma. The emphasis on culture change is also explicit: Sanofi says it is fostering an *"AI-first mindset"* throughout the organization (www.sanofi.com). The ultimate ambition is to transform "the practice of medicine" itself by harnessing what it calls "disruptive technologies" (www.sanofi.com). Industry commentators note that such a comprehensive stance – with C-suite backing and a public commitment – is emblematic of a leader preparing to scale AI. A Forbes analysis highlights the unusually candid and detailed nature of Sanofi's CEO quote and strategy announcement (www.forbes.com).

Finally, Sanofi has organized **dedicated teams and processes** to implement this vision. It has established a Chief Digital Officer and cross-functional *digital accelerator* teams for different domains (www.sanofi.com). Sanofi identifies RAISE as underpinning its responsible AI strategy (Sanofi). It has also set up partnerships with academic and industry groups to share best practices. In short, Sanofi's approach shows all the hallmarks of an enterprise aiming for *AI at scale*: clear leadership, articulated pillars, pervasive tools, and systematic change management. The sections below unpack how this plays out in R&D, manufacturing, and decision-making, with data on outcomes and expert perspectives.

AI in Research and Development

One of the most dramatic applications of AI at Sanofi is in drug discovery and R&D. The traditional process of identifying a therapeutic target, designing a molecule, and screening in the lab can take years. Sanofi is deploying AI to **compress this timeline** and uncover new possibilities that might be missed by human intuition alone.

Target Discovery and Early-Stage Research

Sanofi reports that it has built *"multiple AI programs to slash research times through improved predictive modelling and automated time-sink activities"* (www.sanofi.com). For example, its **Target Discovery engines** integrate machine learning with high-throughput biology. These engines ingest vast datasets (genomic, proteomic, phenotypic data) and suggest novel drug targets. The company claims these tools **"have delivered seven novel drug targets in just one year"** (www.sanofi.com). To put that in context, finding even a single validated target in a new disease area can historically take many years, so seven in a year represents a major acceleration. Sanofi reports that its engines delivered seven novel drug targets in one year (Sanofi).

Another R&D application is designing biologics (e.g. antibodies, nanobodies) and nucleic acid therapies. Sanofi states it is developing *"breakthrough AI, such as deep learning and large language models, to transform the discovery process of large molecules and biologics"* (www.sanofi.com). A concrete example is the **CodonBERT** project: a transformer-based AI model trained on 10 million mRNA sequences. CodonBERT assists in optimizing mRNA vaccine sequences (for example, maximizing expression or stability). According to Sanofi, this effort has *halved the time needed* to design mRNA constructs (www.sanofi.com). The 2024 *Genome Research* paper describes training CodonBERT on more than 10 million mRNA sequences and using

it to predict mRNA properties (Li et al.). These model-training and prediction results should be distinguished from the 50% operational design-time saving reported by Sanofi. By automating would-be tedious tweaks to genetic sequences, AI frees scientists to explore more vaccine ideas in parallel.

Sanofi is also using AI to explore unconventional approaches. One illustration from a press release is AI-guided **lipid nanoparticle selection** for mRNA delivery. Sanofi has a large library of lipid nanoparticles for mRNA vaccines, and it applies AI to **"create digital models to predict the strongest selection of particles"** for new vaccines (www.sanofi.com). In practice, this moved a process from *months to days*, according to their report (www.sanofi.com). Rather than empirically testing thousands of combinations in the lab, virtual screening with a trained model quickly narrows down the best candidates.

Generative AI and AI Partnerships in Discovery

Beyond in-house tools, Sanofi has made several high-profile collaborations to inject AI into its R&D pipeline. A 2023 press release highlights partnerships with AI-drug startups: Exscientia (for precision oncology and immunology targets), Atomwise (for molecular screening), Insilico Medicine (generative AI for end-to-end discovery) and others (www.sanofi.com). These platforms allow Sanofi's scientists to run AI-driven design cycles on real human tissue models or molecular libraries years before traditional lab work. Sanofi's June 2023 announcement identifies Insilico Medicine and Atomwise as partners using AI-driven platforms to speed medicine development (Sanofi). Similarly, a deal with Exscientia has Sanofi testing AI-suggested drug candidates in biological assays. These alliances complement Sanofi's own AI teams and illustrate a hybrid R&D model combining internal AI with external deep-learning innovators.

Perhaps the most forward-looking AI collaboration is the May 2024 **Sanofi–Formation Bio–OpenAI** program (www.sanofi.com). This "first-of-its-kind" partnership aims to fine-tune OpenAI's models on Sanofi's proprietary data to build *purpose-built* AI agents for drug development. Sanofi explicitly says it will *"provide access to proprietary data to develop AI models"* as it presses toward being the first AI-powered biopharma (www.sanofi.com). The CEOs of the three organizations emphasize that custom-tuned large language models and AI agents could reshape drug discovery workflows (www.sanofi.com). The collaboration introduced Muse, an AI tool intended to optimize clinical-trial patient recruitment, on November 12, 2024 (Formation Bio). Its announced objectives should be distinguished from independently demonstrated clinical or productivity benefits.

In summary, AI has become embedded in Sanofi's R&D pipeline. It is **slashing timeframes** for target identification, molecular design, and preclinical validation. For instance, *predictive modeling* has reportedly reduced weeks of work to just hours (www.sanofi.com), and in immunology/oncology/neurology it boosted target identification rates by *20–30%* (www.sanofi.com). External analysts note that AI is now central to bio-discovery: one Nature *News* feature (Aug 2024) documents how major pharma are making multi-hundred-million-dollar deals with AIdriven biotech startups to enrich their pipelines (www.nature.com). Sanofi is very much part of this wave: for example, in October 2023 it entered a collaboration with BioMap to co-develop AI modules for biotherapeutic drug discovery, with a $10 million upfront payment and eligibility for more than $1 billion in contingent milestone payments (BioMap) and signed an up-to $140M deal with Aqemia (a startup using generative AI and physics for small molecules) (www.nature.com). These collaborations reflect the trend

reported by dealmaking analysts: “the potential of generative AI models to accelerate the design of drug candidates looks set to boost the funding raised by AI-focused companies and is driving dealmaking by major biopharma” (www.nature.com).

Nevertheless, even with all these advances, R&D remains risky and uncertain. Not every AI-suggested target will yield a drug. Sanofi acknowledges that it is early days: CEO Hudson has said they have *“just scratched the surface”* of what AI can do in research (www.sanofi.com). NIST cautions that harmful bias and data quality issues can affect AI system trustworthiness (NIST). For CGMP drug records, FDA’s guidance recommends complete, consistent and accurate data that are attributable, legible, contemporaneously recorded, and original or a true copy (FDA). Sanofi identifies Responsible AI at Sanofi for Everyone (RAISE) as underpinning its responsible AI strategy (Sanofi). Overall, however, there is broad **optimism that AI will revolutionize pharma R&D**. As Nvidia’s CEO predicted at Davos 2026, drug research is likely to shift “from traditional labs to AI platforms”, enabling much faster progression of new treatments (www.axios.com). Sanofi’s concerted efforts suggest it intends to ride that wave rather than be left behind.

AI in Manufacturing and Supply Chain

Beyond discovery, Sanofi is also applying AI to biomanufacturing and supply chain — an area often called “Manufacturing 4.0.” The goal is to **accelerate production of therapies, increase quality, and reduce costs**, complementing the speed gains in R&D. In late 2023 and 2025 publications, Sanofi highlights several AI-driven initiatives in its manufacturing network:

- **Yield and Process Optimization:** Sanofi built an in-house AI solution that *“learns from past and current batch performance to enable consistently higher yield levels”* (www.sanofi.com). This system, named *SimplY*, uses machine learning on historical batch data to flag patterns that affect yield and suggest optimal process parameters. Early results indicate better raw material utilisation and more steady production. A higher yield not only gets more product per batch (improving availability) but also aligns with sustainability goals by reducing waste . Early adopters claim continuous performance improvements, although exact percentages are proprietary. Relatedly, Sanofi has digitized quality processes (migrating from paper to Electronic Batch Records) to feed these AI tools (www.sanofi.com).
- **Predictive Supply Planning:** Using its plai platform in the supply chain, Sanofi is moving from reactive to proactive logistics. The plai AI app was extended to *“biopharma Supply Chain”*, where it enabled teams to **predict 80% of low-inventory positions** (www.sanofi.com). In practice, this means the system analyses global inventory, production schedules and demand forecasts to warn of looming shortages. In real-world a pilot, Sanofi says it could identify four out of five potential stock outs *in advance*, giving planners critical lead time to adjust shipments or open alternative manufacturing. The AI also correlates supply risks (65% of them) to root causes like production delays or quality rejects . This kind of visibility is a hallmark of “AI at scale” — knitting together disparate data (ERP, IoT sensors, external analytics) to support strategic decisions. Such predictive planning can markedly reduce stockout-driven sales losses and ensure patients aren’t left waiting.

- **Digital Twins and Real-Time Monitoring:** The company has set up *Digital Accelerators* (cross-functional innovation hubs) that implement advanced sensors, IoT connectivity, and simulation models. For instance, the newest accelerator in Lyon is deploying **digital twins of production lines** (www.sanofi.com). These virtual copies of equipment run in parallel to real factories, simulating how changes (e.g. a new batch formula or equipment shift) would play out. Combined with AI analytics, these twins enable "what-if" exploration without interrupting real operations. Sanofi reports that across its network, embedding AI and agility is expected to **shave up to one year off product time-to-market** (www.sanofi.com). In concrete terms, launching a new biologic or vaccine could proceed 12 months faster, an enormous gain in a business where every additional month saved can translate to significant revenue and faster patient access. The stock of digital capabilities now spans multiple vaccine and biologics platforms (including mRNA), in Sanofi's highly automated sites in Singapore and France .
- **Quality and Continuous Manufacturing:** Although not yet detailed, the implication is that AI also helps with quality oversight. For example, machine vision and anomaly detection can catch micro-variations in bioprocesses faster than human inspectors. The Sanofi text mentions *"manufacturing 4.0 capabilities"* and *"predictive decision-making"* (www.sanofi.com), suggesting that practices like predictive maintenance, real-time quality control, and adaptive scheduling are in play. These are standard Industry 4.0 initiatives in other sectors, adapted to the rigor of pharmaceutical manufacturing.

These manufacturing AI efforts bear evidence of success. Sanofi executives explicitly credit AI with **higher productivity** in manufacturing. For instance, the SimplY yield tool not only increases production, but also supports cost efficiency and environmental targets . And the broader digitization is said to contribute to Sanofi's sustainability goals (like net-zero emissions by 2045) since smarter resource use and smaller batch failures mean less waste . In the industry at large, such results are echoed by other firms: for example, Nvidia CEO Huang noted that Lilly's collaboration on an AI supercomputer aims to *"enabling research models [and] generating 'scientific AI agents'"* to improve manufacturing methods (www.axios.com).

Nevertheless, rolling out AI in biomanufacturing is challenging. It often requires upgrading plants with sensors and connectivity (investment) and training staff. For computerized applications used in GMP-regulated activities, EU GMP Annex 11 calls for application validation, with the extent of validation and data-integrity controls based on a justified, documented risk assessment (European Commission). Sanofi's use of digital accelerators reflects an awareness of these hurdles: they act like "skunkworks" to experiment with new tech outside day-to-day production. Over time, the learnings are folded into standard operating procedures.

In sum, Sanofi's manufacturing strategy shows that **"AI at scale" extends well beyond the lab**. By applying machine learning to both routine data analysis (like batch records) and advanced modeling (digital twins), Sanofi is creating a smart supply chain. According to industry definitions, this meets the criteria of AI at scale: multi-site implementation, real-time operational use, and measurable business benefits. We see tangible impacts: yield improvements and inventory risk reduction that directly affect drug availability.

AI in Clinical Development and Patient Engagement

While not explicitly highlighted under Sanofi's core pillars, AI is also influencing clinical trial design and patient-centric innovation at Sanofi (and this too is part of their value chain transformation). According to the company:

- **Smart Clinical Trials:** Sanofi uses AI to optimize trial site selection and patient recruitment. The press releases mention that using plai, *"R&D teams can find and set up new, more convenient trial sites for their target groups, broadening opportunities for those from historically underrepresented communities"* (www.sanofi.com). This points to AI analysis of demographic and site performance data to improve trial diversity and efficiency. A related partnership is with Owkin (an AI startup specializing in clinical data). Sanofi invested $180M in Owkin in 2021, using its AI platform to predict patient responses (www.forbes.com). The idea is that by analyzing pooled patient data from multiple centers, AI can help choose the right endpoints or identify high-responder subsets.
- **Patient Digital Twins:** Sanofi's work on patient-level modeling also counts. A feature article describes a *"patient-centric accelerator"* focusing on digital twin technologies to understand patient and healthcare-provider behavior (www.sanofi.com). The goal is to simulate how individual patients might respond to therapies or adhere to treatments. Sanofi reports that their Patient Digital Twin improved predictive accuracy (presumably for outcomes or care pathways) (www.sanofi.com). While details are sparse, this approach aligns with a wider trend of using AI (and digital biomarkers) to personalize medicine.
- **Post-Market and Consumer Health:** In consumer health, Sanofi launched an open innovation portal and also uses AI to personalize marketing (e.g. the *Turing* tool gives "next best action" for communications with providers (www.sanofi.com)). These commercial analytics, while not directly saving patient lives, are part of the same data-driven culture. They illustrate that Sanofi is bringing AI into corporate and medical affairs as well as core R&D.

Overall, Sanofi envelops every stage from **formation to fulfillment** in its AI strategy. Sanofi describes building and deploying AI-based solutions across its value chain, from R&D to manufacturing and patient engagement (Sanofi). This end-to-end perspective is what "AI at scale" implies: not only designing the drugs but also making and delivering them using AI.

Decision-Making and Enterprise Operations

A key dimension of "AI at scale" is how it changes **routine corporate decision-making**. Sanofi's approach empowers thousands of employees to use AI in their daily jobs and equips managers with integrated insights.

- **plai 360° Platform:** As mentioned, Sanofi's *plai* is a company-wide AI-enabled app developed in partnership with Aily Labs (www.sanofi.com) (www.bain.com). It aggregates data from all functions (R&D pipelines, manufacturing schedules, sales figures, etc.) and provides dashboards, forecasts, and "what-if" scenario tools (www.sanofi.com). The press release touts that plai *"gives an unprecedented 360° view across all Sanofi activities"*, supporting thousands of decision makers (www.sanofi.com). By having real-

time KPIs at their fingertips, leaders can respond more quickly to issues (e.g. shifting demand, trial setbacks). The fact that *20,000 Sanofians* use plai daily means the AI insights reach into nearly every corner of the enterprise (www.sanofi.com).

- **Concierge GenAI Assistant:** Sanofi also rolled out an internal generative AI assistant called *Concierge* (www.sanofi.com). Powered by large language models (likely OpenAI's or similar), Concierge helps employees with routine tasks – answering policy questions, navigating internal tools, drafting emails, etc. Described as *"designed to streamline daily tasks"* (www.sanofi.com), this snackable GenAI tool democratizes AI capabilities. Rather than just tech teams, it is used by general staff for knowledge management. Its deployment signals that Sanofi is treating AI as a standard middleware, available to all like email or CRM software. (This parallels what Moderna did with its mChat: an internal ChatGPT reported to reach 80% adoption (www.janeasystems.com).)
- **Salesforce and Commercial Analytics:** On the commercial side, Sanofi employs AI in marketing decisions. The *Turing* platform analyzes patient outcome and prescribing data to recommend the *"next best action"* to sales reps and medical liaisons (www.sanofi.com). For example, Turing might suggest which HCPs to call on, which data to present, or what content to send to maximize impact. By framing marketing like a chess game played by AI, Sanofi aims to increase ROI on its huge commercial expenses. Although Sanofi has not published ROI numbers for Turing, the very existence of an AI-based sales tool is noteworthy.
- **Budgeting, Forecasting, and Resource Allocation:** Behind the scenes, Sanofi is using AI for planning decisions. Probabilistic planning algorithms have been applied to supply chain, and by extension can be used for financial forecasting and demand planning. A noteworthy statistic: deploying plai in manufacturing and supply has *predicted 80% of stock disruptions*, enabling faster mitigation (www.sanofi.com). If this success can be translated to sales forecasts or capacity planning, it could significantly reduce overstock or underutilization. Indeed, Bain notes that leading pharma (like Sanofi) are integrating AI forecasts into budgeting, with some diverting AI investment returns directly into R&D or marketing budgets (www.bain.com).
- **Cultural Impact:** Beyond tools, Sanofi actively promotes an *"AI mindset"*. The company says it is putting *"AI in the hands of every Sanofian"* and instilling *"a culture of curiosity and creativity"* (www.sanofi.com). Training programs, hackathons, and internal AI project showcases (e.g. VivaTech 2023 demos) help employees adopt new ways of working. For example, at VivaTech, Sanofi's teams presented an AI-guided "digital twin" for insulin pens, showing even peripheral divisions engaging with AI (www.sanofi.com). In the strategy described here, then-CEO Paul Hudson and Sanofi's digital leadership championed this agenda to help overcome inertia. External research underscores that leadership and culture – not just technology – are the key hurdles in scaling AI (www.janeasystems.com) (www.forbes.com). Sanofi seems to recognize this by highlighting its C-suite commitment and by framing generative AI skills as analogous to adopting the personal computer (citing Moderna's CEO) (www.janeasystems.com).

Analysts observe that for AI to truly transform decision-making, companies must also change their organizational structures. Bain recommends "cross-functional AI governance" – groups of executives to hold the company accountable to the AI roadmap (www.bain.com). Sanofi identifies RAISE as underpinning its

responsible AI strategy (Sanofi). By tracking usage metrics (20k users, number of insights generated) and outcomes (e.g. stockouts predicted, trials improved), Sanofi is building an ROI narrative around enterprise AI.

In practice, the **impact on decision-making** is already visible. Sanofi's CEO noted that AI and data science are already speeding drug discovery, enhancing trial design, and improving manufacturing (www.sanofi.com) (www.forbes.com). Each of these flows back into strategic planning. For example, if AI identifies a promising biology target earlier, leadership can reallocate R&D budget to that program. If manufacturing AI flags a yield issue, supply planners can preemptively adjust logistics. When marketing AI targets the right doctors, sales forecasts become more accurate. In sum, AI at scale means that instead of manually driven executive decisions, Sanofi increasingly **relies on AI-derived insights to guide daily and long-term choices**.

Case Study: The OpenAI Partnership and AI Collaboration

A concrete landmark in Sanofi's AI journey is the **May 2024 collaboration with OpenAI and Formation Bio**. As reported in a press release, this is *"the first such collaboration of its kind within the pharma and life sciences industries"* (www.sanofi.com). Under the deal, Sanofi provides proprietary scientific and operational data, while OpenAI contributes advanced AI expertise (including fine-tuning models) and Formation Bio brings its tech-driven drug development platform. The CEOs of all three organizations emphasize that the goal is to create *customized AI models and agents tailored to pharma*, enabling Sanofi to *"shape the future of drug development"* (www.sanofi.com).

This partnership involves combining data, software and tuned models to develop purpose-built tools for drug development (Sanofi). Formation Bio introduced Muse as the collaboration's first outcome on November 12, 2024, with Sanofi planning initial use in Phase 3 multiple-sclerosis studies (Formation Bio). This was an announced tool and deployment plan; its intended benefits should be distinguished from independently demonstrated clinical or productivity improvements.

Another case example is Sanofi's **Digital Accelerators** in manufacturing. The *third Digital Accelerator*, launched in mid-2025, focuses on AI in production. Brendan O'Callaghan (EVP of Manufacturing & Supply) describes it as integrating digital agility *"into every link of our manufacturing value chain"* (www.sanofi.com). Within this accelerator, a scrappy team built a virtual simulation of an entire production line (digital twin) that management can use to test changes without halting actual operations (www.sanofi.com). This capability means if a sensor detects a drift, AI can simulate the effect and decide if a fix is needed. Sanofi claims this approach supports faster, more predictive production. The broader metric they cite is *up to 1 year faster time to market* (www.sanofi.com), which presumably comes from summing the small time savings across many molecules.

A third illustrative example is the **plai app itself**. Built with AI platform company Aily Labs, plai is now a standard tool used in team meetings and strategy sessions across Sanofi (www.forbes.com). Sanofi's CTO and R&D chiefs use it in real time: the Forbes piece mentions that Paul Hudson was *"already actively using the plai app and explaining the integration of generative AI"* as early as January 2023 (www.forbes.com). This indicates that Sanofi did not keep plai shelved as a theoretical project, but pushed it into daily use by

leadership even before its public launch announcement. Plai's success is a case of an AI tool moving from pilot to production mode; according to Bain, having such enterprise apps that connect diverse data sources is exactly how a company "lays the groundwork for AI at scale" (www.bain.com).

These case studies show different facets of Sanofi's AI program: the OpenAI partnership addresses the *technology base*, the digital accelerator targets *process innovation*, and the plai app focuses on *people's everyday use*. Collectively they demonstrate how the company is weaving AI into both strategy and execution. Importantly, they also suggest best practices: co-develop with tech leaders, embed cross-functional teams, and measure user adoption. Sanofi's public communications take great care to report numeric outcomes (like the 7 targets, 50% design cut, 80% predictions) to validate the ROI of these cases.

Industry Context and Peer Comparisons

Sanofi is not alone in seeking to harness AI in pharma, but it has distinguished itself by explicitly tying corporate identity to AI. For comparison, most large drugmakers now have AI initiatives, but they vary widely in approach and scale:

- **Eli Lilly** has invested heavily in AI infrastructure. Notably, in 2025 Lilly announced a partnership with NVIDIA to build a supercomputer for drug design, manufacturing improvements and even "scientific AI agents" to plan experiments (www.axios.com). This indicates Lilly sees AI as a core research tool. Lilly claims it has already saved 1.4 million hours of "rote human activity" via automation since 2022, with a goal of 2.4 million by end of 2023 (www.bain.com). This metric (though in internal jobs) shows material productivity gains and aligns with Sanofi's claim to improve R&D and operations.
- **Moderna** is often cited as an AI-savvy "digital pharma." It has built an enterprise ChatGPT (mChat) with 80% employee adoption, aiming for "full generative AI proficiency" company-wide (www.janeasystems.com). Moderna's approach (training its whole workforce, focusing on AI literacy) is consistent with the need for cultural change in "AI at scale" that Sanofi also emphasizes. However, Moderna's R&D is more narrowly focused on mRNA and vaccine development, whereas Sanofi spans many therapeutic areas.
- **Novartis**: Although not detailed here, Novartis has partnered with leading AI players (e.g. a multi-year deal with Microsoft, work with IBM Watson and NVIDIA, and internal analytics). Its announced Microsoft collaboration included a multiyear research and development effort (Novartis). A corporate innovation report (2019) called AI a "strategic imperative" for Novartis, similar to Sanofi.
- **GSK**: GSK has created an internal responsible AI team (bringing engineers, philosophers and policy experts) to handle biases and governance (www.bain.com). It is also known to have multiple AI research projects in discovery and trials. GSK's stance is that AI should be responsible and ethical, paralleling Sanofi's emphasis on safe deployment (e.g. going through compliance reviews).
- **AstraZeneca** has invested in AI startups (e.g. AZ collaborated with BenevolentAI and Insilico), and uses AI for patient data analytics. However, AZ has not publicly branded itself as an "AI-first" company to the extent Sanofi has.

- **Roche** (including Genentech) has embraced machine learning for in vitro diagnostics and immunology, but tends to implement behind the scenes. Genentech announced an AI research collaboration with NVIDIA to support drug discovery and development (Roche). Roche also partnered with Telavant on a costly TL1A antibody in late 2023, competing with Sanofi for that target (www.nature.com).
- **Biotech Startups**: Outside pharma giants, a host of pure-play AI drug companies (e.g. Exscientia, Insilico Medicine, BenevolentAI, Recursion, XtalPi) have raised large rounds in recent years to sell their tech to pharma. The Nature article notes that Sanofi (and others) have invested in or partnered with many of these innovators (www.sanofi.com) (www.nature.com). Sanofi's pipeline is thus augmented by these external AI forces. Notably, as of 2024 there were at least a dozen multi-hundred-million-dollar biotech-pharma deals announced (e.g. Absci with AstraZeneca, BigHat with AbbVie, Isomorphic with Lilly) (www.nature.com).

In surveys, industry consensus is clearly positive on AI. Bain's February 2024 analysis reported that **75% of pharma companies** cited generative AI as a C-suite and board priority (www.bain.com). Machine-learning for target discovery and trial analytics are becoming as ubiquitous as bioinformatics was a decade ago. Nevertheless, not all view it as an unalloyed benefit. Many caution that pharma's regulatory environment and data fragmentation slow AI adoption. Indeed, one **Forbes Technology Council** article argued that pharma is *"still playing catch-up"* to other industries because of strict compliance regimes (www.forbes.com). Sanofi itself acknowledges that new tech can be disruptive: Paul Hudson noted Sanofi is *"just scratching the surface"* and that AI is *"disruptive"* (www.sanofi.com).

Still, among peers Sanofi's declared "first to AI at scale" label is bold. It has generated publicity (and some skepticism) but is grounded in serious strategy. The Forbes article by Alex Zhavoronkov (founder of Insilico Medicine, a Sanofi partner, writing from a partner's perspective) points out that Sanofi's press release was unusually direct for pharma, and notes that Paul Hudson has been personally championing AI at investor events (www.forbes.com). Observers will be watching metrics (e.g. how many AI-clinical trials Sanofi manages per year, or whether AI-derived products reach market) to see if the claim holds up. Bain's February 2024 analysis noted that investors were watching closely to distinguish AI "pioneers" from "followers" (www.bain.com).

Implications for Roadmap, Operating Model, and Enterprise Strategy

Sanofi's experience provides **rich material for shaping AI roadmaps and operating models** in pharma and beyond. Several key lessons emerge:

- **Set Explicit Goals and Metrics:** Sanofi made no secret of its goal ("first pharma powered by AI at scale") and tied it to tangible metrics (e.g. new targets found, time reductions). This clarity helps align the entire company. Other firms should similarly define what "AI-powered" means (faster launches? Fewer errors? Increased output). Metrics from Sanofi's early projects (50% faster design, 12-month

launch acceleration, 80% supply predictability) help justify continued investment. Bain reported in February 2024 that 40% of pharma executives were including expected generative AI savings in their 2024 budgets (www.bain.com).

- **Develop a Three-Tier Value Chain Strategy:** The separation of R&D, Manufacturing/Supply, and Commercial/Corporate functions, each with AI plans, is instructive. Roadmaps should list AI use cases for each domain. For example, Sanofi's R&D roadmap covers target discovery, mRNA design, trial optimization. Manufacturing covers yield, digital twins, inventory. Corporate covers analytics and knowledge tools. Each segment can recruit domain experts teamed with data scientists (the "Expert AI" vs "Snackable AI" approach). An integrated digital planning tool (like plai) can connect these segments.
- **Build the Technical Backbone and Platforms:** Sanofi's plai platform and digital accelerators required significant IT infrastructure. This suggests a staging approach: first improve data warehousing/quality (perhaps via cloud data lakes), then implement middleware AI platforms that many teams can deploy (like plai). Sanofi mentions relationships with multiple cloud and AI service providers (Educational materials note firms "experiment with multiple foundation models providers" (www.bain.com)). A possible roadmap step is securing strategic contracts with major AI cloud vendors and ensuring GxP-compliant architectures. Critically, global metadata and unified standards (so that all manufacturing sites share the same data schema) is needed.
- **Form Center of Excellence and Governance:** Sanofi identifies RAISE as underpinning its responsible AI strategy (Sanofi). According to Bain, this is essential: leading companies have a cross-functional AI governance team or CoE that manages the roadmap and enforces standards (www.bain.com). A practical model is a steering committee with R&D, IT, compliance, and business unit heads. They arbitrate priorities ("bold bets" vs incremental use cases) and allocate funding. Sanofi's approach suggests splitting responsibility: IT houses infrastructure costs, while business units realize the benefits in their budgets.
- **Invest in Talent and Culture:** Sanofi's success depends on its people adapting. The company emphasizes employee-driven AI through Snackable tools. Others should follow suit: training programs (as Moderna's "AI fluency" example shows (www.janeasystems.com)), AI champions in each department, and change management. Pain points like time-consuming approval processes (the Forbes article noted that internal AI approvals could take months (www.forbes.com)) must be streamlined. Instituting policies that expedite low-risk AI pilots can prevent bureaucracy from stall new ideas.
- **Plan for Ethics, Regulation, and Data Quality:** Roadmaps must include data governance. Pharma's regulatory environment means AI outputs might be part of submissions. Sanofi and GSK examples highlight having a *Responsible AI* framework (www.bain.com). Bain recommends addressing data security, privacy, legal issues and model bias from the start (Bain). Setting up an ethics committee and monitoring tools (as Sanofi likely does) should be on the roadmap. Also, high data quality should be maintained continuously. For CGMP drug records, FDA's guidance recommends complete, consistent and accurate data that are attributable, legible, contemporaneously recorded, and original or a true copy (FDA).

- **Pilot, Learn, Scale:** Sanofi's digital accelerators essentially function as pilot labs. A recommended roadmap approach is to start with focused PoCs in each domain, then use the successes to roll out global programs. For example, a company might first pilot AI for just one drug discovery project, or in one factory line. Once validated (e.g. demonstrated 10% yield gain), then scale the algorithm to all lines/factories. This builds confidence and provides case studies to get stakeholder buy-in.
- **Engage Ecosystem:** Sanofi's external partnerships are a model for open innovation. Roadmaps should include working with startups, academia and even competitors (in pre-competitive consortia) to share data and models. The OpenAI partnership, deals with Exscientia, Insilico, etc., show that no company will code every AI app internally. Outlining a partnership strategy in the roadmap (identifying best-in-class AI firms to collaborate with) can accelerate progress.

In summary, Sanofi's experience suggests that an **enterprise framing for AI** involves treating it as a core strategic program, akin to mergers or new therapy platforms. The Chief Digital Officer (or equivalent) is a full executive member, not just an IT manager. Budgets for AI come from multiple sources (R&D, IT, operations) but are coordinated. Business cases for AI projects clearly tie to therapy development goals and cost targets. All of these elements – governance, platforms, use cases, culture – need to be documented in a multi-year roadmap. The Sanofi example supplies material for each of these sections: its public documents could serve as references or templates for creating similar content in another organization.

Challenges and Considerations

Despite the promise, several challenges temper the "AI at scale" vision. Sanofi and industry experts acknowledge them openly:

- **Regulatory and Compliance Hurdles:** As a regulated industry, pharma must validate many systems before use. New algorithms often have to pass an internal "AI council" for compliance (www.forbes.com). This can delay experimentation. Forbes notes that sometimes it takes *months* to even launch an AI proof-of-concept due to governance reviews (www.forbes.com). Any company adopting AI at scale must therefore plan for longer deployment timelines and work closely with QA/regulatory teams. Fortunately, AI companies and vendors are developing frameworks for explainability and audit trails, but pharma will still typically require extensive documentation.
- **Cultural Resistance and Change Management:** The Forbes article also highlights that *"traditional ways of working"* in pharma are *"embedded almost intractably"* (www.forbes.com). Even if new tools exist, experienced scientists or managers may default to known processes. In his commentary, Tom Hughes argues that teams can remain reliant on familiar processes. Overcoming this requires clear evidence of value and strong leadership – which Sanofi is emphasizing via CEO involvement. Bain's experts note that disruptive projects must be funded appropriately (not just by IT, with confusion over savings) (www.bain.com). Incentives or bonus structures can help: e.g. if an R&D team hits an AI-driven milestone, part of their budget might be freed.

- **Data Silos and Quality:** Pharma data is notoriously fragmented (clinical, lab, manufacturing, sales all in different systems). AI needs integrated data lakes. Sanofi's plai is an attempt at data unification, but initial data cleaning was no doubt intensive. NIST cautions that harmful bias and other data-quality issues can affect AI system trustworthiness and lead to negative impacts (NIST). Companies must invest in master data management and continuous data monitoring. While Sanofi hasn't detailed its data strategy publicly, the scale of its AI suggests it has made this investment. Any roadmap must include data engineering and governance workstreams.
- **Ethical and Privacy Concerns:** Deploying AI in healthcare can raise ethical questions. For example, using patient data for AI model training must comply with HIPAA, GDPR, and other privacy laws. Moreover, Sanofi's AI (like any) could have biases if not carefully trained. According to Bain, leading companies proactively address this with enterprise-wide risk management and guardrails (www.bain.com). Sanofi's public materials identify RAISE as underpinning its responsible AI strategy (Sanofi). GSK's example (forming an in-house ethics team) suggests a roadmap step: create internal guidelines (and possibly external advisory boards) for safe AI use.
- **Infrastructure and Cost:** Scaling AI requires significant compute power (GPUs, cloud) and specialized software. Sanofi's May 2024 collaboration announcement describes bringing together data, software and tuned models for purpose-built drug-development solutions (Sanofi). A roadmap should assess cloud versus on-premises infrastructure and budget for hardware, software licenses and cloud services.
- **Talent Shortage:** There is a global shortage of data scientists and AI engineers, particularly in biotech. Bain notes companies struggle to hire enough AI talent and must recruit aggressively (www.bain.com). Sanofi's solution includes partnering with startups (outsourcing some engineering) and training internal folks. Other methods: retraining lab scientists in data skills, or forming joint teams with academia. If talent gaps slow progress, companies may explore managed services or specialized recruiting.

In balancing these challenges with opportunities, the consensus is that **the rewards outweigh the risks**. As Forbes commentary emphasizes, pharma's ultimate mission is to bring treatments to patients faster and more reliably (www.forbes.com), and AI is one of the few levers that can expedite this at the system level. Sanofi's decision to charge full steam ahead – and to openly discuss their challenges in terms of career re-skilling and regulatory approval – provides a realistic roadmap for others. It shows that scaling AI in pharma is a multi-year journey requiring patience, but also that early wins (like those Sanofi reports) can build momentum.

Future Directions and Conclusions

The current wave of AI transformation in pharma is likely only the beginning. Sanofi's claim to be "first at scale" carries a sense of urgency: time and competitors will tell. Looking forward:

- **Advanced AI Models and Research:** Sanofi and other pharmas will continue to integrate newer AI innovations. Beyond LLMs, areas like *protein structure prediction* (AlphaFold, RoseTTAFold) and *AI-driven synthetic biology* will grow. For example, Lilly's announced AI supercomputer uses NVIDIA DGX SuperPOD with DGX B300 systems (Lilly).

- **Digital Clinical Trials:** Rolling out AI in clinical trials (e.g. remote monitoring with wearables, predictive patient stratification, virtual trials) is on the horizon. Sanofi's patient digital twin work hints at personalized trial design, which could accelerate trial completion and efficacy demonstrations.
- **Integration with Real-World Data:** AI may analyze real-world evidence (electronic health records, registries) to support regulatory decisions. Sanofi's partnerships (Owkin etc.) suggest this trend. Leveraging cloud platforms that integrate genomic and patient data could enable AI-driven post-market surveillance and adaptive labeling.
- **Regulatory Evolution:** For drug and biological products, FDA's January 2025 draft guidance proposes a risk-based framework for assessing an AI model's credibility within its particular context of use. It is a draft, is not for implementation and contains non-binding recommendations.
- **Ecosystem Innovation:** The "first at scale" is also an open invitation to partners. Sanofi explicitly invited startups and universities to *"join us on this journey"* (www.sanofi.com). We expect open innovation to expand: more biotech startups raised capital explicitly to collaborate with Big Pharma, or spin out once their models are proven. Even insurers and health systems may start co-developing AI health solutions with pharma players.

In conclusion, Sanofi's drive to become an AI-powered biopharma at scale illuminates both **what is possible and what is required** in this era of digital healthcare. The combination of internal initiatives (pillars, platforms, culture) and external partnerships (OpenAI, biotech) demonstrates a **multi-faceted effort**. While it remains to be seen which specific treatments will owe their existence to Sanofi's AI programs, the metrics and anecdotes cited indicate substantial progress: faster R&D, smarter factories, and more data-driven decisions across the enterprise.

For life sciences leaders, Sanofi's story provides a detailed blueprint. It validates key principles: set bold AI goals, invest in data and infrastructure, democratize analytics, recruit cross-disciplinary talent, and measure outcomes rigorously (www.bain.com). It also highlights pitfalls to avoid (e.g. neglecting change management, underestimating regulatory requirements). Ultimately, embedding AI at scale could help shape the next generation of medicines. Whether Sanofi truly becomes the *"first AI-powered biotech"* remains to be seen, but its strategic positioning and concrete gains suggest that this pioneer will influence the path of pharmaceutical development for years to come.

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Source links

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