



GenAI Business Value Report for the UK Pharmaceuticals Sector

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Executive Summary

The UK pharmaceutical sector is a global innovation leader, anchored by major firms and a vibrant biotech ecosystem. It is driven by intensive R&D investment, although lengthy drug development cycles—averaging 10–12 years and costing around £2.1 billion—remain a key challenge [8]. Generative AI (GenAI) presents a transformative opportunity to overcome these challenges, with estimates suggesting an annual value potential of £50–90 billion [1].

This report demonstrates how GenAI can revolutionise industry functions. It accelerates R&D by reducing discovery times dramatically, streamlines clinical trials, enhances manufacturing efficiency, and automates compliance and commercial processes.

Collectively, these improvements translate into significant productivity gains, cost savings, and faster innovation, enabling UK pharmaceutical firms to remain competitive and deliver better patient outcomes.

Top Three GenAI Use Cases by Function

1. R&D & Clinical Trials

In-Silico Screening and Trial Candidate Selection

Challenge: Selecting the best candidates for clinical trials is resource-intensive and marred by high late-stage failure rates.

GenAI Solution: AI models screen virtual compound libraries and predict biological activity and safety profiles, prioritising candidates with the highest likelihood of success.

Impact: AI-driven screening can accelerate lead identification by up to four times, reducing both time and costs [2].

AI-Driven Drug Discovery

Challenge: Traditional drug discovery is costly and slow, often requiring years to identify viable leads.

GenAI Solution: Generative AI rapidly designs novel compounds with target properties by exploring vast chemical spaces and suggesting molecules with high potential.

Impact: One case study demonstrated a 75% reduction in lead optimisation time—from approximately 4.5 years to 12–15 months—thereby significantly reducing R&D costs [11].

Clinical Trial Design and Optimisation

Challenge: Designing efficient clinical trials that meet regulatory requirements while ensuring rapid patient enrolment is challenging.

GenAI Solution: AI assists in drafting trial protocols, suggesting optimal inclusion criteria, and simulating outcomes using synthetic patient data.

Impact: GenAI-enhanced trial designs have reduced trial durations by approximately 20% and improved patient enrolment rates by 10–20% [2].

Top Three GenAI Use Cases by Function

2. Manufacturing & Supply Chain

Intelligent Manufacturing Operations

Challenge: Pharmaceutical manufacturing is often hindered by suboptimal scheduling, equipment downtime, and process variability.

GenAI Solution: AI-driven systems monitor real-time production data and generate recommendations to optimise batch processes, maintenance schedules, and quality checks.

Impact: Deployments have improved overall equipment effectiveness by 10–15% and increased production line productivity by over 30% [9].

Quality Control and Issue Resolution

Challenge: Identifying and resolving quality issues promptly is essential to avoid production delays and costly rework.

GenAI Solution: AI tools analyse historical production and sensor data to rapidly pinpoint root causes and propose corrective measures.

Impact: Such systems have boosted quality team productivity by over 35% and significantly reduced investigation times [9].

Demand Forecasting and Supply Planning

Challenge: Inaccurate demand forecasts can lead to drug shortages or surplus inventory, affecting overall supply chain efficiency.

GenAI Solution: By analysing extensive datasets—including sales trends, prescription data, and external factors—AI produces accurate demand scenarios and optimised inventory strategies.

Impact: Improvements in forecast accuracy of around 15% have enabled companies to reduce supply chain costs by 2–3% [9].

Top Three GenAI Use Cases by Function

3. Regulatory & Compliance

Regulatory Document Authoring

Challenge: Preparing extensive regulatory submissions is time-consuming and susceptible to errors.

GenAI Solution: GenAI automates the drafting of regulatory documents by pre-populating templates and ensuring consistency across reports.

Impact: This automation has reduced writing efforts by 20–30%, resulting in significant cost savings and shorter submission cycles [4].

Regulatory Intelligence and Compliance Q&A

Challenge: Keeping pace with evolving regulations and responding swiftly to queries is a major operational challenge.

GenAI Solution: AI tools continuously monitor regulatory updates and provide immediate, accurate responses to compliance queries.

Impact: Firms have achieved approximately 30% faster response times to regulatory enquiries, enhancing overall compliance efficiency [4].

Pharmacovigilance Automation

Challenge: Manually processing vast volumes of adverse event reports delays essential safety interventions.

GenAI Solution: AI-powered platforms automate the intake, coding, and analysis of adverse event data, ensuring rapid signal detection.

Impact: These platforms have reduced case processing times by up to 50% and decreased manual effort by as much as 60% in pilot studies [6].

Top Three GenAI Use Cases by Function

4. Commercial & Marketing

Content Creation and Marketing Collateral

Challenge: Producing high-quality, compliant content for multiple audiences is resource-intensive.

GenAI Solution: Generative AI creates draft marketing materials—ranging from promotional copy to visual assets—that experts can then refine.

Impact: This approach has reduced content creation costs by 30–50% and accelerated campaign development by over 20% [2].

Sales Force Support (AI Rep Assistant)

Challenge: Sales representatives must quickly communicate complex product information to healthcare professionals.

GenAI Solution: AI-powered assistants provide real-time, tailored information and generate follow-up communications, streamlining client interactions.

Impact: Sales teams have reported productivity improvements of 10–15%, contributing to incremental revenue gains [2].

Market Insights and Personalisation

Challenge: Manually analysing market research and customer feedback delays the delivery of personalised campaign strategies.

GenAI Solution: AI synthesises large datasets to extract key trends and tailor messaging for distinct customer segments.

Impact: These insights have improved market analysis by 10–30% and boosted engagement through targeted messaging [2].

Top Three GenAI Use Cases by Function

5. Data & Analytics

AI-Powered Insight Generation

Challenge: Analysts must synthesise insights from vast, disparate data sources, including scientific literature, sales figures, and patient records, often resulting in time-consuming processes.

GenAI Solution: A GenAI co-pilot retrieves, summarises, and cross-correlates both structured and unstructured data, allowing users to pose natural language queries that yield immediate, actionable insights.

Impact: Studies report a 10–15% increase in productivity for data analysts, leading to enhanced decision-making and improved revenue performance [2].

Predictive Modelling and Forecasting

Challenge: Forecasting drug demand, sales, or patient outcomes is inherently complex and error-prone, which can lead to inefficiencies in supply and investment decisions.

GenAI Solution: Generative models simulate numerous scenarios by analysing historical sales, epidemiological trends, and demographic data, thereby improving forecasting accuracy.

Impact: AI-driven forecasting has boosted accuracy by around 15%, contributing to a 2–3% reduction in supply chain costs [2].

Automated Data Management

Challenge: Cleaning and managing clinical data is labour-intensive and delays critical analysis in research and clinical trials.

GenAI Solution: Automated tools streamline data aggregation, reconcile discrepancies, and generate reports—freeing teams to focus on high-value analysis.

Impact: These systems have achieved cost savings of over 30% in clinical data management and reduced database finalisation times by more than 50% [2].

Top Three GenAI Use Cases by Function

6. Finance & Strategy

Financial Analysis and Reporting Automation

Challenge: Finance teams spend excessive time aggregating data and preparing reports, detracting from strategic planning.

GenAI Solution: Automation tools integrate data from multiple sources to generate real-time reports and conduct what-if analyses, reducing manual effort.

Impact: Such implementations have yielded productivity gains of 50–80% in reporting tasks, facilitating faster, data-driven decisions [10].

Portfolio Strategy and Pipeline Prioritisation

Challenge: Evaluating complex R&D programmes to allocate resources optimally is both challenging and critical for success.

GenAI Solution: AI synthesises scientific literature, clinical data, and market trends to prioritise the most promising drug candidates and therapeutic areas.

Impact: Companies have seen double-digit percentage increases in portfolio net present value by reallocating resources to high-probability projects [10].

Risk Modelling and Scenario Simulation

Challenge: Traditional scenario planning is limited in scope and cannot fully capture the range of market and operational risks.

GenAI Solution: AI generates and evaluates numerous “what-if” scenarios, enabling firms to stress-test strategies and capital allocations under diverse conditions.

Impact: Enhanced scenario simulation has led to more robust strategic decision-making and reduced exposure to unforeseen risks [10].

Top Three GenAI Use Cases by Function

7. Human Resources & Talent

Recruitment and Talent Sourcing Automation

Challenge: Screening large volumes of candidates and engaging talent efficiently is a time-consuming process.

GenAI Solution: AI-powered recruitment platforms automate candidate screening, initial interviews, and personalised outreach.

Impact: Organisations have reduced recruitment costs by up to 50% and enhanced HR productivity by around 25% [7].

Employee Self-Service and Learning

Challenge: Addressing routine HR enquiries and developing training materials manually places a strain on HR resources.

GenAI Solution: AI-driven chatbots and knowledge bases manage employee queries and generate customised learning modules on demand.

Impact: These systems have freed up 20–40% of HR staff time, significantly improving process efficiency [7].

Talent Retention and People Analytics

Challenge: Identifying turnover risks and engagement issues from diverse data sources can be difficult.

GenAI Solution: People analytics platforms use AI to predict turnover risks and recommend tailored retention strategies.

Impact: Such data-driven approaches have led to a 24% improvement in employee retention rates [12].

Organisation-wide Data Literacy

A data-literate culture is essential for realising the full benefits of GenAI. When employees understand how to interpret and trust AI-derived insights, they are better equipped to make evidence-based decisions and optimise processes. Across research, manufacturing, and marketing, enhanced data literacy enables staff to pose pertinent questions, validate outputs, and spot potential biases. By investing in training and upskilling initiatives, organisations empower their workforce to seamlessly integrate GenAI tools into daily operations. This not only improves operational efficiency but also cultivates an innovative environment where data-driven insights lead to smarter, more agile strategies.

Table of Productivity Improvements

Function	Use Case	Claimed Improvement	Reference
Data & Analytics	Insight Generation	10–15% increase in analyst productivity	[2]
R&D & Clinical Trials	In-Silico Screening	Up to 4× faster lead identification	[2]
R&D & Clinical Trials	Trial Design and Optimisation	20% reduction in trial duration	[2]
Manufacturing & Supply Chain	Quality Control and Issue Resolution	35% increase in quality team productivity	[9]
Finance & Strategy	Financial Reporting Automation	50–80% productivity gains in reporting tasks	[10]
Regulatory & Compliance	Pharmacovigilance Automation	50% faster adverse event processing	[6]
Commercial & Marketing	Content Creation	30–50% lower content creation costs	[2]

GenAI Case Study: Exscientia – AI-Driven Drug Discovery

Exscientia, based in Oxford, is a pioneering pharmatech firm that has embraced GenAI to revolutionise drug discovery.

Established in 2012 as an academic spin-out, the company has grown into a prominent player with global operations. Its business model centres on utilising a proprietary AI platform to rapidly design novel drug candidates, both in partnership with major pharmaceutical firms and through its own research programmes.

At the heart of Exscientia's approach is its AI platform, which integrates generative models with expert medicinal chemistry.

Researchers input desired drug profiles—such as target potency, selectivity, and safety—and the AI generates innovative compound structures predicted to meet these criteria. The process forms a continuous loop: AI-generated suggestions are synthesised and tested in the laboratory, and the results are fed back to refine subsequent predictions. This iterative cycle has enabled Exscientia to cut lead optimisation time by approximately 75%, reducing a process that traditionally took 4–5 years to just 12–15 months.

The impact of this approach is substantial.

Exscientia's first AI-designed candidate for obsessive-compulsive disorder entered human clinical trials significantly faster than traditional methods. This accelerated timeline not only reduces R&D costs but also extends the revenue-generating period before patent expiry. The efficiency gains have attracted major partnerships with global pharmaceutical giants, resulting in collaboration deals exceeding £800 million.

Key lessons from Exscientia's experience include the importance of maintaining a human-AI collaborative model.

By ensuring that expert chemists remain involved in the process, the firm guarantees that AI recommendations are both clinically viable and rapidly validated. Furthermore, a focus on high-quality, domain-specific data has been instrumental in refining its generative models. Ultimately, Exscientia's success demonstrates that strategic investment in GenAI can yield transformative improvements in drug discovery, making a compelling case for its wider adoption in the UK pharmaceutical sector.

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