OPTIMIZING DESIGN, SAFETY AND EFFICIENCY WITH ARTIFICIAL INTELLIGENCE

Dr. Richard Willmann
Image Guided Therapy Systems, Philips
June 3rd, 2025

PHILIPS

Executive summary

AI is integrated in many medical devices, and the FDA has approved more than 950 over the past 10 years

In the past 3 years, AI is increasingly also used to streamline the R&D process itself

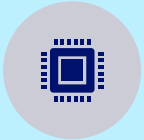
More than 50% of med tech companies have not yet realized value from AI in the R&D process

AI in R&D will lead to about 20% cost reduction and a similar time-to-market speed up within 3 years

There are hundreds of use cases, thousands of vendors and not one encompassing tool chain

Example use cases include ideation, SW co-creation, knowledge management, generative HW design optimization, risk management and complaint handling, training material creation

The most successful implementation plans will include process redesign and require technology partners



AI in R&D will not provide a sustainable competitive advantage, but be a necessity, like the introduction of PCs in the 1980s

PHILIPS

Not all types of AI are used in FDA approved medical devices

AI tools used for R&D include also generative AI and Large Language Models

Smart patient monitoring

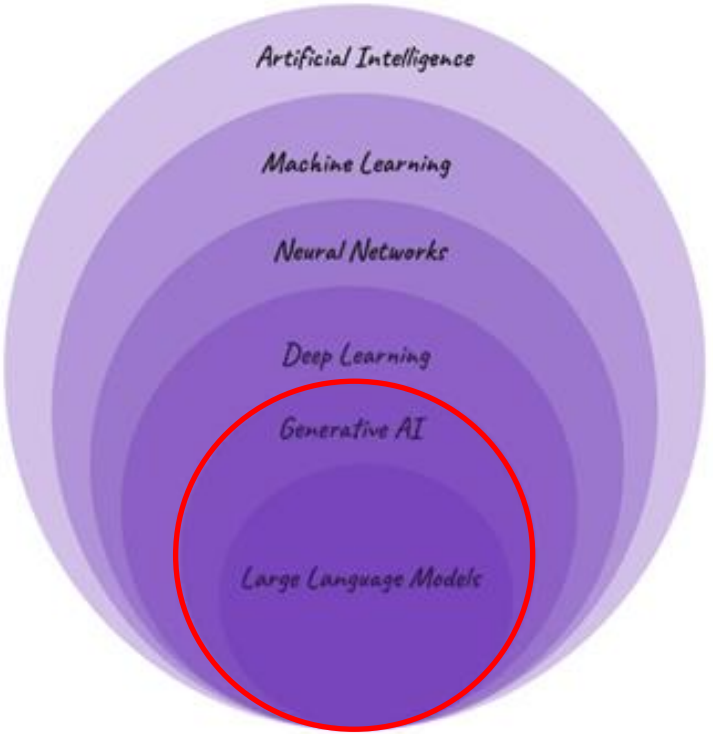
Enabling timely care interventions

Radiology Operations Command Center

Connecting imaging experts at a central command center with onsite staff for virtual support

Tasy EMR AI Virtual Assistant
can help streamline the charting and ordering process to save clinicians valuable time

MR SmartSpeed
can increase imaging speed by up to a factor 3 while providing up to 65% greater image resolution

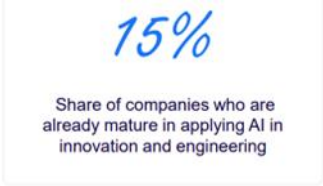


PHILIPS

Most med tech companies have not yet seen value created by AI in R&D, but expect significant efficiencies in the next 3 years

State of adoption

Deloitte

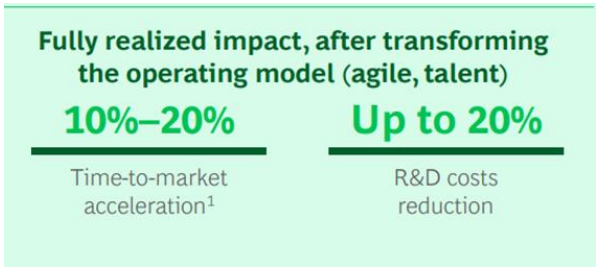


Arthur D Little

Size of the prize

Type of costs	Top 10 medtech firm average cost*	Potential savings % from use of AI in the next 2–3 years*	Potential savings estimate	Functional areas likely to benefit
Selling, general and administrative costs (SG&A)	$7.2B	7%-19%	$0.5B - $1.5B	Commercial, Shared services
Cost of goods sold (COGS)	$11.7B	5%-12%	$0.6B - $1.4B	Supply chain and manufacturing
R&D costs	$1.5B	7%-20%	$0.1B - $0.3B	Product development
Estimated potential savings for a large medtech company in the next 2–3 years			$1.2B - $3.2B	

Deloitte



Boston Consulting Group

PHILIPS

The FDA has adopted generative AI for their own work

FDA uses a customized ChatGPT based model that is running on a private server

FDA NEWS RELEASE

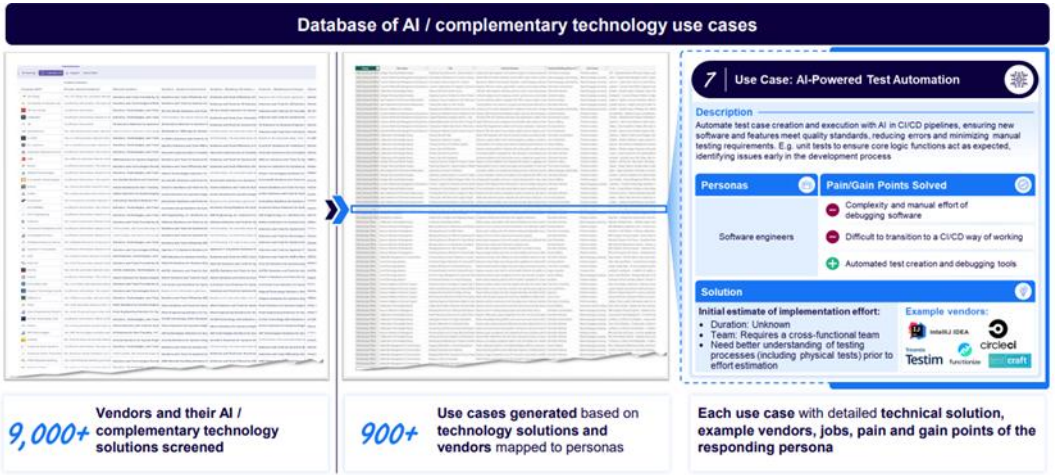
FDA Announces Completion of First AI-Assisted Scientific Review Pilot and Aggressive Agency-Wide AI Rollout Timeline

For Immediate Release: May 08, 2025

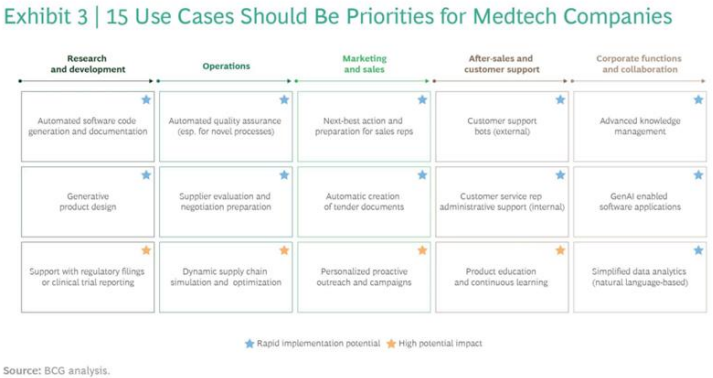
In a historic first for the agency, FDA Commissioner Martin A. Makary, M.D., M.P.H., today announced an aggressive timeline to scale use of artificial intelligence (AI) internally across all FDA centers by June 30, 2025, following the completion of a new generative AI pilot for scientific reviewers.

"I was blown away by the success of our first AI-assisted scientific review pilot. We need to value our scientists' time and reduce the amount of non-productive busywork that has historically consumed much of the review process. The agency-wide deployment of these capabilities holds tremendous promise in accelerating the review time for new therapies," said Dr. Makary.

With hundreds of possible use cases for AI in R&D across the whole life-cycle, companies need to chose use cases wisely



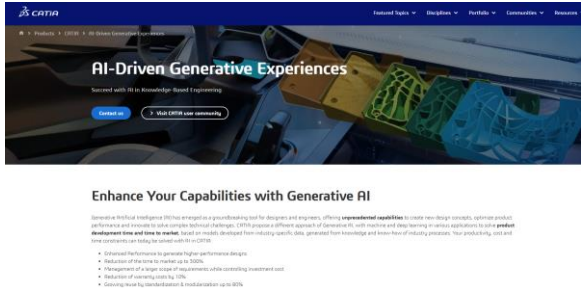
Arthur D Little



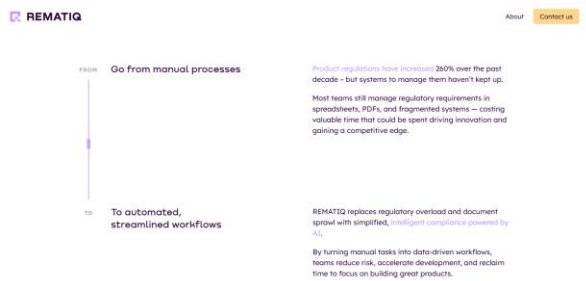
Boston Consulting Group

PHILIPS

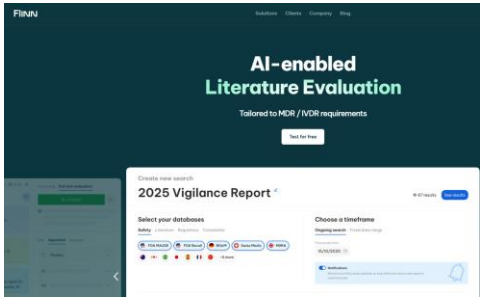
Several AI vendors are exhibiting on the European Medical Device summit



Dassault: generative HW design



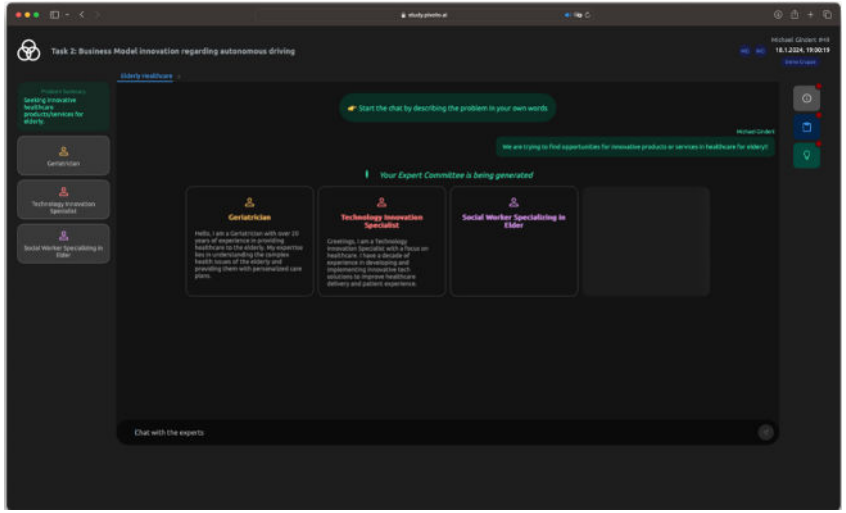
Rematiq: norm compliance and requirements

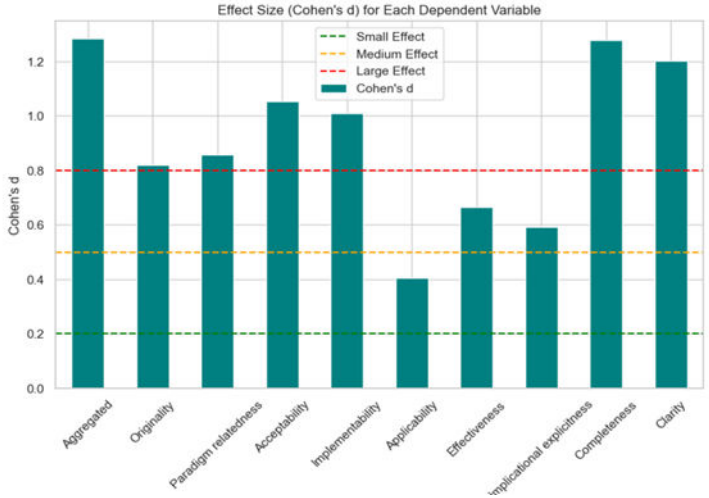


Flinn: AI-enabled regulatory document creation

AI-augmented teams are better in ideation and brainstorming

Scientific experiment by University of Regensburg demonstrates the value of generative AI ‘team members’

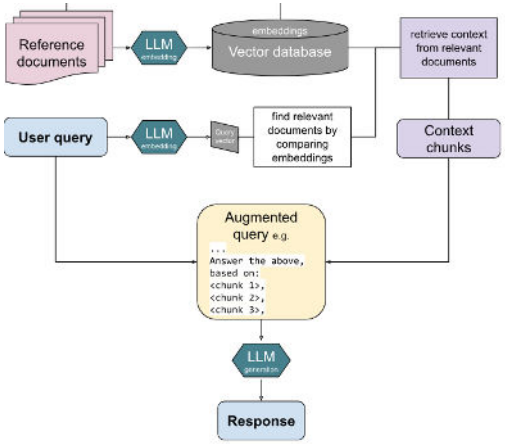


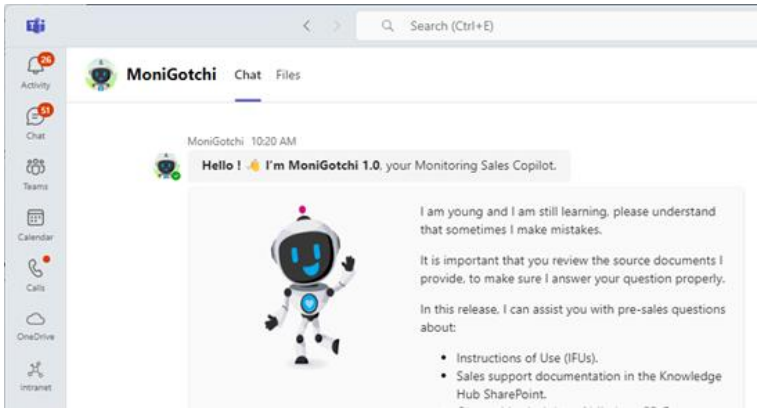


PHILIPS

AI can make legacy knowledge accessible to all employees

Using a private LLM version in combination with a document archive (medical device DHF)



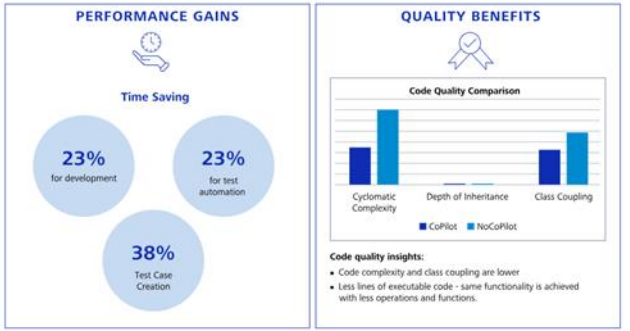


Wikipedia: Retrieval Augmented Generation

GitHub Copilot is increasing the efficiency of SW developers

Results reported from actual deployments differ widely

Github Copilot

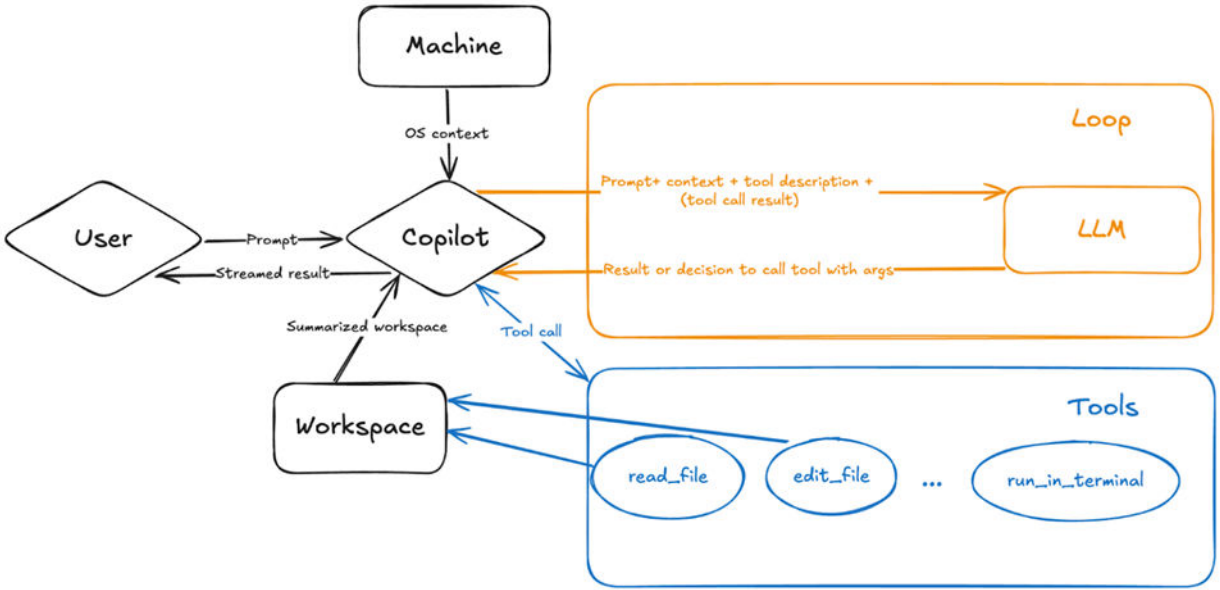


Zeiss

PHILIPS

GitHub Copilot just introduced an agentic AI version

Goal driven agents, once given a goal, can plan steps, take actions, learn from results and improve



Github Copilot

PHILIPS

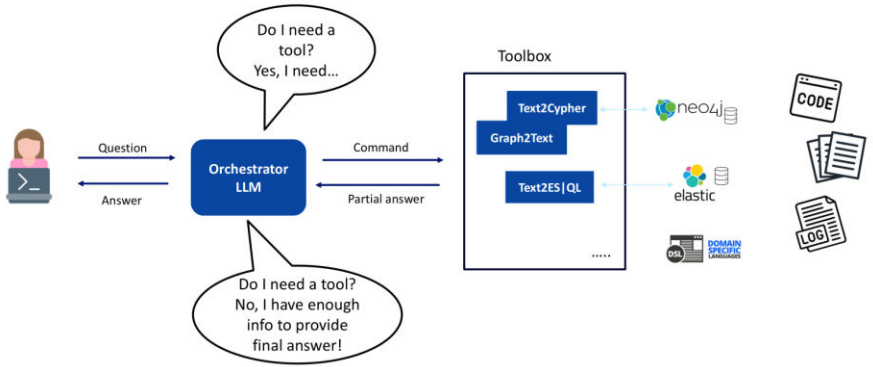
AI assists the CAPA process

PPP with TNO-ESI aims to develop an AI-powered, trustworthy assistant

7 Complaints and Adverse Events related to the Safety Risk or Noncompliance Issue

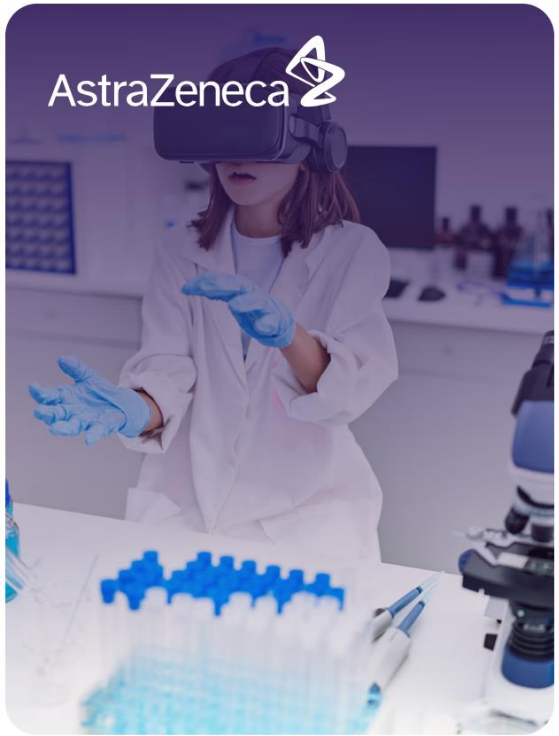
Complaint Search Window:	Trackwise search from 01 Oct 2020 until 30 Jun 2023. This is a standardized time frame from the complaint handling unit.
Methodology:	A keyword search on 'line', 'collimator' and 'shutter' was performed on the following TrackWise fields: Description, Notes, Communication, Problem, Investigation, Evaluation, Action, Software Revision. Further filtering was applied to exclude complaints where 'line' was unrelated to collimation.
Results: Number of Complaints: 9 Injuries Reported by country / region: 0	

DELPHI 2024 is looking to automate this step from the IIA report, by using GenAI



PHILIPS

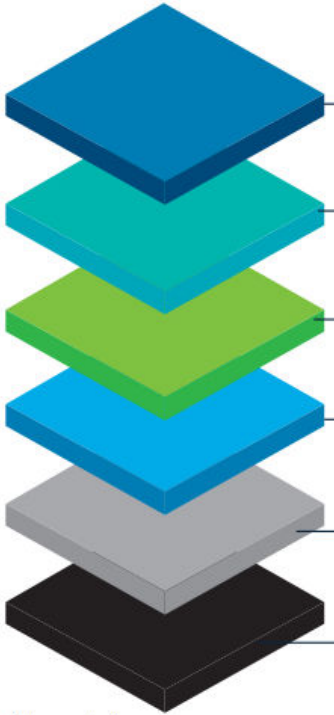
AI-generated training material



- AI translated operating procedures and technical documentation into virtual reality storyboards
- 10 training modules generated within 2 weeks

PHILIPS

Companies need a comprehensive implementation strategy to benefit fully from AI in R&D



Craft a strategic blueprint: Anchor AI investments to meet overarching business objectives and focus on 3 to 5 high-value opportunity areas to scale AI.

Build operating structures: Establish measurable AI targets and possibly a Center of Excellence (COE) to align investments and resources, supporting prioritized AI and GenAI use cases.

Focus on value realization: Take a disciplined approach to evaluate, approve, and adopt AI and GenAI to help ensure value.

Create tech and scaling capabilities: Select an appropriate technology platform to leverage LLMs while forging ecosystem partnerships to scale AI and GenAI.

Build new ways of working: Emphasize AI's role in enhancing human capabilities, and develop training programs to improve AI literacy and optimize workflows.

Promote responsible AI use: Establish governance to address data privacy, security, and bias, and foster the accountable and ethical deployment of AI.

Source: Deloitte analysis

Conclusion

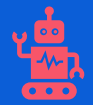
The use of AI in R&D is a significant opportunity to improve efficiency and quality of results

There is no ready-made playbook and no single tool chain

Many commercial offerings are just wrappers around the big LLMs and the vendor landscape will consolidate

Senior leaders need to engage

Med tech companies should choose a technology partner to enable proprietary models at acceptable cost



AI in R&D will not lead to a sustainable competitive advantage, once companies are through the adoption curve

PHILIPS

Sources

- Deloitte: Is Generative AI changing the game for medtech, 2024
- Boston Consulting Group: AI Powered R&D, 2025
- Boston Consulting Group: Medtech’s Generative AI Opportunity, 2025
- Arthur D Little: Eureka! On Steroids, 2025
- Accenture: Reinventing R&D in the age of AI, 2024
- M. Gindert and M.L. Muller, The Impact of Generative Artificial Intelligence on Ideation and the performance of Innovation Teams, 2024
- Zeiss: Can Microsoft GitHub Copilot Enhance the Productivity of Medical Software Development?, 2025
- TNO-ESI: Large Language Models for Systems Engineering, 2025

PHILIPS