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OMT 520 Strategic Management of Technology

STRATEGY EXAMINATION OF THE ARTIFICIAL INTELLIGENCE IN HEALTHCARE INDUSTRY

Team 5

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INTRODUCTION

In 1956, John McCarthy, Marvin Minsky, Claude Shannon, and Nathaniel Rochester led the Dartmouth Research Project, reintroducing AI. It combines human intelligence by means of machines that experience processed test claims, locate, and act in a manner that produces premises, problem-solving, and decision-making (Topol, 2019). In the 1960s and 1970s, the usage of early clinical information and decision support systems was the first step in the introduction of AI in the healthcare sector. (Topol, 2019) Utilizing AI, AI leverages data to identify patterns, make predictions, and influence healthcare decisions (Topol, 2019). AI (Takita et al., 2025) has since been utilized to assist in clinicians' prior and more accurate diagnosis of the patient, limiting the amount of paperwork encouraged and furthering patient flow and triage (Takita as modified, 2025). To enhance quality and remove operating costs in the clinical setting, AI appears to be applied. Prior to AI, the situation was entirely different from what it is now because decision-makers required greater expertise to categorize the patient, which hindered the patient's evaluation and made the workload of clerical work somewhat difficult (Topol, 2019). The creation of AI scribes has particularly increased hospital and clinical revenue, leading to a decline in the insurance claims drop rate (Bishop, 2022).

AI lies spilling across the healthcare industry, from pilot projects to key infrastructure. In addition to use in insurance claims and healthcare management (Bishop, 2022; FDA, 2025a), hospitals and doctors are utilizing machine learning for imaging, triage, and documentation (Bishop, 2022). The healthtech-related IT sector is trying to build generative and predictive models that may efficiently improve the usage of AI in healthcare (Bishop, 2022; Pifer, 2022). Based on Grand View Research, the market for AI in the healthcare sector may pass $10 billion in 2025, and this niche is expected to widen actively through 2030 because of the transition between the provider and payer settings (Grand View Research, 2025).

Further shifts in the institutional environment underscore the strategic value of AI in healthcare. The Office of the National Coordinator for Health IT (ONC) encourages national data exchange through the Trusted Exchange Framework and Common Agreement (TEFCA) to help access for model building and deployment (Office for Civil Rights, 2024). The FDA maintains an updated list of medical products with AI/ML capabilities that have received marketing licenses. A new system relying on Category III CPT codes, created by the American Medical Association (AMA), that is a significant step toward standardized reimbursement (American Medical Association, 2024; Murray et al., 2022) has already been enriched.

But trust still needs to be earned. Adoption remains uneven, and legal and ethical limitations are becoming stricter. The U.S. Department of Health and Human Services' 2024 final rule, which restricts discrimination by the use of healthcare decision-support systems (Federal Register, 2024), at present defines algorithmic bias and monitoring properly. While digital medicine meta-analyses illustrate the potential for imaging and diagnostics, the technologies also emphasize the value of careful evaluation and methodological diversity (Nature, 2023).

This paper performs a thorough strategic analysis of AI in the healthcare industry to determine sources of sustainable competitive advantage in a rapidly emerging market. It comprises analyses of its structural characteristics, competitive dynamics, and firm-level strategies. The analysis employs Porter's Five Forces Framework, the Resource-Based View (RBV), and the VRIO Framework to characterize internal resources, the Core Competencies Framework, and business-level, corporate-level, and cooperative strategies to predict market positioning, growth, and partnerships. The following sections offer an overview of the sector and its market structure, a thorough analysis with these frameworks, and a discussion of important findings and implications for businesses having a competitive advantage in this dynamic field.

LITERATURE REVIEW

Evolution of Artificial Intelligence

The computer scientists named John McCarthy, Marvin Minsky, Claude Shannon, and Nathaniel Rochester organized the Dartmouth Conference in 1956, which was known as the official beginning of the research of artificial intelligence (AI) (Russell & Norvig, 2020). To create machines that can think, learn, and make choices like people do was the main goal of AI. The early AI research of the 1960s and 1970s was mostly about symbolic reasoning and expert systems that used rules to remember what people knew. These early systems worked well, but they had some problems because they needed rules that were written by hand, which made them difficult to change and grow (McCarthy et al., 2006).

People started using machine learning in the 1980s and 1990s because it allowed the systems to identify patterns in data instead of just following rules. Many people were interested in neural networks, which were based on how the human brain works, but they were limited in usefulness because computers were not powerful enough during those periods (LeCun et al., 2015). As computers improved , data sets grew larger, and algorithms became more efficient in the early 2000s; these advancements helped improve machine learning approaches. In several fields, such as support vector machines, decision trees, and ensemble approaches, they have been useful for identifying trends and predicting the results. (Bishop, 2006).

The most significant change that happened in the 2010s was deep learning, a type of machine learning that uses many layers of neural networks to learn from raw data for example study cases of medical material or information fed by humans. Then there was outstanding progress in image recognition, language processing, and playing complex games (Goodfellow et al., 2016). Convolutional neural networks improved the processing of images, recurrent neural networks made it easier to handle sequential data, and also the understanding of language was improved. In 2017, transformer architectures were introduced, which was the reason for the development of large language models that became important in the late 2010s and early 2020s (Vaswani et al., 2017). Later on in 2020, AI changed from simple rule-based systems into powerful data-driven technologies, which were capable of solving complex problems across various fields, thereby creating numerous new opportunities in the healthcare industry.

Evolution of Artificial Intelligence in Healthcare

The development of AI in healthcare was started in the 1960s and 70s with programs like MYCIN, an expert system that was used for decision-making purposes. It was developed by Stanford University in the 1970s; it helped doctors and physicians in identifying diseases that were infectious and provided the suitable antibiotic treatments for the same. However, MYCIN was not widely used due to lack of accuracy and lack of awareness (Shortliffe, 1976).

AI didn't really start to progress until the 1990s and 2000s, when it became useful in medical imaging, helping doctors read mammograms by acting as a "second pair of eyes" (FDA, 2025a). During this period, the shift to electronic health records (EHRs) generated massive data that guided the future growth (Topol, 2019). A significant shift in AI occurred during the 2010s with advances in "deep learning," which enabled AI algorithms to detect skin cancer and eye diseases in images at the same level of accuracy as human specialists (Esteva et al., 2017; Gulshan et al., 2016).

AI was even beneficial in predicting patients who would become more ill (Rajkomar et al., 2018). By the end of 2019 and into the early 2020s, AI was being utilized more frequently and being viewed positively. The COVID-19 pandemic from 2020 until 2023 sped acceptance for more digital health and created demand for AI-enabled solutions for patient monitoring, diagnostic decision-making, and resource management (Takita et al., 2025). AI was helping with everything from writing the doctor's notes automatically to tracking hospital schedules. There were some rules and systems created for helping this growth. The FDA made it easier to approve AI medical software (FDA, 2025b), the ONC set standards for safe data sharing (ONC, n.d.), and the AMA (American Medical Association) set up new billing codes so that hospitals and doctors could get paid for using these advanced tools (AMA, 2024; Murray et al., 2022). The figure 1 below shows key milestones of the evolution of how AI in healthcare has emerged. It started in 1960s by early AI programs developed by MYCIN to select the antibiotic. The timeline evolved in 1990s where the use of AI in medical imaging and EHR gained traction. After the covid-19, use of AI widespread across the industry and the transition into regulatory and payments frameworks established in 2020s.

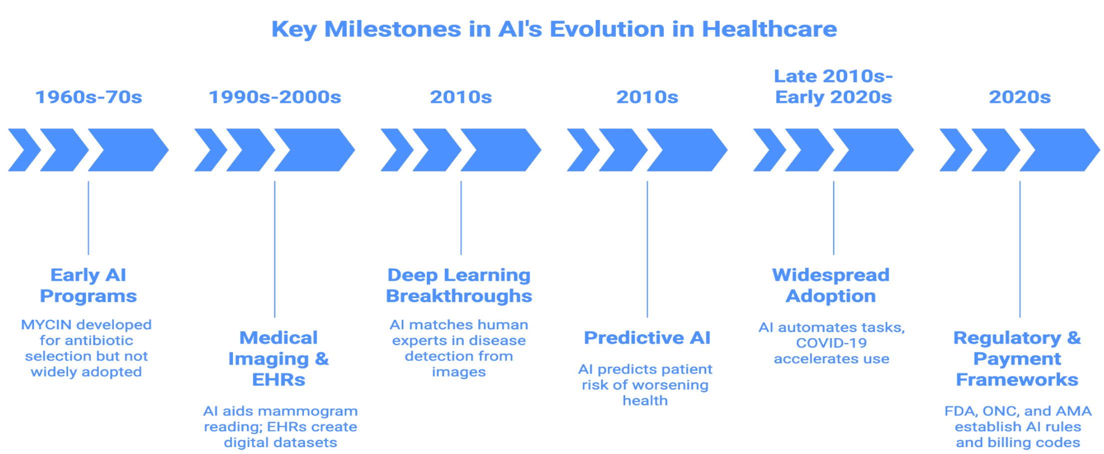

Figure 1, Key Milestones in AI Evolution in Healthcare.

Current Characteristics and Applications of AI in Healthcare

AI functions as an operational optimization, administrative automation, and clinical decision-support system in three principal ways. To enhance diagnostic accuracy, reduce administrative inefficiency, and optimize institutional resource allocation (Topol, 2019; Takita et al., 2025), specific functional layers are delineated for each overarching domain. By employing computational modeling techniques that improve diagnostic precision, operational efficiency, and patient outcomes, these features are manifested across both domains. To continue with this foundation, AI in healthcare is implemented across various domains in the healthcare industry, one of which is clinical decision support. To identify pathological markers such as cancer, cardiovascular abnormalities, and indicators of infection, AI systems analyze medical imaging and patient data. By prioritizing diagnostic processes, reducing evaluation complexity, and ensuring interpretive consistency, they contribute to more accurate clinical decision-making. Image-classification algorithms directly detect abnormal cellular morphology in pathology. To generate probabilistic differential diagnoses and associated quantitative confidence levels, integrated diagnostic models combine laboratory results with symptom-based data.

In addition to the clinical decision support, AI is widely used in automating the administrative workload, which enhances the operational workflow. The necessity for clerical and transactional tasks in the delivery of medical care is reduced by artificial intelligence–based solutions. Through automated transcription services, each clinical encounter produces structured and standardized clinical documentation. To achieve the complementary objectives of improved documentation accuracy and reduced turnaround time, robotic process automation and machine learning algorithms are employed to streamline medical coding and referral management systems, prioritize data processing, and validate billing. Overall, these innovations contribute to reduced clinician fatigue and lower administrative costs.

While AI is implemented in clinical settings to reduce the provider burden, it is also applied to predicting the operational efficiency of the hospital by ensuring the hospital is well equipped with all the necessary health supplies. In addition to approximating capacity constraints, predictive models are constructed to take into account patient flow and anticipated resource utilization. The scheduling algorithm probably has much to do with predicted patient flow and workforce staffing, which has so far demonstrated issues with a flawed allocation. These algorithms analyze the status of the service schedule, supplies, and inventory. This almost recent evaluation reduces the number of operating room bottlenecks while additionally increasing spent space and providing the flow of patients through the procedure. Using a risk-stratified approach, hospitals will initially incorporate AI applications in high-volume, non-clinical situation initiatives with minimal clinical exposure, transitioning on to applications with dedicated deployment to clinical operations as validation is funded by empirical data and model validation. In the end, the capacity to manage models may rely on the ability to check compliance with the data, study the model, and read the data.

The operational efficiency and clinical automation demonstrate how AI in healthcare is becoming more and more data driven and technology enabled. With the help of large language models (LLMs), machine learning (ML), deep learning (DL), and natural language processing (NLP) packages were analytically developed on three foundations: machine learning (ML), deep learning (DL), and natural language processing (NLP). These real-world applications are possible because of recent advances in technologies, where machine learning plays a vital role.

In order to estimate a specified patient's response or adverse event, constrain events into risk tiers, and customize treatment options, machine learning (ML) systems grow trained through retrospective datasets and test-derived statistical associations and patterns. Common applications include trajectory mapping for disease progression, in addition to models of the postoperative probability of patients getting remanded. Machine learning is a high-level technology that subsets deep learning, which helps in processing the high-level medical data into small polished chunks.

High-dimensional biomedical inputs like radiologic images, electrocardiograms, and genomic sequences are used in deep learning's dense neural networks. Convolutional layers, on the other hand, exhibit spatial hierarchies in scanning data, while recurrent layers exhibit temporal ties in physiological signals. Relating conventional diagnostic heuristics to these systems, they offer measurable precision gain for the early detection of malignant diseases and heart conditions.

Complementing the approaches by various technologies Natural language processing is another technology that uses large language models to analyze the data in unstructured clinical data. In order to determine diagnostic, procedural, and pharmacologic entities from physician narratives and medical documentation, NLP and LLM transform unstructured clinical text into structured semantic representations. Applications include the generation of documentation, the forming of clinicians' notes, the identification of salient entities, which includes diagnoses, drugs, and procedures, and, moreover, the summarization of clinicians' notes, which is then forwarded to the EMR (Electronic Medical Records). By better efficiently standardizing the practice of medical reporting, surroundings, and literature reviews, LLM-based architectures further enhance this capability with domain-specific reasoning and generative synthesis.

All three approaches suffer from common challenges: bias of algorithms, vulnerability of data security, and generalization instability in different populations. To mitigate these risks, institutions adopt human-in-the-loop governance in which clinicians validate AI outputs prior to taking action. This correspondence stands in contrast to the FDA’s Software as a Medical Device (SaMD) regulatory framework, which requires traceability, model interpretability, and ongoing post-market performance monitoring for clinical safety and reliability (FDA, 2025b). The figure 2 below illustrates the three technical foundations of machine learning, deep learning, and natural language processing that underpin artificial intelligence applications in healthcare.

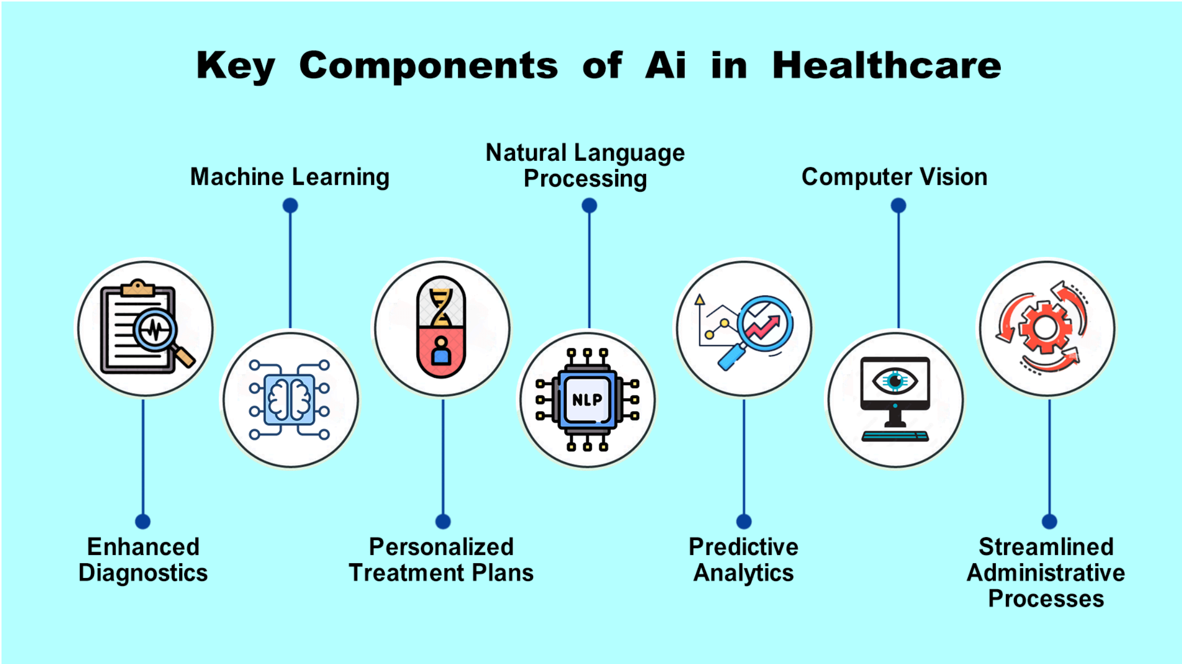

Figure 2, Technical Foundations of Artificial Intelligence in Healthcare (Topol, 2019; Takita et al., 2025).

Strategy Theories and Frameworks of Analysis

To analyze industry structure, company positioning, and sources of competitive advantage in the AI healthcare sector, the strategic management frameworks that will be used in the ensuing analysis are explained in this section.

Competitive Analysis for Attractiveness of the Industry and Five Forces Framework

Michael Porter's Five Forces Framework explains a clear method of analyzing an industry's environment of competition and potential for profit. It allows understanding of outside factors (forces) that affect strategic decisions and define competitiveness.

The framework looks at five elements of competition that are rivalry between existing companies, the threat of substitutes, the bargaining power of suppliers, the negotiating power of customers, and the threat of new entrants. When entry barriers like scale economies, capital demands, or rules are low, new competitors create a threat to revenue growth. When inputs are unique or there are few suppliers, supplier power increases. When there are a large number of customers who buy that specific product or service or have easy access to alternatives, buyer power increases. When substitute goods or services satisfy similar demands, they reduce profitability. Rivalry increases when there are a lot of competitors and also when the growth is slow. Figure 3 below is the representation of five forces explained by Porter (Porter, 1980).

Figure 3, Michael Porter's Five Forces of Competitive Strategy (Gupta, S. 2021, August 1).

Resource-Based View and VRIO Framework

According to the Resource-Based View (RBV), a firm acquires its sustainable competitive advantage (Barney, 1991) from organizationally established, rarely valued, and unique resources and capabilities (Barney, 1991).

This perspective differentiates itself from traditional industry structure analysis by focusing on firm-specific resources rather than external market positioning. Physical assets include things like money and real estate, intangible assets include things like company culture, intellectual property, and brand reputation, and capabilities include things like capacity, methods, and abilities. The VRIO framework is used to analyze whether resources offer a competitive advantage according to the four criteria (Barney & Hesterly, 2019). The four criteria are the value (With the resource's help, can the business reduce risks or grab opportunities?) Rarity (Does the resource have few competitors?) Imitability (Do competitors face financial challenges while trying to get or utilize the resource?). Is the firm organized to capture value from the resource through appropriate structures, processes, and systems?

Resources that meet all the above four criteria give sustained competitive advantage and are valuable and rare, providing temporary advantage until competitors are able to replicate the product or services. Resources that are valuable but neither rare nor difficult to imitate provide a competitive advantage over others. The framework focuses strategic attention on developing and protecting resources that are most likely to generate sustainable advantage (Barney & Hesterly, 2019). Figure 4 below illustrates how the VRIO framework evaluates firm resources to determine sustainable competitive advantage based on value, rarity, imitability, and organization.

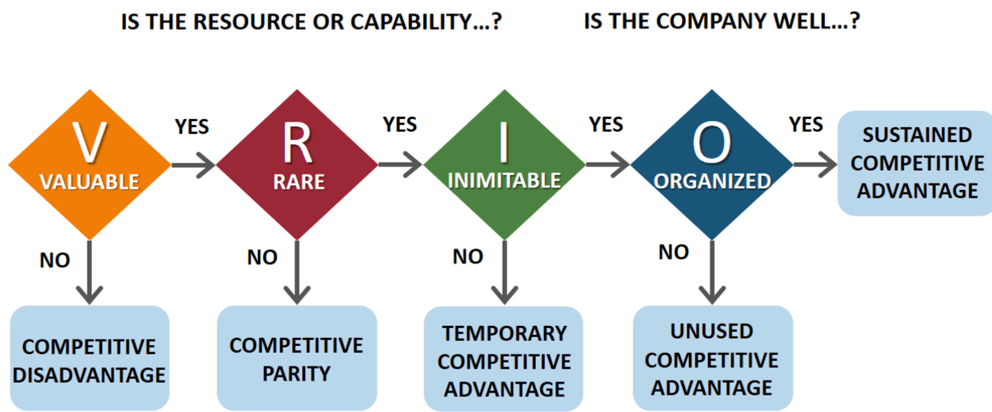

Figure 4, VRIO: From Firm Resources to Competitive Advantage (de Bruin, L. 2016, November 20).

Core Competencies of the Firm

Core competencies form the collective learning and coordination capabilities that allow businesses to transform technologies, exchange knowledge, and access various markets, according to Prahalad and Hamel (1990). These skills form a basis for a sustained competitive advantage because they constitute bundles of skills rather than individual assets. Barney's (1991) resource-based theory, which augments this view, tells how valuable and uncommon resources grow into firm-specific capabilities that sort core competencies. Through data analytics, algorithm design, and clinical integration, companies like Google Health, IBM Watson Health, and Tempus exhibit these skills, delivering better performance and differentiation in the AI healthcare industry.

Figure 5 below explains how AI healthcare firms can develop and coordinate core competencies such as data analytics, algorithm design, and clinical integration to strengthen organizational capability and achieve long-term competitive advantage in the industry.

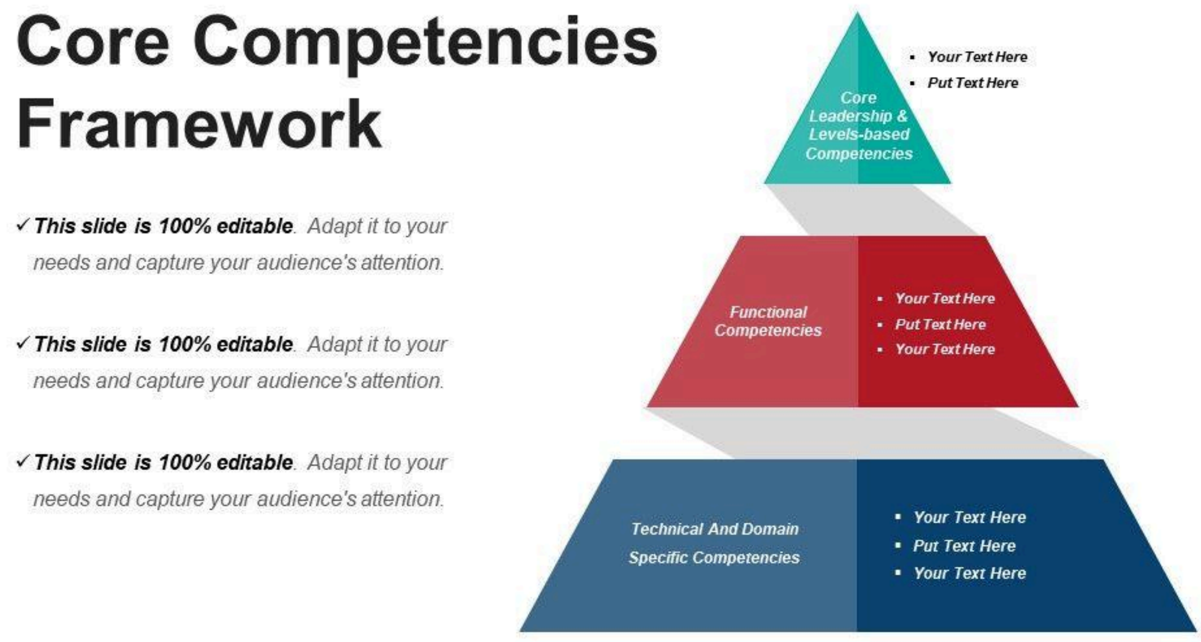

Figure 5, Core Competency Framework in the AI Healthcare Industry (Prahalad & Hamel, 1990).

Generic Business-Level Strategies

Porter's (1980) general business-level strategy framework illustrates how businesses can maintain their competitive advantage within an industry. Cost leadership, differentiation, and focus are three general tactics for getting a competitive edge. Cost-focused and differentiation-focused focuses can also be subdivided into the focus strategy.

By being the lowest-cost producer in its sector, a company can achieve a competitive advantage. Cost control, efficient operations, process innovation, and economy of scale can achieve this. To raise market share, cost leaders do charge industry-average prices to maintain margins or lower prices to raise market share.

Differentiation consists of viewing a company as unique in ways that buyers value. Advancing businesses and their differentiation creates distinct services or products through product features, brand image, outstanding customer service, or advanced technology. These unique qualities permit them to effectively receive prices that appear higher than those resulting from differentiation.

Strategies with focus seek to maintain a potent edge over competitors in a particular market segment. Cost focus in its target market achieves a company's lowest cost. In its differentiation focus, a company prioritizes establishing its uniqueness within that specific segment. Each approach demands a harmony between organizational structure, resource allocation, and strategic intent.

Based on Porter (1980), businesses that try to employ multiple strategies at another run a risk of becoming sandwiched in the center and lacking a significant competitive advantage.

Corporate-Level and Cooperative Strategies

Corporate-level strategy determines the number of business units to manage for overall synergy and shapes the extent of a firm's operations. It guides business decisions concerning diversification, integration, and collaboration (Barney & Hesterly, 2019).

To minimize risk and improve profitability, diversification comprises expanding into new markets or products. Companies can relate when they share customers, technology, or resources, or when they are unrelated. Related diversification reduces costs by utilizing divisionalized skills, capital, and managerial expertise, which result in economies of scale and scope.

Incorporation augments the value chain. A business grows toward suppliers or customers to manage inputs or distribution channels, lower transaction costs, and secure supply chains. In contrast, horizontal integration refers to mergers or acquisitions of rivals that improve market power and effectiveness through scale (Barney & Hesterly, 2019).

Firms may mix complementary resources without holding full ownership through cooperative strategies like alliances and joint ventures. These partnerships distribute cost and risk, facilitate market entry, and leverage each partner's unique capabilities. To achieve mutual benefit, they require careful partner selection, transparent governance structures, and continued relationship management (Hill, Jones, & Schilling, 2019).

INDUSTRY CASE

Market Size and Growth

In the last decade in the healthcare industry, the growth of artificial intelligence (AI) has been nothing short of remarkable, and this is reflected in the spending on AI in the healthcare sector. Figure 6 shows that, globally, AI health spending escalated from around $1.1 billion back in 2016 to a remarkable $22 billion to $32 billion in 2023 (Grand View Research, 2025; McKinsey & Company, 2023). In the US, total healthcare AI investment, according to Forbes Health in 2024, soared to $11.8 billion and is now no longer just a series of pilot projects but a fundamental part of the US healthcare infrastructure.

Figure 7, shows the regional share, North America earning the largest share of 49%, whereas Europe summing up to 27% and the rest occupied by Asia-Pacific and the rest of the world, with Asia-Pacific becoming the largest expanding region in AI in the healthcare industry.

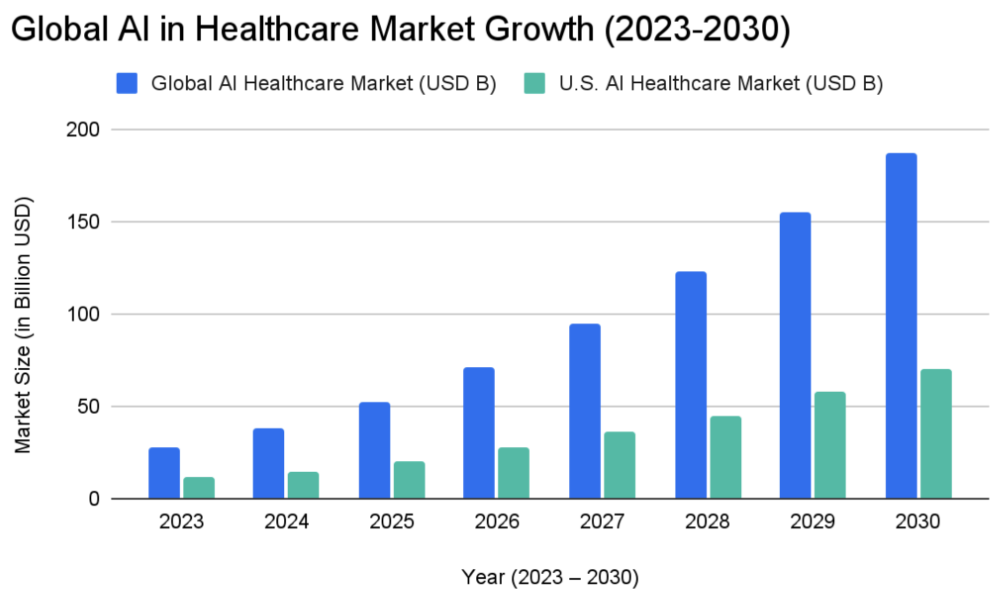

Figure 6, Global AI in Healthcare Market Growth (2023-2030) (Dange, 2025)

Analysts forecast a compound annual growth rate of 35 to 45% from 2024 to 2030 and predict that the global AI health market will burst past $180 to $190 billion in 2030 and could conceivably top $500 billion in 2032 (McKinsey & Company, 2023).

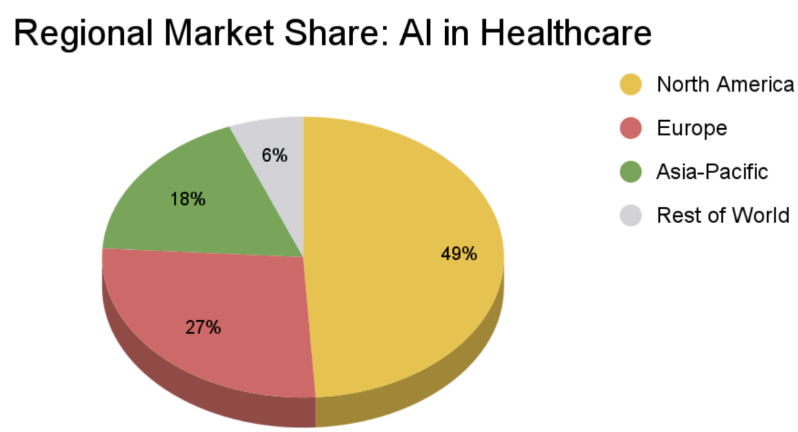

Figure 7, Regional Market Share in AI in Healthcare Industry (Dange, 2025).

Market Segmentation and Current State

The AI healthcare market encompasses numerous interconnected segments across clinical, administrative, and operational functions. As shown in figure 8, clinical decision support and diagnostics is the most significant segment, with multiple FDA-cleared imaging tools existing to assist clinicians with detecting cancers, heart disease, and neurological conditions (Grand View Research, 2025). AI-assisted and robotic surgery is the fastest-growing segment, as it promotes less invasive techniques and more precise interventions (Grand View Research, 2025). Administrative automation encompasses functions such as ambient documentation, billing, and coding. AI scribes (e.g., Nuance DAX) are an example of capabilities designed to improve efficiencies and reduce clinician burnout (MarketsandMarkets, 2024). Drug discovery and precision medicine utilize deep learning to design molecules, monitor specific cohorts of patients, and analyze clinical trials to decrease time to market (Grand View Research, 2025). Virtual assistants and remote monitoring amalgamate natural language processing (NLP) and predictive analytics to facilitate the telehealth consult and long-term care. In terms of components, revenues derived from software represent the largest share, followed by services, and finally, specialty hardware (Grand View Research, 2025). Most healthcare providers utilizing AI techniques are hospitals and clinics; pharmaceutical companies and insurers are utilizing AI to a much greater degree, and primarily for drug discovery/research and claims analytics. North America accounts for nearly 49 percent of global expenditures on AI in healthcare, aided by supportive hardware, health IT infrastructure, and venture funding for healthcare start-ups. While North America carries the largest share of total expenditures on AI in healthcare, Asia-Pacific is experiencing the fastest rate of growth in spending, driven by rapid adoption of digital health technologies in China and India (Fortune Business Insights, 2025; Grand View Research, 2025).

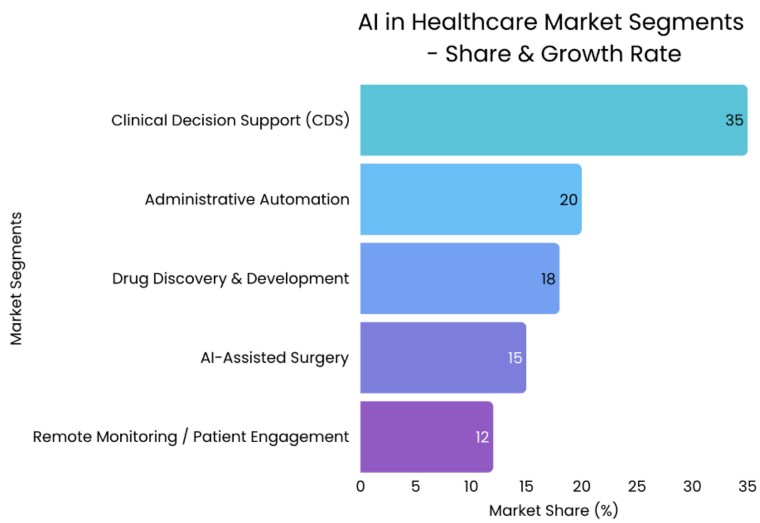

Figure 8, Market Segmentation (Share and Growth Rate) AI in Healthcare Industry (Dange, 2025).

Main Players in the Artificial Intelligence Healthcare Industry

The competition is made up of large tech companies and smaller dedicated health AI companies. The four major companies are Microsoft, Google, Amazon Web Services (AWS), and IBM, each leveraging what it considers its own advantages to grow in the healthcare space.

Microsoft has firmly emerged as a major player in healthcare artificial intelligence after acquiring Nuance for $19.7 billion in 2022, which brought medical speech recognition and ambient documentation to Azure Health Cloud (Microsoft, 2023; Nuance Communications, 2022). Microsoft has relationships with Epic and has been developing tools using GPT-4 Copilot to support AI documentation and clinical summaries, or AI decision support. Microsoft maintains a strong position thanks to its extensive enterprise reach, HIPAA-ready cloud environment, and commitment to interoperability (Microsoft, 2023). Microsoft revenued by $281.7 billion in 2025 with 228,000 employees which operated in healthcare AI strategy by the intelligent cloud segment. After the Nuance acquisition, around 77% of U.S. hospitals use Azure for stack information. Microsoft's R&D is supported by MSR Health Futures Lab with over 70,000 U.S. patents.

Google remains a unique balance of traditional research and enterprise tools in healthcare and has a strong educational influence in academic medicine. DeepMind was important in developing early prediction of diseases, while Med-PaLM and AlphaFold paired powerful clinical language models with drug discovery (Google Research, 2023). Google Cloud's Healthcare Data Engine provides and connects imaging data, electronic health records, and genomic data, all on secure AI-enabled health platforms. Google Cloud reportedly has a partnership with Mayo Clinic and has worked with National Health Services (NHS) hospitals, emphasizing their focus on real-world research and clinical demonstration (Google Cloud, 2024). Google earned $307.4 billion in 2024 revenue and operated via a decentralized "company-wide effort." It's R&D is driven by Google Deepmind with more than 1,121 new AI patents in 2024, with a 71% reported ROI by the clients within the first year.

Amazon is at the forefront of the healthcare cloud market with tools like Comprehend Medical and HealthLake that rely on Natural Language Processing (NLP) techniques to pull meaning out of messy health data and organize it (Amazon Web Services, 2024). AWS is working with leading health systems on analytics, risk prediction, and fraud detection to improve outcomes and control costs. Most importantly, in 2023, Amazon moved deeper into care by purchasing One Medical and is operating Amazon Pharmacy using AI and their data capabilities to simplify supply chains and improve patient experience. The scale that AWS provides, with its partner ecosystem combined with the clinical data, will continue to make it a go-to AI infrastructure in healthcare (Business Insider, 2025). Amazon operates in a dual-threat model, with a profit of $108 billion 2024 loss in the patient care division, which is One Medical and Amazon Pharmacy. One Medical's R&D is funded by $15.3 billion for AL/ML in 2024, as well as an $8 billion investment with Anthropic, its AI partner.

IBM was an early player in healthcare with Watson Health, using AI to support cancer care and clinical decision-making. After divesting Watson Health in 2022, IBM launched Watsonx to deliver AI analytics and consulting to highly regulated industries like healthcare (IBM, 2024). A combination of IBM's capabilities in medical natural language processing, data management, and hybrid cloud continues to be relevant to large healthcare organizations (Merative, 2024). IBM being the least revenue by $62.75 billion in 2024, with the most R&D, with 3,000 researchers in 12 global labs including MIT-IBM Watson AI Labs.

General Environment

Regulators have shown their support for AI in healthcare but on the other hand, they have put more rules and oversight in place. The FDA says that the number of AI/ML medical devices approved will be close to 900 by 2025, showing that there is already a lot of activity in terms of approvals (FDA, 2025). ONC's TEFCA promotes secure and nationwide health data sharing; the AMA created a new Category III CPT code so that AI-assisted services can be reimbursed

(AMA, n.d.), and HHS published Section 1557 of the Affordable Care Act, which bans biased algorithms from being used in clinical decision-making tools (HHS OCR, 2023). These initiatives have the goal of using artificial intelligence (AI) in a manner that is ethical, fair, and clear in the field of medicine.

Between 2020 and 2023, in terms of the economy, society, and technology, health AI investment went up to the highest level ever as the investors looked for cost-saving innovations through a prolonged period of healthcare spending (CB Insights, 2024; Rock Health, 2024). The lack of medical practitioners as well as the burden of paperwork have together led to the implementation of AI in a manner that is less time-consuming and less stressful for the practitioners (AMA, n.d.). At the same time, deep learning and large language models, as well as cloud computing, are making AI more powerful (McKinsey & Company, 2023). However, the issues of internet security and legal privacy concerns are still major obstacles that AI must overcome before it can be widely used and accepted in healthcare.

Industry Trends Analysis

The healthcare AI market is clearly going through a phase of consolidation. After the many trials and tests, it is now moving towards integration as a key infrastructure. This change is supported by a number of strong market forecasts including a compound annual growth rate (CAGR) of around 37, 38%. At the moment, North America is making up almost half (~49%) of the world market.

The sources of this growth first of all are clinics and hospitals which are turning to automation both for clinical and administrative activities. Scaling is mainly achieved in use cases such as ambient documentation (scribing), automated billing and coding, and clinical decision support. On the other hand, advanced diagnostics and drug discovery areas are still growing slowly as they are dependent on obtaining more clinical evidence for validation.

The sector is moving towards the use of cloud based platforms that are quite heavily integrated with Electronic Health Record (EHR) systems from the technological viewpoint. We can observe that the strategic actions of major market leaders reflect this trend:

Microsoft is directly integrating its Nuance DAX innovation along the Epic, Azure pathways and its general Azure Health Data Services.

Google is turning its cutting edge research from DeepMind and Med, PaLM into easily accessible APIs delivered via its Healthcare Data Engine.

IBM is implementing AI through its watsonx platform in a standardized, regulated way, using the Red Hat hybrid cloud infrastructure to cater to the gamut of enterprise requirements.

Moreover, the range of data that is being used is no longer limited to just the text from static EHRs. Companies are progressively taking on board data from sensors and wearables, an excellent illustration of which is Google's purchase of Fitbit for the development of continuous, longitudinal patient datasets. What results from this is the rise of a platformized ecosystem where companies are taking up different strategic roles ("Integrator, " "Innovator, " or "Trusted Partner") to position their abilities most effectively with provider workflows.

Along with these technical changes, customer behavior is also changing. Buyers, especially very large hospital systems and payers, are more and more behaving as enterprise platform customers, not as "point, solution" buyers. To start with, they require that a new solution be seamlessly integrated with their current EHRs.Other conditions needed for the deployment are security has to be verifiable through artifacts and there should be a quantifiable and measurable return on investment (ROI). This situation is forcing AI suppliers to look for collaborative selling agreements with leading EHR providers and also to prove the value of their solutions in real, world clinical settings.

Meanwhile, the regulatory environment is becoming more and more stable. Some of the proactive policy actions such as an accelerated FDA engagement and the Office of the National Coordinator's (ONC) TEFCA (Trusted Exchange Framework and Common Agreement) are facilitating the setting of standards for clinical evidence and secure data sharing. This supports the "governance, first" delivery model, which sees auditability as a product feature rather than a compliance burden.

On a strategic level, these factors are causing changes in vendor, client interactions with the first moves from short, term, single, department pilots towards multi-year platform partnerships. Some of the evidence are the moves by Microsoft such as the deep Epic, Azure integration and the Nuance acquisition that are aimed at not only fastening its distribution channels and workflow access but also hard, wiring them.

Google's long term projects with Mayo Clinic and the NHS, which not only ensure crucial evaluation environments but also facilitate the translation of research into practice.

IBM's change of focus from Watson Health to watsonx, which is a market driven reaction to the need for governed, regulated, and hybrid, cloud deployment models.

To wrap it up, the sector is moving towards the model of evidence, backed, EHR, embedded platforms. Therefore, in this new balance, success and market size are to a large extent dependent on having strong channels and excelling in compliance besides the inherent quality of the AI model.

STRATEGY ANALYSIS

Porter’s Five Forces Analysis of AI in Healthcare Industry

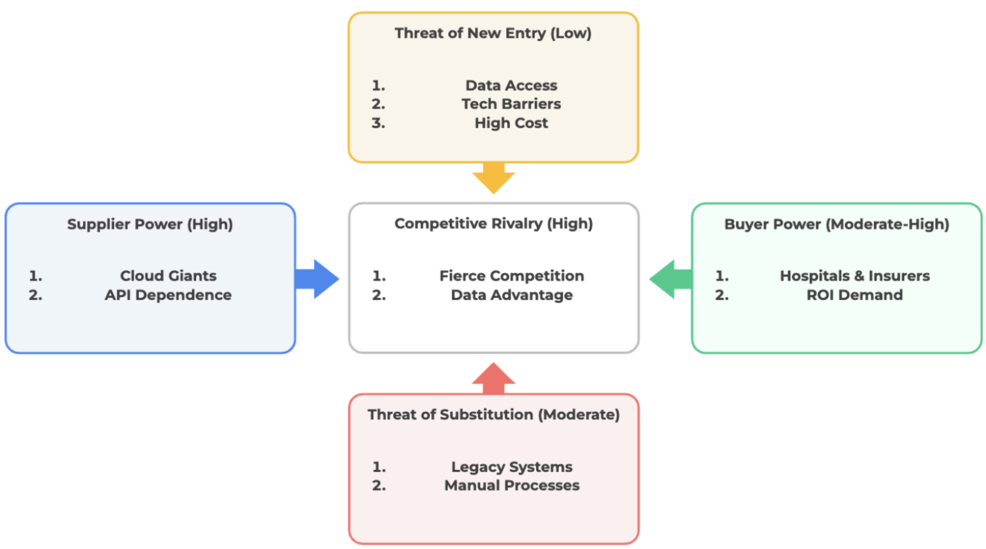

Figure 9, Summary of Porter’s Five Forces Analysis of the AI in Healthcare Industry. (Dange, 2025).

Threat of New Entrants: Initially, the barriers to entry appear to be low, but the proliferation of open-source models and development tools allows new firms to prototype these AI tools and features, such as scribing or virtual assistants, with relative ease and speed. However, a significant gap exists between a functional prototype and a commercially viable product. This requires a lot of capital and government support to enter the market, and this suppresses entry even in a fast-growing market.

Entry into this market is constrained by three substantial hurdles:

1. Data & Evaluation
2. Workflow Integration
3. Governance & Compliance (HIPAA & FDA approvals)

Microsoft's Nuance acquisition puts it in a privileged data/workflow position that a new entrant can't duplicate anytime soon; Epic-Azure gives Microsoft NLP in clinical workflows, making it hard for any newcomer to access the same clinics. At the same time, Google's research partnerships with Mayo Clinic and NHS create evaluation settings that newcomers would be hard-pressed to get; IBM's hybrid-cloud approach with Red Hat removes institutional barriers to on-prem/edge access, making entrance not realistic. Technology is available, commercialization is hard which makes the threat of entry as moderate.

Buyer power: Providers of healthcare services and payors are consolidated, process-oriented buyers. They are capable of executing pilots, requesting security/compliance evidence, and postponing scale-up until clinical and financial results (e.g., documentation time savings, denial declines) are shown. Due to the dense infrastructure and governance of North America, buy-side sophistication is relatively high, demanding the evidence of the solution, which reinforces negotiating power. In conclusion, the buyer power is high in this classification.

Supplier Power: This industry is heavily dependent upon the infrastructure providers such as AWS, Google Cloud, IBM, etc. Inputs upstream are consolidated into cloud platforms, EHR (Electronic Health Records) channels, and proprietary clinical datasets/models. Epic-Azure routes and Nuance's medical voice data are not without switching costs in alternative tooling and evidence. Google's DeepMind/Med-PaLM research engine and IBM's Red Hat-based hybrid dimension embed switching costs in tooling, deployment, and governance. Vendors frequently accept co-sell/platform provisions to obtain the buyer's workflow, and as such, a supplier can exert influence over vendor pricing and roadmaps, hence this is a moderate to high classification.

Threat of Substitution: Substitutes still exist for many administrative duties such as native EHR capabilities, old-fashioned analytics or RPA, and comfortable manual workflows. As evidence mounts (e.g., FDA-tracked devices powered by AI; ambient documentation evidence), NLP will push substitutes out in documented niches; elsewhere credible alternatives will maintain price/adoption pressure making this a moderate classification of substitutes.

Competitive Rivalry: The competitive rivalry in this industry is high as Big Tech companies and specialists land on overlapping budget lines. Our focal players space out distinct positions with various different strategies and offerings, yet compete for the same enterprise accounts. The three players mentioned in this paper have their own unique value propositions in this industry. Microsoft builds distinction with a workflow-embedded clinical AI (Nuance DAX) and Epic's distribution with Azure while Google leads the way with seamlessly translating research into a platform (Med-PaLM/DeepMind; Healthcare Data Engine), and IBM plays into governed, hybrid deployment (watsonx + Red Hat) with services-led assurances. This special offering makes the competition even more tougher hence is classified as highly competitive.

Resource-Based View (RBV) Analysis of AI in Healthcare Industry

Jay Barney's "resource-based view" approach states that firms' advantages primarily come from the resources they possess and control independently, rather than solely from external industry structures. (Barney, 1991; Barney & Hesterly, 2019). These resources include both physical assets, like cloud infrastructure, data centers, and capital, and intangible assets, like access to clinical data, partnerships with hospitals, brand reputation in the enterprise market, and organizational capacity that connects AI with health information systems (EHR) in AI-driven healthcare. (Barney, 1991; Prahalad & Hamel, 1990). The three selected market leaders are analyzed below in light of this viewpoint. (Grand View Research, 2024; McKinsey & Company, 2025; Precedence Research, 2024).

The business benefits from Nuance's acquisition, which allows it to offer clinical-grade speech, medical terminology, real usage data from doctors, and a strong enterprise brand. (Nuance, 2024; Microsoft, 2024). The acquisition offers a base for internal resources that most other technology companies lack. (Nuance, 2024). Hospitals and payers also widely use Microsoft's Azure. It also has exclusive or closed integrations with EHR vendors like Epic, which may mean that AI services need to be used as separate tools or sold separately. (Microsoft, 2024; Microsoft News Center, 2023; Epic Systems, 2024). Microsoft's technology-driven organizational culture enhances its position in the AI healthcare market, making it challenging for late entrants to catch up. (Microsoft, 2024).

Google's internal strength stems from having intriguing data-engineering platforms that refine FHIR/health data for hospitals, as well as its world-class AI research capability (DeepMind, Med-PaLM 2, and bio-AI pipelines). (Google Cloud, 2024; Singhal et al., 2023; DeepMind, 2024). Over time, Google has amassed predominantly knowledge-based and intangible resources. (Google Research, 2023). Google may prove, validate, and augment its medical models, considering current clinical scenarios, thanks to its access to the best research partners like Mayo Clinic and NHS. (Mayo Clinic, 2023; NHS, 2023). Google's ability to transfer frontier research into cloud APIs constitutes an organizational capability that facilitates future growth in healthcare, even though it isn't every hospital's first choice cloud. (Google Cloud, 2024). Compared to its installed base, Google's competitive advantage lies largely in its unique AI information and research partnerships. (Singhal et al., 2023; DeepMind, 2024).

With its long history of specialized and technological resources, it is using WatsonX and its capabilities to produce hybrid cloud solutions that meet hospitals' security and privacy residency requirements. (IBM, 2023; IBM, 2024; Red Hat, 2024). IBM's healthcare relationship network lies narrower than those of Google and Microsoft, and it still has substantial intangible assets like industry expertise, enterprise trust, and large patent portfolios in AI and analytics. (IBM, 2024). Because IBM provides a strong grasp of service-led delivery, it can take an AI platform and customize it for a specific client, which is a feature that many cloud-only vendors lack. (IBM, 2024). However, the incorporation of open-source technologies enhances the uniqueness of certain aspects of IBM's AI stack. (Red Hat, 2024). The quality of this resource pales in comparison to Google's frontier medical models and Microsoft's clinical speech data. (Singhal et al., 2023; Nuance, 2024).

Based on the RBV analysis, Microsoft holds the strongest and most health-specific resource base thanks to its in-house clinical AI (Nuance), health cloud, and EHR ties; Google's strength comes from its rare AI research and knowledge alliances, while IBM prioritizes organizational and delivery skills over rare healthcare assets, resulting in internal resources that support market participation but generally offer a lower level of distinctiveness. (Microsoft, 2024; Nuance, 2024; Microsoft News Center, 2023; Singhal et al., 2023; DeepMind, 2024; Mayo Clinic, 2023; NHS, 2023; IBM, 2023; IBM, 2024). This evidence favors the RBV claim that Google's research-based, standards-based platform competence enables it to effectively grow as a provider, as its use of evidence increases. (Barney, 1991; Barney & Hesterly, 2019).

VRIO Analysis of AI in Healthcare Industry

Microsoft 's AI Healthcare - Value-Microsoft's Nuance DAX and related tools reduce the time doctors spend on paperwork, decrease burnout, and enhance chart quality, which leads to improved financial outcomes and better overall quality results by minimizing note-taking after patient visits. (Nuance, 2024). In addition to increasing hospitals' total cost of adoption and risk, Azure Health Data Services introduces identity/permissioning, audit trails, encryption, and regulatory tooling. (Microsoft, 2023; Microsoft, 2024).

A rarity - Microsoft combines different clinical speech datasets and terminology from Nuance with strong connections to Epic EHR to create a valuable mix of "data plus workflow access." (Nuance, 2024; Microsoft News Center, 2023). This combination is rare in the health IT industry because most companies lack deep EHR connections, clinical-grade voice datasets, or a sizable interest in the field. (Epic Systems, 2024).

Impossibility - Large health systems require long-term investments and teams from different fields, which leads to high expenses, lengthy processes, and a strong reliance on previous decisions. This process is necessary to create medical speech databases, improve accuracy across different accents and background noise, align clinical terms, and gradually obtain privacy and security To keep imitation challenging, large clinical datasets and EHR partnerships are necessary for nearly capable rivals to achieve functional substitutability. (Barney & Hesterly, 2019).

Organization - Microsoft operates through different divisions on one Azure platform, which includes product, compliance, security, and a big channel for independent software vendors and system integrators The company manages everything from models to sequences, as well as The company specializes in global sales and delivery. (Microsoft, 2024). Through healthcare-specific data governance, BAA procedures, and quoting paths, the company ensures the identification of value. (Microsoft, 2024).

Google 's AI Healthcare - Value - Models such as Med-PaLM 2 enhance clinical question-answering, reasoning, and decision support. (Singhal et al., 2023). The results are advantageous for both providers and developers because of Google's Health Data Exchange tools, which assist in organizing and linking their separate data with AI systems. (Google Cloud, 2024).

A rarity - Recent long-term collaborations with the NHS and the Mayo Clinic result in relatively uncommon prospective evaluation settings and clinical feedback loops. (NHS, 2023; Mayo Clinic, 2023). Only a small number of firms can develop and authenticate bio-AI knowledge using Google, DeepMind's research engine, and medical expertise (DeepMind, 2024).

Impossibility - Google often conforms to the "publish open tools to platformize" trend. Strong rivals may push through public papers and toolchains, but non-imitability comes solely through a full shield and steadily relies on accruing real-world clinical data, evidence, and process-implementing tests to narrow the gap. Strong rivals may additionally push along public papers and toolchains. (Google Research, 2023).

Organization - Utilizing a sizable developer ecosystem and partners, Google earns money from shipping capabilities through cloud APIs and healthcare data services. (Google Cloud, 2024). Google's platform scale and organizational advantages will broaden the gap if it improves the descent of research assets into EHR or care-team workflows. (Google Cloud, 2024).

IBM 's AI Healthcare - Value - Watsonx emphasizes model governance, compliance, and risk control, which effectively address the healthcare needs that are covered. (IBM, 2023). Setting up systems on-site, either close to the data source or in IBM and Red Hat's hybrid cloud solutions, meets the needs for security, speed, and data location, making a central place possible. (IBM, 2024; Red Hat, 2024).

A rarity - IBM boasts fewer deep EHR ties and fewer healthcare-specific data assets than Microsoft and Google. (IBM, 2024). Reliance on open technologies and industry standards significantly improves interoperability and adoption, but this situation is less unique. (Red Hat, 2024).

Impossibility - Competitors may build comparable offerings without significant cost because the stack employs open-source components and a services-led playbook. IBM's differentiation arises more from its methods and delivery experience than from hard-copy proprietary data or algorithms. (IBM, 2023; Red Hat, 2024).

Organization - IBM's product-type divisions collaborate with strong consulting and services divisions to translate platform capabilities into client-specific solutions, focusing on large-account governance, compliance documentation, and migration roadmaps. (IBM, 2024). Figure 10 of the VRIO analysis, in general, highlights market leaders' abilities and their This contributes to a competitive advantage in the NLP market. (Grand View Research, 2024; Precedence Research, 2024).

Core Competence Analysis of AI in Healthcare Industry

A company's core competence comprises a difficult-to-imitate set of organizational routines, processes, and technologies that allow it to adjust to industry change and maintain an advantage. (Prahalad & Hamel, 1990). Companies employ their resources' skills at a global scale with the help of technology, well-designed processes, and internal knowledge sharing. (Prahalad & Hamel, 1990). We explain the core competencies of the three selected companies below.

Firm	Value	Rarity	Imitability	Organization	Advantage
Microsoft	✅Nuance DAX (Clinical Efficiency)	✅Epic EHR (Exclusive Integration)	✅Medical Voice Data (Proprietary)	✅Azure HDS (Unified Ecosystem)	Sustained
Google	✅Med-PaLM 2 (Diagnostic Accuracy)	✅Mayo & NHS (Research Access)	—R&D Process (High Cost)	✅Cloud API (Health Integration)	Temporary & Potential
IBM	✅Watsonx (AI Customization)	❌Healthcare Ties (Limited)	❌Open-source (Replicable)	✅Hybrid Cloud (IBM + Red Hat)	Competitive Parity

Figure 10, Summary of the VRIO Analysis of Major Players (Jingxin, 2025).

Microsoft **-** Clinical-grade AI embedded into compliant cloud and EHR frameworks is Microsoft's field of expertise. In reality, Microsoft does an impressive job by working closely with big EHRs, especially Epic and Azure, to ensure that AI is integrated smoothly into decision support and documentation rather than being a separate tool. (Microsoft News Center, 2023; Microsoft, 2024). Nuance offers specialized models (like GPT-4-powered ambient documentation) that improve workflows for doctors and provide them with better support. (Nuance, 2024). Releasing best practices through Azure's marketplace, along with broad provider alliances and ISV co-development, helps to foster knowledge sharing. (Microsoft, 2024). Likewise, Microsoft's dynamic ability rapidly turns pilots into scalable, secure Adaptive Health Solutions. (Microsoft, 2024). This capability enables Microsoft to generate successes across service lines and geographies. (Microsoft, 2024). Since it combines data assets and workflow access, together with a compliant cloud stack, these features create a system that appears difficult to assemble. (Barney & Hesterly, 2019).

Google **-** Research-to-platform translation for medical reasoning and interoperable data is Google's core field of expertise. (Singhal et al., 2023). By evolving diagnostic reasoning and evaluation techniques, DeepMind and Med-PaLM 2 consolidate knowledge creation. (DeepMind, 2024; Singhal et al., 2023). By turning to cutting-edge models, Google Cloud APIs, a Health Data Exchange (FHIR-based) platform, and modular services facilitate integration and application. (Google Cloud, 2024). By generating environments for screening and feedback loops, deep research collaborations with the Mayo Clinic and the NHS increase knowledge sharing. (Mayo Clinic, 2023; NHS, 2023). From publication to platformization, Google's continuous R&D cycle, undeniably, lessens the time between publication and platformization.

(Google Research, 2023). Google's research-based and standards-based platform competence enables the company to grow effectively as evidence and provider integration become increasingly prevalent, though clinical education is still in its early stages. (Google Cloud, 2024).

***IBM* -** Providing managed AI through a hybrid cloud for regulated businesses comprises IBM's core competency. (IBM, 2023; IBM, 2024). Watsonx stresses model governance, transparency, and risk management capabilities, which are just like those required for healthcare compliance, when dealing with its creation. (IBM, 2023). IBM's hybrid cloud paths (IBM and Red Hat) allow for on-premises and edge deployment while accommodating hospital IT and data location requirements. (IBM, 2024; Red Hat, 2024). Knowledge exchange takes the shape of targeted provider collaborations (Cleveland Clinic), which turn domain knowledge into playbooks for repeatable services. (IBM Newsroom, 2024). IBM's dynamic capability, resulting from an organizational shift toward AI governance and services, supports clients in operationalizing safe, auditable AI across complex estates. (IBM, 2024). Although IBM holds fewer unique clinical data assets than competitors, this competence consolidates credibility for modernization initiatives. (IBM, 2024).

In Figure 11, Microsoft focuses on workflow-embedded clinical AI, Google focuses on frontier research converted into interoperable platforms, and IBM emphasizes administered AI with hybrid delivery, opposing the comparative logic. (Barney & Hesterly, 2019). Each bundle has its very own path-dependent and organizational roots, making it more challenging to emulate and providing unique long-term advantages. (Prahalad & Hamel, 1990). The area of focus for Google is in AI healthcare. (Singhal et al., 2023; Google Research, 2023).

Competence Dimension	Microsoft	Google	IBM
Knowledge Creation	GPT-4 Nuance (Clinical AI)	DeepMind AlphaFold (Bio-AI)	watsonx (Regulatory AI)
Integration & Application	Epic + Azure (EHR sync)	HDE (Health Data Exchange)	Hybrid Cloud (Deploy)
Knowledge Sharing & Partnerships	Health Alliances (Co-dev)	Mayo & NHS (Research)	Cleveland Clinic (Pilot)
Dynamic Capability	Adaptive Health Solutions	Continuous R&D Cycle	AI Governance Shift

Figure 11, Summary of Core Competence Analysis of Major Players (Jingxin, 2025).

Generic Business-Level Strategies in Healthcare AI

According to Porter's (1980) original theory, sustainable competitive advantage is created by pursuing a distinct generic strategy: cost leadership, differentiation, or focus. Those organizations that do not choose one strategy over another but instead try to position themselves in between will be left "stuck in the middle" with no clear-cut advantage. Of course, a healthcare AI market is a complex one, which means that any particular business's strategy needs to match up with its unique resources, following Resource-Based View (RBV) theory. Examination of each of the top three competitors in this market will shine the clear light on each one's strategic positioning.

Microsoft does this through a wide-ranging differentiation strategy. Its distinct value does not lie in it providing this service for free. Rather, it is because it offers something unique by tightly integrating all its solutions right into the current clinical practice.

The heart of this strategy is based on the integration of Nuance DAX (Dragon Ambient eXperience) and Azure Health Data Services with traditional Electronic Health Record (EHR) systems, especially with its partnership with Epic. This bundle offering with access to proprietary voice data for healthcare, privileged access to EHRs, and overall compliance resources makes for a high-value "sticky" environment. Microsoft is effectively leveraging documentation efficiency to deliver ROI to providers, increasing switching costs and making it difficult for competitors to replace it."

Google is also competing on a differentiation strategy with one that is rooted in innovation leadership and research excellence. Its unique value is based on its capacity to innovate and produce leading models such as Med-PaLM and developments made by DeepMind, all because of long-horizon research collaborations with top organizations such as the Mayo Clinic.

Google's plan is to translate these unique knowledge resources into scaled-service propositions, which it offers to the market through its Healthcare Data Engine and Cloud APIs. Such innovation-driven strategies have resulted in Google emerging as market leaders in NLP-driven reasoning and complex data harmonization.

After shifting strategies and concentrating not on the overall market with Watson Health, IBM has now adopted a focused differentiation strategy. Its activities are specifically aimed at satisfying one particular segment in the market: organizations which are regulated with particular demands concerning corporate governance and data management. IBM's offering, built around watsonx and Red Hat tech, is hybrid deployable, enabling customers to deploy AI models on-premises or on the edge versus only on public clouds. Their uniqueness is to cater to customers who value assurance, model governance, and audit-able compliance deliverables above everything else. IBM is competing in the market position of "Trusted Partner" for customers for whom data security and flexibility on any clouds stand non-negotiable.

This analysis confirms that all three major players have successfully avoided the "stuck in the middle" trap. Each has committed to a clear and defensible basis of competition: Microsoft with its in-workflow clinical differentiation, Google with its innovation-led differentiation, and IBM with its governed hybrid-cloud focus.

Corporate and Cooperative Strategy Analysis

The healthcare industry is being transformed by AI and hence many top IT companies are competing to innovate and expand their market as a result of this transformation. Microsoft, Google, and IBM, among others, are developing partnerships through mergers, strategic alliances, and next-generation AI solutions in order to get a better position in this rapidly evolving market.

Microsoft **-** It entered the healthcare industry through strategic collaboration and diversification. One of its most important decisions was the $19.7 billion acquisition of Nuance Communications in 2022 with the goal of improving Microsoft's AI capabilities for healthcare. Microsoft then improved its position in the healthcare industry because of Nuance's expertise in clinical natural language processing (NLP) and speech recognition (Microsoft News Center, 2022). By expanding Microsoft's current AI and cloud technology into applications which are specific to healthcare, this acquisition represents related diversification. By incorporating Nuance's technology into its own cloud services, Microsoft now contributes to the healthcare software that doctors use for interaction with patients and documentation.

In 2020, Microsoft introduced the Microsoft Cloud for Healthcare, a vertically integrated platform which was developed for healthcare organizations with customized data models, compliance tools, and connections to electronic health record (EHR) systems (Microsoft, 2020) this move transformed Microsoft's general cloud infrastructure into a domain-focused service. By doing this, Microsoft increased its reach within the healthcare value chain and provided an entire solution instead of limiting itself to only general-purpose cloud technologies.

In addition, Microsoft heavily depends on strategic partnerships for strengthening its ecosystem. In order to include Azure OpenAI services into Epic's clinical software, it strengthened its collaboration with Epic Systems, the biggest EHR provider in the United States, in 2023. The partnership gave the opportunity to several hospitals to access Epic's systems and now open the door to use Microsoft's AI technologies (Epic Systems & Microsoft, 2023). In a similar way, its collaboration with Walgreens (2019) focused on updating Walgreens' healthcare infrastructure while developing digital health solutions (Microsoft & Walgreens Boots Alliance, 2019). Besides this, Microsoft has partnerships with major healthcare providers such as Cleveland Clinic and Mount Sinai Health System to jointly create and evaluate healthcare AI solutions in real-world situations.

Other than alliances and acquisitions Microsoft has also made strategic investments to strengthen its AI foundation. Even though they are not related to the healthcare sector, Microsoft's OpenAI investments (2019 and 2023) provided access to cutting-edge generative AI models which are already being used in the healthcare sector (Microsoft, 2023). In summary, all these relationships, financial support, and taking over other companies shows that the company's policy of developing a cloud ecosystem for healthcare that is both integrated and powered by AI. Below, Figure 12 shows the summary of how Microsoft took different strategic moves while getting multiple alliances and acquisitions.

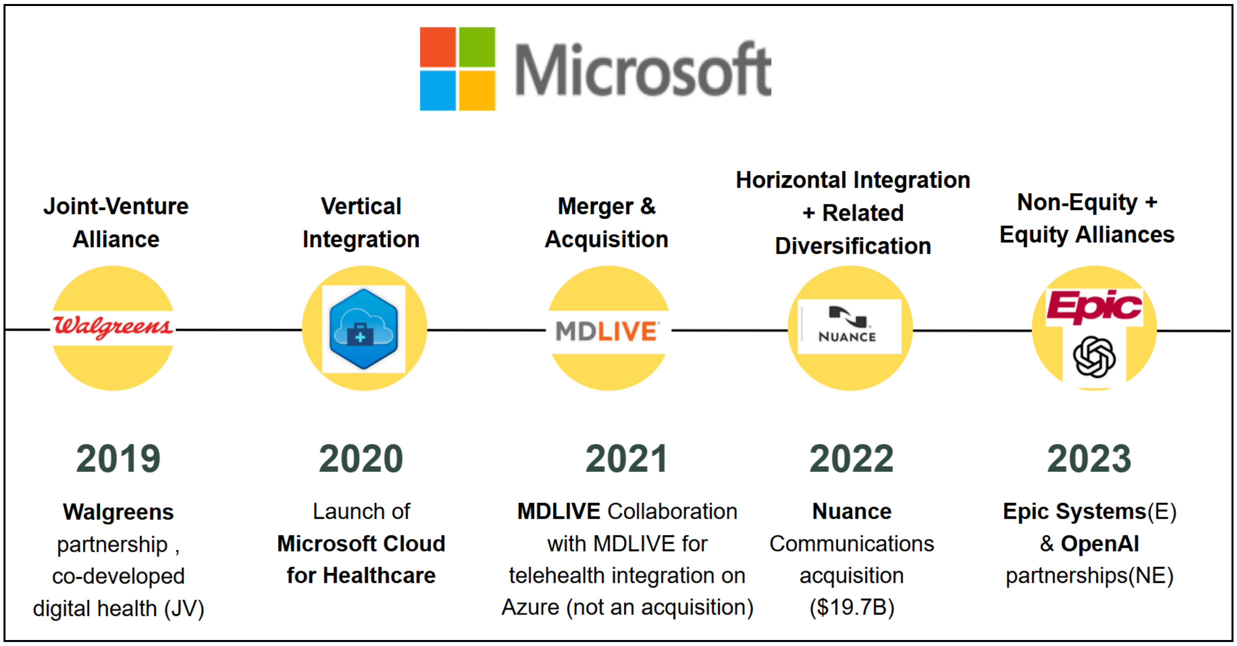

Figure 12, Microsoft's strategic moves in healthcare, 2019–2023 (Bhandare, 2025).

Google **-** Through its parent company Alphabet adopted a variety of complementary strategies for its healthcare diversification. Among the main initiators was Alphabet that formed the subsidiaries Verily Life Sciences (2015) and Calico (2013) with a focus on medical technology, data science, and longevity research. These projects are surrounded by diversification in the area of medical devices, data analytics, and drug discovery besides Google's core tech business (Alphabet, 2015; Alphabet, 2013). The Fitbit acquisition by Google on a $2.1 billion deal in 2021 not only expanded but also strengthened its presence in customer health and wearables market presence, empowered with a wide pool of health data and a new means to incorporate AI-powered health insights (Alphabet, 2021).

Through the horizontal acquisitions like DeepMind (2014), Google made a drastic leap in its AI skills. DeepMind's medical research, where AI was being trained for retinal disease recognition, was merged into Google's overall AI supremacy (Google, 2014). It was via acquisitions such as Senosis (smartphone health monitoring) and Fitbit, that Google assembled an interconnected healthcare ecosystem, taking care of data collection through wearables to AI-based insights in the cloud (Alphabet, 2021).

Google's healthcare expansion mainly revolved around strategic partnerships. The company collaborated with the Mayo Clinic for a long-term period (for four years now, since 2019), mainly on AI and cloud migration, and in 2023, a generative AI search tool for clinicians to pull information from the medical database has been developed as a result of the partnership.(Google Cloud, 2023; Mayo Clinic, 2019) Other notable partnerships are HCA Healthcare (2021) for hospital analytics and Ascension (2019) for health record management. This year, Google has also formed a partnership with MEDITECH, one of the leading EHR vendors, to integrate its AI technology into the electronic health systems of the latter (Google Cloud, 2023).

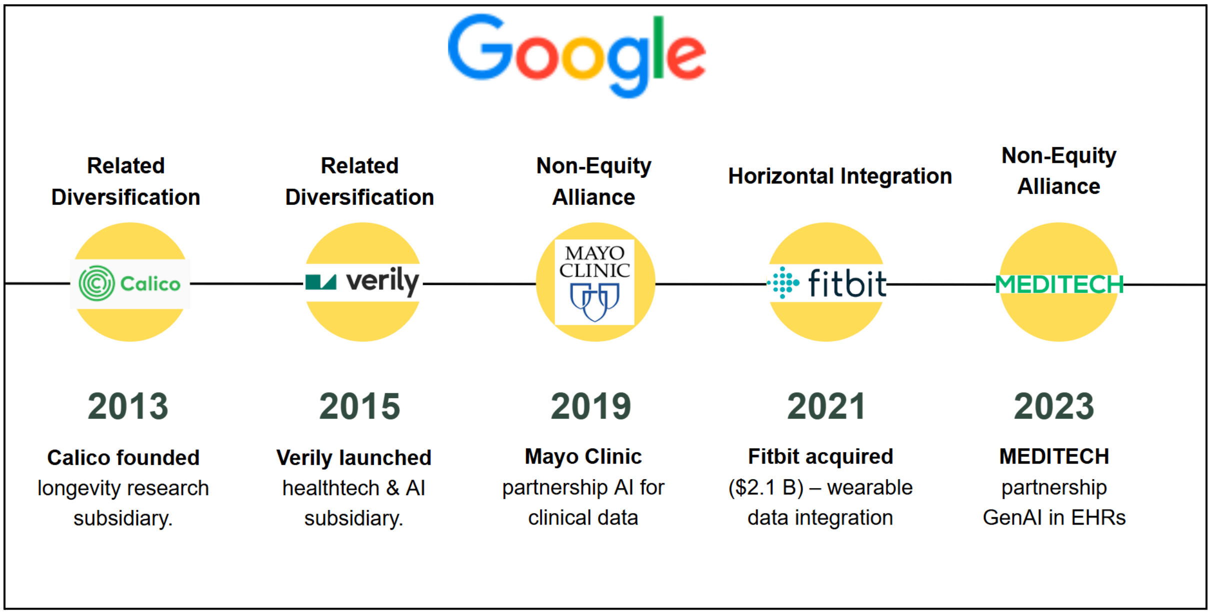

Figure 13, Google's strategic moves in healthcare, 2013–2023 (Bhandare, 2025).

Google regularly engages in collaborative research projects such as the NIH's STRIDES program and the COVID-19 High Performance Computing Consortium, effectively combining resources with the academic world and other tech giants (NIH, 2018; COVID-19 HPC Consortium, 2020). To create health technology products Google also works through verily with drug manufactures such as Sanofi and Novartis (Verily, 2019). These alliances serve to solidify Google as a critical factor in healthcare innovation, implying the use of its AI and cloud technology in the future as an indispensable part of the healthcare solutions. Figure 13 gives a timeline of how google took different strategic decisions.

IBM **-** IBM's health sector involvement shows a mix of diversification and change in strategy which was strategic refocusing. The company invested more than $4 billion during the years 2015 and 2016, making acquisitions of Phytel, Explorys, Merge Healthcare, and Truven Health Analytics, among others, to create IBM Watson Health. This was a significant horizontal integration attempt to unite data, analytics, and AI throughout the healthcare industry. However, IBM was not able to develop a solid growth and eventually decided to part with Watson Health assets by selling them to Francisco Partners in 2022, which indicated a strategic withdrawal from the market and a focus on its types of cloud computing and AI (IBM Newsroom, 2022).

Once the divestiture was done, IBM shifted its focus to horizontal technologies and concentrated on delivering non-specific technologies to the healthcare sector, mainly general AI and hybrid cloud solutions that could be transferred to various industries, healthcare included. It is no longer advertising its IBM Watsonx platform and Hybrid Cloud services as healthcare-specific tools but as industry-neutral tools. The emphasis is on flexibility and scalability instead of directly emphasizing clinical use (IBM, 2023).

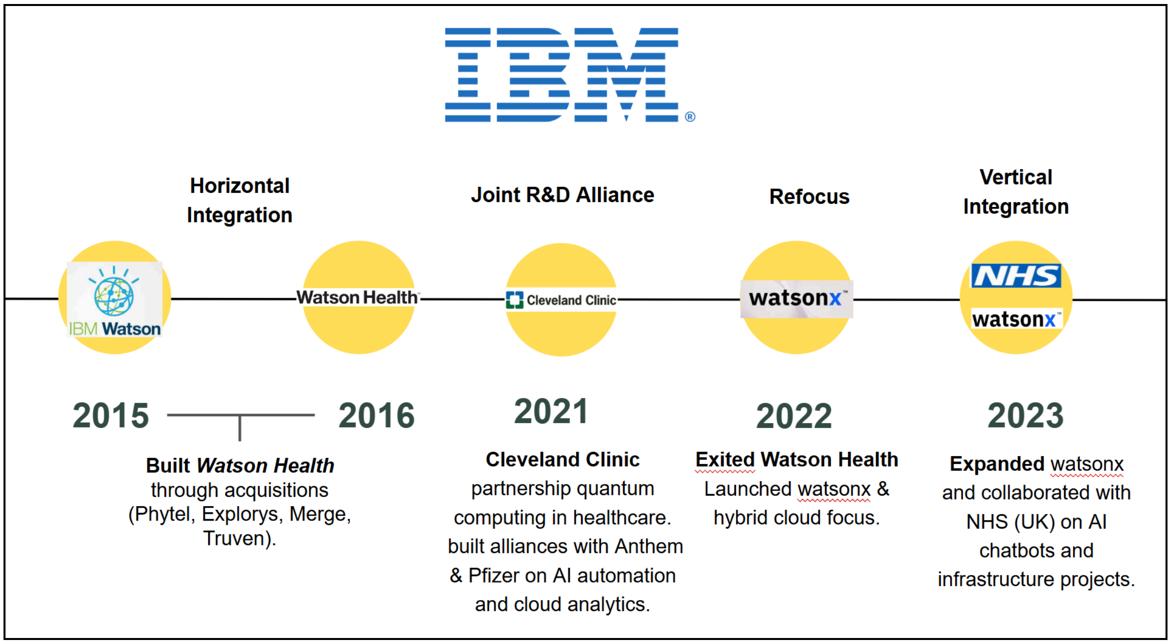

Figure 14, IBM's strategic moves in healthcare, 2015–2023 (Bhandare, 2025).

Using strategic partnerships, IBM is still very much present in the healthcare innovation platform. The 10-year collaboration deal with Cleveland Clinic (2021) led to the creation of the Discovery Accelerator. This new initiative used quantum computing and other IBM technologies to speed up the medical research of Cleveland Clinic (Cleveland Clinic & IBM, 2021). Besides, IBM is automating the claims processing for Anthem and facilitating AI-supported updates for the drugs' supply chain with Pfizer (IBM, 2021). It is certainly allowing the technology transfer while benefiting from the experts cooperation that is typical of IBM's partnership model.

Moreover, IBM retains a sort of vertical integration through its consulting and managed services. Through IBM Consulting, the enterprise delivers all-inclusive solutions from technology formulation to execution and maintenance assisting hospitals and health agencies in their IT system management. For instance, IBM has partnered with the UK's NHS for cloud infrastructure and AI-assisted chatbot development (IBM, 2020). This method incorporates IBM into healthcare processes, thus making it a permanent technology associate rather than a product supply company. Figure 14 gives a summary of a timeline of how IBM took different strategic decisions.

RESULTS AND CONCLUSION

The Artificial Intelligence industry has achieved a stable rapid growth phase in which the healthcare industry is strongly backed by a large amount of investment, has regulatory alignment and a well defined operational demand. Global spending on AI technologies in the health sector has increased significantly from $1.1 billion in 2016 to about $22-32 billion in 2023, this indicates a sustained shift from trials to large-scale operational use. It is forecasted that the industry to be worth $180-190 billion by 2030, with a potential growth of $500 billion by 2032.

Around 49% of the global market share is captured by North America, Europe comes next with a 27% contribution while the Asia Pacific region is the fastest-growing market. This industry addresses various healthcare concerns i.e., workforce shortages, increasing administrative burdens, fragmented clinical data, and rising operational costs, which together create a steady demand for automation, predictive analytics, and digital decision support. In order to fast-track the adoption of these technologies, regulatory agencies have also taken their steps in various approvals such as: the FDA has approved almost 900 AI/ML powered medical devices, the AMA has set up Category III CPT codes to facilitate AI reimbursement, and TEFCA has opened up national interoperability standards. These changes showcase that AI has became a essential part of the healthcare system rather than just a technology.

In contrast, industry trends also point out that although technological innovation is available to everyone, in order to be able to meaningfully participate in this market one must have a lot of clinical, regulatory, and infrastructural capacity. Hospitals and health systems as buyers of AI products have strong power because they will only implement AI tools at scale after they have obtained clinical validation performance, security assurances, and measurable financial returns. Looking at the supplier power, it is still limited to a few cloud and data infrastructure firms that are benefiting from the dominance of already established players. Trends in market segmentation show that clinical decision support and diagnostic imaging AI are at the forefront in terms of size and advancement while administrative automation, such as ambient documentation, is growing rapidly because it has a direct impact on clinician workload and the revenue cycle of healthcare organizations.

The combination of high compliance requirements, complex workflow integration, and the need for extensive real-world data creates significant barriers for new entrants in the market, which is why competition in this industry is very strong but only among a few firms that possess the necessary assets. Therefore, the market is more favorable to those who can merge innovation with their deployment capabilities, long-term provider partnerships, governance maturity, and interoperability. These conditions are indicative of the industry consolidating around ecosystem-level platforms instead of fragmented point solutions.

Core Competencies demonstrated effectively

An analysis of the core competencies for all three firms shows that each firm has developed the strengths which are related to its strategic positioning. Microsoft shows its core competency in combining workflows and clinical-grade AI which combines its language models based on Nuance with Azure Health Cloud to enhance medical paperwork and assist in making decisions. Google has a strong position in both research innovation as well as data interoperability, because of its partnership with DeepMind and Med-PaLM which convert cutting-edge AI models into reproducible healthcare products. IBM, on the other hand focuses on AI regulation and bioinformatics which offers safe and approved platforms through its Watsonx and Red Hat clouds. Altogether, these strengths demonstrate that each company makes the most of its unique technological and organizational assets to have a sustainable competitive edge in the fast-changing healthcare AI business of the future.

Corporate and Cooperative Strategy and their Successful Implementation in the AI Healthcare Industry

Through the analysis of the corporate and cooperative strategies employed by Microsoft, Google, and IBM, it becomes evident that each of them has opted for a unique approach to gain a competitive advantage in the AI healthcare market. Acquisitions, partnerships, and tech collaborations have been common to all three companies, but their differences lie in the ways the previously discussed strategies are incorporated into healthcare workflows, research, and regulations in the various countries.

Microsoft - Microsoft clearly shows a very progressive related diversification and horizontal integration strategy. The acquisition of Nuance Communications in 2022 turned out to be a tremendous advantage for Microsoft since it united the cloud and AI power of Microsoft with the clinical natural language processing (NLP) skill of Nuance.This move helped Microsoft to shift the AI technology to the healthcare industry through the Microsoft Cloud for Healthcare and its collaboration with Epic Systems, therefore this also helped documentation, compliance, and data management making it easier. Also, collaborations with hospitals like the Cleveland Clinic and Mount Sinai have helped it secure a place in the market and thus more hospitals adopting its technology. Through the combination of acquisitions and workflow partnerships, Microsoft has created a competitive advantage that is very hard to copy as it is based on clinical integration, switching costs, and proven operational outcomes.

Google - Google has been true to its corporate strategy and made diversification the main focus area but then also it still centers around the innovations of the future and the long-term partnerships. Through its parent company Alphabet, the tech giant has extended its reach horizontally by acquiring companies like DeepMind, Fitbit, and Senosis, as well as vertically by creating areas that are quite similar to Verily Life Sciences and Calico, which not only do AI but also are heavily involved in medical research, drug discovery, and longevity science. Google's cooperative strategy encourages research-based alliances over acquisitions and ownership partnerships.

The collaboration with Mayo Clinic, NHS, and HCA Healthcare, among others, not only has given access to various datasets which are crucial for the development of models such as Med-PaLM but also has provided real-world validation. In fact, this cooperation fits with a platform-based strategy where Google Cloud's Healthcare Data Engine is employed to supply the necessary scalable and interoperable infrastructure. Even though Google does not have as much direct access to workflows as Microsoft, its vast network of academic and clinical collaborations has further strengthened its innovation-driven differentiation and long-term sustainability.

IBM - Through the separation and concentration on specific areas, IBM has made a big change in its strategy, which is referred to as a strategic refocus. After Watson Health was sold off in 2022, IBM changed the way it viewed the whole company and through that focused on Watsonx and hybrid cloud solutions of Red Hat while on-premises deployment for regulated industries, governance, and transparency were given priority. This focus on vertical integration is perfectly in sync with the legal compliance and data residency requirements of healthcare institutions.

Particularly IBM's cooperative strategies are related to service-oriented alliances, for instance, the 10-year collaboration with the Cleveland Clinic aimed at the speeding up of medical research by leveraging quantum computing and partnerships with Pfizer and Anthem for

AI-driven operations. These cooperative strategies show that IBM acts as a trusted integrator and governance expert, offering AI deployments that can be tailored and are ready to be used with regulations. Although IBM's strategy gives precedence to deploying reliable systems over the pace of innovation, it is still very defensible in those markets where security and governance of data are the most important factors.

Sustainable Competitive Advantage by Firm

Drawing on the previous analysis, Microsoft presently experiences the most important long-term competitive advantage in AI healthcare among the three companies. High switching costs are high and difficult for rivals to adequately emulate because of its workflow-embedded clinical AI, rich access to real-world patient data, and deep integration with leading EHRs. Google contains a stronger innovation engine due to its models, publications, and interoperable data platforms, which make it highly dynamic and research-driven, but its edge collapses as a result of its reliance on open standards and widespread research due to slowed innovation or execution. IBM offers a narrow advantage since it emphasizes governance-intensive, hybrid-cloud deployments for strongly regulated clients. It possesses the same scale and lock-in potential as Microsoft. Collectively, the VRIO data shows that Microsoft is best situated to sustain its lead, whereas Google and IBM, for example, rely on continued innovation and specialized governance.

The comparison of Microsoft, Google, and IBM utilizing the Five Forces, RBV, VRIO, core competencies, and corporate/cooperative strategies identifies Microsoft as the company that has a better position to maintain a long, term competitive advantage in the AI healthcare sector. Microsoft's advantage comes from resources that are not only highly specialized but also deeply integrated into clinical workflows.The purchase of Nuance makes available clinical, grade speech data and ambient documentation functionalities which competitors may find very difficult to imitate, while the integration with Epic gives workflow penetration which, in turn, creates substantial switching costs for providers. These resources are advantageous, uncommon, and very challenging to copy, and Microsoft is also organizationally prepared to exploit them to the full extent through Azure's compliance oriented cloud ecosystem and its vast enterprise distribution channels.

Google is still in a strong position mainly due to its research excellence, frontier model development, and long term partnerships with leading health institutions such as Mayo Clinic and the NHS. On the other hand, a substantial part of Google's power is still research, which has to be transformed into operational, scalable solutions within provider environments. IBM is still relevant in governance, intensive and hybrid, cloud deployments but its lack of proprietary clinical data and relatively smaller footprint in the healthcare sector make its position less defensible in comparison.

Knowing which company has the most sustainable advantage also sheds light on the strategic approach needed to be successful over the long run in this industry. Sustainable advantage in AI healthcare is not just a consequence of advanced model development but rather the result of the ability to implement those models within the clinical, regulatory, and economic constraints of healthcare systems. Companies that succeed are those that can embed AI tools in established workflows, ensure compliance via robust cloud governance, and obtain long term partnerships that facilitate continuous model improvement and real world validation. These capabilities become even more important as the market trends towards platform - based solutions, hybrid deployment models, and interoperability driven ecosystems.The industry will keep rewarding those companies which, besides technological innovation, also provide embedded access, domain, specific evidence generation, and strong data governance. In this regard, the way Microsoft integrates proprietary data assets, enterprise cloud infrastructure, and clinic partnerships is the most thorough and stands out as the most defensible basis for leadership continued over time as AI gets more and more central to healthcare delivery.

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