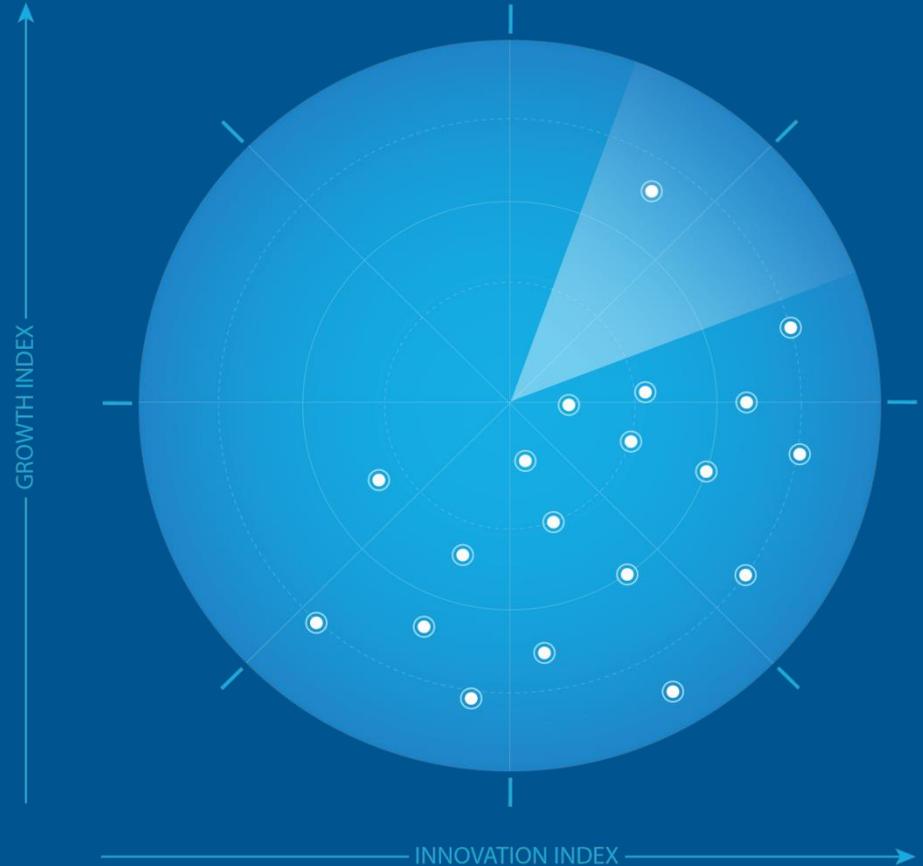


FROST RADAR™: ARTIFICIAL INTELLIGENCE FOR HEALTHCARE IT, GLOBAL, 2020

BENCHMARKING FUTURE
GROWTH POTENTIAL

GLOBAL TRANSFORMATIONAL
HEALTH RESEARCH TEAM AT
FROST & SULLIVAN



Contents

Section	Slide Number
Strategic Imperative and Growth Environment	4
The Frost Radar™: AI for the Global Healthcare IT Market, 2020	8
Companies to Action	13
• Allscripts	14
• Amazon Web Services	15
• Apple	16
• Change Healthcare	17
• GE Healthcare	18
• Google	19
• Health Catalyst	20
• HPE	21
• IBM Watson Health	22
• Inovalon	23
• Intel	24
• Medial Early Sign	25
• Microsoft	26

Contents (continued)

Section	Slide Number
• Nuance	27
• Optum	28
• Philips Healthcare	29
• Qure.ai	30
• Salesforce	31
• SigTuple	32
• Wolters Kluwer	33
Strategic Insights	34
Impacts on Key Industry Participants	36
• Significance of Being on the Frost Radar™	37
• Leadership - CEO's Growth Team	38
• Investors	39
• Customers	40
• Board of Directors	41
Frost Radar™ Analytics	42

Author: Koustav Chatterjee

**STRATEGIC IMPERATIVE
AND GROWTH
ENVIRONMENT**



Strategic Imperative

- Legacy healthcare IT systems are largely unable to deal with the volume, complexity, and growth of medical data across the care continuum. As a result, at a global level, most clinical interventions are not personalized, financial workflows overlook payment fraud, and administrative processes require manual involvement that ultimately results in medical reconciliation.
- Artificial intelligence (AI) technologies are applied on healthcare IT systems to improve the computing capability of front-line clinical, financial, and operational systems amid massive growth of unstructured data that hold the clue for improved outcomes. Adoption had been limited to a few large enterprises that could afford to modernize their IT offerings at an enterprise level, and uses mostly were limited to data management, corporate risk mitigation, administrative automation, and regulatory compliance optimization.
- Over the last 2 to 3 years, however, AI has become an integral part of all healthcare IT systems, and has become more accessible and affordable for patients, providers, and payers. A key contributing factor is the role of pure-play ICT companies that have democratized development, deployment, and commercialization of AI solutions through robust infrastructure support and proactive partnerships via open API programs.
- The global market for AI in healthcare IT is poised for unprecedented growth as all healthcare stakeholders now have the need and the incentive to embrace full-fledged AI to improve clinical efficacy, augment financial performance, and streamline operational agility.

Source: Frost & Sullivan

Strategic Imperative (continued)

- Frost & Sullivan research has identified the core areas in which AI-enabled healthcare IT solutions are most relevant for hospitals, physicians, and payers.
 - Hospitals that have so far invested in AI-based financial solutions to automate patient access management, reimbursement eligibility matching, and computer-assisted coding are now also preferring clinical-grade AI solutions for imaging analytics, genomics profiling, clinical risk stratification, and precision medicine-based diagnosis.
 - Physician practices continue to focus on automated, AI-based healthcare IT solutions that perform practice management, physician scheduling, and workforce attribution. Large group practices are investing in conversational AI solutions that engage and activate patients via chatbot. AI also allows practice management software to merge with a third-party electronic medical record (EMR) or population health management platform for effective referral management and patient tracking in their journey across the care continuum.
 - The payer market, one of the biggest investors in AI-based healthcare IT solutions, is betting big on enterprise-grade AI platforms that predict epidemics (such as COVID-19), forecast patient volume across their member providers, authenticate reimbursement, and drive general well-being of the insured population through medication management and self-care enablement.
- Other stakeholders are emerging, too. Government agencies, patients, incubators, academic medical centers, large healthcare IT vendors, and institutional investors are playing important roles in helping this technology gain traction in global healthcare market.

Source: Frost & Sullivan

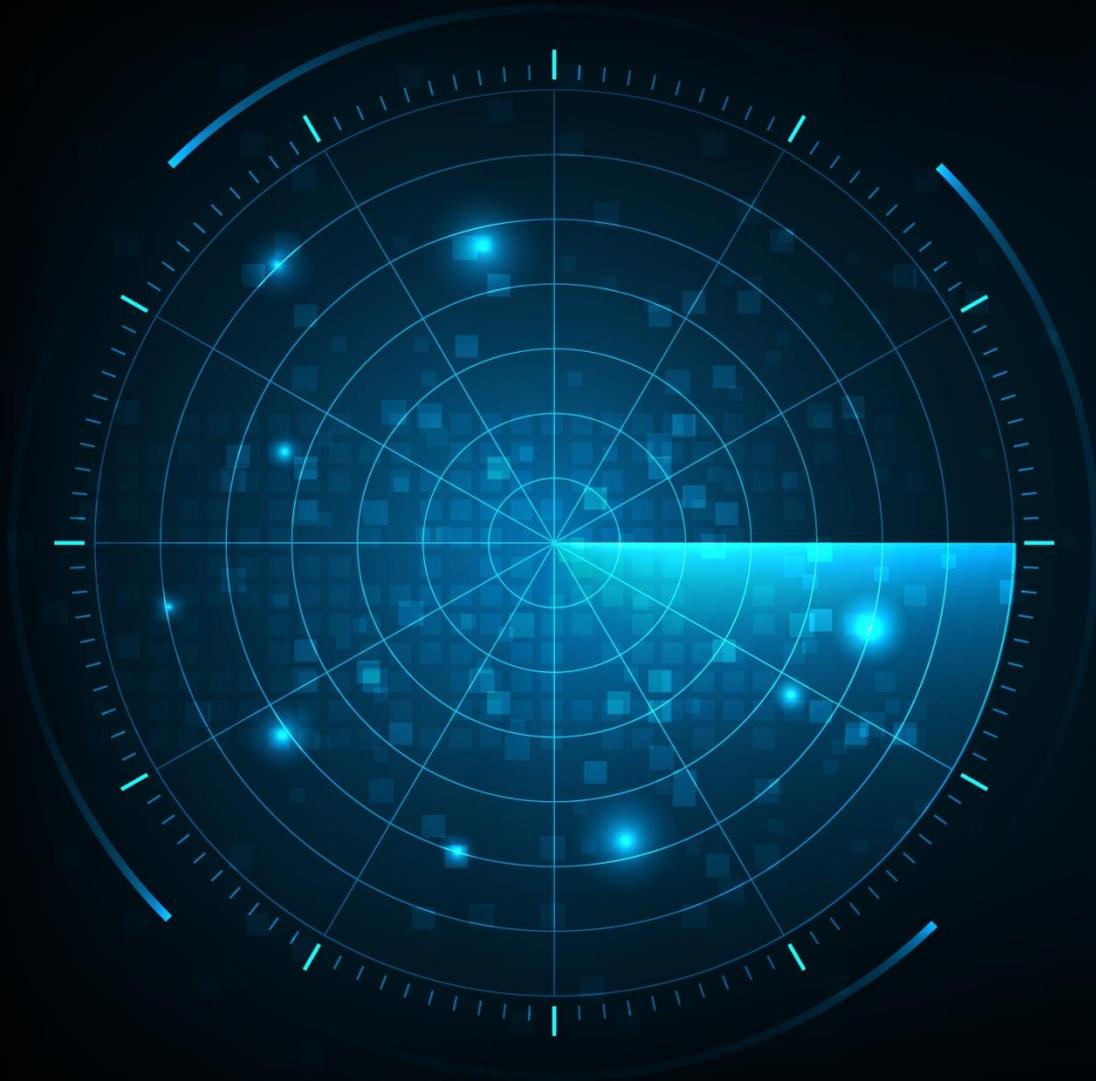
Growth Environment

- The global market for AI in healthcare IT is on a rapid growth trajectory: Frost & Sullivan expects sales of AI-enabled products to generate more than \$34.83 billion globally by 2025. Almost 50.7% of the revenue will come from government agencies (including public payers), followed by hospitals (36.3%), and physician practices (13.0%). Clinical and financial AI solutions each will generate about 40% of the market revenue; the rest will be derived by selling operational AI solutions.
- Next-generation AI solutions that will improve healthcare ecosystem efficiency include
 - **Conversational AI:** Clinical risk stratification and provider referral via chatbot
 - **Pharmaceutical AI:** Clinical trial eligibility assessment via IT
 - **Bioinformatics AI:** Targeted immunotherapy for infectious diseases via IT
 - **Infrastructure AI:** Super computing on cloud to incorporate clinical research outcomes on front-line clinical decision support systems
 - **Remote AI:** Contactless health hygiene via the Internet of Things (IoT), and contactless pain management via face recognition IoT
 - **Hardware-Integrated AI:** Rapid molecular diagnostic testing through wearables
 - **Deep Tech AI:** National data center for infectious diseases
 - **Genomics AI:** Precision medicine IT for infectious or rare diseases (e.g., DNA sequencing through AI to assess the vulnerability of a chronic population to an infectious or rare disease)
 - **Operations AI:** Supply chain analytics of medical products specific to infectious or rare diseases
 - **Research AI:** Real-world evidence IT for complex diseases
 - **Social AI:** National contact tracing application for transmissible diseases

Source: Frost & Sullivan

FROST RADAR™

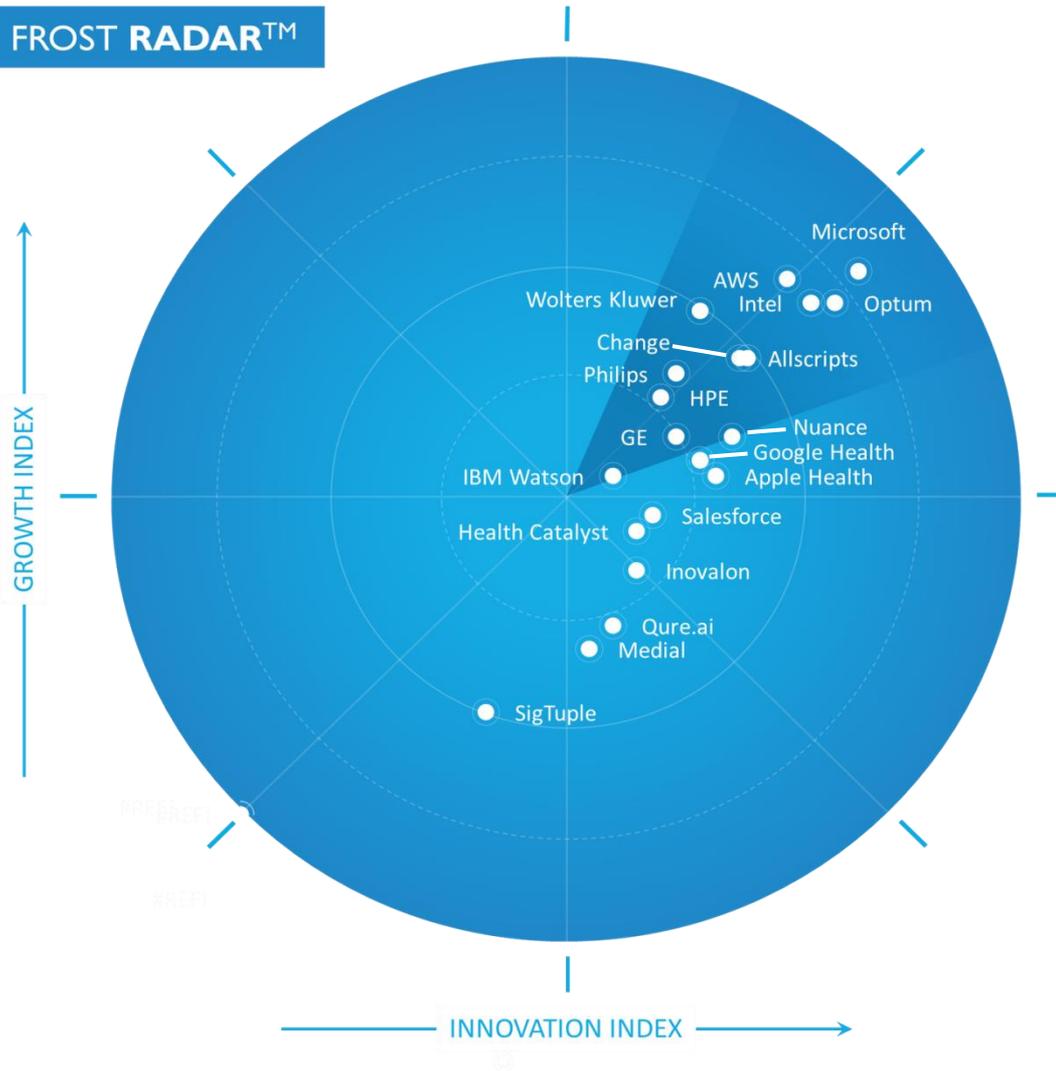
AI FOR HEALTHCARE IT



Frost Radar™

AI for Healthcare IT Market Growth Opportunities

FROST RADAR™



In a field of more than 200 global industry participants, Frost & Sullivan independently plotted the **top 20** companies in this Frost Radar™ analysis. Parameters assessed in the analysis included:

- Innovation Scalability
- Research and Development
- Product Portfolio
- Mega Trends Leverage
- Customer Alignment
- Revenue Growth
- Market Share Growth
- Growth Pipeline
- Vision and Strategy
- Sales and Marketing

Frost & Sullivan studies related to this independent analysis:

- **K26D:** Artificial Intelligence Market—Key Application Areas for Growth in Healthcare IT, Forecast to 2022
- **K3CE:** Role of AI in the Pharmaceutical Industry, 2018-2022
- **MD1C:** Growth Opportunities in the Global Medical Imaging Artificial Intelligence Market, Forecast to 2022

Source: Frost & Sullivan

Frost Radar™

Competitive Environment

- The global market for AI in healthcare IT is largely fragmented. It currently includes more than 200 vendors offering foundational infrastructure capabilities, integrated platform solutions, and plug-in tools, models, algorithms, and services.
- As part of this study, Frost & Sullivan screened and analyzed 115 healthcare AI companies from all over the world: 65 companies were short-listed based on detailed analysis of their corporate growth potential and ability to drive visionary innovation in healthcare through AI technologies; of these, 20 were selected and plotted on the Frost Radar™ to represent the best mix of enterprise-grade and modular healthcare AI solutions.
- **Microsoft, Optum, Intel, and Amazon Web Services (AWS)** form the cluster of “best-of-the-best” healthcare AI companies in the world.
- Globally, **Microsoft** earned the top spot because of its industry-leading effort to incorporate next-generation AI infrastructure for large-scale deployment of clinical decision support, precision medicine, population health management, clinical research, and drug discovery.
- **Optum** remains a close second to Microsoft with its aggressive investment in administrative AI solutions (natural language processing [NLP], voice assistant, pattern recognition, machine learning) and adoption of cognitive clinical applications that drive real-world efficiency for payers and providers.

Source: Frost & Sullivan

- **Intel** has the third spot in the total market but remains close to Microsoft in terms of its ability to facilitate a AI-led medical breakthroughs. Intel's hardware (servers and data processors) solutions appear to be critical to the diagnostic success of Philips Healthcare and GE Healthcare: precision imaging yields proven results on Intel hardware. Intel's software platform and AI toolkits also pave the way for deployment of deep learning models that drive genomics and video analytics at scale.
- **AWS** is the other leader for its interoperable cloud capabilities and intuitive point solutions.
- **Nuance** and **HPE (Hewlett Packard Enterprise)** are pioneering AI evangelists that are using advanced AI solutions for data management, care management, clinical documentation improvement, and computer-assisted coding.
- **Allscripts** secured a top position too for its ongoing work in the field of AI-enabled clinical pathway management within the EMR workflow and interdisciplinary population health management through holistic application of machine learning technologies across its entire product line. Its subsidiary 2bPrecise offers foundational precision medicine capabilities in the United States.
- **GE Healthcare** and **Philips Healthcare** also are categorized as leaders because of their industry-leading medical imaging and on-device AI capabilities.
- **Change Healthcare, IBM Watson Health, and Wolters Kluwer** are the other leaders that are reimagining cognitive clinical decision-making, consumer-grade revenue cycle management, and predictive clinical surveillance, respectively.

Frost Radar™

Competitive Environment (continued)

- Core ICT giants **Apple Health** and **Google Health** scored high on both growth potential and innovation with their futuristic and consumer-grade AI solutions.
- Another noteworthy company deploying cognitive digital health platforms via native cloud is **Salesforce**, which is positioned very close to the market leaders.
- Only 2 pure-play healthcare data analytics companies are featured in the Frost Radar™: **Health Catalyst** and **Inovalon**. Both exhibit tremendous receptivity to incorporate native and third-party AI products across their entire product line.
- Frost & Sullivan also has recognized top regional companies including **Medial Early Sign** (machine learning AI on pathology tests) from Israel, and **SigTuple** (visual AI on pathology tests) and **Qure.ai** (AI in medical imaging) from India.

Source: Frost & Sullivan

COMPANIES TO ACTION
COMPANIES TO BE CONSIDERED FIRST
FOR INVESTMENT, PARTNERSHIPS, OR
BENCHMARKING

Allscripts

FROST RADAR™ LOCATION

- Allscripts is a global healthcare IT company positioned in the coveted leader area of the Radar.
- It is the only global EMR company to secure a top position: many other competitors failed to demonstrate comparable AI capabilities across their healthcare IT solutions.
- Allscripts' performance on various growth metrics is much better than most others on the Radar and comparable with its performance across the innovation metrics.
- Allscripts' AI capabilities are deeply integrated into its entire spectrum of healthcare IT products.

GROWTH

- Allscripts' superior growth stems from its proven ability to offer a wide range of horizontal platform solutions (e.g., EMR, population health management, patient engagement, and precision medicine) that cater to large integrated delivery networks, accountable care organizations, national payers, government agencies, and big pharma.
- The firm has an equally good reputation for customized services that ensure optimal deployment and performance of its AI-enabled IT products.
- The winning combination enables the firm to grow exponentially and expand its market footprint.

INNOVATION

- Allscripts pioneers AI-led (Sunrise EMR) workflow adjustments and subsequent patient-level clinical decision-making.
- It incorporates voice-assistant technology coupled with NLP to help physicians improve patient-provider interaction (DB Motion) and expedite clinical documentation (BOSSnet).
- Subsidiary 2bPrecise leverages deep learning technologies to integrate patients' genomic data into EMR workflows to aid precision medicine-based clinical intervention.
- The population health management platform incorporates AI to predict health outcomes at an enterprise level.

NEXT STEPS

- Allscripts is geared to transform its EMR capabilities and integrate ambient deep learning technologies across its healthcare IT workflow.
- Its revenue cycle management platform solutions are also likely to see greater adoption of AI for patient access management, computer-assisted coding, claims pre-adjudication, and denials management.
- Frost & Sullivan predicts that in next few years, Allscripts' focus on AI will gain traction among hospitals and payers that are trying to weather the COVID-19 crisis with IT-enabled population health management.

Source: Frost & Sullivan

Amazon Web Services

FROST RADAR™ LOCATION

- AWS, part of Amazon, offers fundamental healthcare AI infrastructure capabilities along with plug-in-based tools to the entire ecosystem.
- The company has secured a leadership position on the Frost Radar™.
- AWS's score on Growth mirrors its performance across various innovation metrics, though it is slightly behind Microsoft, Optum, and Intel across the Innovation metrics.
- The company's Growth score is higher than those of Optum and Intel because of its agile and cost-effective offerings that prioritize local innovation across various countries.

GROWTH

- AWS's growth strategy stems from its ability to offer horizontal, industry-agnostic AI infrastructure capabilities that remain critical for payers, providers, life science companies, biotech firms, and healthcare IT vendors.
- It strategically offers tools, algorithms, platforms, a research repository, and normalized clinical data sets that allow its customers to build custom AI applications quickly, safely, and compliantly.
- AWS is expected to grow further as it localizes healthcare AI deployment through country-specific data warehouses that protect sensitive patient data from cross-country transfer.

INNOVATION

- AWS's innovation is targeted to real-world healthcare challenges such as the lack of availability of clinically relevant healthcare Big Data, poor visibility on patients' healthcare experience, and the need for comprehensive digital transformation of pharmaceutical value chain.
- AWS deploys dedicated clinical researchers, algorithmists, physicians, academicians, and data scientists to build its healthcare platform, which remains interoperable with both native and third-party AI tools.
- AWS remains one of the top genomic analyzers on cloud across the globe.

NEXT STEPS

- AWS will continue to support mature healthcare IT enterprises, promising start-ups, and technology consortiums to build AI solutions/standards globally.
- The AWS Marketplace will be a growth catalyzer for the firm: it allows for collaborative innovation on infrastructure (OS, networking, security, and storage) and point-of-care solutions (e.g., data analytics, data visualization tools, and developer applications).
- Frost & Sullivan believes that AWS could improve its Radar position to become one of the top 3 healthcare AI companies in the world in the next 2 to 3 years.

Source: Frost & Sullivan

FROST RADAR™ LOCATION

- Apple is the world's leading mobile technology company. It has been investing substantially in healthcare AI solutions with a focus on the cognitive EMR, healthcare cloud, and wearable markets.
- Apple outscored many competitors, including some of the Growth leaders, across Innovation index metrics. It demonstrates strong performance on Growth with the successful launch and scale of the integrated Apple Health, iCloud, and iWatch-based ECG service line.
- Apple's long-term growth forecast for its healthcare AI technologies is exceptional and best in its class.

GROWTH

- Apple's strong growth is attributed to more AI-related acquisitions than any other competitor, related to its vision to reimagine health records and reduce medical waste through around-the-clock monitoring of patients' health conditions through iWatch to ultimately reduce unnecessary diagnostic intervention and save money.
- Apple's iCloud infrastructure offers unmatched interoperability, safety, and agility for the healthcare industry.
- Its dedicated AI platform that offers custom toolkits for medical imaging and digital health is a key growth enabler.

INNOVATION

- Apple's healthcare AI innovation has 3 dimensions: on-device machine learning and NLP; deep learning on iCloud; and access to a secure digital health platform that incorporates population health evidence coupled with AI tools (CareKit, HealthKit, and Health app) to support development of native or third-party AI solutions specific to medical imaging, mobile diagnostics, and EMR.
- With ResearchKit tools, Apple enables medical research at scale.
- Insights generated from these hardware systems, apps, and EMR can be consolidated, processed, and visualized on the iCloud platform.

NEXT STEPS

- Apple Health will continue to support external AI technology developers, medical device companies, and providers to build custom applications that demonstrate superior design and ensure data safety and security.
- Apple is committed to launch consumer-centric health AI apps that reduce the frequency of provider interventions by proactively monitoring patient health.
- Frost & Sullivan is confident that Apple's strategy to develop proprietary solutions and gain market traction through targeted acquisitions and extensive partnerships will place it among the Radar leaders in the next 2 years.

Source: Frost & Sullivan

Change Healthcare

FROST RADAR™ LOCATION

- Change Healthcare is a global healthcare IT company that remains a top vendor using AI to improve operational and financial workflows for payers and providers.
- Change Healthcare is positioned among the Frost Radar™ leaders, with excellent performance on Growth and Innovation metrics. It is slightly behind core ICT and a few other global healthcare IT companies because the diversity and scope of its AI solution are not comparable to those that have managed to incorporate AI more comprehensively around the world.

GROWTH

- Change Healthcare is poised to grow at a phenomenal pace since it applies AI to reduce medical waste, payment fraud, and denials—the top cost contributors of any healthcare business.
- It uses progressive AI technologies to help payers and providers discover gaps in administrative and financial workflows. The technologies generate tangible returns on investment and establish long-term business utility—value propositions that result in sustainable growth for any healthcare IT company.
- Change Healthcare is at the forefront of benefiting from this growth prospect.

INNOVATION

- Change Healthcare's AI-integrated revenue cycle management solutions are trained on 205 million unique claims from its Intelligent Healthcare Network health information exchange that consolidates data from 2,200 payers and 5,500 hospitals.
- Its Claims Lifecycle AI solutions pre-authorize claims, resulting in faster identification of denials pre-submission.
- It leverages AI extensively for clinical documentation and expedites coding 7.2 times faster than manual intervention.
- The firm is expected to invest in additional consumer-grade AI solutions for patient access.

NEXT STEPS

- Change Healthcare is poised for success both in terms of growth and innovation with its targeted AI approach.
- Frost & Sullivan predicts that the firm will continue to develop progressive AI-enabled revenue cycle management workflows that optimize patients' financial experience and augment provider profitability.
- Payers also will appreciate Change Healthcare's ability to identify payment fraud early and eliminate preventable costs.
- The firm is likely to improve its Radar position significantly in 2 years when experimental AI capabilities are commercialized.

Source: Frost & Sullivan

GE Healthcare

FROST RADAR™ LOCATION

- GE Healthcare is a global healthcare enterprise, using hardware-integrated AI solutions to aid precision imaging at scale.
- The company is featured among the Radar leaders, and secured the position of one of the best diagnostic companies that is investing in AI to perform next-generation scanning, diagnostics, therapy, and reporting across the globe.
- GE Healthcare works directly with many companies on the Radar via its flagship partner program, which ultimately supports its own Radar position.

GROWTH

- GE Healthcare's entire product line that offers diagnosis, therapy, and monitoring capabilities is expected to grow at a healthy rate of 3% to 6% for the next 3 years.
- The highest growth is expected in its enterprise software and service solution business, which embraces AI to perform personalized monitoring of patient outcomes.
- GE Healthcare also pioneered strategic partnerships with digital health infrastructure providers such as AWS and Microsoft to aid cloud-based clinical interpretation and monitoring of patients' imaging test results at provider and patient levels.

INNOVATION

- GE Healthcare invests more than \$1 billion annually on R&D. A significant part of that investment is for development of deep learning algorithms and pattern recognition technologies; as a result, the company holds more than 5,000 pending patent applications (hardware and software).
- Some of the key applications of AI for diagnostic care include automation of tasks for radiologists, early detection and quantification of disease volume, and evidence-based planning of interventional procedures.
- Quality outcomes reporting and administrative analytics are the other areas where Optum is placing its bet.

NEXT STEPS

- GE Healthcare is expected to prioritize AI-led diagnosis to improve accuracy, productivity, and efficiency of technologists, radiologists, and interventionists all over the world.
- Frost & Sullivan predicts that GE Healthcare's investment in AI-led diagnosis and monitoring capabilities will grow at double digits year over year through 2023.
- Its focus on ramping up digital capabilities to pursue proactive patient monitoring across the care continuum is a good strategy for the future after the COVID-19 crisis.

Source: Frost & Sullivan

FROST RADAR™ LOCATION

- Google is a global internet company that has been investing aggressively in healthcare IT capabilities to build an ecosystem of consumer- and clinical-grade applications for patients, providers, and life science companies.
- The company is positioned among the leaders, and is one of the more innovative companies on the Radar.
- Google has been growing faster than most other competitors due to the fact that over the last few years it has consolidated most of its healthcare investments under a targeted domain called Google Health, which has 500 employees.

GROWTH

- Google is on high growth trajectory. The firm's healthcare AI strategy is diverse yet targeted to broad healthcare inefficiencies such as a lack of data interoperability among medical devices, unavailability of scalable clinical research platforms, ineffective digital transformation efforts of large providers, and most importantly the need for a standardized AI framework for cloud-based processing of patient data (clinical and genomics) at provider and population levels.
- Google, via Google Health and Verily, has catered to most of the pain points and secured high scores on various growth metrics.

INNOVATION

- Google has scored relatively high on innovation and is trailing Apple by a small margin. Its clinical applications have a global impact but are focused on the provider domain.
- Google Cloud is at the forefront of AI-integrated clinical research, data interoperability, and cybersecurity.
- With Verily, the firm has introduced visionary on-device AI capabilities that revolutionize ophthalmology intervention, irregular pulse monitoring, quality outcomes reporting, and clinical trial optimization.
- Google will continue to improve its Innovation score and may eventually secure a leadership position.

NEXT STEPS

- Google is on a mission to standardize AI-led healthcare intervention at a global level.
- Frost & Sullivan predicts that Google Cloud will allow large providers and life science firms to embrace AI-led clinical intervention and patient monitoring.
- Frost & Sullivan also appreciates Google's strategy to create a framework for ensuring safety and privacy of patient data on its cloud. More importantly, Google's strategy to empower consumers with personalized clinical insights for evidence-based decision-making will be important after COVID-19.

Source: Frost & Sullivan

Health Catalyst

FROST RADAR™ LOCATION

- Health Catalyst is a progressive healthcare data analytics company, offering visionary predictive and prescriptive AI tools to a wide range of US healthcare stakeholders.
- Health Catalyst is positioned close to the center of the Radar and delivers better results across Innovation metrics than Growth.
- It is one of the top 3 healthcare data analytics companies on the Radar.
- Although not a market leader yet, Health Catalyst has shown tremendous growth of its AI-enabled data warehouse solution, which ultimately will earn it a coveted position on the Frost Radar™.

GROWTH

- Health Catalyst is offering AI-enabled solutions via a native ecosystem that thrives on its proprietary data operating system—a hosting platform for all in-house and third-party AI tools and technologies.
- The operating system further prioritizes AI technologies that adhere to ethical principles and promote best-in-class data management, orchestration, and visualization.
- The prevalent use cases of AI-enabled healthcare data analytics are observed in the provider and payer settings,
- Positioning Health Catalyst to grow at a record speed in next few years.

INNOVATION

- Health Catalyst innovates with precision. It offers the foundational data operating system necessary for developers to build custom AI applications.
- Catalyst.ai (incumbent algorithms deeply entrenched into all Health Catalyst solutions) and healthcare.ai (open sourced AI applications built with in-house tools) together serve clinical, financial, and operational domains in healthcare. These applications drive real results in the form of drops in avoidable clinical events (by 30%) and hospital-acquired infections, and prediction of hospital length of stay.

NEXT STEPS

- Health Catalyst is expanding its US healthcare AI footprint by introducing cognitive capabilities across all its product lines.
- The firm also is investing heavily to build new models that effectively reduce 1-year mortality rates, forecast propensity to pay for medical interventions, and predict no-shows.
- Frost & Sullivan applauds Health Catalyst's ability to offer predictive insight on chronic conditions at a population level.
- Health Catalyst may become the world's top AI-enabled data analytics company in the next 3 to 5 years.

Source: Frost & Sullivan

FROST RADAR™ LOCATION

- HPE (Hewlett Packard Enterprise) is the world's leading ICT company, offering enterprise-grade healthcare applications for providers, pharma enterprises, and other healthcare IT companies.
- HPE remains one of the top 10 healthcare AI companies on the Frost Radar™ based on its Growth and Innovation scores.
- HPE offers the underlying digital architecture to health systems, trying to connect disparate applications, platforms, and data sources for creating the single source of truth at a patient and provider level.
- HPE's AI portfolio is targeted to enhance automation and cybersecurity.

GROWTH

- HPE is recording strong growth of its enterprise healthcare IT business because it is able to aid in a comprehensive digital transformation for large provider networks, big pharma companies, national imaging and diagnostic chains, and government departments.
- HPE's growth strategy centers on its digital health network capabilities (wired or wireless) that drive patient data interoperability, host third-party applications, aid digital command centers, and support quality outcomes reporting safely and securely.

INNOVATION

- HPE invests heavily in R&D to build proprietary AI applications that drive healthcare automation at scale.
- HPE's healthcare customers benefit from its AI-driven cybersecurity solutions as well.
- HPE is building next-generation AI solutions to drive genomics analytics, which will highlight personalized clinical workflows based on correlation between patients' genomic data and their susceptibility for various comorbidities.
- HPE is likely to improve its Innovation score in the next 2 years because of its ongoing work to manage the COVID-19 outbreak.

NEXT STEPS

- HPE is projected to double down on AI capabilities for its large healthcare and life science clients.
- It is going to go global in its approach to launch locally relevant AI solutions for international healthcare and life science companies.
- Frost & Sullivan expects HPE to continue to invest heavily in hardware integrated AI solutions and video analytics, and improve its overall position on the Radar in the next 2 years.
- The firm will start to explore opportunities to expand its Internet of Medical Things portfolio that will aid digital continuity of care at a provider network level.

Source: Frost & Sullivan

IBM Watson Health

FROST RADAR™ LOCATION

- IBM Watson Health is a global healthcare AI evangelist. It is positioned as an aspirational leader on the Frost Radar™.
- IBM Watson Health's cognitive healthcare IT capabilities are globally adopted by major payers, providers, life science companies, government agencies, and imaging centers.
- IBM Watson Health currently offers innovative AI solutions, but its growth has been fluctuating due to the historical focus on long-term medical breakthroughs.

GROWTH

- The firm has been growing faster than many other global healthcare AI companies due to strong enterprise-grade solutions that apply to its parent company's high-impact global clients and other progressive companies that are undergoing digital transformation of their entire healthcare business.
- AI-led automation and decision support that ultimately improve clinical outcomes, reduce preventable costs, eliminate errors, and optimize quality adherence is the key enabler
- A differentiated focus as a result of recent management reorganization should propel its growth.

INNOVATION

- IBM Watson Health appears to be one of the most innovative healthcare AI companies in the world.
- It combined best-in-class AI infrastructure capability with end-to-end services that ensure successful onboarding of long-term projects for some of the biggest global healthcare companies.
- Its patented AI technologies are leading visionary innovation in the field of clinical diagnosis, drug discovery, imaging informatics, payer-provider connectivity, health plan utility, and employee benefits management.
- The firm will continue to score high on innovation with COVID-19 tools.

NEXT STEPS

- IBM Watson Health is going to prioritize real-world healthcare problems without shifting the core focus from moon-shot applications. Frost & Sullivan appreciates its decision to categorize global healthcare problems such as medical waste, cybersecurity, clinical errors, payment fraud and employee health for targeted AI-led applications.
- The firm has strong support from its parent company to continue breaking new ground globally for most of its healthcare AI customers.
- Better collaboration with regional healthcare AI start-ups would allow for maximum impact.

Source: Frost & Sullivan

Inovalon

FROST RADAR™ LOCATION

- Inovalon is a major healthcare data analytics company that primarily caters to US payers, providers, pharma, and pharmacy clients.
- The company exhibits especially strong performance across innovation metrics.
- Inovalon's AI solutions digitize clinical review, automate quality outcomes reporting, personalize clinical gap analysis, and predict medical emergencies.
- It also offers population health analytics for comorbidity and forecasts patient volume in a provider setting in near-real time.

GROWTH

- Inovalon has been reporting strong growth for offering best-in-class analytics solutions that deliver real results for its customers.
- Natural language processing as a service (NLPaaS) technology can analyze 35,000 patient records a day, reducing the aggregate spend on clinical review by 25% for providers.
- Its AI technology that predicts medical encounters (MORE Registry) is built based on a rules engine that incorporates evidence from 70,000 ICD codes and data from 100,000 claims. As a result, clinical risks are flagged automatically 4 times faster than through manual methods.

INNOVATION

- A sizable portion of Inovalon's \$500 million annual revenue is dedicated to development, deployment, and optimization of AI-enabled healthcare data analytics solutions.
- NLPaaS and the More Registry continue to be at the forefront of AI innovation, applied to solve real-world administrative and clinical challenges for Inovalon's customers.
- As these solutions become mainstream, Inovalon is likely to exhibit comparable performance on both Growth and Innovation indices.

NEXT STEPS

- Inovalon is poised for even better growth, mainly catalyzed by its foundational AI capabilities for administrative automation and clinical decision support.
- Frost & Sullivan applauds Inovalon's leadership in the North American AI-enabled analytics market due to its agile, tailored, and plug-in based tools.
- It remains one of the top 3 pure-play healthcare data analytics companies that is using AI comprehensively across its product lines in market-ready capacity.

Source: Frost & Sullivan

FROST RADAR™ LOCATION

- Intel is a global ICT company, applying advanced AI technologies across its hardware and software solutions for providers and life science and healthcare IT clients.
- Intel has secured a leadership position on the Frost Radar™ and is one of world's top 3 healthcare AI companies.
- Intel outscored almost every competitor in the Innovation metrics, and is 4th highest across the Growth metrics.
- Intel remains the leading company offering foundational hardware data processors, algorithms, codes, and toolkits for development of healthcare AI solutions.

GROWTH

- Intel reports strong growth of its healthcare AI business. Its strategy is unique and best in its class: it offers leading hardware solutions, data centers, plug-in-based tools, and an interoperable analytics platform that embrace AI solutions at scale for some of the world's biggest companies, including Philips and GE Healthcare.
- Intel truly allows AI developers to build next-generation technologies due to the computing capability of its data processors, and it offers access to proprietary deep learning resources for video analytics, precision imaging, genomics analytics, and drug discovery.

INNOVATION

- Intel is a pioneer in the field of healthcare AI with its market-ready applications that are built in partnership with third-party companies.
- Its Intel Xeon processor acts as the backbone for Philips and GE Healthcare's AI solutions for medical imaging.
- Intel is also supporting Siemens Healthineers with additional capabilities, such as Intel Deep Learning Boost and Intel Distribution of OpenVINO toolkit for AI-based medical imaging of cardiac markers.
- Other companies are working with Intel to leverage its informatics platform that aids predictive clinical intervention and biomarker discovery.

NEXT STEPS

- Intel is an important company for the global healthcare AI market.
- Frost & Sullivan predicts that all major healthcare IT companies will use Intel capabilities to protect and scale their AI solutions.
- Intel's AI marketplace for external developers creates the perfect ecosystem for collaborative innovation in the field of deep neural network solutions, next-generation sequencing, precision imaging, and genomics.
- Intel remains the top healthcare AI company for the pharmaceutical domain and could dethrone Microsoft as the top AI company for the entire market in 2 years.

Source: Frost & Sullivan

Medial Early Sign

FROST RADAR™ LOCATION

- Medial Early Sign is a progressive Israeli start-up with relatively new offerings as compared to the others profiled in this Radar. Its products represent an important market segment that characterizes application of AI on diagnostic test results for advanced and personalized reporting of disease susceptibility, progression, and comorbidity.
- Medial Early Sign is positioned lower in both Growth and Innovation than most other participants due to lack of comparable evidence. However, Frost & Sullivan acknowledges that this firm is a leader in its own market segment.

GROWTH

- Medial Early Sign is growing at a moderate pace. The company works with a wide range of healthcare enterprises, including clinical labs, providers, payers, and life science companies, that are slowly realizing the need for early detection of high-risk, high-cost diseases at a patient, insurance member, and clinical trial participant level via AI.
- Growth is poised to improve since the firm recently validated the accuracy and efficacy of its predictive, point-of-care insight through peer-reviewed research and clinical practice—the hallmarks of customer acceptance.

INNOVATION

- Medial Early Sign offers 2 major product lines: AlgoAnalyzer, which is a machine learning operating system capable of hosting predictive clinical risk scoring tools at an enterprise level; and AlgoMarker, which is hosted within AlgoAnalyzer to combine lab results, EMR data, and patient-generated data to stratify clinical risk for chronic kidney disease, flu, cardiovascular disease, lung cancer, diabetes, and lower GI disorders.
- Proprietary machine learning algorithms coupled with the native AI operating system qualify it as a reasonably innovative company aspiring to transform diagnostic care.

NEXT STEPS

- Medial Early Sign has a targeted and differentiated approach to optimize clinical interpretation of diagnostic test results.
- With a total funding of \$50 million, the firm is poised to diversify product line through ongoing R&D, and expand its market footprint through precise sales and implementation.
- The company has the unique advantage to target a market segment that has wide applicability and needs plug-in-based AI applications that produce next-generation clinical reporting faster and more accurately while remaining agile, interoperable, and cost effective.

Source: Frost & Sullivan

Microsoft

FROST RADAR™ LOCATION

- Microsoft is pioneering the robust and comprehensive application of AI across a broad range of infrastructure and point solutions for the entire healthcare IT industry.
- Microsoft's AI technology is used globally to drive precision medicine workflows, aid population health analytics, propel evidence-based clinical research on cloud, and expedite drug or treatment discovery.
- Microsoft is the undisputed leader on the Frost Radar™.
- Frost & Sullivan acknowledges that Microsoft is the world's top healthcare AI firm.

GROWTH

- Microsoft's healthcare AI business is growing at record speed among its competitors in the core ICT market and among leading healthcare IT vendors such as Optum since it offers a foundational and deep footprint across all types of healthcare enterprises—especially among large payers, big pharma companies, and major hospitals.
- The company is positioned for additional growth and is expected to remain best in its class since Microsoft's AI business is thriving globally, including in the United States, a significant yet minority revenue contributor to the firm's total healthcare AI business.

INNOVATION

- Microsoft's healthcare AI business unit is diversified and forward thinking.
- It caters to hospitals, leveraging cloud (Azure) platform to drive interdisciplinary clinical decision support through a central command center; pharma companies applying clinical research evidence on drug discovery pipeline to identify treatment breakthroughs; government agencies pursuing population health tracking at scale; leading diagnostic labs applying AI to deliver 360-degree clinical interpretation; and global clinical research organizations and philanthropic health initiatives, driving medical discovery.

NEXT STEPS

- Frost & Sullivan congratulates Microsoft for its leading position on the Frost Radar™ and predicts its continued growth for the next 3 to 5 years.
- With a total funding of \$40 million towards AI-led innovation for clinical research and philanthropic medical projects globally, Microsoft has committed to aid targeted innovation that achieves incremental growth for the company on long run.
- With its global presence, industry-leading brand visibility, and favorable C-suite mindset, Microsoft's healthcare AI business is likely to be a benchmark in the industry for years to come.

Source: Frost & Sullivan

Nuance

FROST RADAR™ LOCATION

- Nuance is one of the original healthcare IT companies that commercialized stand-alone AI applications across clinical, financial, and operational domains for providers and imaging centers. It specializes in AI-led clinical documentation improvement, revenue cycle management, and quality performance management.
- Nuance is among the cluster of leaders on the Radar and exhibits a better growth and innovation than many competitors. Frost & Sullivan acknowledges that Nuance offers the best conversational AI for clinical documentation improvement technology among all competitors.

GROWTH

- Nuance's AI-integrated CDI, radiology reading, and performance management products (among many other solutions) are growth enablers.
- The company is well positioned to sustain its growth momentum due to rich operational experience of 30 years, during which it coded 3 billion lines of medical documentation.
- The firm also invested millions of dollars to build a HITRUST-compliant cloud infrastructure that enables speech recognition and NLP-based virtual coding.
- Nuance's growth is guaranteed because its technology is built into all major EMRs and 200-plus other healthcare IT firms.

INNOVATION

- Nuance scored very high on the Radar's innovation index, mainly due to its superior ability to drive positive business outcomes while using cutting-edge AI technology.
- Nuance's provider customers spend, on average, 45% less time on medical documentation due to adoption of conversational AI.
- The company is working with every 2 out of 3 US radiologists to reduce operational burdens and financial gaps.
- Patient engagement is also optimized through its AI-based self-service tools that reduce contact center costs for providers by as much as 25%.

NEXT STEPS

- Frost & Sullivan is impressed with Nuance's best-in-class AI technologies that drive tangible value for a diverse range of customers.
- Nuance is already a leading healthcare IT firm for the provider market. Frost & Sullivan predicts that it will emphasize the need for payer-provider connectivity solutions that drive claims pre-authorization at the point of care.
- Nuance is expected to commercialize next-generation conversational AI tools that automate medical documentation and recommend personalized clinical workflows.

Source: Frost & Sullivan

Optum

FROST RADAR™ LOCATION

- Optum is one of world's leading providers of AI for healthcare IT, securing a top position on the Frost Radar™ because of its high internal investment to build native applications, strong breadth of solutions for the entire healthcare ecosystem, and exceptional ability to deploy and optimize AI-enabled clinical, financial, and operational workflows that drive value worth billions of dollars.
- Optum is likely to maintain its leadership position for at least another year, though the COVID-19 pandemic and the subsequent AI intervention from core ICT companies may pose threaten that assumption.

GROWTH

- Optum has been growing at a record pace for the last 5 years and secured the highest score across various growth metrics. This is due to the fact that it works closely with some of the world's leading payers including UnitedHealth Group, its parent company.
- Optum has been acquiring providers across all major US states with the intention to overhaul their healthcare IT infrastructure and standardize care at a national level.
- Both these factors contribute to Optum's ability to achieve incremental growth by securing a client's buy-in for AI-related investment.

INNOVATION

- Optum scored very high on innovation and is behind only Microsoft on the Frost Radar™.
- OptumIQ, the flagship AI-based analytics platform, draws clinical, financial, and operational insights from disparate health systems to create personalized workflows at the point of care for physicians, care managers, and patients.
- Other leading solutions, such as Optum 360, Optum Rx, and Optum Population Health Management, are actively embracing next-generational machine learning, NLP, voice assistance, and deep learning technologies.

NEXT STEPS

- Optum is unlikely to be behind the curve in terms of investing in AI solutions to help its payer, provider, government, and life science clients during and after the COVID-19 pandemic.
- Optum has already committed a team of more than 100 data scientists who are working on new AI workflows for clinical intervention, financial decision-making, and operational agility.
- Optum's ability to capture almost 35% of US patient data has favored its position to build large-scale AI solutions that can be applied horizontally across the healthcare ecosystem.

Source: Frost & Sullivan

Philips Healthcare

FROST RADAR™ LOCATION

- Philips Healthcare is a global conglomerate that is solidly among the Frost Radar™ leaders.
- Its commendable Innovation and Growth scores are similar.
- Philips Healthcare remains one of the most diversified healthcare AI evangelists based on its application of machine learning, deep learning, imaging analytics, and visual analytics capabilities for providers and life science companies.
- Philips Healthcare is ahead of GE Healthcare in terms of its growth performance due to strong overall adoption of progressive AI capabilities across its entire hardware and service line for clinical domains.

GROWTH

- Philips Healthcare's strong growth of its healthcare AI business is based on its strategic priority to offer foundational AI models, tools, and platforms for medical imaging, clinical workflow management, clinical case review, quality outcomes monitoring, and prediction of potential medical emergencies.
- Philips Healthcare is investing rapidly to gain traction in other high-impact medical episodes such as pregnancy risk stratification, neonatal monitoring, tele-ICU, and digital command center—all of which extensively leverage cognitive capabilities to personalize clinical decisions and automate intervention.

INNOVATION

- Philips Healthcare offers a range of AI-enabled solutions to aid holistic clinical breakthroughs at an enterprise level.
- Its deep learning algorithms are now fully immersed in all diagnostic hardware solutions (VitalEye, Smart Exam, EPIQ CVx, and CvxI).
- On the digital health side, the IntelliSpace software suite is aiding ground-breaking clinical decision support, medical research, and collaborative innovation in the field of cardiology, neurology, oncology, and other high-risk, high-cost disease episodes.
- It also offers consumer-grade sleep devices that incorporate AI to deliver personalized and predictive analytics.

NEXT STEPS

- Philips Healthcare is focusing on healthcare AI solutions that deliver mission-critical insight to clinical stakeholders and medical researchers.
- The company will double down its focus on tele-ICU and digital command center as part of its commitment to foster interdisciplinary health data interoperability for proactive monitoring and timely intervention.
- Frost & Sullivan observes that Philips also is working closely with Intel for maximum impact at a global level, and expects it to further improve its Innovation and Growth performance.

Source: Frost & Sullivan

FROST RADAR™ LOCATION

- Qure.ai is a leading India-based healthcare AI company that is applying visual deep learning technologies on radiology images for clinical interpretation, risk stratification, and disease progression quantification.
- Qure.ai is positioned far from the growth leaders segment but still scored well on the innovation parameters.
- Due to its recent market entry across many regions outside India, its true growth prospects remains to be evaluated.
- Its growth strategy appears to be good due to short-term opportunity leverage, such as screening for COVID-19 lung abnormality.

GROWTH

- Qure.ai has built a notable list of AI-based imaging IT solutions that cover most of the high burden diseases for radiologists.
- The company offers chest X-ray interpretation including tuberculosis screening. It also offers radiology analytics on CT and MRI scans for brain injuries.
- These features have allowed for moderate growth in spite of the threat from larger competitors such as EMR firms, ICT companies, and diagnostic conglomerates.
- It currently operates in more than 20 countries and provides support for 600,000-plus patients.

INNOVATION

- Qure.ai's competitive score is much higher on innovation than some of the world's biggest and widely known healthcare IT companies on the Radar. This competitive advantage is earned through superior product strength: the chest X-ray tool reports 85% to 97% accuracy.
- The built-in deep learning algorithm highlights pulmonary TB and other underlying diseases (such as COPD and lung cancer) simultaneously.
- The AI algorithms further identify and quantify brain injuries and abnormality at scale with limited intervention from a radiologist at 92% to 97% specificity.

NEXT STEPS

- Qure.ai is poised for better growth as providers and government agencies deploy imaging AI tools to help radiologists make more informed and evidence-based clinical diagnosis at scale with higher precision and accuracy.
- The company is well funded, including \$16 million of investment raised in March 2020. The fresh round is aimed at R&D recalibration to take on competitive threats, and will also support international expansion.
- Frost & Sullivan predicts that Qure.ai will move to the leader zone in about 3 years.

Source: Frost & Sullivan

Salesforce

FROST RADAR™ LOCATION

- Salesforce is a global leader in integrated customer relationship management solutions for all industries, but specifically for healthcare.
- It is close to the main cluster of leaders, scoring higher on innovation than growth.
- With its Health Cloud platform, the company is able to offer a 360-degree overview of medical information at population and patient levels.
- Its integrated AI capabilities support interdisciplinary CRM, care management, member engagement, and quality outcomes reporting.
- The firm acquired Tableau in 2019 to aid visionary innovation in AI-based healthcare data analytics.

GROWTH

- Salesforce has been reporting record growth for last few years due to its inorganic approach of gaining market share through acquisitions.
- In healthcare, Salesforce remains the best platform that integrates top-end AI technologies such as voice assistant (EINSTEIN Sales Platform) and deep learning to allow a diverse range of stakeholders to report and manage patient outreach and outcomes.
- Salesforce works with medical device and life science companies that leverage its Health Cloud platform coupled with AI-led analytics capabilities to measure and benchmark patient outcomes at scale.

INNOVATION

- Salesforce has a dual innovation approach: it invests millions of dollars in R&D to build proprietary healthcare IT capabilities that leverage native and third-party AI technologies to aid medical breakthrough by payers, providers, medical device companies and pharmaceutical enterprises, and it strategically acquires or partners with other best-in-class healthcare AI evangelists to gain market share globally.
- Salesforce will remain invested in the potential of healthcare AI and is expected to improve its score even further in the next 2 to 3 years.

NEXT STEPS

- Salesforce is currently running multiple pilot programs that deeply utilize AI capabilities to aid automation of CRM via voice commands, patient-generated data reporting from medical devices, indexing of social determinants of health, and population health markers for clinical research.
- Frost & Sullivan predicts that once these projects are clinically validated and commercially launched, Salesforce will significantly improve its growth trajectory.
- Tableau will help Salesforce visualize medical data at scale to aid precise intervention across the care continuum.

Source: Frost & Sullivan

SigTuple

FROST RADAR™ LOCATION

- SigTuple is an India-based digital diagnostic company that offers an integrated AI platform capable of visually interpreting common pathology test results.
- SigTuple is featured at the bottom of the Frost Radar™. Its aggregate score on innovation is higher.
- SigTuple is a “new kid on the block,” with only 4 years of experience, yet the company impresses Frost & Sullivan with its country-leading ability to drive cloud-based virtual analysis of the 5 most common pathology tests: blood, urine, semen, chest X-ray, and retinal scan.

GROWTH

- SigTuple has scored relatively low on growth metrics because it has only one product that passed the clinical validation stage and is currently being used by diagnostic and provider partners in beta version.
- Frost & Sullivan expects this reality to change soon: SigTuple’s two other major visual diagnostic AI tools are nearing clinical validation.
- The remaining two solutions will begin to go through the clinical validation process after them, resulting in the ability to cover millions of pathology tests in India.

INNOVATION

- SigTuple makes up for its low score on growth through innovation.
- Its technology is patented, pure-play, AI-driven, and constantly evolving with new workflows.
- The company allows its customers to deploy custom modules within its native and AI-enabled cloud hosting ecosystem (Manthan) for safe and secure processing of sensitive medical data. The technology is interoperable too.
- The tools are built using suggestions from top medical experts and clinical scientists who are constantly evaluating the efficiency and accuracy of its predictive test results.

NEXT STEPS

- SigTuple is looking for rapid market entry with its debut product (Shonit) that delivers blood smear analysis through visual deep learning and statistical machine learning technology.
- Frost & Sullivan suggests SigTuple harness the opportunity to expand aggressively locally and internationally by working as a diagnostic chain itself and by partnering with other major pathology labs.
- Frost & Sullivan believes that the full stack of solutions, when available in commercialized version, can dramatically improve SigTuple’s position in the Radar.

Source: Frost & Sullivan

FROST RADAR™ LOCATION

- Wolters-Kluwer (WK) is a global healthcare IT enterprise that has demonstrated superior deep learning, NLP, and predictive clinical surveillance capabilities than most others.
- WK is one of the top Growth performers and is poised to move higher on the Radar in the next 2 years.
- WK has been investing strongly in various AI solutions that effectively consolidate disparate medical data at a provider level, convert unstructured medical notes into standardized clinical documents, and monitor clinical outcomes for regulatory reporting.

GROWTH

- WK is growing rapidly due to recent investment that it has committed to accelerate adoption of AI-enabled healthcare IT for all payer and provider customers.
- Its biggest growth opportunity has remained post-merger IT integration for large providers that are forming accountable care organizations or being acquired by private equity players.
- WK's Health Language platform is embracing various native AI solutions that allow providers to visualize population level health data post-merger and create actionable line items for stakeholders across the care continuum.

INNOVATION

- WK has scored well in Innovation metrics due to its ability to deliver exception results at scale for payers and providers.
- The Health Language platform is able to incorporate AI to automate the process of mapping non standardized lab notes onto LOINC codes.
- The platform further leverages the cNLP solution that allows pattern recognition and easy identification of clinical evidence in EMR, lab, and clinical decision support workflows based on its history of working with more than 300,000 providers for the last 10 years.

NEXT STEPS

- WK is geared for rapid market expansion with proprietary solutions, exceptional domain expertise, and best-in-class operational agility.
- Frost & Sullivan considers WK's decision to invest up to 10% of its revenue on product enhancement to be groundbreaking.
- Frost & Sullivan predicts that WK will gradually expand its AI-enabled healthcare IT footprint beyond North America and will work closely with large health systems, government agencies, and leading start-ups from Europe, the Middle East, and Southeast Asia in the next 2 to 3 years.

Source: Frost & Sullivan

**STRATEGIC
INSIGHTS**



Strategic Insights

1

AI drives the much-needed digital transformation in healthcare. The combination of machine learning, deep learning, NLP, and voice recognition technologies personalize clinical diagnoses, automate administrative processes, and expedite financial decision-making at the patient, population, and enterprise levels.

2

Machine learning and NLP capabilities for clinical review, patient engagement, claims preauthorization, coding, and payment fraud analysis appear to be relatively more mature in terms of adoption and utility across the global healthcare market. However, investment in deep neural network technologies and on-device AI for precision imaging, video analytics, the Internet of Medical Things, digital command center, and integrated remote patient monitoring is growing faster.

3

The COVID-19 crisis is rewriting the future of healthcare AI. Large-scale and enterprise-grade AI platforms that offer foundational infrastructure (hardware and software) and modular toolkits for targeted AI applications in the fields of predictive workflows, preventive intervention, medical research, genomics, and drug discovery will see maximum traction from payers, providers, pharma, and government agencies.

Source: Frost & Sullivan



**NEXT STEPS:
LEVERAGING THE
FROST RADAR™ TO
EMPOWER KEY
STAKEHOLDERS**

Significance of Being on the Frost Radar™

Companies plotted on the Frost Radar™ are the leaders in the industry for growth, innovation, or both. They are instrumental in advancing the industry into the future.

GROWTH POTENTIAL

Your organization has significant future growth potential, which makes it a Company to Action.

BEST PRACTICES

Your organization is well positioned to shape Growth Pipeline™ best practices in your industry.

COMPETITIVE INTENSITY

Your organization is one of the key drivers of competitive intensity in the growth environment.

CUSTOMER VALUE

Your organization has demonstrated the ability to significantly enhance its customer value proposition.

PARTNER POTENTIAL

Your organization is top of mind for customers, investors, value chain partners, and future talent as a significant value provider.

Source: Frost & Sullivan

Frost Radar™ Empowers the CEO's Growth Team

STRATEGIC IMPERATIVE

- Growth is increasingly difficult to achieve.
- Competitive intensity is high.
- More collaboration, teamwork, and focus are needed.
- The growth environment is complex.

LEVERAGING THE FROST RADAR™

- The Growth Team has the tools needed to foster a collaborative environment among the entire management team to drive best practices.
- The Growth Team has a measurement platform to assess future growth potential.
- The Growth Team has the ability to support the CEO with a powerful Growth Pipeline™.

NEXT STEPS

- **Growth Pipeline Audit™**
- **Growth Pipeline as a Service™**
- **Growth Pipeline™ Dialogue with Team Frost**

Source: Frost & Sullivan

Frost Radar™ Empowers Investors

STRATEGIC IMPERATIVE

- Deal flow is low and competition is high.
- Due diligence is hampered by industry complexity.
- Portfolio management is not effective.

LEVERAGING THE FROST RADAR™

- Investors can focus on future growth potential by creating a powerful pipeline of Companies to Action for high-potential investments.
- Investors can perform due diligence that improves accuracy and accelerates the deal process.
- Investors can realize the maximum internal rate of return and ensure long-term success for shareholders.
- Investors can continually benchmark performance with best practices for optimal portfolio management.

NEXT STEPS

- **Growth Pipeline™ Dialogue**
- **Opportunity Universe Workshop**
- **Growth Pipeline Audit™ as Mandated Due Diligence**

Source: Frost & Sullivan

Frost Radar™ Empowers Customers

STRATEGIC IMPERATIVE

- Solutions are increasingly complex and have long-term implications.
- Vendor solutions can be confusing.
- Vendor volatility adds to the uncertainty.

LEVERAGING THE FROST RADAR™

- Customers have an analytical framework to benchmark potential vendors and identify partners that will provide powerful, long-term solutions.
- Customers can evaluate the most innovative solutions and understand how different solutions would meet their needs.
- Customers gain a long-term perspective on vendor partnerships.

NEXT STEPS

- **Growth Pipeline™ Dialogue**
- **Growth Pipeline™ Diagnostic**
- **Frost Radar™ Benchmarking System**

Source: Frost & Sullivan

Frost Radar™ Empowers the Board of Directors

STRATEGIC IMPERATIVE

- Growth is increasingly difficult; CEOs require guidance.
- The Growth Environment requires complex navigational skills.
- The customer value chain is changing.

LEVERAGING THE FROST RADAR™

- The Board of Directors has a unique measurement system to ensure oversight of the company's long-term success.
- The Board of Directors has a discussion platform that centers on the driving issues, benchmarks, and best practices that will protect shareholder investment.
- The Board of Directors can ensure skillful mentoring, support, and governance of the CEO to maximize future growth potential.

NEXT STEPS

- **Growth Pipeline Audit™**
- **Growth Pipeline as a Service™**

Source: Frost & Sullivan

FROST RADAR™ ANALYTICS



Frost Radar™: Benchmarking Future Growth Potential

2 Major Indices, 10 Analytical Ingredients, 1 Platform

VERTICAL AXIS

Growth Index (GI) is a measure of a company's growth performance and track record, along with its ability to develop and execute a fully aligned growth strategy and vision; a robust growth pipeline system; and effective market, competitor, and end-user focused sales and marketing strategies.

GROWTH INDEX ELEMENTS

- **GI1: MARKET SHARE (PREVIOUS 3 YEARS)**
This is a comparison of a company's market share relative to its competitors in a given market space for the previous 3 years.
- **GI2: REVENUE GROWTH (PREVIOUS 3 YEARS)**
This is a look at a company's revenue growth rate for the previous 3 years in the market/industry/category that forms the context for the given Frost Radar™.
- **GI3: GROWTH PIPELINE**
This is an evaluation of the strength and leverage of a company's growth pipeline system to continuously capture, analyze, and prioritize its universe of growth opportunities.
- **GI4: VISION AND STRATEGY**
This is an assessment of how well a company's growth strategy is aligned with its vision. Are the investments that a company is making in new products and markets consistent with the stated vision?
- **GI5: SALES AND MARKETING**
This is a measure of the effectiveness of a company's sales and marketing efforts in helping it drive demand and achieve its growth objectives.

Frost Radar™: Benchmarking Future Growth Potential

2 Major Indices, 10 Analytical Ingredients, 1 Platform

HORIZONTAL AXIS

Innovation Index (II) is a measure of a company's ability to develop products/services/solutions (with a clear understanding of disruptive Mega Trends) that are globally applicable, are able to evolve and expand to serve multiple markets, and are aligned to customers' changing needs.

INNOVATION INDEX ELEMENTS

- **II1: INNOVATION SCALABILITY**
This determines whether an organization's innovations are globally scalable and applicable in both developing and mature markets, and also in adjacent and non-adjacent industry verticals.
- **II2: RESEARCH AND DEVELOPMENT**
This is a measure of the efficacy of a company's R&D strategy, as determined by the size of its R&D investment and how it feeds the innovation pipeline.
- **II3: PRODUCT PORTFOLIO**
This is a measure of a company's product portfolio, focusing on the relative contribution of new products to its annual revenue.
- **II4: MEGA TRENDS LEVERAGE**
This is an assessment of a company's proactive leverage of evolving, long-term opportunities and new business models, as the foundation of its innovation pipeline. An explanation of Mega Trends can be found [here](#).
- **II5: CUSTOMER ALIGNMENT**
This evaluates the applicability of a company's products/services/solutions to current and potential customers, as well as how its innovation strategy is influenced by evolving customer needs.

Frost Radar™: Benchmarking Future Growth Potential

Companies to Action

COMPANIES TO ACTION

All companies on the Frost Radar™ are Companies to Action. **Best Practice** recipients are the companies that Frost & Sullivan considers the companies to act on now.

GROWTH EXCELLENCE AWARD

The Growth Excellence best practice award is bestowed upon companies achieving high growth in an intensely competitive industry. This includes emerging companies making great strides in market penetration and seasoned incumbents holding on to their perch at the pinnacle of the industry.

INNOVATION EXCELLENCE AWARD

The Innovation Excellence best practice award is bestowed upon companies that are industry leaders outperforming their competitors in this area or new market entrants contending for leadership through heavy investment in R&D and innovation.

GROWTH INNOVATION & LEADERSHIP AWARD

The Growth Innovation Leadership (GIL) best practice award is bestowed upon companies that are market leaders at the forefront of innovation. These companies consolidate or grow their leadership position by continuously innovating and creating new products and solutions that serve the evolving needs of the customer base. These companies are also best positioned to expand the market by strategically broadening their product portfolio.

Legal Disclaimer

Frost & Sullivan is not responsible for any incorrect information supplied by companies or users. Quantitative market information is based primarily on interviews and therefore is subject to fluctuation. Frost & Sullivan research services are limited publications containing valuable market information provided to a select group of customers. Customers acknowledge, when ordering or downloading, that Frost & Sullivan research services are for internal use and not for general publication or disclosure to third parties. No part of this research service may be given, lent, resold, or disclosed to noncustomers without written permission. Furthermore, no part may be reproduced, stored in a retrieval system, or transmitted in any form or by any means—electronic, mechanical, photocopying, recording, or otherwise—without the permission of the publisher.

For information regarding permission, write to:

Frost & Sullivan

3211 Scott Blvd., Suite 203

Santa Clara, CA 95054

© 2020 Frost & Sullivan. All rights reserved. This document contains highly confidential information and is the sole property of Frost & Sullivan. No part of it may be circulated, quoted, copied, or otherwise reproduced without the written approval of Frost & Sullivan.