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Top 5 Growth Opportunities in Medical Imaging and Informatics, 2024

Transformative Technologies and Trends Help Overcome Industry Challenges and Improve Health Equity

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Top Growth Opportunities for 2024

Strategic Imperatives

- The medical imaging and informatics market evolves rapidly, in tandem with the transformation that the global healthcare industry is experiencing. Various opportunities and challenges emerge as the industry greatly emphasizes advancing patient care–sustainability, health equity, staff shortages, and the rapid growth of AI in medical imaging are the topics that most attract the industry's interest.
- There are an estimated 250,000 trained radiologists in the entire world. Approximately half of them are in Asia-Pacific (APAC), and different countries and regions experience shortages that affect patient safety, because diagnosing patients accurately and timely becomes difficult. This leads to delayed treatment, higher expenses, and poor health outcomes.
- Mobile imaging expands access to imaging services across the continuum of care. The need for mobile (point-of-care) imaging grows because it can provide access to rural patients and patients who are aged or immobile and require diagnostic imaging at their bedsides or non-hospital sites. Many medical imaging companies are developing strategies and innovative solutions to extend access to high-quality radiology services to underserved populations.
- In the recent past, the medical imaging market has seen regulators approve many standalone AI applications that healthcare providers then quickly adopted. However, directly buying and integrating these AI solutions can be challenging. Original equipment manufacturers (OEMs) and other companies offer AI marketplaces that allow third-party developers to access their software development kits (SDKs) and application programming interfaces (APIs) to create AI applications that integrate with their imaging platforms. These companies grant providers several options so they can switch to their preferred vendors without disrupting their existing workflows.
- The healthcare industry accounts for 4% of the global total carbon emissions and medical imaging is a major contributor to the industry’s carbon footprint. Many large OEMs, such as GE, Philips, and Siemens, are committed to reducing their carbon footprint and are taking various sustainability measures to reduce carbon emissions.

Source: Frost & Sullivan

Strategic Imperatives (continued)

- Frost & Sullivan's **Growth Accelerators** are companies at the forefront of driving growth in their respective industries. These companies accelerate growth by continuously innovating and creating new technologies, solutions, platforms, business models, or strategies that serve ever-evolving customer needs. These companies are also best positioned to expand market growth by strategically broadening and/or enhancing their product portfolio. Accelerating new growth opportunities is never an easy task. Still, it is one made even more difficult considering today's strategic imperatives, from disruptive technologies and value chain compression to industry convergence and new business models. In this context, recognition as a **Growth Accelerator** signifies an incredible accomplishment.

Source: Frost & Sullivan

Top 5 Growth Opportunities

1. Technological Solutions to the Radiologist Shortage
2. Mobile Imaging Expands Access to Imaging Across the Continuum of Care
3. AI Marketplace Expansion Offers More Choices for Healthcare Providers
4. Cloud-based Enterprise Imaging
5. Sustainability and Decarbonization

Source: Frost & Sullivan

1 Growth Opportunity 1: Technological Solutions to the Radiologist Shortage

Strategic Imperatives and Growth Environment

- There is a global shortage of radiologists. The US has only about 90 radiologists per million people. With a larger aging population, Medicare enrollment has increased leading to a growing demand for imaging which outpaces radiologist availability, and the training of new radiologists is not keeping up.
- Europe and the United Kingdom experience a similar shortage. Europe has 13 radiologists per 100,000 people, while the United Kingdom has only 8.5.
- In APAC, Malaysia has only 30 radiologists per million people, and India has only 15,000 radiologists for a population of 1.4 billion.
- These shortages affect patient safety since patients cannot be accurately and timely diagnosed, which delays treatments, increases expenses, and worsens health outcomes. In addition, the shortages affect staff morale as doctors must work under high pressure.
- Many technological solutions exist that healthcare providers and institutions can implement, besides strategies such as offering hybrid and shift-based working models to radiologists to address the shortage/burnout, so that patients' health outcomes do not suffer.

Growth Opportunities

- **Remote Scanning**: Technology to improve digitization, connectivity, and collaboration across diagnostics will reduce the pressure on the radiology staff and improve patient care. Remote scanning enables experienced technologists to help less experienced members remotely for exams or provide support in running scans from a central scan center or home. For example, Siemens's syngo is a virtual cockpit software that enables radiologists to view images in real time, take control, communicate, and have an overview of the situation onsite via video communication.
- **AI-based Solutions**: AI solutions for various indications in radiology across modalities—such as X-ray, CT scans, or ultrasound—address the radiologist shortage and improve the current standard of care by reducing the overall scanning time while increasing accuracy. AI is used in breast and lung cancer detection. In cardiac imaging, it helps identify, quantify, and characterize cardiac diseases. This enables better decision-making by physicians to improve patient outcomes. Hospitals are deploying AI solutions as part of their radiology workflow to provide effective radiologist support.
- **Cloud Solutions**: Cloud-based teleradiology under a software-as-a-service model, such as zero-footprint viewer solutions, can work with many devices—including desktop PCs, tablets, and smartphones. They allow access to patient medical images and information through a web browser and can help healthcare providers mitigate the radiologist shortage by allowing them to work in shifts or through a hybrid model.
- Implementing cloud-native enterprise imaging provides better daily workflow and enterprise deployment, as it opens the full potential of the cloud. Cloud-native solutions offer location flexibility to radiologists, cardiologists, and consulting physicians to support remote teams and flexibility in work locale anywhere and anytime for imaging.

Source: Frost & Sullivan

1 Growth Opportunity 1: Technological Solutions to the Radiologist Shortage (continued)

Companies to Action

Siemens Healthineers's remote scanning, WeScan, provides additional remote scan support on a regular basis or as needed.

qure.ai's Qxr is an AI tool for comprehensive chest x-ray reporting that provides pre-read assistance in 20 seconds with findings in the lungs, heart, pleura, mediastinum, bones, and diaphragm.

GE Healthcare's Centricity Universal Viewer Zero Footprint provides access to a patient's imaging data from almost any browser or mobile device for the care team to review, reformat, make measurements, and add notes on imaging studies when required.

Change Healthcare's cloud-native medical imaging archive enables healthcare providers to simplify image management. The solution also helps reduce IT costs and enables secure access from any location.

Intelerad's Enterprise Viewer provides healthcare professionals with seamless access to all patient images stored across the imaging ecosystem.

RadNet's Saige-Dx, automatically identifies suspicious lesions in mammograms and assigns a suspicion level to each finding and the entire case.

Source: Frost & Sullivan

2 Growth Opportunity 2: Mobile Imaging Expands Access to Imaging across the Continuum of Care

Strategic Imperatives and Growth Environment

- The need for mobile (point-of-care [POC]) imaging grows because it can provide access to rural patients and patients who are aged or immobile and require diagnostic imaging at their bedsides. Mobile or at-home imaging increased after the global pandemic. Transporting critically ill patients to diagnostic imaging centers can lead to various complications, while mobile medical imaging systems can perform diagnostics in non-hospital sites, eliminating the need to transport the patient. Besides aged or immobile patients, this service is especially helpful for those with memory-related disorders who prefer familiar environments.

Growth Opportunities

- Mobile imaging companies must focus on developing user-friendly, lightweight, portable imaging equipment for high-quality POC diagnostic imaging to increase access in underserved regions.
- Photon-counting computed tomography (PCCT) is a major technological breakthrough that uses energy-resolving detectors to scan at multiple energies. Mobile CT manufacturers should partner with research institutes and companies that develop technologies related to semiconductor detector modules to incorporate PCCT in mobile CT scanners. For example, Neurologica has launched mobile photon counting CT.
- Mobile magnetic resonance imaging (MRI) scanner companies have developed machines that can be easily moved within hospital premises for bedside imaging, however, they should also focus on developing portable MRI machines that can be transported to outpatient care sites such as homes and assisted living communities for immobile patients and senior citizens.
- Mobile POC solutions will become integral to the growing remote monitoring. Ultraportable and portable ultrasound devices might soon replace the stethoscope.

Companies to Action

Hyperfine's portable MRI is the world's first such system that can provide POC neuroimaging. The system can be brought to the patient's bedside, plugged into a standard electrical outlet, and controlled from an Apple iPad.

Neurologica In 2022, the company received the US Federal Drug Administration (FDA) 510(k) clearance for a photon counting mobile CT scanner which is portable and offers POC scanning.

Clarius's scanners offer high portability, ease of use, and high-definition imaging for a wide range of applications featuring AI, specialized presets, and customizable workflows at an affordable cost.

Shimadzu offers mobile X-ray systems equipped with dynamic digital radiology (DDR). Mobile DDR visualizes the motion of structures such as lungs and diaphragms and provides more information than conventional static images.

United Imaging's mobile X-ray has an ultra-narrow body design, a high-voltage generator, and a remote console that redefines the workflow for POC imaging.

Source: Frost & Sullivan

3 Growth Opportunity 3: AI Marketplace Expansion Offers More Choices for Healthcare Providers

Strategic Imperatives and Growth Environment

- In the recent past, the medical imaging market has seen regulators approve many standalone AI applications. As a result, healthcare institutions have multiple AI tools to choose from according to their requirements. However, they face many challenges, namely usability and integration of algorithms with their systems and imaging workflows, since the AI solutions are bought directly from providers.
- In that context, OEMs and other companies offer AI marketplaces that allow third-party developers to access their proprietary SDK and APIs to build new AI applications that work in conjunction with their imaging platform. These are like mobile app stores and grant providers several options to switch to their preferred vendors without disrupting their workflows.

Growth Opportunities

- Expanding vendor AI marketplaces presents an opportunity for OEMs. This will allow third-party developers to directly integrate their algorithms within the OEMs' application and platform so that healthcare providers may use AI applications with greater ease and better results.
- Companies such as Nuance Communications, SymphonyAI, AlmaAI, and Citadel Health offer holistic platforms for imaging solutions to facilitate wider deployment and seamless utilization through a single cloud platform. Bayer, a well-established company, acquired Blackford Analysis in 2023 to enter the marketplace ecosystem and offer imaging solutions for CT and MRI scans.
- In November 2023, iCardio.ai partnered with Butterfly Network, to include the former's deep learning algorithms for ultrasound images within the Butterfly Garden marketplace. The product is pending FDA 510(k) clearance and should be deployed with Butterfly's single-probe, whole-body handheld ultrasound system.

Companies to Action

Siemens Healthineers's digital marketplace offers a wide range applications from Siemens Healthineers and its partners.

Butterfly Network has launched its AI marketplace—Butterfly Garden—which creates an easy pathway for third parties to develop new AI tools using its platform, and it enables them to access larger audiences through Butterfly's installed base.

Nuance's AI marketplace is a diagnostic imaging app store that provides AI application developers access to over 70% of radiologists across the 5,500 healthcare facilities connected Nuance's network.

Blackford Analysis's AI marketplace offers access to over 100 AI applications from 40 different vendors catering to 8 clinical areas and multiple clinical service lines.

Wingspan is a Chinese AI marketplace that offers AI solutions for imaging modalities such as digital radiography (DR), CT, and MRI for cardiovascular, head, and lung clinical application areas.

Source: Frost & Sullivan

4 Growth Opportunity 4: Cloud-based Enterprise Imaging

Strategic Imperatives and Growth Environment

- While enterprise imaging informatics sees application mostly in developed countries—the United States, Canada, the United Kingdom, the EU4, and Japan—, it is experiencing adoption in most healthcare facilities across the world due to the healthcare challenges that health systems face.
- Cloud-based medical imaging informatics vendors and other service providers are consolidating their service offerings to provide a one-stop solution. This is the driver behind the enterprise imaging concept, which involves image management solutions for entire organizations or regions. Easily managing images across an enterprise, enhanced efficiency, better interoperability, and low cost are some factors that drive this trend. Companies pursue strategic mergers and acquisitions (M&A) to diversify their product portfolio to cater to customers with specific requirements.

Growth Opportunities

- Enterprise imaging involves a set of strategies, initiatives, and workflows that are implemented across a healthcare enterprise to capture, index, manage, store, distribute, view, exchange, and analyze all medical imaging and multimedia content to enhance electronic health records (EHRs).
- Enterprise imaging solutions vendors should focus on enterprise strategies that address the specific requirements and needs of end customers, namely integrated delivery networks (IDNs), ambulatory surgery centers (ASC), outpatient imaging centers, and other healthcare centers.
- The cloud-based enterprise imaging roadmap will be unique for each healthcare provider. It will depend on specific pain points, contract renewals, and vendor relationships. However, enterprise imaging vendors can help these providers roll out their strategy through real-world use cases to help them learn from other healthcare providers that have implemented similar solutions as well as share best practices.
- Enterprise imaging solutions are not just for radiology—they are applicable in cardiology, pathology, and other areas, as the requirements and challenges are unique to each specialty.

Companies to Action

Change Healthcare launched its cloud-native enterprise imaging platform (Change HC Stratus Imaging) in 2020. It is built on Google Cloud, and the platform is highly secure (HITRUST-certified and SOC 2 compliant).

Canon Medical's enterprise imaging solution provides a picture archiving and communication system, a vendor-neutral archive, and orchestrates data and workflows to help healthcare professionals efficiently address healthcare challenges.

Visage 7, an enterprise imaging platform, is a scalable growth platform deliverable that can be based on the cloud or on-premise.

ScImage's PICOM365 is an enterprise imaging platform for cardiology workflows in the cloud or on-premises.

Sectra's Enterprise Imaging for Cardiology is a vendor-neutral solution to review the most common cardiology procedures.

Source: Frost & Sullivan

5 Growth Opportunity 5: Sustainability and Decarbonization

Strategic Imperatives and Growth Environment

- The healthcare industry accounts for 4% of the global total carbon emissions and medical imaging is a major contributor to the industry's carbon footprint. Many large OEMs, such as GE, are committed to reducing their GHG emissions—its goal is to reduce operational emissions by 50% by 2030 and reach net-zero emissions by 2050. To achieve this, GE innovates on imaging modalities to reduce its carbon footprint. Other large OEMs, such as Siemens and Philips, have similar net-zero carbon emission targets for 2045 and 2050, respectively.
- Many initiatives are underway to reduce the carbon footprint—the development of helium-free MRI machines is one of them. It is estimated that a standard MRI scan requires about 25 kW, which can go up to 70 kW and 80 kW during demanding examinations. Most of the MRI's total energy consumption (over 60%) is used for cooling the magnet, and more than one-fourth of the yearly helium consumption globally goes to cooling superconducting magnets. Since helium is a precious resource, reserves must be managed judiciously. OEMs and superconducting magnetics researchers are seeking ways to develop MRI scanners without helium cooling. These MRI scanners will be smaller, lighter, and less expensive to manufacture and operate, and will increase patient accessibility. With the limited global reserves of helium declining, suppliers are finding it difficult to provide while medical researchers and healthcare providers expect long-term solutions.

Growth Opportunities

- Innovations in MRI technology enable the healthcare industry to reduce its carbon footprint. OEMs are developing helium-free MRI machines that are lighter and have intelligent magnet technology and built-in features that reduce energy consumption, such as sleep mode. Older, conventional MRIs require over 1,000 liters of liquid helium for cooling, while newer ones use closed-circuit systems that need approximately one liter. For example, the new-gen MRI machines from GE are 1.4 times lighter than the previous generation of 3T machines and use 70% less helium.
- OEMs are developing MRI machines with shorter scanning, optimized sequences, and better post-processing with the help of advanced digital tools and AI algorithms which are now becoming available. These innovations will help further reduce the scanning time, reducing energy consumption.
- Promoting circularity is another initiative to reduce carbon emissions, and repairing is a key component of the circular economy. By applying circularity and repairing and re-using parts in imaging equipment, carbon emissions can be significantly reduced. For example, MRI machines that have been deployed for more than 10 years can be rejuvenated in their current premises and turned into a scanner that is one or two generations younger. This helps the customer to defer buying completely new equipment and prevents energy-intensive shipping as well as extensive work for assembling a new system.
- Companies are using predictive maintenance tools to reduce unplanned downtime. For example, Siemens has acquired Senseye, a Japanese company that develops scalable and sustainable asset-intelligence SaaS solutions. It has built a machine learning and AI-based predictive maintenance solution. These sustainability initiatives from OEMs help hospitals and care providers improve their efficiency and reduce costs.

Companies to Action

Siemens Healthineers's new-gen Magnetom MRI scanners require less than a liter of liquid helium to maintain their cool temperature, their energy consumption is low, and they are cost-efficient.

GE Healthcare GE Healthcare's innovative new MRI systems are lighter, consume less energy, and are manufactured using recyclable materials to reduce the company's carbon footprint.

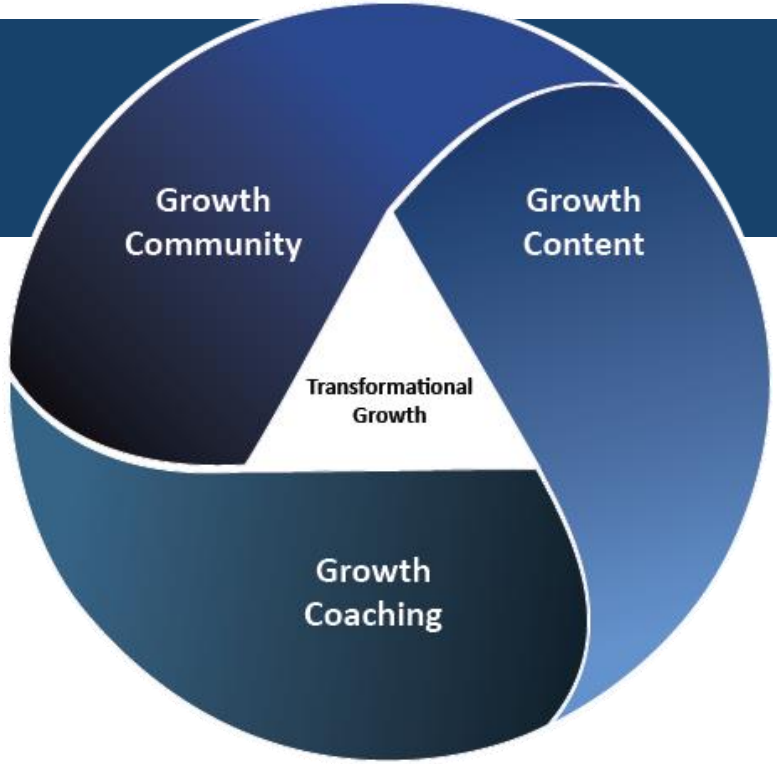
Philips aims to generate 25% of its revenues from circular products, services, and solutions by 2025.

Canon aims to be carbon neutral by 2050.

Fujifilm's high-end modern Fujifilm MRI scanners offer a power-saving mode and a standby mode, helping reduce energy consumption by up to 17% in operation, and using minimal power when the instrument is not in operation.

Source: Frost & Sullivan

Next Steps



SCHEDULE A COMPLIMENTARY DISCUSSION WITH OUR INDUSTRY EXPERTS

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Recommended Reading:

- Global Mobile Medical Imaging Market—Trends and Growth Opportunities
- Frost Radar™: Enterprise Cloud Imaging Informatics, 2023
- Frost Radar™: Point-of-Care Ultrasound (Portable and Ultraportable), 2023
- Global Outpatient Care Imaging Services Growth Opportunities

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