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Embracing Digital Transformation in Enterprise Imaging with the HIMSS DIAM

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IMAGING IT MUST KEEP PACE WITH HEALTHCARE'S DIGITAL TRANSFORMATION

Healthcare provider organizations are in the midst of a dramatic change. The convergence of IT modernization, virtual care and work, workflows, and personalization (Figure 1) will demand new approaches to achieve business operation and care delivery goals, as well as the right solutions, services and partners.

Figure 1: A Dynamic Environment is Changing Providers' Imaging IT Needs
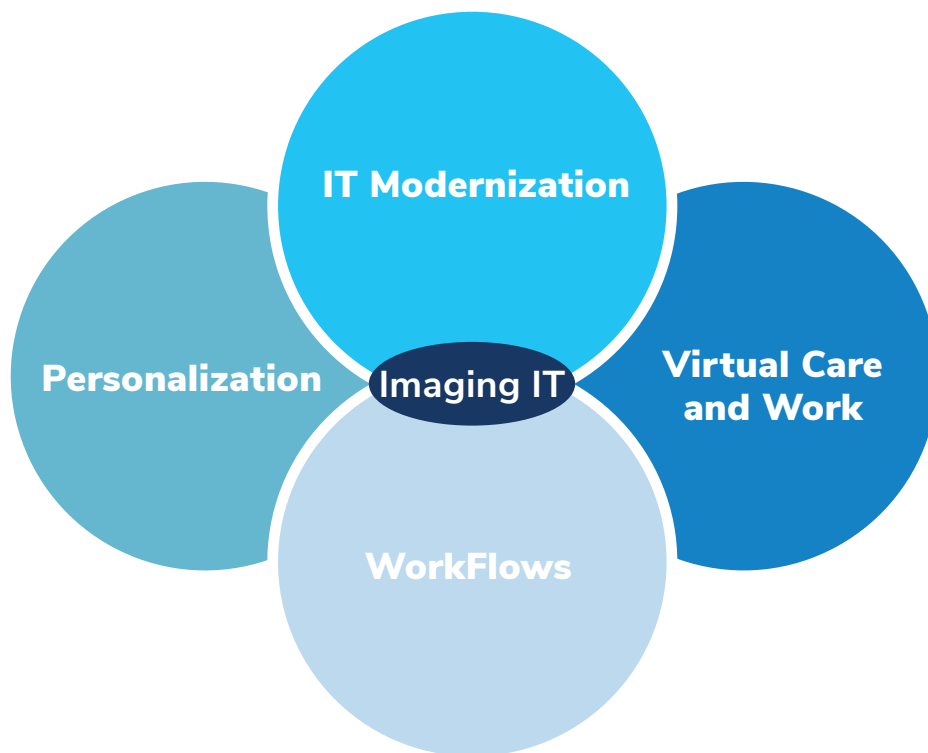
Source: Frost & Sullivan

IT modernization

A sound digital transformation plan must consider information technology and software longevity, infrastructure requirements, and data privacy and security. Providers' imaging informatics strategies must include a long-term vision to address needs such as scalability to accommodate and effectively utilize the sheer volume of data, breaking down information silos, and data sharing across care settings.

Workflows

Radiologists, cardiologists, technologists, collaborating physicians, and other healthcare professionals face challenges with fragmented systems that are not integrated and often require workarounds. They are demanding more efficient, streamlined workflows with easier-to-use tools and more deeply integrated information and technology.

Virtual care and work

Almost overnight, the COVID-19 pandemic changed the structure of business operations and team functions, and how virtual and remote technologies and solutions are used to help deliver healthcare services. Since the start of the COVID-19 pandemic, radiologists are more likely to rely on virtual meeting and image-sharing platforms. The cross-care setting expansion of telehealth has spurred greater telehealth utilization and integration with medical imaging in physician-physician consultations and physician-patient encounters.[1]

Personalization

A patient's unique history and risk factors will be considered in all facets of prevention, diagnostics, and treatment. A more personalized and curated patient experience will directly impact patient satisfaction as a quality measurement and the ability to leverage optimized approaches to patient engagement.

NEW DEMANDS FOR PROVIDER ORGANIZATIONS

Medical imaging originates from a large volume of different hardware capital equipment and handheld and mobile devices among a range of different users for different use cases. As innovations in the use of still images, video/multimedia, visible light, and handheld and mobile devices reshape medical imaging, all specialties will expect better solutions for their storage, workflow, and IT needs. Provider organizations are wondering if they are on the right path for their digital imaging strategy and ideally should address it in a way that brings the needs of the organization together across various disciplines and departments cohesively.

STRATEGIC GOALS ARE IMPACTING DIGITAL IMAGING

Provider organizations are responding with new strategic enterprise imaging imperatives.

They include:

- Focusing on the goals of the Quadruple Aim,[2] which include improving patient and provider experiences, improving the health of populations, and reducing the per capita cost of care.

- Effectively dealing with data migration as part of upgrading systems and integrating innovations such as artificial intelligence, machine learning, and natural language processing.

- Addressing teleradiology growth (during the COVID-19 pandemic, 75% of daytime reads moved to internal teleradiology).[3]

- Integrating new workflow and collaboration tools for more patient-centric clinical care services. An enterprise approach to imaging informatics supports enhanced clinical and operational workflow from scheduling and image acquisition to reporting and follow-on care.

- Creating a 360-degree view of the patient with various types of structured and unstructured data for the effective development of precision medicine and precision imaging, including radiomics and radiogenomics.[4]

NEW ORGANIZATIONAL ROLES ARE EMERGING

The people responsible for healthcare IT initiatives and purchasing decisions are changing; historically, the responsibility fell heavily to the chief information officer (CIO). As health IT adoption has rapidly changed post-HITECH,[5] the range of roles across provider organizations involved in decision-making is evolving as well. Involving key stakeholders, including radiologists and other service lines that leverage varying imaging modalities in the purchasing process for imaging solutions, is also an approach promoting clinician engagement.

The chief digital officer (CDO) is emerging as a vital influencer to lead a provider organization throughout its cross-functional transformation to a digital-enabled enterprise.[6] The CDO (commonly found in the banking, financial services, and insurance industry) is viewed as an evangelist for a digital strategy and a digital change agent. Typical responsibilities include aligning a digital strategy with an organization's strategic goals, supporting a culture of digital innovation, and designing metrics to measure the progress of digital roadmaps.[7]

Clinicians, including radiologists, cardiologists and oncologists, are also considered in the purchasing process when it comes to digital imaging solutions.
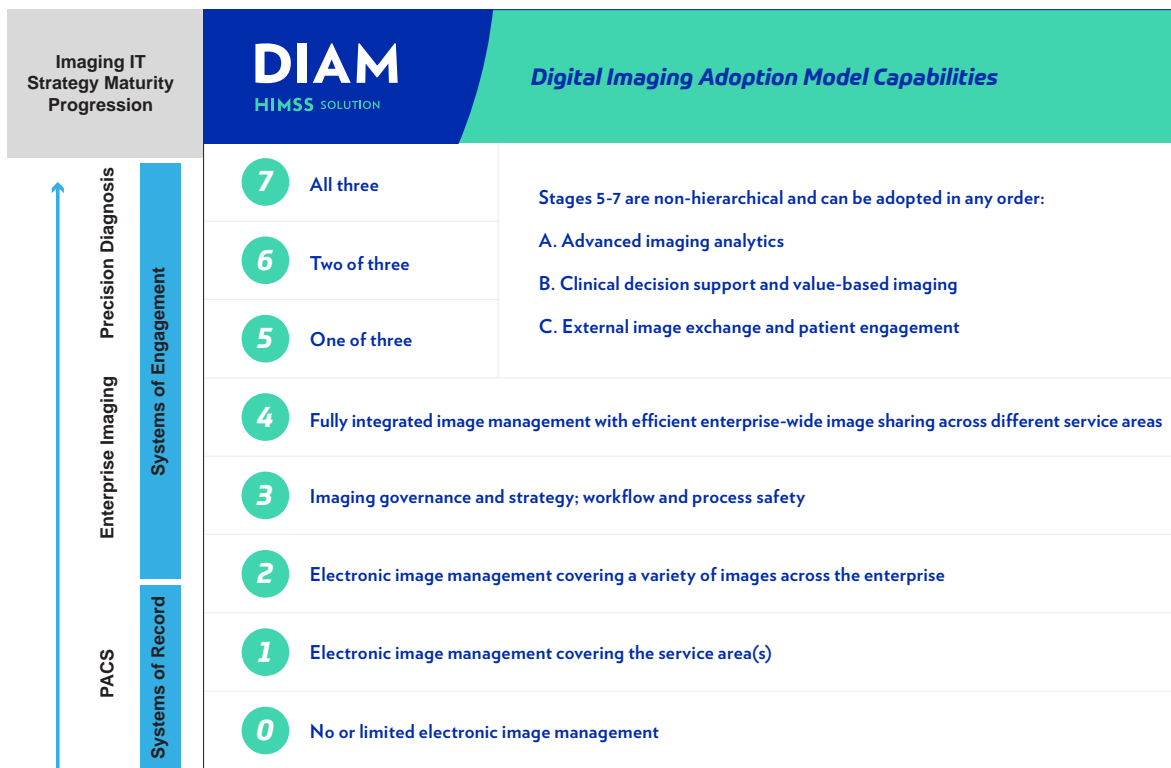
UNDERSTAND WHERE YOU ARE AND WHERE YOU SHOULD BE IN DIGITAL IMAGING MATURITY

Provider organizations' leadership teams often look to established maturity models, such as the Healthcare Information and Management Systems Society (HIMSS) Analytics Electronic Medical Record Adoption Model (EMRAM) or Analytics Clinically Integrated Supply Outcomes Model (CISOM), to guide their strategies. There are a wide variety of maturity models across healthcare and generically that address advancing the use of IT and digital transformation.

The HIMSS Analytics Digital Imaging Adoption Model (DIAM)[8] was created to help healthcare organizations develop and mature an enterprise approach to digital clinical imaging. HIMSS developed it with the support of the Society of Imaging Informatics in Medicine (SIIM), the European Society of Radiology (ESR), and the European Society of Medical Imaging Informatics (EUSOMII).[9]

The DIAM eight-stage model (Figure 2) directly supports provider organizations in creating a pragmatic approach to enterprise imaging while ensuring stability, with a maturity model that addresses the differences and nuances specific to medical imaging. It is critical for health systems, hospitals, and imaging facilities to understand best practices, benchmark with peers and other organizations, measure where they are today, and determine where they want to be in the future with digital imaging.

Figure 2: HIMSS DIAM Stages Related to Imaging IT Strategy Maturity

Imaging IT Strategy Maturity Progression	DIAM HIMSS SOLUTION	Digital Imaging Adoption Model Capabilities
	7 All three	Stages 5-7 are non-hierarchical and can be adopted in any order:
Precision Diagnosis / Systems of Engagement	**6** Two of three	**A. Advanced imaging analytics**
	5 One of three	**B. Clinical decision support and value-based imaging**
		C. External image exchange and patient engagement
Enterprise Imaging / Systems of Engagement	**4** Fully integrated image management with efficient enterprise-wide image sharing across different service areas	
	3 Imaging governance and strategy; workflow and process safety	
	2 Electronic image management covering a variety of images across the enterprise	
PACS / Systems of Record	**1** Electronic image management covering the service area(s)	
	0 No or limited electronic image management	

Source: Modified by Frost & Sullivan from HIMSS Analytics DIAM Model; image source: HIMSS

THE IMPORTANCE OF ENTERPRISE IMAGING

An enterprise imaging strategy is "an organized plan to optimize the electronic health record so that healthcare providers have intuitive and immediate access to all patient clinical images and their associated documentation, regardless of source."[10] Enterprise imaging can help organizations achieve the Quadruple Aim[11] by eliminating the need to search for images in various departmental IT systems, thereby improving patient and provider experiences and reducing costs via centralized data management. An effective enterprise imaging and unified vendor-neutral archive (VNA) strategy also enables more patient-centered and personalized care.[12]

Providers are focusing on assessing how to develop the right imperatives, roadmap and IT strategy to drive success, given medical imaging continues to evolve along with the overall healthcare environment. The HIMSS Analytics DIAM can help provider organizations navigate the digital transformation of imaging with a globally applicable, roadmap-based assessment leveraging more than 100 indicators across software, governance, image capture, image distribution and viewing, clinical decision support, analytics, and patient engagement. A prescriptive framework allows leaders of health systems, hospitals, and diagnostic imaging centers to validate successes, discover gaps, and break down complexities on their journey from PACS to enterprise imaging and beyond. A DIAM Assessment is available through HIMSS Analytics and certified organizations.

Endnotes

1   Frost & Sullivan. "Perspectives on Digital Imaging to Improve Patient and Provider Outcomes." March 2021.

2   Thomas Bodenheimer and Christine Sinsky, Annals of Family Medicine no. 12 (2014): 573-76.

3   Mohammed Imran Quraishi; Avez A. Rizvi; and Robert E. Heidel, "Off-Site Radiology Workflow Changes Due to the Coronavirus Disease 2019 (COVID-19) Pandemic," Journal of the American College of Radiology 17, no. 7 [2020]: 878-81. doi:10.1016/j.jacr.2020.05.008.

4   Frost & Sullivan. "Strategic Analysis of the Global Medical Imaging Informatics Industry, Forecast to 2025." February 2021.

5   Health Information Technology for Economic and Clinical Health (HITECH) Act, part of the American Recovery and Reinvestment Act of 2009.

6   As defined by Strategy&, PwC's strategy consulting group, in the 2019 Chief Digital Officer Study.

7   Hillary Ross. "The Chief Digital Officer: Determining the Need, Defining the Role," Becker's Hospital Review. [March 2019]. https://www.beckershospitalreview.com/healthcare-information-technology/the-chief-digital-officer-determining-the-need-defining-the-role.html

8   HIMSS DIAM overview available at https://www.himssanalytics.org/north-america/digital-imaging-adoption-model.

9   HIMSS Analytics

10   Henri Primo; Matthew Bishop; Louis Lannum, et al., "10 Steps to Strategically Build and Implement your Enterprise Imaging System: HIMSS-SIIM Collaborative White Paper. Journal of Digital Imaging, no. 32 (2019): 535-543. doi:10.1007/s10278-019-00236-w.

11   Ibid.

12   Frost & Sullivan. "Global Enterprise Imaging Solutions Market, Forecast to 2024." September 2019.

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