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Digital Transformation in Healthcare

Smart finance: Overcoming the investment challenge

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Summary



1. Digital and AI-driven technologies tangibly improve the effectiveness of healthcare delivery and access – whether holistic patient management, clinical productivity, or hospital site utilization – all of which ultimately improve patient outcomes.



2. The healthcare sector faces financial challenges to acquire the clinical, care, collaboration and buildings technology required to make the digital transition complete.



3. Not only does the healthcare sector need to invest in refreshing its existing technology base, it must also find the means to acquire emerging digital innovations that can improve access, efficiency, and clinical effectiveness.



This short paper aims to:

- Provide evidence that growing awareness of digital transformation and its benefits is driving an accelerated pace of digital adoption in healthcare in most parts of the world.
- Demonstrate the scale of current and impending investment challenges faced by the healthcare sector in refreshing its existing technologies as well as accessing new innovations.
- Give examples of the ways in which smart financing solutions from private sector providers are playing a vital role in making such investments possible, affordable, and sustainable.



Growing pressures driving the shift to healthcare digitalization

The pandemic crisis of 2020-2022 put enormous strain on healthcare services around the world.¹ In particular, it highlighted where a lack of sufficient medical equipment and technology – especially connected technologies – made it very difficult for some healthcare organizations to pivot and address the emerging requirements.² At the same time, where remote and online healthcare provision and management³ had been enabled by investments in digital platforms and equipment, its value became very clear.

Digital capabilities in healthcare technology were also shown to enable greater access and productivity, early diagnosis, and contribution to better outcomes in healthcare systems across the world. Most healthcare organizations have already embarked on digital transformation and are now looking at speed of implementation, along with providing evidence of tangible outcomes, to inspire budget holders and maintain momentum in their digital transformation journeys.

A study of healthcare technology executives by Deloitte⁴ notes that “...most survey respondents (60%) rated their organizations as midway through their [digital] journeys. Health system interviewees and panelists acknowledged that the transformation journey is longer than they had initially expected as the opportunities and definition of digital transformation expand.” Clinical benefits from digital transformation tend to be the first strategic targets. However, the rising prices of supplies and energy are also focusing the minds of healthcare administrators on digitalization to reduce costs in infrastructure and operations.⁵



Accelerating pace of transformation. A study from Accenture⁶ has highlighted the increasing momentum of change in the sector. 81% of healthcare executives say the pace of digital transformation for their organization is accelerating. 93% report that they are innovating with a sense of urgency. The industry has accepted that digital is here to stay, with 87% of executives saying their organization's business and technology strategies are becoming inseparable. This underlines the need for smart financing techniques to ensure that technology investment continues even in the face of difficult economic headwinds.



Governmental support. The EU's Expert Panel on Effective Ways of Investing in Health⁷ observes that "[t]he 'digital transformation of health services' is seen as an important and influential process, that has already had a substantial impact on current healthcare and health systems and is expected to have a further fundamental impact ...in the future." However, the panel also notes the importance of measurable outputs from digital transformation, writing, "Decisions to adopt, use or reimburse new digital health services, at different levels of the healthcare system, are ideally based on evidence regarding their performance in the light of health system goals."

Financial benefits. When we consider access to care, the financial advantages of digital transformation in healthcare are seen as considerable. In terms of payback from digital transformation, European commentators⁸ talk about the 'digital dividend.' One academic review from the U.S.⁹ concludes that "[d]igital technology is reported to reduce healthcare costs by 7-10%." A single country study by McKinsey¹⁰ found that "the total savings potential from digitizing healthcare in Switzerland... with currently existing technologies sums up [to]... 11.8% of the total addressable healthcare expenditures[.]" Moreover, patient attitudes are increasingly sympathetic to digitalized health services. A survey by Accenture in the U.S.,¹¹ for instance, found that more than half (54%) of the survey respondents said they believe that virtual care reduces medical costs to patients, and 43% reported they like the timely care that virtual technology provides.



In developing economies, digitalization is already more accepted than it is in mature healthcare systems. In the mature ones, the patient is used to demanding the doctor face-to-face, or going to a top-class facility. In the developing world, they've never had the choice, so a telemedicine appointment is a massive positive leap."

Tisha Boatman

SVP, Global Access to Care,
Siemens Healthineers

Access to healthcare. Digitalization also helps combat the issue of healthcare access, both in mature and developing health systems. As the WHO¹² states, “The outcome document of the high-level meeting of the United Nations General Assembly... highlighted the technology-enabled breakthroughs in government in the provision of healthcare, with greater numbers of people having access to services and data that might previously have been out of reach or unaffordable.” With the right financial support, it's possible to get care to under-served populations. This is an important benefit of digitalized healthcare given the shortage of various clinical and care professionals across all regions of the world.¹³

Attracting medical talent. Similarly, on an individual healthcare organization level, it has been widely reported that institutions with optimum equipment and technology (usually new-generation digitalized versions) tend to attract the best healthcare professionals. As Deloitte¹⁴ writes, “It can... improve the day-to-day life of healthcare practitioners, letting them spend more time looking after patients and in so doing, raise staff morale and improve retention.” In another study,¹⁵ Deloitte adds, “The organizations that fail to fuse talent and healthcare workforce technology risk missing out on great leaps in efficiency and engagement. From a healthcare perspective, it can mean a dispirited workforce with growing nursing shortages and high levels of burnout, a reduced ability to attract and retain highly skilled clinicians and non-clinicians, a reduction in the quality of care, and a loss of position as a patient’s provider of choice.”



“Leading clinicians and care professionals want to work where they have access to the latest technology – alongside top colleagues and forward-thinking management. As the war for healthcare talent continues to heat up, organizations that want to attract and retain the best healthcare professionals will have to look to all of these factors.”

Martin Klein

Head of Financing Services,
Siemens Healthineers



Improving sustainability. Digital platforms are also proving the essential enabler of achieving sustainability goals in the healthcare sector. The EU has composed detailed recommendations on this theme: Building Sustainable Digital Health Services in Europe.¹⁶ Similarly, the WHO's Global Strategy on Digital Health 2020-2025¹⁷ notes, "The vision of the global strategy is to improve health for everyone, everywhere by accelerating the development and adoption of appropriate, accessible, affordable, scalable and *sustainable* person-centric digital health solutions... to achieve the health-related *Sustainable Development Goals* [emphasis added]."

Smarter buildings. Analyst Accenture points out the important contribution made by smart hospital infrastructure and buildings: "One way to produce such smart healthcare is to realize the potential of smart infrastructure... By gathering new streams of real-time data, building connections between asset owners and service providers, and applying digital analytics techniques, we can create a far more sensitive and responsive infrastructure."¹⁸ Similarly, Intel notes that "[s]mart hospitals are taking a holistic approach to infrastructure modernization, integrating digital and physical assets in a unified framework that ties the institution's various clinical and business workflows and assets together."¹⁹ Smarter buildings are also more sustainable. For instance, researchers at Northeastern University and Yale University found that hospitals are the second-most energy intensive commercial buildings in the U.S..²⁰ Not surprising, then, that analysts recommend "installing smart lighting systems [and] invest[ing] in green energy, solar panels and other clean energy generators. Some health systems even generate energy from the onsite incinerators they use to dispose of waste."²¹



Digital delivers specific benefits for **healthcare organizations**

Clearly, these key trends in digital transformation in healthcare are gaining momentum. Beyond generic statements about the disproportionately positive impact of new technologies in healthcare, it is worth describing a selection of specific examples currently delivering that impact. They come from clinical, care, administrative, and infrastructure/buildings settings. While this forms a series of useful real-life examples, according to academic,²² governmental,²³ and analyst²⁴ commentators, the strategic approach to digital transformation is to establish a 'digital thread' running through healthcare organizations and systems. This allows digitalized capabilities to be connected all the way along the patient pathway, helping to achieve significant outcome improvements, clinical effectiveness, and cost reductions.

Greater productivity for radiologists.²⁵

So significant is the potential for artificial intelligence in a digitalized world of medical imaging that the U.S. Food and Drug Administration (FDA) has issued the Artificial Intelligence/Machine Learning (AI/ML)-Based Software as a Medical Device (SaMD) Action Plan. At the same time, the Radiology Society of North America (RSNA) is regularly publishing on the subject to encourage progress in the field.²⁶ Clinical adoption of AI by radiologists went from zero to 30% between 2015 and 2020, according to a study by the American College of Radiology.²⁷ In Europe, a study by the European Society of Radiologists found that of the sample of radiologists who used AI-based algorithms for diagnostic purposes, 75.7% considered the results of the algorithms generally reliable. On the other side of the world, Alibaba Cloud partnered with a hospital in Zhejiang province in China to automatically identify thyroid cancer in ultrasound scans.²⁸ And the National Clinical Research Center for Cancer (NCRCC) in China has signed a deal with the Institute of Computing Technology under the Chinese Academy of Sciences (CAS) to use artificial intelligence (AI) in medical imaging.²⁹ As one academic paper³⁰ notes "Artificial intelligence (AI) algorithms, particularly deep learning, have demonstrated remarkable progress in image-recognition tasks... AI methods excel at automatically recognizing complex patterns in imaging data and providing quantitative, rather than qualitative, assessments of radiographic characteristics."

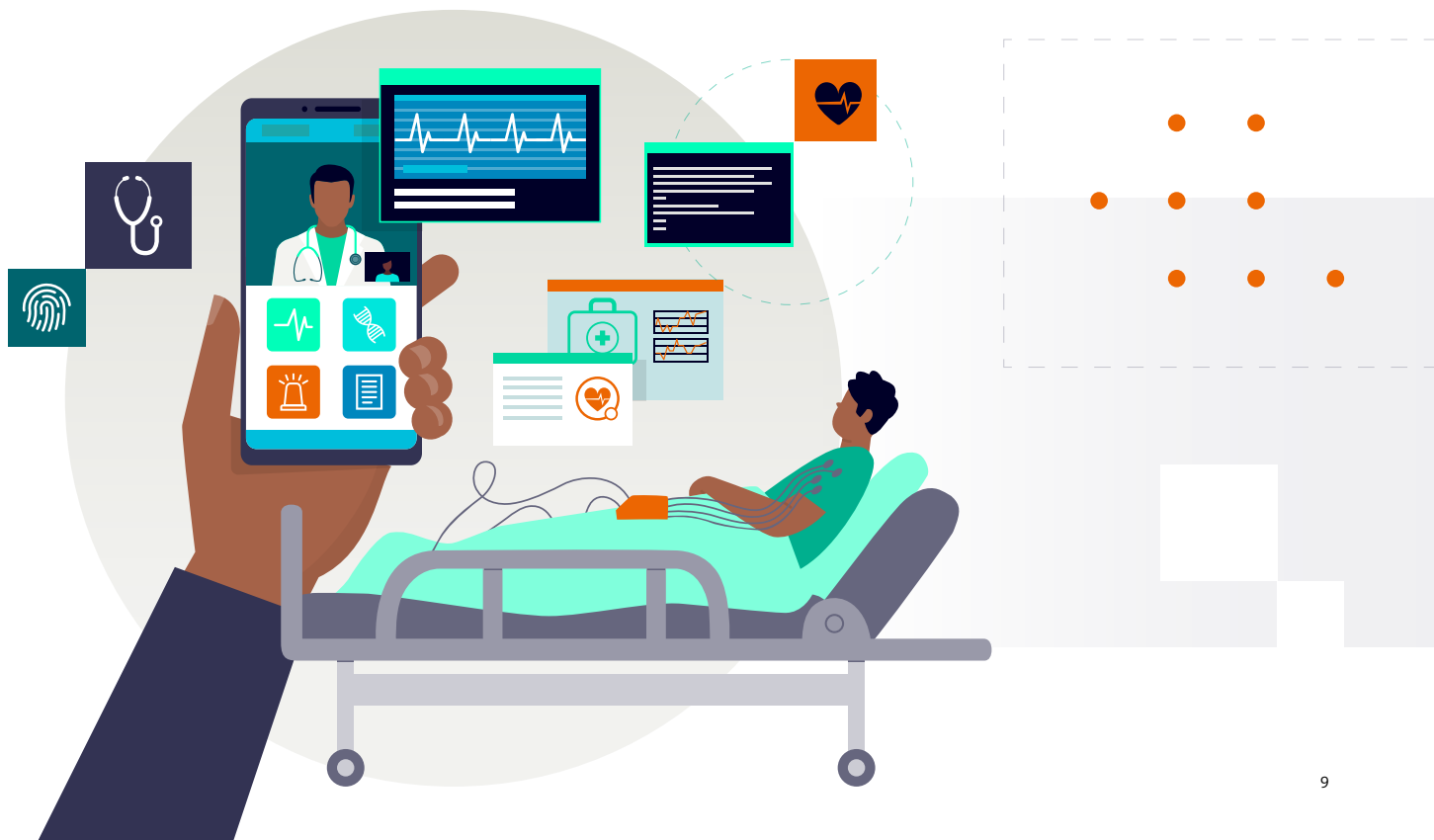


Telehealthcare and patient self-management.³¹

According to Siemens Healthineers, a good example of this is a telemonitoring program for heart failure patients at the Heart and Diabetes Center North Rhine-Westphalia in Germany. Patients are equipped with mobile ECG monitors and blood pressure sensors. The data collected is combined with the patient's self-description of their health and well-being and transmitted via smartphone to the care team in the clinic, who are able to access the information on a user-friendly dashboard. In addition, doctors are able to reach patients directly via text message. One of the primary goals of the project is to prevent cardiac decompensation and hospital admissions by means of early intervention and therapy adjustments, improving patients' quality of life.

Remote telesurgery.³²

A recent study assessing progress in telesurgery noted that while there remain some adoption obstacles, the pandemic experience shows its value and viability. The study notes that, "Telesurgery or remote surgery is a promising surgical advancement... Zero-latency time and improvement in haptic feedback technology are required for precise and well-done surgeries. Technologies like 5G network, IoT, and tactile robotics should be integrated in telesurgery to overcome these barriers. Cost and legalization to address legal and ethical issues remain to be addressed. Robotic surgery can demonstrate a pivotal role in the surgical procedures being performed in the... pandemic by minimizing the number of surgical staff in the operation theaters, hence curtailing the risk of COVID-19 infection that can subsequently lead to profound morbidity and mortality."



Patient management and triage are key benefits of digital transformation.

An article in the Harvard Business Review³³ tells us that the Beth Israel Deaconess Medical Center in Boston, in collaboration with a team of operations researchers from MIT, has implemented prediction-informed dashboards to support admission and transfer decisions by displaying each ward's current census as well as its projected number of discharges. Similarly, Boston Children's Hospital uses the Predictor of Patient Placement System, which allows the emergency department to know which patients are likely to be admitted to the hospital and to which ward. Hospital-wide bed management dashboards enable better planning and enhanced communication across the different wards and can be further developed to provide automated alerts about the system, such as when the average wait time for a new bed exceeds a predetermined threshold.

Smart hospital buildings offer improved patient experiences and outcomes, and at the same time deliver important cost savings and sustainability benefits. Siemens equipped the Proton and Radiotherapy Center at Chang Gung Memorial Hospital (CGMH) in Taiwan³⁴ with its building management system to make the building's operations more intelligent and energy efficient. As a result, CGMH now saves 2 million kilowatt hours of electricity annually (1,224 metric tons of CO₂ emissions). In addition, the wastewater recycling and reclaimed water system reduce water consumption by 61%, or 18,750 metric tons of water annually. In Europe – specifically the UK - the Milton Keynes University Hospital NHS Foundation Trust is piloting a solution that allows the hospital to create a digital twin of its building. This enables staff to access a huge amount of real-time data, such as room occupancy, the location of critical equipment, and even the status of paper towel dispensers in the bathrooms.



Ankara City Hospital in Turkey is one of the largest hospital campuses in the world – and one of the most modern, too. It is a powerful ecosystem that offers patients and staff the utmost in wellbeing, efficiency, resiliency, and safety. The key: seamless integration and central control of 22 hospital subsystems through Siemens' Desigo CC building management platform. It monitors and controls almost 800,000 data points, enabling critical infrastructure to run smoothly – day and night. This puts Ankara City Hospital at the forefront of digital transformation in the healthcare sector.

Digital technology **replacement *and* innovation through smart finance.**

In general, investment in healthcare technology – and its projected growth over the next five years – is substantial, yet it cannot generally be afforded through available capital expenditure budgets in healthcare systems.³⁵

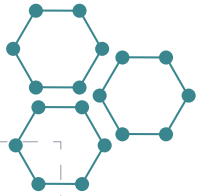
This is the case both for aging equipment that needs replacement and upgrading, as well as for newer technologies on the market whose benefits have only recently emerged.

Additionally, estimates of the technology investment required often fail to include the required facilities adaptation to house that technology. Yet, as we have already seen in this paper, there is widespread recognition of the critical role that smart buildings play in delivering the environment required for digitalized healthcare.

Moreover, the healthcare sector is responsible for some 4–5% of global greenhouse gas emissions³⁶ and therefore has a vital role to play in climate change mitigation efforts, which will not only result in substantial reductions in emissions, but can often lead to enhanced patient care, staff satisfaction, and cost savings.³⁷

To boost the availability of capital with which digital transformation can be achieved, the healthcare sector therefore has to harness private sector finance to enable a digital, commercial, clinical, and sustainable transition. Private sector finance – usually from specialist financiers with a deep understanding of the technology and its applications – plays a crucial role in enabling the development and digitalization of healthcare systems all around the world, offering two vital support functions:

1.



Replacement or upgrade of existing technology and clinical infrastructure/ buildings that are aging – in a natural (or accelerated) replacement cycle to realize productivity and efficiency gains. This also has the potential to support the circular economy in terms of equipment and technology retrofit, refurbishment, and re-siting.

These established medical technology and equipment markets are very large in value. Although exhibiting relatively modest levels of growth, the financial volumes required to address replacement and upgrade needs are considerable. For instance, the average analyst view of market estimates sees the diagnostic imaging market size growing from over \$35 billion in 2022 to almost \$50 billion in 2030, with a Compound Annual Growth Rate (CAGR) of 5.8% during the forecast period.

The Klinikum Forchheim-Fränkische Schweiz in Germany wanted to replace its medical imaging technology with state-of-the-art medical technology in the diagnostic field – but within an attractive and calculable framework analogous to previous costs. Siemens Financial services was able to structure the investment at predictable, affordable monthly rates. The payment period was set over eight years for the 3 Tesla magnetic resonance tomograph Magnetom VIDA and an YSIO X.pree X-ray system. The arrangement embraces full maintenance of both devices, including software upgrades and replacement of the computer hardware where necessary.

2.

Enabling investment in new and emerging technologies that will bring about step-change improvement in healthcare delivery, healthcare economics, and patient outcomes.

The markets for these technologies that can have a disproportionately positive effect on patient outcomes and whole of life therapy/care costs are often currently small in size, but are expected to show exponential growth. They often also require investment on top of current equipment fleet replacement and upgrade budgets.

Take, for instance, the artificial intelligence in diagnostics market. Current analyst views value it at around \$800 million in 2022 (just over 2% of the overall diagnostic imaging market) – yet it is projected to grow at a CAGR of over 30% until 2030 – bringing its value to over one quarter of the overall diagnostic imaging market by 2030.

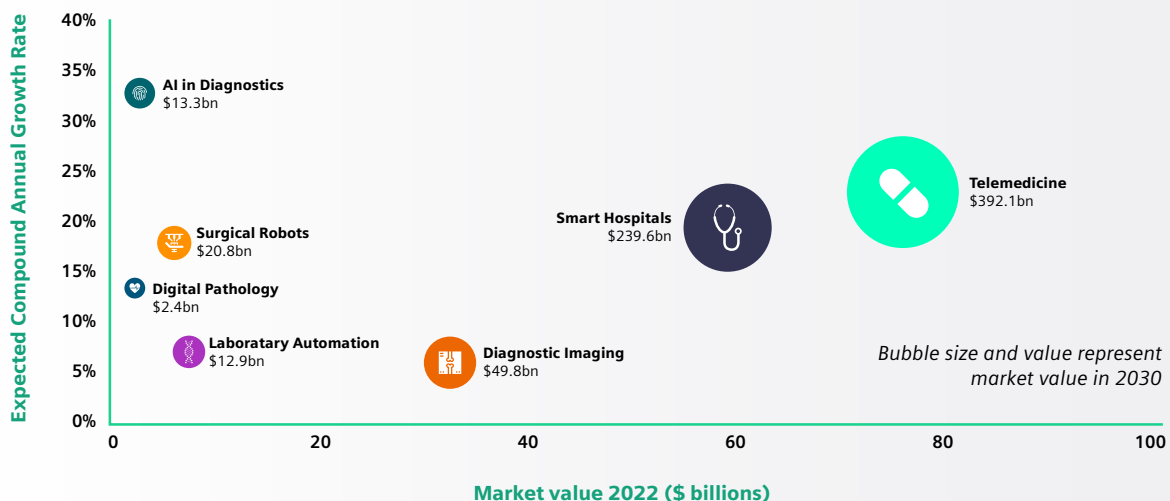
The New York Proton Center is creating the gold standard for proton therapy, giving new hope to patients living with cancer. Working in conjunction with Siemens Healthineers, who provided the equipment, Siemens Financial Services (SFS) provided a holistic financial solution that took into account the Center's business objectives beyond just equipment. This comprised a unique financing solution that allowed the Center to immediately obtain the necessary equipment but defer payments for 12 months, allowing them to open after construction delays. "Siemens Financial Services has been a terrific partner to the New York Proton Center. Their responsive and creative financing structure provided important flexibility during a critical time in the project's development," notes Jonathan Weinbach, Chief Financial Officer, New York Proton Center.

Enabling urgent investment.

Not only are these technology investments important, they are also urgent. McKinsey highlights that around \$250 billion of costs in U.S. healthcare are being shifted to the more efficient, lower cost telehealth.³⁸ In the same country, the Healthcare Information Management and Systems Society (HIMSS) stresses the need for over \$36 billion of investment over the next ten years for public health infrastructure.³⁹ In Europe, health ministers from all Member States have adopted the region's first-ever digital health action plan – an ambitious agenda that will leverage digital transformation in Europe and Central Asia with the aim of improving people's health and well-being.⁴⁰ The World Health Organization (WHO) highlights the requirement to "[r]ecognize the urgent need to address the major impediments faced by least-developed countries implementing digital health technologies." The Organization for Economic Co-operation and Development (OECD) identifies the most urgent investment priorities in recent policy papers.⁴¹ In China, healthcare remains a positive area for foreign investment in the most recent Catalogue of Industries for Encouraging Foreign Investment.⁴² Similarly, in India, independent commentators speak of "a wake-up call and a case to invest in health systems like never before."⁴³

To illustrate the range of investment challenge areas the healthcare sector faces, the following chart (based on multiple analyst sources⁴⁴) shows both the market size and the projected growth rate for a number of key medical technologies. Each presents an investment challenge requiring smart private sector finance – whether coping with replacement/renewal volume, the rapid growth of novel technologies, or both. Smart finance enables these investments in an affordable and cash-flow friendly way. For healthcare systems the world over, enabling these investments makes a disproportionately positive contribution to efficiency and effectiveness in healthcare delivery, healthcare access, and patient outcomes (short-term and long-term, reducing the social cost of rising overall demand and lifetime healthcare costs).

Current and projected market value 2030 for selected medical technology markets.



Financing digital transformation: **Examples in clinical, care, collaboration, and smart buildings technologies**

Smart finance enables three key areas of technology investment: upgrade, net new technology, and smarter buildings. These smart financing techniques are equally important for buyers and technology vendors alike. Buyers need an affordable and financially sustainable means of acquiring the equipment and technology they need to improve clinical efficiency, patient outcomes, cost optimization, and smooth administration. Vendors need to leverage smart finance to make new technology more affordable and accessible for customers, manage cash flow, and offer a competitive value proposition to healthcare organizations. In each of the three main areas that smart finance enables, the options and their benefits can be summarized as follows:



1. Smart finance equipment and technology replacement and upgrade:



Pay as you use

Healthcare organizations need to replace aging or obsolete equipment and technology, providing clinicians, care staff, and administration with greater productivity, efficiency, and healthcare effectiveness. Specialist financing partners will flex financing periods to help fit digital equipment upgrades into current and projected cash flow requirements. Such smart financing also aligns payments with the rate and value of benefits gained. Healthcare organizations can acquire the best equipment option for their clinical and care needs because flexible financing makes all options affordable.



Tech refresh

These are options that enable periodic replacement of equipment with 'new-phase' versions or alternatives – during the original financing period. Such arrangements help healthcare organizations keep pace with ongoing digital technology developments while remaining within the same financing arrangement.



Equipment disposal/repurposing

Specialist asset finance providers have an international network set up to dispose of/repurpose/re-market equipment at its end of life. As healthcare looks to achieve sustainability targets across the globe, its Scope 3 carbon footprint (up the supply chain) also has to be measured and managed. Smart financing options contribute to these goals.



Retrofit

This allows healthcare equipment to be digitally upgraded (software, sensors, etc.) to enable extended capabilities while retaining the core hardware platform. This delivers digitalization along with sustainable repurposing while containing replacement costs.



2. Smart finance for acquiring new technologies:



Pay as you gain

New digital technology can make a step-change difference in the effectiveness of healthcare access and delivery. However, the additional benefits and improved outcomes from new technology will be gained over time. Smart financing arrangements can be structured to reflect the impact of those benefits. Not only can the length of the financing period be adjusted, but low-start and seasonally variable payments are all possible and can be aligned with the expected outcomes. This provides critical assistance to organizations seeking to manage pressurized operating expenditures.



Technology and buildings/facility adaptation

New equipment and technology often require the adaptation of facilities and buildings. Smart finance providers recognize this requirement and will offer arrangements that embrace the total cost of technology acquisition and setup. A single arrangement will include the technology, its installation, and the buildings technology that makes the whole facility work.



Managed services

Pioneering technology vendors are now increasingly working with healthcare organizations in a partnership model. In such arrangements, the technology provider agrees on a service level that it commits to provide – encompassing equipment/technology maintenance, service, uptime, and sometimes even human skills and outsourced peak demand management. Underpinning these managed services arrangements are smart financing structures that make them work for providers and healthcare organization alike.



3. Smart finance for smarter buildings



Energy efficiency

The healthcare sector is responsible for approximately 4-5% of greenhouse gas emissions. It must play its part in achieving overall climate goals, and smart buildings technologies can radically reduce energy consumption. This is doubly important in a world with rising energy prices. Smart financing arrangements make it possible to harness future energy savings and bring them forward to fund the energy efficiency installation project itself. This is known as Energy Efficiency as a Service. No capital is required, and the organization achieves sustainable goals at zero net cost.



Smart buildings technology

Smart buildings technology can improve the capacity and efficient throughput of healthcare facilities – a key target as healthcare demand continues to rise. On-site people flows, airflow management, patient comfort and recovery, hot-desking, security, and much more can be automated and digitally managed using smart buildings technology – but capital budgets are under tremendous pressure in healthcare. Smart financing allows buildings to be made smart without the need to tie up capital.



Smart Buildings as a Service

This is a form of managed service agreement where performance criteria are built into the operating agreement. These criteria may include energy use, buildings occupancy, asset visibility, cleaning efficiency, patient satisfaction, and more. Smart finance structures capitalize these arrangements, making them economic for suppliers and healthcare organizations alike. Hospitals and other healthcare bodies typically use these arrangements to develop or upgrade whole facilities, such as a whole medical imaging department or pathology department.



CASE STUDY

Admiraal De Ruyter Ziekenhuis (ADRZ)

Admiraal De Ruyter Ziekenhuis (ADRZ) in the Netherlands is working with Siemens Healthineers in a 10-year-long strategic partnership that includes providing medical equipment, building works, financing, and management services. This collaboration has yielded and will continue to yield significant clinical, operational, and financial outcomes.

The partnership value at a glance:

- Design, construction, and leasing of six standardized operating rooms to improve quality of health services to patients
- Efficient primary care offered to roughly 248,000 people in the region
- 10% lower turnkey investment compared with conventional solutions
- Rapid availability of the new infrastructure (15 months from preparation to completion)
- €11.7 million capital freed up through embedded financing solution for other urgently needed investments

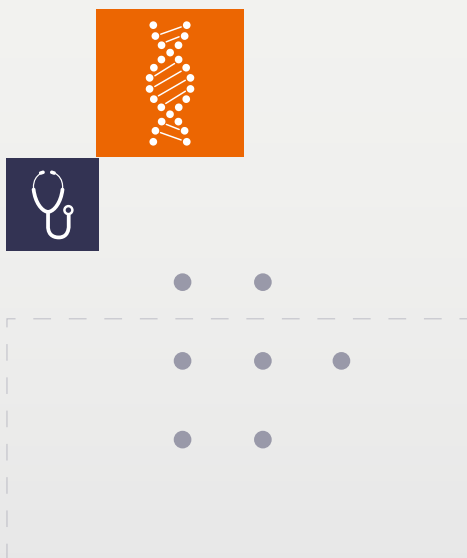
Source: <https://www.siemens-healthineers.com/services/value-partnerships/asset-center/customer-insights/admiraal-de-ruyter-ziekenhuis>



CASE STUDY

Biosynergie in France

Biosynergie in France is a group of nine medical laboratories that merged to manage reform in the national laboratory system. The organization aimed to create a common chemistry and immunoassay platform. A fully automated immunoassay platform was provided by Siemens, increasing testing capacity to keep pace with peak workload without adding staff. SFS made the investment affordable through an all-inclusive package – instrumentation, financing, insurance, and maintenance – spread over 60 months to align costs with benefits. A yearly renewable and independent contract was put in place for reagents. “The payments spread over the financing period and the global approach with a unique interlocutor for equipment, reagents, and financing attracted us by its simplicity. This solution allowed the laboratory to address the creation of our new testing site with serenity,” says M. François Léonard of Biosynergie.



CASE STUDY

Chennai Scans in India

Chennai Scans in India is a diagnostic center established by four radiologists. The center wanted to upgrade its MRI technology to a model from Siemens Healthineers and was looking for flexible financing options to facilitate the investment. Specifically, the organization needed financing terms that could match projected cash flows for the first year. In collaboration with Siemens Healthineers, Siemens Financial Services was able to offer a uniquely tailored financing solution for Chennai Scans. SFS provided a six-year arrangement to make monthly costs manageable, and further customized the repayment structure to align with expected flows. To make the transition as smooth as possible, the first six installments were set at a lower rate. "With Siemens, we received the equipment on time and could establish our diagnostic center. They understood our timelines and cash flow requirements well and supported us all the way in achieving our goals," says Dr. Mubarak RM, Director, Chennai Scans.



CASE STUDY

Klinikum Braunschweig in Northern Germany

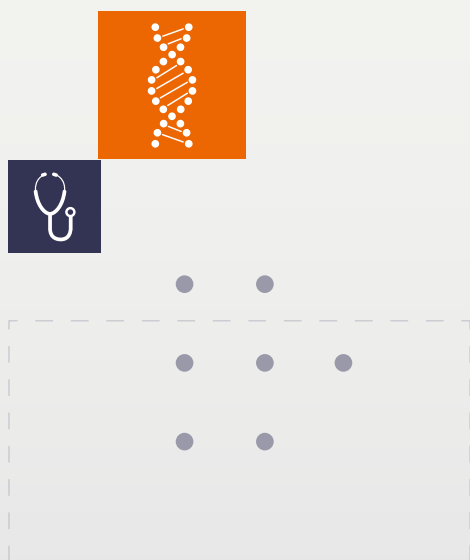
Comprising 21 clinics and 17 institutes, Klinikum Braunschweig in northern Germany wanted to completely upgrade its radiology and emergency facilities. The hospital wanted a long-term technology and financing partner.

Siemens Healthineers has delivered, installed, and maintains the complete radiological equipment fleet (MRI, CT, and X-ray) – with an innovation guarantee (updates and upgrades).

Financed over ten years, the arrangement offers an affordable and clearly calculable managed equipment services contract.

The hospital now has the most modern medical technology at its disposal, enabling it to provide optimal patient care with maximum cost security.

Source: <https://www.siemens-healthineers.com/press/releases/pr-20190711025shs.html>



Conclusion: **the urgency to act now**

This paper has illustrated the increasing pressures on healthcare technology investment, challenging countries across the world. The need to refresh healthcare's existing technology base goes hand in hand with the equally urgent need to acquire emerging digital technologies. The global COVID crisis clearly demonstrated the value – in terms of both efficiency and patient outcomes – of digital transformation in the healthcare sector.

In light of these drivers of change, each month that passes without progress on digital transformation is regarded by healthcare digitalization pioneers as a month in which healthcare resources have not been efficiently deployed, people's professional time has not been effectively managed, costs have not been optimized, and patient outcome improvements have not been implemented.

Transformation cannot be funded by the public purse alone. Private sector finance is playing a critical role in enabling the digital transition. Partnering with a smart solutions provider allows healthcare organizations to achieve radical, data- and evidence-driven change through digital transformation – improving patient outcomes, reducing both immediate and lifetime healthcare costs, and deploying scarce clinical and care skills more efficiently and effectively.



Medical Technologies - Definitions

- AI in Diagnostic Imaging, [machine learning, context-aware computing, computer vision, neuro-linguistic programming and other relevant technologies]
- Telemedicine [hardware, software and systems for tele-consulting, tele-monitoring, tele-radiology, tele-pathology, tele-dermatology, tele-cardiology, tele-education/training and other applications]
- Smart Hospitals [Electronic Health Record and Clinic Workflow, Remote Medicine Management, Medical Connected Imaging, Asset Tracking, Outpatient Vigilance and Medical Assistance, Facilities Technology, Others]
- Surgical Robots [Robot Systems, Instruments & Accessories, across Orthopedic Surgery, Neurosurgery, General Surgery, Gynecology Surgery, Urologic Surgery, Others]
- Digital Pathology [Virtual Microscopy, Whole Slide Imaging, Image Analysis-Informatics, Information Management System Storage & Communication, Digital IVD Devices, Scanners, Software, Others]
- Lab Automation [Automated Workstations, Automated Microplate Reader, Robotic Systems, Laboratory Information Management, System, Electronic Lab Notebooks, Subtotal Automation, Task Targeted Automation, and Total Laboratory Automation, and Others]
- Diagnostic Imaging [Magnetic Resonance Imaging, Computed Tomography, X-ray, Ultrasound, and Molecular Imaging]

Telemedicine

- Grand View Research, Telemedicine Market Size, Share & Trends Analysis Report By Component (Products, Services), By End User (Patients, Providers), By Application, By Modality, By Delivery Mode, By Facility, And By Segment Forecasts, 2022 – 2030. Product: Hardware, Software, Others. Services: Tele-consulting; Tele-monitoring; Tele-education. Modality: Store and forward; Real time, Others. Application: Teleradiology; Telepsychiatry; Telepathology; Teledermatology; Telecardiology
- Allied Market Research, Telemedicine market by Application (teleradiology, telepsychiatry, telepathology, teledermatology, telecardiology and other applications), component (software, hardware and services), and end user (healthcare providers, payers, consumers and other end users): global opportunity analysis and industry forecast 2021-2030
- Fortune Business Insights, Telehealth Market Size, Share & COVID-19 Impact Analysis, by Type (products & services), by Application (Telemedicine, Patient Monitoring, continuous Medical Education, and Others), by Modality (Real-time [Synchronous], Store and forward [Asynchronous], and Remote Patient Monitoring),Telepathology, Teledermatology, Telecardiology, Telepsychiatry and Others), by End User (Hospital Facilities, Homecare, and Others), and Regional Forecast 2020-2028

AI in Diagnostic Imaging

- Verified Market Research, Artificial Intelligence (AI) In Diagnostics Market” By Component (Hardware, Software, Services), By Technology (Machine Learning, NLP, Context-Aware Computing, Computer Vision), By Diagnosis Type (Radiology, Oncology, Neurology & Cardiology, Chest & Lungs, Pathology), and By Geography. Fatpos Global, AI in Medical Diagnostics Market - Analysis of Market Size, Share & Trends for 2020 – 2030 and Forecasts to 2030. Segmented by Component into Software, Services. By Application into In Vivo Diagnostics, In Vitro Diagnostics. By End-User into Hospitals, Diagnostic Imaging Centers, Diagnostic Laboratories, Others. Geographically, the market is segmented into North America, Latin America, Europe, Asia Pacific, and Middle East, and Africa.
- Grand View Market Research, Artificial Intelligence In Diagnostics Market Size, Share & Trends Analysis Report By Component (Software, Services), By Diagnosis Type (Neurology, Radiology, Oncology), By Region (Europe, APAC), And Segment Forecasts, 2022 - 2030
- Vision Research, Artificial Intelligence in Diagnostics Market Size, Report 2021 to 2030. On the basis of components, the global AI in diagnostics market is categorized into hardware, software, and services. Based on diagnosis type, the market is categorized into cardiology, oncology, pathology, radiology, chest and lung, neurology, and others. On the basis of geographies, the market has been divided into Asia Pacific, North America, Europe, Latin America, and Middle East & Africa.

Lab Automation

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