

Digital technology is already transforming many aspects of healthcare, from electronic booking through to video consultations and emerging AI solutions, but in Europe at least, the sheer scale of the task means hospitals have been slow to get on board the revolution. L.E.K. Consulting partners **Klaus Boehncke**, **Guillaume Duparc** and **Ben Faircloth** explain what hospitals need to consider to make the most of their investments in digitalisation



Hospitals tomorrow the digital transformation

American patients visiting a hospital in Europe might be forgiven for thinking they have stepped back in time. Walking around the wards, they might notice bundles of paper – including medical records, prescribing forms and care plans – and hear the whirring of fax machines.

While in the US, hospitals appear to have embraced the digital revolution (driven by incentives during the Obama administration), Central European countries have been much slower to sign up to digital technology. Yet, despite this, many do acknowledge the importance of digital technology in building the hospitals of tomorrow – a recent L.E.K. Consulting hospital study in the UK, France and Germany saw respondents rank investment in new IT systems and digital capabilities as the two top themes for the next five years (Figure One).

One stumbling block for European hospitals could be the sheer enormity of the task. To have the most impact, digital technology should be embedded throughout the healthcare system, and many projects end up overrunning or overshooting already stretched budgets.

Yet, as countries from diverse regions

including Denmark, the US and Singapore demonstrate, digital technology can dramatically improve healthcare systems for patients and healthcare professionals. Hospitals in Central Europe have a genuine opportunity and must plan their transformation strategies carefully to succeed.

The key advantages of digital

Digitisation can positively impact hospital operations in a number of ways (see Figure Two). To ensure success, a digital hospital strategy should focus on four key pillars: 1) automating core clinical and administrative processes, 2) reinventing the patient and staff experiences, 3) building the intelligent hospital, and 4) developing and participating in ecosystems.

Automating core clinical and administrative processes

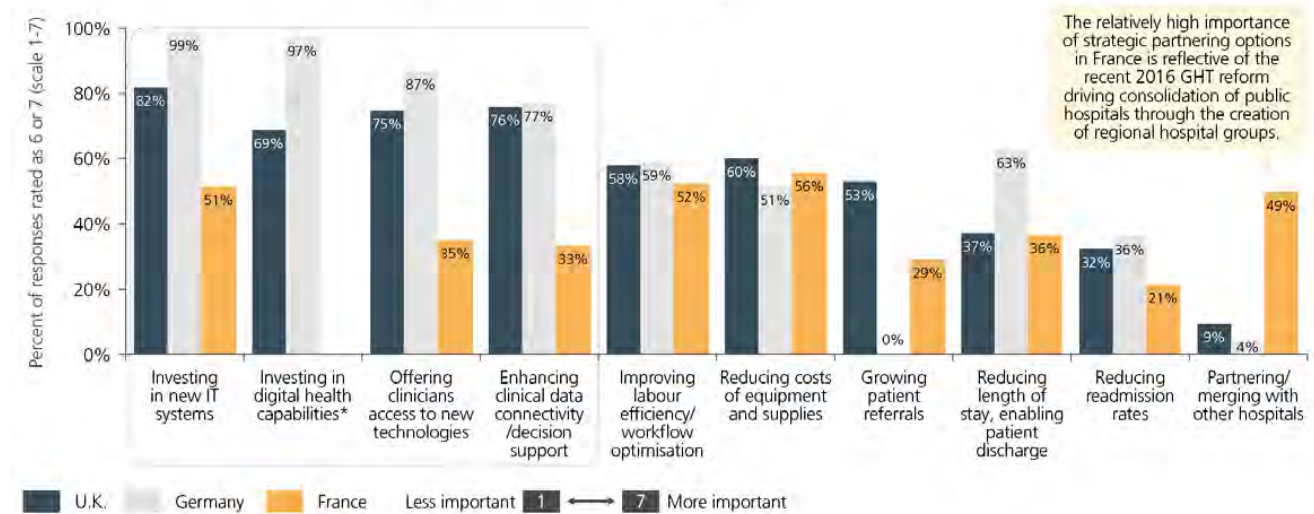
The foundation of hospital digital healthcare at the core clinical level is an electronic medical record (EMR) system,

which can be seen as the single largest source of improvements, benefiting safety and quality, efficiency, medical outcomes, and overall profitability.

The most advanced systems include technology-enabled medication ordering and management, alongside many other features, and their positive impact in comparison to paper-based medication management has been proven in many studies. By way of example, medication prescribing errors can happen more than six times per patient admission – mainly due to paper-based processes (see Case Study One). This can lead to medication administration errors and serious adverse drug effects. In hospitals where EMRs have been introduced, errors can often fall by more than 50%. By improving medication management, EMRs also reduce overall length of stay for patients and cut the turnaround time of discharge scripts, allowing patients to be discharged faster.

While the clinical ‘front office’ is important to improve patient quality and safety and reduce the length of stay, the ‘back office’ must run smoothly if the hospital is to operate at an economically efficient level. As in other industries, the trend has been to implement ERP

FIGURE ONE
IMPORTANCE OF STRATEGIC PRIORITIES IN THE NEXT FIVE YEARS ACCORDING TO COUNTRY



NOTES N=300; UP TO TEN INDIVIDUALS PER CATEGORY INDICATED 'I DON'T KNOW'; * THESE CATEGORIES WERE ONLY SURVEYED IN SOME COUNTRIES
SOURCE L.E.K. SURVEY, Q6/Q8 HOW IMPORTANT ARE EACH OF THE FOLLOWING STRATEGIC PRIORITIES FOR YOUR HOSPITAL OVER THE NEXT FIVE YEARS? PLEASE INDICATE THE IMPORTANCE OF NEED ON A SCALE OF 1-7

(enterprise resource planning) systems to help streamline supply chain, finance and human resources functions.

Reinventing patient and staff experiences

Digital technology can significantly improve the patient and staff experiences, creating new ways of putting patients first, changing the experience of nervous children and parents (see Case Study Two), and freeing staff from routine administrative burdens. For example, check-in kiosks and hospital mobile apps are becoming more common, and Apple has already signed up EMR vendors Epic, Cerner and Allscripts to facilitate downloads of hospital health records upon discharge, enabling easy access by the patients or sharing with other healthcare providers. These efforts also make economic sense – the Economist Intelligence Unit recently reported examples of a 1.4% increase in net margin and nearly 4.5% drop in staff turnover for hospitals that were focusing on better patient and staff experiences.

Building the intelligent hospital

Another revolutionary area is artificial intelligence (AI) and cognitive and algorithm-based medicine. Data and knowledge-driven systems offer significant

potential, and AI-based technologies that allow machine-augmented decision-making are increasingly helping to ensure the best possible diagnosis and treatment options, enabling more personalised and targeted therapies. Genetic and clinical information from patients can be used to apply cognitive insights and create precision medicine (see Case Study 3). According to Bart de Witte, founder of the Hippo AI Foundation², there are already more than 30 algorithms that are often better than most human medical specialists.

Developing and participating in ecosystems

More broadly, digital technology can improve patient care pre- and post-admission, and facilitate new revenue streams by leveraging existing knowledge

to provide 'digital twin' and telemedical services regionally and globally, including mobile applications that offer education. Sharing of electronic health data also allows closer monitoring of population health.

Developing IT systems that offer these kinds of advantages may, at first, appear expensive and time consuming. An EMR system can cost €60,000-€90,000 per bed to introduce in a hospital, and implementation can take from three to six years. Yet digital technology merits close consideration in light of the numerous efficiency, safety, quality and care enhancements that it enables for hospitals, patients and staff in the longer term.

Key considerations and pitfalls

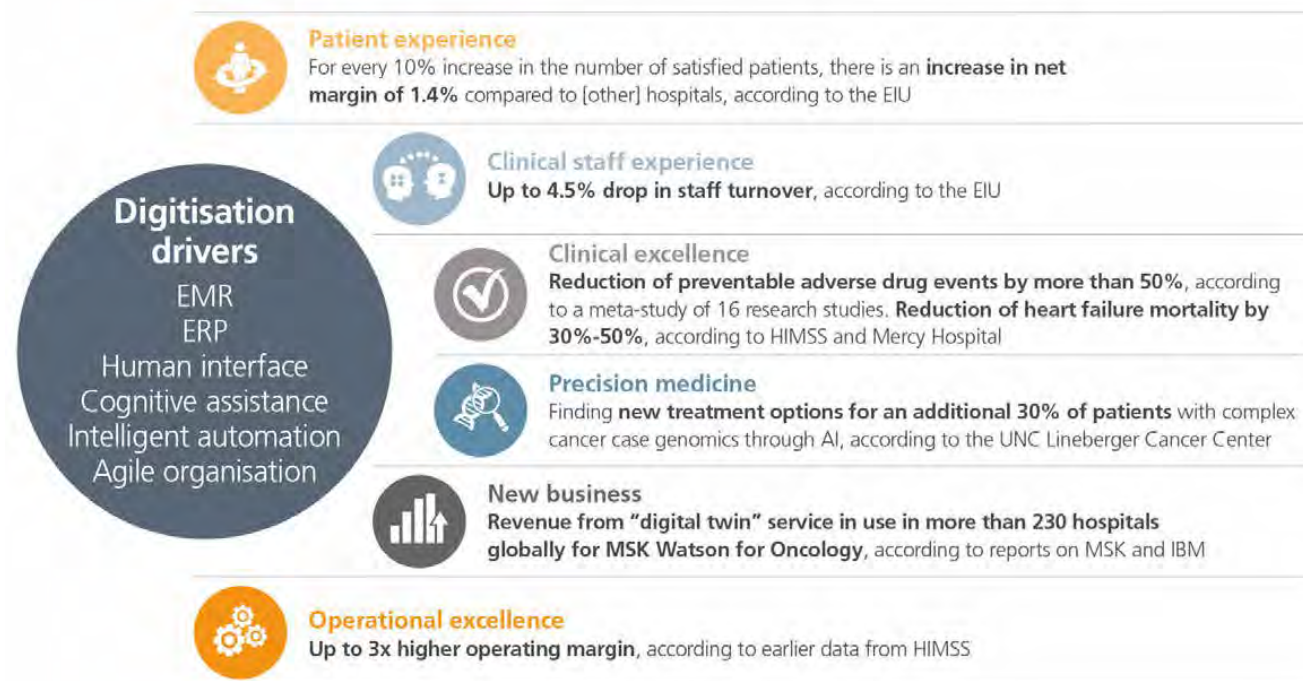
The principal disincentive for hospitals to implement new technology is the risks

CASE STUDY ONE

Two landmark studies¹ examining the impact of paper-based medication management further highlight the importance of EMR systems. The first focused on nearly 2,000 patients in two teaching hospitals, and noted more than 11,000 prescribing errors, up to 5.8 medication prescribing errors per admission, due to 'unclear, illegal, and incomplete orders'.

In the second study, which focused on intravenous medication administration, researchers stated that 'of 568 intravenous administrations, 69.7% [...] had at least one clinical error and 25.5% [...] of these were serious.'

FIGURE TWO
EXAMPLES OF THE POSITIVE IMPACT OF DIGITISATION



SOURCE ECONOMIST INTELLIGENCE UNIT; HIMSS; LINEBERGER CANCER CENTRE; IBM; EHRINTELLIGENCE.COM

associated with digital transformation.

Hospitals must consider the business risks of such a transformation. This includes the potential for delays and a much lower return on investment than envisaged, potentially due to cost overruns and/or because of limited adoption. System or process failure risks real physical harm to patients and can cause tension among the workforce.

Organisational readiness is also a significant factor in the success of a digital transformation programme. Risks

are increased if the hospital leadership is unclear about the business and digital strategy; if clinical staff lack experience using IT in their daily work routines; or if the IT department is without significant EMR and ERP expertise, is unclear about IT strategy and architecture, or has vacancies in key positions.

Ensuring infrastructure readiness is crucial, and buildings must be ready for the demands of new IT systems, including hardware such as power plugs, sensors and wi-fi. Power and emergency

backup need to be sufficiently scalable, and tried and tested cloud architecture is essential to aid implementation.

Finally, security and privacy protection is critical to safeguard medical data; cyberattacks and data loss have severe consequences (the NHS lost nearly £100m in the 2018 WannaCry cyberattack), and there are stringent regulatory requirements to be met. Basic security is not enough, and hospitals ideally require a three-pronged approach that includes security strategy, planning and setup; a security operations and response centre; and information risk and protection rules and regulations.

CASE STUDY TWO

Magnetic resonance imaging (MRI) machines can often be traumatic experiences for children.

The Royal Children’s Hospital in Melbourne, Australia, addresses this by preparing children for their MRI scan with a mobile game that can be started at home, and through simulating an underwater submarine experience in specially painted hospital rooms that mimic an underwater world – the game can only be completed by living the ‘adventure’ of going into the tube. As a result, an experience that children and

their parents may otherwise fear has been transformed into something fun.

But this new patient (and parent) experience also has economic benefits for the hospital. The number of patients that require sedation and multiple tries in the machine has seen a notable reduction, significantly increasing machine utilisation. In another hospital³, more than 150 kids per year who previously would have been sedated for an MRI did not require this treatment due an enhanced focus on patient experience.

Implementing a digital hospital vision

There are six key considerations for implementing a digital hospital:

- 1. Clear line of sight from business vision through to technology blueprint.** This is one of the most significant determinants of success. Before embarking on a hospital digital transformation project, appropriate questions must be asked to define the starting point,

the end goal and how to reach it, the overall benefit, associated costs, and approach to change management. This will help develop a framework for a sound digital strategy that combines strategic business objectives with customer experience goals, an understanding of the technology objectives, and a detailed road map for implementation.

2. **Phasing of the different implementation streams.** This is crucial to avoid doing too much in parallel. By starting with one ward or department, and rolling out the implementation in other parts of the hospital after it has been successful, hospitals can avoid a 'big bang' approach that might leave staff overloaded.
3. **A benefit-focused view.** Proven to be invaluable in large transformation programmes, such an approach helps focus programme attention on the capabilities, processes and stakeholders that will generate the most value (such as medication management).
4. **Clear governance.** Clear governance, supported by a programme management office (PMO) is good housekeeping to implement such a complex programme and to mitigate risks.
5. **Change management.** To ensure that all stakeholders are immersed at every stage of the

CASE STUDY THREE

According to a 2017 study at the UNC Lineberger Comprehensive Cancer Center in the US, IBM's Watson for Genomics system was able to identify new treatment options for cancer patients.

Out of the 1,000 patients in the study, Watson found new clinically actionable information for 300 patients that had not previously been identified by the oncology specialists at the centre.

digital transformation programme, from day one, an appropriate change management strategy is critical. In fact, change management is so important that experience has shown it should be budgeted into the cost at around 10%-20% of project budget.

6. **Embedding new skills across the organisation.** For example, the IT function may need to be upgraded and expanded, with new staff hired to help develop, implement and support these new systems. In addition, seeking external expertise to help with the strategy and implementation is viewed as best practice.

al excellence and enhanced patient and staff experience.

Perhaps most important is to recognise that becoming a digital hospital is about transforming a business – it is not a technology exercise. Success depends on winning hearts and minds.

NOTES

- 1 Professor Johanna Westbrook, 'Effects of Two Commercial Electronic Prescribing Systems on Prescribing Error Rates in Hospital In-Patients: A Before and After Study', and 'Errors in the administration of intravenous medications in hospital and the role of correct procedures and nurse experience'.
- 2 Diagnostic Imaging, Making Imaging Centers Child Friendly.
- 3 The Hippo.ai Foundation is a non-profit organisation focused on making AI-based healthcare a public good. An article related to the number of algorithms that are 'better' than humans (in German) can be found on its website.

Hospitals of the future

The evidence is that digital technology can significantly improve quality of care and operational efficiency. EMRs and AI-based diagnosis and treatment systems represent significant advances for healthcare, and the hospitals of the future will make use of a wide range of digital technologies in their quest for operation-



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