



# The Promise of Digital Health

Hype and reality – will digitalisation improve workflows, drug research, integrate systems & facilitate disease management?

Technology does not always hold the key for clinical improvements and cost avoidance at the same time, but sometimes it does. In case of digital healthcare, we believe that some solutions in this growing subsector could strike this difficult balance. We had many inspiring debates at our COMPASS seminar held in Berlin in October 2018, discussing how hospital workflows can be improved and become vendor neutral, how modern clinical and pre-clinical research is impacted by AI, real world evidence and Big Data, and finally, how new digitalised patient-doctor interfaces could improve quality of care and patient mortality.

Innovation often accumulates existing technologies rather than replacing the obsolete ones. If we don't rationalise and constantly review existing technologies, healthcare systems will hardly become more economical. At goetzpartners securities, we advise clients on workflow optimisation and efficiency gains, which are amongst the biggest cost blocks in healthcare, in our view. However, the digitalisation of healthcare is at risk of becoming another technology hype. This means that careful assessment of new digital technologies is of paramount importance. Digital processes, can also increase costs and decrease efficiencies if not done in a collaborative, patient-centred approach.

We discussed these complex topics with senior healthcare professionals from all areas of the sector and featured high profile speakers from innovative and established businesses, world renowned health economists, high profile clinicians, managers from clinical operations, entrepreneurs, users of Telemedicine, governmental organisations such as NICE and senior healthcare politicians. We debated how digitalisation will change and improve both the delivery of healthcare and product development. We explored aspects both from a clinical and economical point of view.

We have to identify interests from stakeholders and their goals in order to manage patient-oriented solutions with best possible results. Too often, industry players act primarily to protect revenues from obsolete technologies. Short horizons from politicians and sometimes "non-patient" centred interests from lobbying organisations hinder innovation or prevent policy makers from adapting better guidelines and reimbursement metrics. We aim to bring all stakeholders together and challenge them in our debates.

With our COMPASS event we have developed a unique forum, useful for all stakeholders to broaden their views. Guiding investors has to be a genuine interest of governments and patients, so capital finds the right way to the best technologies. Consensus orientated debates help to optimise resource allocation. This benefits all stakeholders and most importantly the patients.

Professor Elias Mossialos, from the London School of Economics set the stage on the state of our healthcare system. Focus on multi-morbid patients and tackling of waste, which is a fifth of our healthcare spend, was a key message.



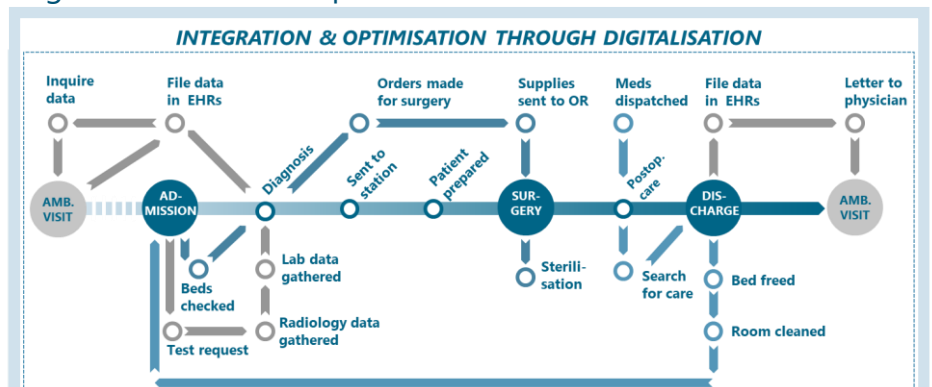
*Solutions in digitalisation can help to improve the quality of care when they are used in the right way. Digitalisation will free up precious time, optimise today's flawed workflows in hospitals and doctors' practices, and streamline medical research.*



Source: goetzpartners securities

## Digital sequencing of Healthcare

Digitalisation offers improvements of the healthcare structure



Source: goetzpartners securities

Seamless workflows and integrated systems – just unrealistic expectations?

These days, hospitals have to face many challenges: Stopping the cost explosion of the past ten years (e.g. +50% in GER<sup>[1]</sup>) as well as an increasing patient volume per hospital (+30% in GER<sup>[2]</sup>). This is topped with an ageing population with multi-morbid patients in a still silo-like structured hospital organisation.

To master these challenges, hospitals have to take a major step towards digitalisation. Many have already started the journey with great results in their pilots. Digitalisation lifts operational excellence to the next level:

- Improve throughput of patients at higher quality standards by integrating systems / processes
  - Provide decision support by supplying AI-based analysis
  - Offer best team approach by virtual reality / remote (surgery) access
- Proof of concept is available as demonstrated in the following examples.

Higher throughput at improved quality levels – squaring the circle?

Yes indeed, as shown in diagnostics, care services and in the operating room:

- Diagnostics: connecting radiology assets across hospitals improves utilisation (+ 100 MRIs per month<sup>[3]</sup>).
- Care services: real time localisation of beds by RFID chip (40% reduction of process time for cleaning<sup>[3]</sup>).
- Operating room: process standards and integrated systems ensure fewer complications and smooth workflows (€100k cost savings per OR p.a.<sup>[3]</sup>).

Providing physicians with excellent decision support by AI – a sacrilege?

No, it makes the life of the physician easier in today's hectic environment:

- Software enables the detection of abnormalities and reduces analysis time by 1/5, down to 20 minutes<sup>[3]</sup>.
- Learning algorithms suggest the dose of substrates for MRI / CT according to the position of the patient.

## MARKET VOICES in Hospitals

**Sana** – A leading private hospital chain in Germany, established a corporate-wide digital office to act as an incubator by screening new ideas from start-ups, co-ordinating pilots within the group and steering the group-wide roll-out. Their approach is to talk with physicians about their pain points and then to use start-ups to remedy those pain points.

**Siemens Healthineers** – A global leader in medical technology and software, views digitalisation as enabler for transforming hospital operations and healthcare structures – leveraging hospital capabilities is key to providing best in class solutions (also from other healthcare systems) to ensure a successful implementation in a proper timeframe. Given that the digital value creation of three levers is possible: expanding precision medicine, transforming care delivery and improving patient experience.

To advance surgical processes, achieve better medical outcomes and generate economic gains, the **Surgical Process Institute** – a Germany based solutions provider, aims to venture into almost holy territory – standardising and digitising medical procedures in the surgery room. With that approach the huge variations in treatment quality can be reduced significantly.

**Optimus ISE** – An innovative player in system integration solutions, focuses on reducing the increasing complexity in surgery rooms today. Adding a communication layer that allows exchange of data and gives commands to all equipment in the surgery room is a key element of their offering. By leveraging system integration and innovative technologies, Optimus is able to increase patient safety, solve inefficiencies and improve financial performance.

**Professor Clemens Cyran** – From the LMU in Munich, offers the academic and practising perspective, highlighting the power of AI solutions in augmenting the value of radiology in new payment and quality-driven healthcare delivery models, contributing to precision medicine, reducing costs and improving population health. Only AI makes it possible to manage the huge amount of data effectively. Automatic triage tools will improve quality and overall risk management.

**Lohmann & Birkner** – A hospital specialist and consultant, further emphasises that digital solutions, such as augmented reality have to be combined with real operations in order to push medical outcomes to a next level. In addition, a WhatsApp-like communication between physicians and care staff improves process (idle) times significantly by having reasonable investments.

Learning and involving the best minds remotely – the future of collaboration?

Yes and No. For training purposes and supervisory activities indeed, but the surgeon's on-site presence still remains a critical factor

- Remote surgery brings the best team together. Young physicians benefit from experience of senior experts.
- Virtual trials by VR enable surgeons to optimise complex procedures.

Digitalisation is about to boost hospitals' operational excellence. But managing the implementation is key. Data silos and missing interaction of medical staff across treatment areas are the major obstacles.

One way forward is to push specialisation of hospitals further and to provide an open-source based ecosystem. To make the dream come true, a stringent transformation is necessary.

## Digitalised workflows?

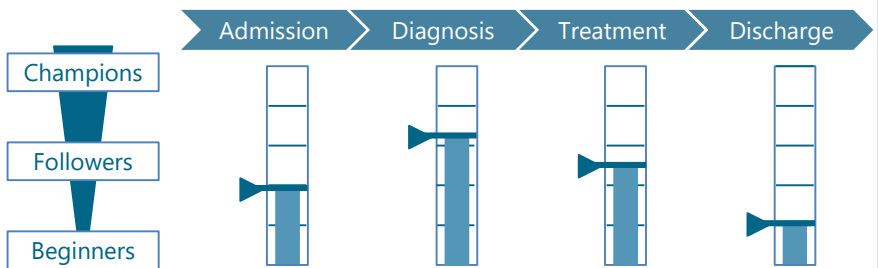


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Digital process readiness of German hospitals - 2018



Source: goetpartners securities hospital study 2018

What is the impact of digitalisation on the Pharma business model?

Multiple opportunities from digitalisation along the pharma value chain and patient journey arise.

**Efficiency improvements:** Digitalisation becomes a key instrument for efficiency gains with a broad spectrum of applications – be it in R&D, where estimates for cost improvement reach beyond 20%, for example driven by optimisation of clinical trials (e.g. through drastic acceleration of recruitment and enrolment processes and optimised patient stratification based on digitally collected biomarkers). Or, in production, where substantial efficiency increases are on the horizon – the same is true for marketing & sales powered by AI and big data.

**Multimodal diagnostic information gathering** allows to connect data from liquid biopsy, digital histopathology and genome sequencing. Additional options for value demonstration and evidence generation: New, digital and data-driven models substantially enhance the existing approaches around Health Technology Assessments, Real World Evidence, or validations of Patient Reported Outcomes.

**Improved early diagnosis** with faster, more precise detection could lead to better identification of diseases, e.g. for diagnosis of cancer where a substantial share of existing carcinoma remains undetected; AI-supported visual diagnosis systems present a big opportunity here. Another case refers to Audio Intelligence: Automatic interpretation of audio signals enabled through automated Deep Learning, allows for new applications; examples include diagnosis of Parkinson disease or early diagnosis of depression.

**New options for drug discovery** through AI and quantum computing-support: Big data analysis for molecule identification bears remarkable potential as additional source for innovation.

## MARKET VOICES in Pharma

**Evotec** – Specialist in drug discovery services for Pharma and shareholder in Exscientia, a leader in AI-driven drug discovery, highlighted the ongoing paradigm shift: “externalisation” of discovery with whole units spun-out to CDMOs and new collaboration models in virtual networks. AI is a crucial factor in complementing “human” drug discovery, speeding up the design-make-test cycle and capturing even the most subtle drug candidate improvements by machine learning. Novel tools such as “-OMICS”, iPSC (cell-based assays) and academic collaborations have an impact as well – bringing all these factors together is needed to solve existing challenges.

**Molecular Health** – A company aiming to transform big data into actionable decisions, elaborated on their cloud-based technology platform analysing the molecular and clinical data of individual patients against the world’s medical, biological, and pharmacological knowledge, to drive more precise diagnostic, therapeutic, and drug safety decisions. Opportunities arising from sequencing the human genome have the potential to change the business model of the industry. On the one hand, AI-supported precision medicine will help practitioners to make better decisions. In addition, Big data and AI will allow to predict real outcomes. The Predictive Engine, a knowledge database with an algorithm that predicts the likelihood of a trial to work, demonstrates this potential.

**Definiens** – An innovative player in the field of digital pathology for identification of cancer focuses on extracting information from human tissue. The so-called “Tissue Phenomics” works by gathering data from tissue images, correlating the data with signatures and clinical outcomes to predict how the patient will respond to a treatment. Moreover, identifying biomarkers to understand the biology of the cancer and provide decision-support on treatment options. Applied methods include Cognition Network, and Deep / Machine Learning.

**Shire** – Global Biotech leader in rare diseases, emphasised the increasing opportunities for early diagnosis through algorithms that spot combinations of symptoms to predict or detect a rare disease, illustrating the approach with a successful project in Columbia. A key challenge that Shire is working on in this context is the management of large amounts of data in a strategic and holistic way to unfold the full potential of data.

To respond to the challenges Pharma is facing, the UK-based **National Institute for Health and Care Excellence (“NICE”)** outlined three key initiatives: 1. EUnetHTA aims at setting standards for the use of real world evidence; an assessment evaluates if registries are of sufficient quality 2. Digital Evidence - a standard to guide users on how to evaluate Healthcare apps, 3. HealthTech Connect - a database where medical technology manufacturers can upload evidence data for their products.

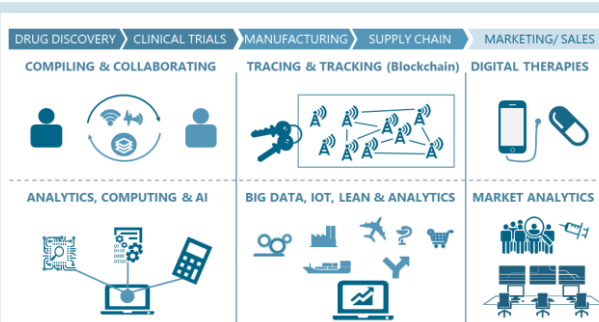
One of the main challenges relates to data itself which is often incomplete, unstructured, and kept in silos across the various Healthcare stakeholders – paired with the absence of data standards and interoperability.

Market readiness (e.g. regarding reimbursement models or workflows) is seen as an additional hurdle: Care models need to shift from reactive to proactive

care where the role of the patient is significantly changing (patient-centricity).

While drug discovery is becoming more expensive, average sales per project are going down – a clear indicator for the rise of more targeted therapies. Questions to be solved in this context: Who are the owners of data? Which data can be used in what way? – regulatory answers need to be found here.

## New ingredients for drug discovery



Source: goetzpartners securities

*Pharma players already apply AI and machine learning to develop more efficacious drugs faster – big data-sets from diagnostic imaging and sequencing combined with longitudinal patient data require the use of AI to derive treatment decisions and evidence*



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The digital interface between patients and healthcare professionals is barely existent in the current standard of care. As a consequence, flawed workflows and significant rising costs from work and product duplications are still present. This could easily be avoided to a large extent, if systems had a better framework to manage patients in a more holistic way. Digital technology is not sufficiently embraced by practicing physicians.

Healthcare systems have come a long way to successfully treat patients for specific medical conditions. At the same time, there still can be found very much compartmentalised treatment modalities. Healthcare professionals have often little awareness of parallel or previous interventions undertaken by their colleagues. There is a clear need for integrated care. Digital workflows and platform integration can add to an improved situation.

A real case in Telemedicine was given by Professor Anker, who presented evidence for the use of a new digital interface that could improve mortality rates for hospital discharged heart failure patients by 33%. The biggest debate in this panel was the use and introduction of the Electronic Health Record ("EHR"). The EHR not only offers more data transparency for patients, but also provides for a single user interface for all healthcare professionals to assess best treatment options based on all available history.

It was felt, that there is a hype for mobile apps and the use of consumer electronic interfaces to solve complex healthcare problems. While there are more than 500,000 apps on offer to manage patients' health, the big question how to integrate the best innovations into standards of care remains wide open. The conclusion was that both technical standards and treatment standards need to be established to find a harmonised, patient-centred solution from the vast amount of innovative ideas in digital healthcare.

## MARKET VOICES in Telemedicine

**Evidence for Telemedicine (Professor Stefan Anker)** – A recent study (Lancet, 2018) has demonstrated mortality benefit of heart failure patients, when followed up after hospital discharge by Telemedicine. A surplus of big data pertaining to healthcare has cultivated the advancement of neural networks and artificial intelligence algorithms for pattern recognition and disease detection. By using acoustic fingerprinting and voice recognition in tandem with telemedicine, real time data acquired from individuals can be compared against large data sets used to identify or track the progression of those at high risk of cardiovascular disease such as heart failure.

**The Telemedicine Platform (TeleClinic)** - The role of telemedicine in connecting patients with the right medical expert early to optimise treatment. Telemedicine brings access to doctors within the reach of patients living in rural areas, and to those with limited ability due to recent operation or old age. Surveys suggest that 38% of doctor visits and 27% of ER visits by older patients can be better served through telemedicine, highlighting the telemedicine's particular applicability to older populations, as physical visits to a doctor are especially taxing on these patients. As a result, patient travel, wait times, re-admissions, and healthcare costs are reduced, while access to quality care is increased.

**The Electronic Patient Record (EPR, Vivvy)** – The EPR is the backbone for care co-ordination. Increased transparency through the EPR optimises care delivery, avoids duplications and better resource allocation. EPR assists in medication schedules, doctor's appointments, upcoming vaccinations and it is an interface for health professionals to assist them in decision making. The creation of a single interface, such as the EPR holds some significant health economic benefits by integrating data and decision making.

**The German Society of Telemedicine ("DGTelemed")** predicted that telemedicine will add to an increasing diagnostic accuracy via AI-based medical assistance systems, and importantly, the role of telemedicine in reducing the impact of location on quality of care, especially in rural areas. The remote diagnosis and treatment by means of telecommunications technology provides an interface between patients, primary care providers and hospitals.

**The Ministry of Healthcare** has implemented the EPR in Austria, which should lead to better patient outcomes as more time can be spent on direct patient care, while documentation time can be reduced. Furthermore, transition of patients between doctors from an in- to outpatient setting is facilitated, as information is easily accessible for both parties, allowing for seamless transition. This is especially relevant for multi-morbid, high-risk high-need patients that account for the majority of healthcare-related costs and morbidity, and thus represent an area with especially large unmet need.

Today, governments have established technical standards and conventions in other industries like aviation, finance and transport, but not yet for health technologies. The key is to introduce technology, which frees time for health professionals and overcomes information silos.

Significant volumes of data are produced every day in healthcare operations and are thrown away. This shows that current

data processing capabilities are lagging behind the ability to treat patients with the healthcare technology that is at hand today.

The next big wave in healthcare is not triggered by new drugs, new medical devices or new ways how surgical interventions are done. The next quantum leap will come from overcoming hurdles and processing data for the best possible way to handle patients and procedures.

## The direct line to save costs and time?

- 1 **IMPROVED PATIENT OUTCOMES** through easier access to better care
- 2 **IMPROVED PRODUCTIVITY** through smart patient filtering
- 3 **INCREASED FLEXIBILITY** through round-the-clock access
- 4 **IMPROVED COST-EFFICIENCY** through lower overhead costs
- 5 **BETTER RESOURCE ALLOCATION** by optimising the care network
- 6 **HIGHER PATIENT TRANSPARENCY** for more personalised treatments

Source: goetzpartners securities



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