# On the future of digitalization of the Healthcare

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Picture this: a world where your doctor's prescription arrives as a friend request on *Facebook*, and your medical records are protected by the same security measures as your grandma's famous meatloaf recipe. Welcome to the digital healthcare revolution that never quite figured out how to become reality.

## 1   And then, there was the computer

In the annals of healthcare history, the promise of a digital revolution in medicine has tantalized both healthcare professionals and the public for decades. From the earliest attempts at digitizing patient records to ambitious visions of comprehensive national digital health transformations, the journey towards a seamlessly interconnected healthcare system has been a long and arduous one. The idea to digitalize healthcare is almost as old as the computer itself is: The first large-scale integration of electronic health records *(EHRs)* began in Rochester, Minnesota at Mayo Clinic in the 1960s[1] — one would expect the entire healthcare sector to have been brought into the digital age in the last 60 years. However, we are still very much in the transition of retiring paper and pen in most countries. So it is now more than ever worth taking a look at the *status quo* of digitalization in healthcare and what has to change in order to truly have digital healthcare.

## 2   Policies and politics

The aren't many fields in our daily lives that have such strict regulations as healthcare and medicine in general: In most counties, in order to work in the field[2], you are required to have a proper license and there are strict guidelines on how to treat patients. Everything you do while working needs to be documented, the requirement of confidentiality is as strict as it can be. A lot of policies are not dictated directly by your employer, but are controlled and monitored by third-parties, *e.g.* standardization bodies or the government tell how to play the ball. And it makes perfectly sense: Only a strictly regulated environment as critical as the healthcare sector can provide the high medical standards patients expect.

### 2.1   Different regions, different laws

Having a legal framework spanning thousands of pages does not help with standardization and definitely not speed up the development of digital solutions for the field, especially if the framework created is only applicable to one single country or even region. **With the expected complexity of solutions for the**

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[1]Also see https://www.elationhealth.com/resources/blogs/the-history-of-electronic-health-records-ehrs
[2]especially directly with patients

**healthcare sector, adopting systems across different regions and markets are needed in order to be feasible for every healthcare provider.** If every market for digitization products needs a custom solution, the costs will be immense.

## 2.2 Learning from past mistakes

To make my point clear: Epic Systems, a private American healthcare software company were tasked in the United Kingdom to adapt their EHR solution for £200 million to the market. After transferring around 2 million health records, the system became unstable and became unusable. As a result, ambulances needed to divert to different hospitals and among other things, issues were encountered with blood transfusions. Two years later, Danish authorities tasked Epic Systems to implement their solution into the Danish healthcare system for 2.8 billion DKK (around 350 million Euros). After a similarly bad start as in the UK, even two years after the initial rollout serious concerns with the quality of the solution were raised[3].

Not only Epic Systems had their fair share of problems to adopt their systems worldwide, most North American companies had struggles in adopting and expanding with their solutions in Europe, for example the McKesson Corporation, Cerner Corporation and Allscripts Healthcare Solutions, just to name a few. This is of course linked to the widely different systems in healthcare between North America and Europe, and I am not rooting for an alignment in terms of operating procedures, at this point we are far to deep in terms of how we think about healthcare. Instead, I'm calling to factor in these differences when adapting software from abroad (in terms of cost, time in the trial of the software and listening to feedback) and to align healthcare systems that are already close in their approaches. So far, even digitalization affords inside the EU had a long list of problems when adopting to a different region. Aligning the legal frameworks inside the EU would make a huge step towards interoperability of soft- and hardware and allow for a faster implementation in general.

## 2.3 Data security and cyber security

With an average cost of about 10 million Euros per breach, healthcare is the largest and fastest-growing industry to experience multi-million dollar penalties[4]. Protecting the data of patients and employees is crucial for the trust put into the healthcare system. If we want to speed up the digitalization, we need to put measures in place that stop preventable incidents.

# 3 The role and chances of Startups

I'm in the position to share my own experiences in founding a startup in the medical sector: My company "Dotreflection" aims at developing software solutions that help medical professionals communicate their knowledge and medial content to everyone (e.g. by providing a self-hosted and flexible digital video course solution). Note that this automatically puts me in the perspective of founding and running a German startup with the national requirements and laws, but also the national funding measures. Not all points of this topic is directly applicable to everyone, but I try to process the topic as generally and internationally relevant as possible.

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[3]see https://www.eurosai.org/en/databases/audits/Report-on-Sundhedsplatformen/

[4]source: https://intraprisehealth.com/the-cost-of-cyberattacks-in-healthcare/

## 3.1 Why startups are essential for the digitalization

In my opinion, startups are playing a pivotal role in driving the digitalization of healthcare, revolutionizing the industry in numerous ways: These agile and innovative companies are bringing fresh perspectives and long-awaited technologies to address longstanding challenges in healthcare. From telemedicine platforms that enhance access to care, to AI-driven diagnostic tools that improve accuracy, startups are at the forefront of developing solutions that increase efficiency, reduce costs, and enhance patient outcomes. Their ability to quickly adapt to evolving healthcare landscapes, new technologies (like AI[5]) and regulatory environments positions them as catalysts for transformative change, making them indispensable partners in the ongoing digitalization journey of the healthcare sector.

## 3.2 A special market

Despite the legal complexity, market size and peculiarities[6] the healthcare sector, there are a many reasons to enter the sector: From my perspective, the main reasons that I founded a company in healthcare is the recession-resistance of the industry and huge opportunities for innovation with long-lasting partnerships, even between startups. In Germany, around ten percent of all newly founded startups in Q2/2023 chose healthcare as their main market[7]. Those 73 startups have to deal just in Germany with 16 different legal frameworks for data protection for each single federal state. The cost reduction for those startups that would be created just by merging those 16 slightly different legal frameworks into one country-wide framework would be immense. The healthcare market is a *very* unique one — in Germany in particular due to the deeply embedded federalism, further highlighting the importance of widely adopted interoperable legal frameworks.

## 3.3 A bright future for startups?

In my opinion, the future of the healthcare-startup ecosystem holds immense promise and potential for transformative change. We can expect to see continued innovation in areas such as telemedicine, remote patient monitoring, AI-driven diagnostics, and personalized medicine. Startups will likely play a central role in addressing persistent healthcare challenges, including improving healthcare access, reducing costs, and enhancing patient outcomes. Interoperability and data sharing standards will evolve, enabling seamless communication among healthcare systems and facilitating the secure exchange of patient information. Regulatory bodies will continue to adapt to accommodate new technologies, striking a balance between innovation and patient safety. Moreover, as the digital health landscape matures, we may witness increased collaboration between startups, established healthcare institutions, and insurers to create comprehensive, patient-centric healthcare ecosystems. Of course, the healthcare-startup ecosystem faces challenges related to regulatory complexities, where navigating stringent healthcare regulations can be a formidable barrier to market entry and scalability. Additionally, ensuring data security and privacy remains a persistent challenge, given the sensitivity of healthcare information and the growing threat of cyberattacks in the digital age.

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[5]which is in itself not a "new" technology, but is just becoming manageable in terms of processing power and funding

[6]for example, the receiver of the product or treatment is in most cases not the decision making customer

[7]Out of 692 newly founded startups, 73 were founded in the healthcare-sector

## 3.4 Everyone is needed

Despite the promising and disruptive role that startups play in healthcare digitalization, it is essential to emphasize that everyone in the field, including established healthcare institutions and government agencies, remain indispensable. As stated, healthcare is a complex and highly regulated sector, with unique challenges related to patient safety, data privacy, and public health. Established healthcare institutions bring a wealth of experience, infrastructure, and expertise in managing these complexities and ensuring the highest standards of care. Moreover, government agencies provide the necessary regulatory framework to safeguard patients' interests and maintain the integrity of healthcare systems. Collaborations between startups, healthcare incumbents, and regulatory bodies are crucial for striking the right balance between innovation and safety, ensuring that the benefits of digitalization can be harnessed effectively while upholding the fundamental principles of healthcare delivery: The synergy between startups and established players is vital for a sustainable and successful transformation of the healthcare landscape.

# 4 The bottom line

Learning from past mistakes in the digitalisation of healthcare is essential to pave the way for more successful and effective future efforts. Here are my top ten points that I see as crucial for the next years in terms of digitalizing healthcare efficient:

1. Interoperability is Crucial: One of the most significant challenges in healthcare digitalization has been the lack of interoperability among different systems and platforms.

2. Engage Stakeholders Early: Successful digitalization efforts involve all stakeholders, including healthcare providers, patients, regulators, and technology developers, from the outset.

3. Prioritize Data Security and Privacy: Breaches of patient data have raised concerns about data security and privacy in the past, policies must address the fundamental right of privacy and give clear instructions on what to do in case of data security relevant cyber incidents.

4. Healthcare Workforce Training: Providing comprehensive training for healthcare professionals to effectively utilize digital tools and navigate the changing healthcare landscape.

5. Avoid Over-Complexity: Some digital healthcare projects have failed due to over-ambitious goals or overly complex technology solutions. Simplicity and a focus on solving specific problems or improving specific processes can lead to more successful outcomes.

6. Regulatory Alignment: Regulatory frameworks need to evolve in tandem with digitalization efforts. Past mistakes illustrate the challenges that arise when regulations lag behind technological advancements. Close collaboration between regulators and innovators is essential to strike the right balance.

7. Support Startups and new ideas. To challenge the *status quo*, we need to implement new approaches and ideas into the current system.

8. Ethical AI and Data Analytics: Implementing ethical AI and data analytics practices to harness the power of data for predictive analytics and personalized medicine while respecting patient privacy.

9. Change Management is Critical: Resistance to change is a common hurdle in healthcare digitalization. Successful projects prioritize change management strategies to help healthcare professionals adapt to new technologies and workflows.

10. Transparency and Accountability: Transparency in data handling and accountability for errors are vital components of digital healthcare. Mistakes made in the past underscore the importance of clear communication, responsibility, and accountability in healthcare data management.

Wrapping up, I am quite hopeful on the development of new digital approaches in healthcare, including new emerging fields like artificial intelligence. It remains to be seen on how the policy makers will handle the ever increasing velocity of the market, which needs sooner than later clarity on national demands and international co-operations in legal frameworks. Including the private sector, patients and professionals in the field can help in creating practicable policies which fit the market demands while providing strongly needed data security.

If we do all that, give it a few years and wait for the stars to align, I'm certain that *one day* there will be a "doctor's prescription arrives as a friend request on *Facebook*" - while keeping personal data safe and give space for emerging technologies.