With embedded contributions, interviews and perspectives from:
Simon Sinek, Daniel Kraft, AnneMiek Vroom, Hal Wolff III, Bart Brouwers, Bart Timmers, Peter Bennemeer, Anya Kravets, Jules Lancee, Marco Derksen, Marie Johnson, Martijn de Groot, Chris McCarthy, Michiel Muller, Bert Vrijhoef, Rene Bleeker, Tom vd Belt, Claudia Rijken, Maarten van Rixel, Jörn-Ole Stellmann, Shawna Butler and Maarten Steinbuch amongst others.

“Entrepreneur Lucien Engelen has extraordinary vision about the future of health and care. He was the first to conceive a TEDx focused mainly on patients, the first to declare that health conferences MUST bring patients, the first to innovate a medical school curriculum with patients’ advice. A man of insane energy, broad experience, unstoppable passion and clear vision, he has worked tirelessly to inject “patient DNA” into the future of medicine. Work hard to see what he sees. Help make it real.

ePatientDave, Dave de Bronkart
 patiënt-activist

As the founding director of the REshape Center and Advisory of the Executive Board (at Radboud University Medical Center in The Netherlands), Lucien Engelen already helped shape innovation in healthcare for almost a decade. Next to that as of spring 2018 he was appointed as a Edge-fellow of the Deloitte Center for the Edge were he acts as Global Strategist Digital Health. Since 2011 at Singularity University USA he is core faculty of Exponential Medicine track.

“He is too harsh on himself. The message of this book is not about the latest technology, but about broader themes. His first-row observations on the nature of digital innovation, organizational resistance and the still often-neglected effects of consumerization may (yet) lack scientific rigor, but more than make up for that by their candor, hands-on learnings and valuable insights.”

Daniel Kraft MD,
Stanford & Harvard trained MD-Scientist, Aspen Institute Innovation Fellow, Medicine Chair Singularity University and Founder Exponential Medicine

“As the world of technology spins around at an exponentially increasing clock-speed, this book is outdated at the moment I'll publish it”

Lucien Engelen
Author of this book

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AUGMENTED HEALTH (CARE)™

LUCIEN ENGELEN
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Introduction to Augmented Health(care)™, “the end of the beginning”

Be my guest: You can read this book in 5 major themes, that can be read separately as well.

Theme 1. What’s been going on?

In 2007 the first iPhone was introduced, changing the way we interact with technology forever. Who would have figured, back then, that these powerful supercomputers in our pocket would become an important part of data collection for medical purposes and clinical trials? The world has changed fundamentally since the turn of the century: technology grows with exponential speed. “Omnia mutantur nos et mutamur in illis”: Everything changes, and we change with it.

That notion seems even more true in 2018, and beyond. The way we interact with new technologies has changed our social, cultural and economic systems, health(care) included. We are entering a world of Augmented Health(care)™, as I coined it.

What are the main changes I have witnessed in healthcare and technology in the past eight years I’ve been in health(care) innovation and part of ‘the system’?

Theme 1, will touch upon some major developments, from an international perspective. With a number of noted guest con-
tributors, I will dive into the emergence of #patientsincluded™ and #nurseincluded™ as an unstoppable force, the digitization of the healthcare sector and the need for alternative business models, coming from international tech companies such as Apple, Amazon, Google, with a strategic focus on healthcare. We will start with the earliest uses of the Internet in healthcare – mostly as a source to search for medical information – and fast forward to crowdsourcing medical data and novel ways of doing clinical research.

We will share about the future of real estate. At Radboudumc, we are about to begin the biggest real estate transformation in years, building a hospital that is fit for the future. But how do you build a future-proof building in an era of exponential technology? It’s like building a plane in mid-air.

As Rene Bleeker points out: a strategy must be built on bricks, bytes and human behavior.

These are not abstract visions, these are the things that are happening right now, this very moment. Want to know what’s been going on in healthcare? Start here.

**Theme 2. Cracks in the system**

As we continue to live longer, we are not necessarily living healthier: more and more people develop one or multiple chronic diseases, which will cost money and demand services in terms of healthcare. We will have a huge number of people that are moving into retirement age: a “silver tsunami”, as HIMSS CEO Hal Wolff calls them in his contribution. These are the economics that will drive the next ten years in our healthcare systems.
What are these “cracks” in the system? How do they manifest? This theme will not only focus on the increasing pressure that (inter)national healthcare systems are facing. As I will argue in this book, our medical systems mostly consist of logistic processes I reckon 80%: only 20% of our time and energy goes to medicine. Solving the current inefficiencies in this system could be a possible solution. Therefore, we need a new perspective on supply chain management, providing service and customer excellence, as experts from outside healthcare are eager to point out (see, for example, Michiel Muller’s vignette: “We need to optimize the chain with the use of data”).

At the same time, digital healthcare seems like a different planetary system. We come up with separate names, separate reimbursement models and separate workflows when it comes to digital health(care). And as long as a separate digital portal or an app per institution to access your medical records is needed, a challenge (at least, in the Netherlands) remains, we will continue to experience inefficacy and information asymmetry in healthcare. The only solution to stud these cracks in our system is to fully embrace the digital transformation.

Theme 3. Taking part is the only way

“Stop talking, start doing.” It seems so simple, yet most people find it so hard to make the first step and just begin. It’s is one of my mantras that I must have shared almost a thousand times on stage: taking part is the only way. We’ve seen over and over again the hurdles we’ve discussed in all of those sessions prior to the start, in the end, appeared to be different ones. You have to get your feet wet, get into the mud and take the messy, slippery road of innovating in healthcare. It is the only way to excellence in the end. You neither can’t learn how to bike from a book, can you?
In this theme, the learnings and experiences from the REshape Center, the innovation department at the Radboud University Medical Center that I was granted to found in 2011, take a central place. How do you “manage” innovation? How do you prepare an organization – in our case, a university medical center with 13,000 students and professionals – for the future? What can you learn from our mistakes?

Theme 3 takes you on a – by no means all-encompassing - guide for innovation. What is a “moonshot project”? Why is focusing on the “day after tomorrow” so important, yet so hard for most teams or organizations? How do you tackle resistance in your team, amongst your colleagues or in your board? What is the role of leadership and management in organizations when it comes to innovating?

For those interested in our journey of innovation at REshape: I have included some of my memories and recollections in this theme as well, by including some of my LinkedIn blogs (still stunned it has over 750,000 followers already) from earlier days to give some perspective. I have not only been using Gartner’s Hype Cycle to handle the predicted breakthrough moment of technology, but we used it internally as well, as I noticed that every innovation project was roughly going through the same phase of the Hype Cycle. I started to try to influence a specific portion of it, more as a guidance of how projects evolve. Speeding up the Hype Cycle, in my opinion, could increase the actual access to and use of innovation and adoption of the #patientsincluded™ model.

**Theme 4. Digital Strategy**

The digital evolution is impacting the way we work, the resources we use, and the nature of technology itself. If orga-
nizations hope to respond swiftly to change, reap the business benefits of new digital innovation, and attract top-tier talent in the future, their operating model must evolve accordingly into a digital TOM (Technological Operating Model).

For a lot of organizations, however, the digital strategy that they have identified does not fit their current (traditional) OM: it’s like trying to fit a UK plug into a US Power socket or to fit a square peg into a round hole as they say. I have joined forces with Deloitte, to translate into health(care) the nine significant shifts they’ve identified that will influence the model of the future and that need to be discussed in conjunction with each other since they are highly interdependent.

This theme is the strategic core of this book. It is not a handbook, nor a blueprint or a generic approach. Consider this ‘Digital strategy’ merely as the start of a framework for the different steps one could set to see whether or not they’re ready for the things that lie ahead and to offer some assistance.

**Theme 5. This revolution will not stop**

A book on healthcare innovation would not be complete without a brief look into the future. I am grateful for an international team of guest contributors to share their vision of healthcare in 2030, whether it is the future of pharmaceutical care (Claudia Rijcken), the digital skillset that is needed in an exponential age (Daniel Kraft) or how an average day of a general practitioner looks like (Bart Timmers). These vignettes will transpose readers to the future of healthcare.

In this final theme, I share my own vision on the future of healthcare as well. We will be entering an era of Augmented Health(care)™, a layer of smart technology and data that comes
around us and that helps us make better decisions. With us, I mean everyone who is involved in the healthcare: care providers, patients, family, government, industry and informal caregivers. Whether that layer is projected via glasses or in another way such as on your phone, refrigerator or smartwatch, is not that important.

What matters most is that in the future, everyone will have exactly the information they need to be able to do their profession or work well, follow a therapy well, or receive the right information at the right time. With Augmented Health(care)™ healthcare professionals and patients are given digital tools to process and analyze the ever-expanding oceans of data in a meaningful way.
“Omnia mutantur nos et mutamur in illis”: Everything changes, and we change with it.

The world is changing, society is changing, technology is changing, and so health(care) is. And it does so at ever increasing speeds. Platforms like Facebook, Youtube, Spotify, and Amazon have entered our life and are here to stay. Many of these platforms did not exist 15 years ago, and some of them will no longer exist 10 years from now. Healthcare apps for smartphones, portals and big corporate electronic health record (EHR) systems struggle to adapt to a new reality where algorithms and platform thinking emerges. Where patients are in control of their own personal data. And where everything is INTERconnected and traditional healthcare systems (still) are just INTRAconnected. They will enter the ‘End of Life’ phase of their current product cycle.

While many digital health critics at present address privacy and security issues - next to the looming market domination by modern tech-titans - I expect these new global corporates will be compliant to the European GDPR sooner than many of our healthcare institutions. And although I share the worries on the risk of monopolization by tech corporations, I trust the current and future governance systems to handle this. Even though we will see hiccups on the way like recently with the ‘Cambridge Analytica files’ - officially not a ‘data breach’ but a flagrant crossing of ethical borders - I believe that law will follow the practice.
New players like Apple, Amazon, and Google (Verily) first explored the healthcare scene and now aggressively fight for (the data of) patients, offering a consumer-friendly user interface and removing the friction that the traditional silo-structured healthcare industry has been reluctant to address. Meanwhile, these tech-titans create interconnectivity ‘by design’ and on a global scale. Together with their ambition to enter the health(care) domain at an increasingly speed as you can see in this graph below. In it I have pictured the announcements of these non traditional players into the healthcare arena over the past year, starting May 7th 2017. I think this picture needs no further explanation.

We have entered the fourth industrial revolution where everything will connect with everything. In this book, I elaborate on the four pillars of change that I sense healthcare is facing: Delocalisation, Democratisation, Digital, and Dollars, hence my 4D’s.

Why are we at the “End of the beginning”?

I think this current digital transformation is at the “End of the beginning”. In an era where data will be continuously and
easily gathered, analyzed for new patterns and used for machine learning at meticulous speed, technology will ‘augment’ the way we deliver health(care). Not only in industrialized countries: due to the increase of network coverage, Augmented Health(care)™ will become accessible for all people all over the world, supporting citizens to stay healthy and professionals to help people with a condition even better than today.

Some people try to change healthcare by focusing on the quality of care and service. Others focus on safety or healthcare economics. I choose to focus my research on the impact and opportunities digital technology can bring, transforming health(care).

Healthcare has been subject to waves of change in the past centuries when developments came together. We are on the brink of a new wave right now. Although we all want to progress and we need more sustainable health(care) to cope with societal challenges such as aging populations, we also face a daily struggle with implementation of new tools. In this daily struggle important issues like workload, reimbursement, policies, culture, knowledge, and information are all roadblocks in the way to a gentle transition. We need to remove these roadblocks and change the way we educate and train health(care) professionals, change the way we pay for health services, and change how we measure and research digital health(care).

It requires continuous awareness of the ever-changing technological horizons. It requires a thorough implementation of those innovations and the incorporation of digital tools and a digital mindset in daily workflow, becoming “the new normal”. It is almost like building a plane while it is already in mid-air. Maybe we should call this an ‘adaptive digital transformation’.
This book is not a guide, nor a plan. Health(care) organizations, their contexts, and their cultures are different. These external and internal influences vary in each and every organization, so there is no blueprint for innovation. Hopefully, this book will offer some guidance on the next steps, to take on the challenges that lay ahead of us.

I have stepped into this arena almost seven years ago, starting with a shared ambition and the notion to address change. But there was no detailed, worked out plan at REshape, the Center for Innovation in the Radboud University Medical Center, back then. In these early days, we’ve experienced that a shared vision and awareness are powerful motivations for change.

Adjusting over time to the level of awareness, we now face a bigger overhaul, because our organization is ready for the next steps. Creating awareness, inspiring people, creating concepts and a compelling vision alone are not enough anymore. We now need to address the “how-to”-question. How to create meaningful digital tools for professionals and patient, how to organize and align stakeholders, how to scale digital health solutions?

This “how-to” has not been done yet. To me, it appears that a whole network of healthcare innovators across the globe is struggling with the same issues. Some organizations and individuals have a plan, some have partial success, some fail. It looks like we are all ‘writing the book’ as we speak, and yet we need to create tempo and build capacity.

Back then when we started REshape, I would have loved to have a book to learn about that first phase. A tour d’horizon of what is next when you start working on health(care) innovation. While some people think their organization can surpass that first discovery phase, or simply hire someone to come do this
or even stop exploring and testing at one point in time, I would urge you that this exploration is vital. You really have to ‘live’ through this phase with your own people. You have to “feel the joy and the pain” as my friend Chris McCarthy - who ran the innovation center at Kaiser Permanente for twenty years - likes to say. What I am saying is: you can’t learn how to bike from a book. To innovate in healthcare, you have to experience it.

Although the current increase of demand for scaling is valid, there also is the risk of losing sight on the constant change that will be permanent if we only focus on scaling. The world will not pause to change. There should be a fair balance in creativity and room for exploration, and meanwhile implementation and scaling.

In the journey towards this publication, I interviewed some great friends that we have partnered with over the past years. Some of them have written a brief perspective on the changing healthcare landscape. They enrich the broader picture with their ‘vignettes’ throughout this book.

This book is merely a reflection on the seven-year innovation-journey at Radboud University Medical Center (Nijmegen, The Netherlands), my work as faculty member at Exponential Medicine (Singularity University, Silicon Valley) and as CEO of my small company Transform.Health. At all of these positions, I have always been aiming to create sustainable health(care) change together with great professionals, with patients, and with the latest useable technology.

All my personal and professional learnings, the joy and pain, the lessons from others and my observations: they come together in this book, Augmented Health(care)™. I wish it was available as a direct ‘download’ from my brain, but since we’re
not in that exponential era yet and since there still is no USB plug in my brain, we had to write it down ourselves ;-) 

The way this book came about is a journey in itself, with the use of modern and classical tools and means. You can learn more about in the chapter “how this book was made”.

The combined mission of my work at REshape and my other endeavors was and still is to help prepare healthcare for a soft landing into the future. I do hope sharing these reflections and assumptions with you can inspire, assist, and help you to (re)think and encourage you to see the opportunities in this current era, to change health(care) for the better.

I’m grateful for the past and current executive board to have the courage, the boldness, the vision and trust in sending me out there to be their scout, ambassador, and rebel for change. Everybody thinks they’re innovative, but it takes more than throwing some money against the wall and put up a shield “innovation center’. The majority of the things they allowed me to have a long lead-time, before having any impact. There is a lot of tokenism in health(care) innovation, and some think you can change or even fix health(care) overnight. It is not about technology, nor about the process, it is about changing the culture of an organization. As we know culture eats strategy for breakfast. So sticking in there with me for over seven years, so past the ‘seven years itch,’ is to their credit.

All of this takes time, dialogue, and understanding from those surrounding us. There is no quick fix, no silver bullet, and our world will never stop changing. So get on with it!

@lucienengelen, 2018