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Deliberately Digital

Rewriting Enterprise DNA for Enduring Success

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Deliberately Digital

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Foreword

For the last 20 or so years, I have had the privilege of witnessing and participating in the development of the economics of the digital economy. My academic home, the Toulouse School of Economics, has been in the forefront of the development of the theory of platforms, in particular, through the work of my colleagues Bruno Jullien, Jean-Charles Rochet, and Jean Tirole in respect of two-sided markets.

It has also been my great pleasure to discuss and argue with many policy-makers in both public and private spheres about the application of these theories to the practical problems which they face. Among these discussions, those with Hubert Tardieu and his colleagues at Atos stand out in two respects. Firstly, Hubert and his collaborators are deeply involved in the day-to-day challenges faced not only by Atos, but also by its many clients. They search for practical, concrete, and applicable solutions. Secondly, they also understand more deeply than most that these solutions can only be useful if they rest on a rigorous, practical, and tested conceptual framework. We have had great discussions exploring the ways in which economic theory informs business practice and the ways in which business practice challenges economic theory.

Now, as "Deliberately Digital" makes clear the authors read and absorb not only economics, but also business strategy, sociology, and other relevant areas and scholarship. And, furthermore, they are great technologists. The result will be invaluable to many managers who must guide their organizations through our turbulent and exhilarating times. They will find a framework for organizing their thinking—I probably should have written frameworks: The authors make clear that one needs to combine different ways of thinking to make sense of the complexity of the problems that decision-makers face. They will find practical advice, informed by more than a century of collective experience(!), on how to put these frameworks to work for the benefit of their organizations and their customers.

I hope that "Deliberately Digital" is also read by public decision-makers, regulators, and my fellow academics. It provides a unique window on the concrete, real-world challenges created by digital transition and will help them understand how our regulatory frameworks, education policies, and public investment strategies can help firms, non-profits, and public administration meet these challenges

(as well, of course, as ensuring that the technology is indeed put to use for the benefits of citizens). The seven detailed industry case studies at the end of the book will provide useful material to start along this path.

As all good books of this type, "Deliberately Digital" will be the focal point of many discussions. The managers who use it as a guide will want to share their experience, and I hope that the authors will create a forum[1] where they can do it. I am looking forward to taking part in those discussions.

October 2019   Jacques Cremer
                                                 Professor, Toulouse School of Economics
                                                                        Toulouse, France

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[1]https://deliberatelydigital.com is available as a central information point for a discussion forum relating to the topics raised in this book.

Acknowledgements

About This Book

Digital is changing almost everything in the world of business. However, most attempts at enterprise digital transformations fail—largely because of a lack of coherent strategy and the absence of an effective transformation plan. Deliberately Digital takes the lessons learned from the rise of the digital platform giants and explores how they can be adapted and effectively applied to established businesses, allowing them to compete within this new business paradigm.

Taking a holistic view of the business and technology landscape, this book describes the megatrends, evolution, and impact of digital technologies and related business models. It brings together what for many is a disjointed set of business transformation imperatives and creates a realistic guide for digital success.

Using the authors' decades of experience in supporting transformation and innovation, this book lays out a path to progressive iteration of business change and value realization, balancing the perspectives of revolutionary transformation and change-enabling optimization. All authors' royalties from the sale of this book are being donated to "ATD (All Together in Dignity) Fourth World", a movement of solidarity against poverty. This is an international non-governmental organization with no religious or political affiliation. https://www.atd-fourthworld.org.

Introduction to Deliberately Digital

Abstract

Digital Transformation is now a business imperative for every company. Those businesses that are currently lagging behind in the realization of the potential of digital technologies need to act in a way that intentionally delivers the kind of radical changes that will alter their very corporate DNA. Those businesses that are digital start-ups or leading adopters need to embrace continuous innovation and transformation if their models are going to bring lasting success. Whatever the starting point, a deliberate strategy for digital business will be the key to future and on-going business success.

Transformation—A Compelling Need

The advent and maturing of digital technologies have already had an immense impact across all sectors. In the consumer and media market, this is evidenced by the rise of the so-called digital giants (including Google, Apple, Facebook, Amazon, Alibaba, and Netflix). In manufacturing, through Industry 4.0[2] (initially crafted in Germany 8 years ago), we have seen the emergence of a significant new trend which started with the automation of production and has led to the launch of data-driven industrial smart services. In financial services, we see disruptions like open-banking platforms, Pay as You Use insurance, and cryptocurrencies. And now in 2019, at the time of writing this book, we are entering into the age of autonomous systems and artificial intelligence. But with all the incredible digital success stories, there also comes a host of examples of previously viable businesses that are struggling to both embrace and compete with the power and speed of digital. Indeed, there are questions now raised as to whether it is even possible for them to transform in ways and at a scale and pace that will fully re-establish their ability to compete.

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[2]Industry 4.0 describes the trend toward automation and data exchange in manufacturing technologies and related processes.

Data—A Powerful Ally

At the heart of business success in the digital age is data. Data drives knowledge and insight; data informs and enables customer engagement; and (used appropriately) data is an intrinsic source of new value propositions and efficiency—bringing operational, tactical, and strategic advantage. We can distill these driving characteristics down to:

- Enabling "*Intimacy with customers*" through value-added, contextualized, differentiated, and trusted engagements. In this context, a customer is seen as any entity that is in receipt of products and services within a supply chain.
- Enabling "*Scale in operation*" through efficient, informed, responsive, and scalable processes. This dimension is concerned not only with scaling up but scaling out across networks of business opportunity.

The mission for businesses that want to reach digital leadership status is to achieve both these outcomes concurrently. For digital start-ups and new market entrants, that typically have digitally enabled customer intimacy as a given, the challenge is one of efficiently and effectively scaling their operations to drive market share and influence. For market incumbents who currently enjoy market share (albeit supported by legacy business models), the challenge is one of transforming their approach to customer intimacy to defend against new entrants and grow their market further (Fig. 1).
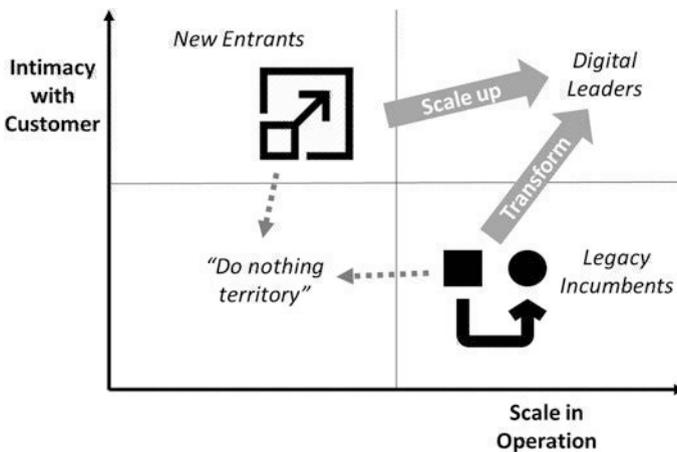

Fig. 1 Routes to digital leadership (authors' own figure)

The Path to Digital Leadership

The nature of the required transformation or scale-up is dependent both on the business's current operating models and the characteristics of the market in which they operate. The question prevails: Which will prove to be the winning course?

What is clear is that failure to appropriately and deliberately respond to the challenges and opportunities presented by the relentless evolution of digital technologies will lead to inevitable decline in business performance and relevance.

This book will explore the forces at work in the new "economy of data" paradigm and will show how businesses can successfully navigate the path toward digital leadership.

In Part I, we look at the imperative for digital transformation considering the factors that can enable and hinder both customer intimacy and operational scalability.

In Part II, we examine the target model for achieving digital leader status, paying particular attention to data-centric platform[3] models, a common operating model of many of today's digital giants.

In Part III, we consider the transformation journey options facing a business wishing to move from legacy incumbent to digital leader, whether this be via digital optimization or business model reinvention.

Old Paradoxes, New Thinking

For the past 30 years, we have seen Information Technology being applied in the transformation of business processes and capabilities; however, from the perspective of some, this has been tempered by the Solow paradox: "*You can see the computer age everywhere but in the productivity statistics*" (Solow 1987). As we enter the third decade of the twenty-first century, can and how will digital transformation address this paradox?

In the business world, we are seeing two major trends:

The first is the emergence of the *Economy of Data*. For two centuries, industries have tended to be fragmented into defined value chains, where every player is specialized in the production of goods or services which, when combined, bring an optimized production process. At every stage of the value chain, competition operates to enable cost reduction and profit maximization. Only recently have businesses realized that they were creating data which could be combined by the various players of an ecosystem to create mutually beneficial additional value.

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[3]A *platform* is a business model that facilitates (data-driven) value creation and exchanges between interdependent groups of consumers and producers. Please refer to the Glossary at the end of this book for a more complete synthesis of platform variants.

Coase in his famous theorem[4] describes the economic efficiency of resource allocation in the presence of externalities (costs or benefits to a party who did not choose to incur them). The theorem states that if trade in an externality is possible, and there are sufficiently low transaction costs, bargaining will lead to the most efficient outcome regardless of the initial allocation of property.[5] In short, industrial data (often seen as an externality) can be traded within an ecosystem of partners to bring a value outcome which might otherwise be prevented by systematic competition.

In some part, the rapid growth of the economy of data has been achieved thanks to gaps in data privacy regulation: In Europe, regulations now require prior consent from data subjects, applying control over the usage of data after such consent has been given; in much of the rest of the world, the jury is still out as to whether privacy belongs to the past or if it is an essential constituent of national policy. This could well be a deciding factor in the viability and effectiveness of emerging digital business models.

The second trend, *Artificial Intelligence*, perhaps has a higher profile because it delivers mythical promises of data being processed in such a way that industrial processes (through machine learning and algorithms) can be automated without predefined reasoning devised by human beings, the dream being that of autonomous industrial productivity gains through the simple accumulation of data. However, this dream still seems a distant one, since first implementations have shown the necessity to rely heavily on human experts for labeling valid outcomes of the learning algorithms. We also have seen notable failures of AI applied to the Health sector, driving one of its pioneers to wonder whether industry was actually ready for AI. Could we be witnessing the next iteration of the Solow paradox?

In this book, we shall address three questions which we have repeatedly been asked by businesses facing the challenge of digital transformation:

1. Why do we need to undergo digital transformation?
2. What will it mean for my company?
3. How can I ensure a sustainable digital transformation?

We believe that the time has come to propose a set of principles and a methodology to help business leaders bring new thinking to the design of a sustainable digital transformation which anticipates the challenges they will have to face.

It is critically important to recognize that success in transformation is far from being a technology-only problem. Consider the following quote from "The Second Machine Age" (Brynjolfsson and McAfee 2016):

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[4]https://www.investopedia.com/terms/c/coase-theorem.asp (accessed 26/10/2019).

[5]Economists call it a Pareto optimum which is a resource allocation where there is no alternative that would put the players in a better position.

> *Years later, when that hallowed General Purpose Technology electricity replaced the steam engine, engineers simply bought the largest electric motors they could find and stuck them where the steam engines used to be. Even when brand-new factories were built, they followed the same design. Perhaps unsurprisingly, records show that the electric motors did not lead to much of an improvement in performance. There might have been less smoke and a little less noise, but the new technology was not always reliable. Overall, productivity barely budged. Only after thirty years—long enough for the original managers to retire and be replaced by a new generation—did factory layouts change. The new factories looked much like those we see today: a single story spread out over an acre or more. Instead of a single massive engine, each piece of equipment had its own small electric motor. Instead of putting the machines needing the most power closest to the power source, the layout was based on a simple and powerful new principle: the natural workflow of materials.*

The "new generation" which was a catalyst for transformational impact in the second industrial revolution is now happening in the context of the IT and digital revolution. Could the resulting cultural change be the means of finally delivering the full potential of digital?

References

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About the Authors

Hubert Tardieu is Advisor to the Atos CEO and Co-chairman of its Scientific Community created in 2009 and comprising Atos' 150 best scientists. The Scientific Community contributes to building the five-year vision for Atos and publishes its report every 2 years. He has been Member of the Executive Committee successively in charge of telecom, finance, and more recently consulting and systems integration. He is author of several books on information system design methods.

David Daly has worked within the technology industry since 1999 in a variety of roles ranging from software engineering and leading development teams, through to driving operational excellence and Agile and DevOps transformations.

He is a Fellow of the British Computer Society, a Chartered IT Professional, and a regular public speaker who has a passion for proving that alternative approaches can produce better results.

José Esteban-Lauzán has been working passionately in Innovation and R&D since 1997. He has directed large international research projects and driven transformation initiatives in the public and private sectors.

José engages with clients on transformation and thought leadership, supports innovators and intrapreneurs, mentors young talent, and likes to challenge the status quo.

José is heavily involved in technologies such as artificial intelligence and additive manufacturing, with a current focus in unpredictability and machine behavior.

John Hall is a Chartered Engineer who has over 30 years' experience of working in a variety of industries, but always with an IT and digital transformation focus. He has a passion for innovation and change leadership, with a very hands-on approach to exploring the potential of new technologies. He is a regular public speaker who enjoys inspiring others to think differently about digital disruption. Current areas of focus include blockchain, quantum computing, and ethical considerations for AI.

George Miller has spent his entire career as a product and services innovator, and for the last 20 years in business technology innovation working across all industry verticals and for clients that include a number of the world's leading firms. His current research interests include new business models, autonomics, artificial intelligence and mixed reality.

Introduction

Abstract What do we mean by "digital" and how has the historical advancement of technology led us to where we are today? Which business and societal trends must be understood? What are the key technologies that organisations must leverage now, and which ones should they be planning to harness in the future? We analyse why many digital transformations struggle to deliver the expected benefits and explain why we believe that a deliberate strategy for ongoing transformation, which requires that the very DNA of an organisation must be re-written, is necessary in order to achieve digital leader status.

In Part I, we will be focusing our attention on the imperative for digital transformation. In doing so, we will consider various forces at play from technology, society, and business trend perspectives and explain how these are interacting to drive seismic shifts in the way that value is both perceived and delivered.

We will contextualize why we have condensed the measures of digital success down to the two axes of "*Intimacy with Customer*" and "*Scale in Operation*" and discuss what is behind these somewhat nebulous terms. We will not be exploring how best to influence the progression along each axis (i.e., the objective of Part III); however, we will be signposting the opportunities and challenges to be faced (Fig. I.1).

It should become very clear that not only has the game changed in terms of the possibilities afforded by rapidly evolving digital technologies, but the rules of the game have changed as well, particularly in terms of customer expectations, perceptions of value, and perspectives on how and even if those possibilities should be adopted.

Digital can be a significant enabler of customer intimacy, but it can also be a huge constraining force if used inappropriately. Gaining and maintaining intimacy with customers is so much more than seeking to understand and influence their buying behaviors. It involves demonstrating deep insights into their market, building credibility, trust, and even shared-value partnerships. In business-to-
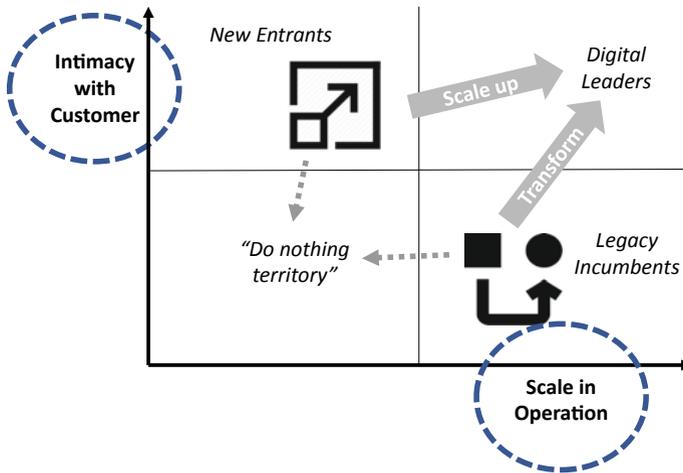
Fig. I.1 Driving forces behind digital leadership (authors' own figure)

business relationships, it might demand the creation of trusted ecosystems of data exchange that support integrated and orchestrated supply chains. Failure to get the balance right will risk businesses being left languishing in the zone of legacy, with ever-declining relevance in the markets in which they operate.

With regard to "*Scale in Operation*," once again digital technologies are key enablers, but the focus cannot solely be on ruthless efficiency and vertical integration[1] of supply chains, but also on understanding and leveraging the dynamics of multi-sided markets and value networks.[2] Scale in operation demands agility and flexibility in response to data-driven insights about market demands and trends.

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[1]"A strategy whereby a company owns or controls its suppliers, distributors, or retail locations thereby controlling its value or supply chain" https://www.investopedia.com/terms/v/verticalintegration.asp (accessed 26/10/2019).

[2]Platform-driven enablers of incremental value creation through direct interactions and exchanges between two or more customer/supplier groups.

The Birth of Digital—A Brief History of Digital Technologies

1.1 What Is "Digital"?

What exactly is "digital" and how did it ever become "a thing"? The term digital has become the kind of complex, multilayered, hyped, and overused concept that often obfuscates more than it reveals. We tend to use it rather glibly and confidently, never quite stopping to reflect on its precise meaning because, well, everybody knows what we mean! As a result, we may think we have successfully communicated about it when, in fact, people's understanding of digital is far from binary and may be open to substantially different interpretations.

As a polysemic, multilayered term, it allows many definitions. The science- and tech-savvy may define it as the representation of information using binary digits (ones and zeros) or perhaps as all the technologies based on data that are represented in this way. Those who are more business-oriented may understand digital as a purpose, giving rise to business models that are (mostly) based on the virtual world, with an emphasis on intangible assets (such as digital data) to tap into new sources of value. Such people often use digital as shorthand for the strategy that will, hopefully, lead to the attainment of such a purpose. Marketing-oriented people might refer to digital as a new form of consumer perception and engagement based on digital technologies. Many people, across the whole spectrum of backgrounds, will define it as one of the biggest fads so far in the twenty-first century.

Based on the numerous engagements and collaborations that the authors have had with clients and partners, with the objective of trying to maintain a clear business focus and for the context of this book, we propose the following pragmatic definition:

> Digital is a mindset that seeks to leverage technology, data, and ways of working to establish new business and service models for the achievement of a higher purpose and value.

1.2   The Transformation Imperative

The first successful digital businesses are known under a variety of nicknames such as "Digital Giants," FAANG (Facebook, Apple, Amazon, Netflix, and Google) or "the Digirati".[1] They are seen by some as the benchmark against which other businesses are measured in their digital efforts. They have grown at lightning speed into huge companies that have reached quasi-monopolistic status in their foundation markets and even in adjacent ones. And this is precisely why all businesses (including public sector organizations) feel the pressing need to digitally transform. If traditional companies and organizations do nothing to embrace the possibilities and tap into the new sources of value that digital technologies bring, they seem destined to disappear or wither into entities that hold only vestigial value.

1.3   The Timeline of Digital Technologies

Digital is the result of nearly a century of discoveries and developments which have recently started converging into vortices of significant possibility and radical change. But even the early phases of the digital revolution brought impressive economical, lifestyle, societal and business growth during the second half of the twentieth century driven by conceptual and implementation breakthroughs in key areas of information and communication technology (ICT). Information theory, microelectronics, and radio communication were the cornerstones for the exponential growth of information storage, computing, and telecommunication.

Personal perceptions of digital differ quite widely, partly because people have lived and experienced different parts of the history of digital technologies and their impact. Let's take a quick walk along the technology timeline to understand why those different perceptions have arisen.

In its infancy, in the 1940s, computing technology was essentially limited to military/defense applications and was embodied in a very few, almost prohibitively expensive machines that occupied entire rooms, weighed many tons, and had ridiculously poor storage and compute capabilities compared to today's standards. Beyond the real specialists, few people knew what digital meant, and most would still think of a person, not a machine, when hearing the term "computer."

By the 1960s, ICT had found its way into corporations, in the form of very expensive large cabinets (mainframes), which were manipulated by specialists and whose use was rationed (queued). By the 1980s, computers were becoming much smaller and more widespread across all kinds of organizations; personal computing was starting to emerge with PCs finding their ways into homes via practitioners, hobbyists, teenagers, and children. During those decades, mass media and

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[1]A term that refers to the "digital literati": organizations or individuals that are well versed in digital matters (technologies, business models, etc.).

audiovisual information were distributed and exchanged via analog means on physical media: vinyl records, audio cassette tapes, and cassette-like videotapes, which were played on expensive and bulky reproduction machines. And, of course, we had paper-based books, magazines, and newspapers.

By the 1990s, computers were commonplace both at work (one per desk) and at home (with their use climbing up the age ladder toward parents). Analog media began the transition to digital media: CDs and DVDs which were much lighter, more reliable, and more capacious than their analog counterparts. The 1990s also saw the appearance and popularization of mobile phones and the Internet (the World Wide Web or Web). The latter enabled the interconnection of the many millions of computers that had until that time been islands of compute power. This in turn led to the mass creation and consumption of electronic content around the world (though mostly using just text and low-fi images). E-mail address lists were the social networks of the day. Phones were basically just phones: good only for talking through and perhaps listening to music, albeit on the move. The second half of the 1990s saw the birth of Google, Amazon (an online bookseller in its early days), early social networks such as Myspace, and online forums.

In the 2000s, the Web had reached a significant proportion[2] of the population, e-commerce became widespread, and peer-to-peer (P2P) protocols emerged to cope with bulky information exchanges at a time when broadband Internet access was nonexistent or a luxury. By the mid-2000s, next-generation social networks appeared (e.g., Facebook). Physical digital media (CDs, DVDs, mp3 players) started being virtualized through real-time streaming, and Netflix appeared and wiped Blockbuster out of the picture—Blockbuster eventually filed for "Chapter 11" bankruptcy protection in September 2010 (de la Merced 2010). Then, the arrival of the iPhone began an inexorable revolution of personal mobile computing, ushering in the era of the handheld personal computer (the reference to "phone" in the device's name was mostly a tongue-in-cheek allusion to the past). Newspapers and magazines also began making their transition to the Web during this decade, most of them in a reactive rather than an intentionally transformative way: not exploiting the full potential of the Web but directly transposing their paper formats and mind-sets over to the electronic world.

This decade also saw the market adoption of fundamental technologies such as big data, after Google's MapReduce paper (Dean and Ghemawat 2004); cloud (led by the bookseller Amazon); and geospatial (location), with Google Maps taking the world by storm. At this stage, computers, tablets, and smartphones (with intuitive user interfaces and purposeful applications) were making it easier for "seniors" and less technology-savvy consumers to enter the digital world.

Around a decade after the introduction of the iPhone, we can ask virtual assistants for directions, which we get immediately, accurately, and for free (in purely monetary terms, at least); we can find almost anything we want and purchase

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[2]1.8 billion Internet-connected people (>25% of global population) by December 2009 according to https://internetworldstats.com/ [accessed 26/10/2019].

it immediately, paying for it via a seamless process (if required); we interact virtually with family members, friends, or colleagues as much as (if not more than) we do physically; we can find training courses on almost any topic in three taps or swipes of our fingers.

However, the 2010s have also seen something of a rebalancing or even a tipping point where the utopian possibilities of digital technology developments are being tempered by the emergence of less positive consequences. The FAANG have consolidated into digital juggernauts that continue to exploit platform economy first-mover advantage, lack of industry regulation, and data protection illiteracy of the masses to acquire and maintain near-monopolistic positions. The popularization of digital technology, coupled with the inherent anonymity of the Internet, has led to unintended consequences such as cyber-bullying, cyber-stalking, fake news, and opinion echo chambers which, rather than helping people communicate and understand each other better, have isolated them into communities of like-minded people, radicalizing some areas of society into highly polarized and confrontational segments. Such negative aspects are under the spotlight at the very end of the 2010s because of their unexpected nature, and because the record speed of adoption of the underlying technology was largely driven by a somewhat positively biased view of their benefits.

The decade of the 2020s is probably going to see the introduction of powerful AI into our devices and apps, which when coupled with advances in networks, robotics, HMIs (Human–Machine Interfaces), and the devices themselves will once again transform the way we live and work in ways that are both expected and unexpected. Cyber-security will become even more important since, together with economics and finance, it will gain prominence as a proxy battlespace for physical wars. The world may become cashless, with digital payments made possible by all sorts of contactless and frictionless mechanisms. Cyber-physical systems will further blur the distinction between the physical and the virtual worlds.

1.4   Digital Has Eaten the World

Marc Andreessen famously wrote that "*software is eating the world*" (Andreessen 2011). This metaphor can be taken even further. Scientists define "human microbiota" as the set of all microorganisms that inhabit the human body. Each of us hosts a myriad of microorganisms in their skin, saliva, or intestines. It is common knowledge that many of them are fundamental for the correct functioning of our physiological processes (e.g., intestinal flora is key for the absorption of nutrients). However, very few of us realize that their number is such that in each of our bodies there are at least as many non-human cells as there are human cells, and some estimates put the ratio at a staggering 3:1!