Thomas Osburg
Christiane Lohrmann   *Editors*

Sustainability in a Digital World

New Opportunities
Through New Technologies

Springer

CSR, Sustainability, Ethics & Governance

More information about this series at http://www.springer.com/series/11565

Thomas Osburg • Christiane Lohrmann
Editors

Sustainability in a Digital World

New Opportunities Through New Technologies

Springer

Editors
Thomas Osburg
Fresenius Business School
Munich, Germany

Christiane Lohrmann
FranklinCovey Leadership Institute GmbH
Grünwald, Germany

Cover illustration: eStudio Calamar, Berlin/Figueres

Printed on acid-free paper

Foreword

Nowadays, digitalization influences nearly every aspect of our life. The seemingly endless global flow of digital information has revolutionized not only our economy by creating manifold application opportunities. In fact, the Internet of Things, Big Data, and digital innovations embody a megatrend. While this development offers various intriguing opportunities, it also includes manifold serious challenges. Besides data security and property rights, one of the biggest questions to answer is whether we can shape a *sustainable* digitalization.

A sustainable development of all societies is of crucial importance for the future of our planet. The United Nations estimate that by 2050 our planet will be home to more than nine billion people. This tremendous demographic change will certainly have a profound impact on our Earth. Humankind has already transformed about half of our planet's land surface, and the oceans, too, are in a much worse state than they were just a few decades ago. Will this development eventually exceed our planetary boundaries? The Sustainable Development Goals (SDGs) attempt to curb an unbearably negative anthropogenic effect on the planet. They define a developmental corridor and a welfare concept with which a considerable increase in global population might be made tolerable. In my opinion, the SDGs are a highly promising instrument as they apply to all states and not just developing countries.

Whether the megatrend of digitalization will contribute toward a sustainable development in the long run is dependent on how we shape it. I will briefly highlight key challenges alongside the pillars of sustainability to pinpoint vital and promising fields of policy activity.

Digitalization is in need of vast quantities of energy, for example, to power data centers. Power usage of these centers alone amounts up to 2% of the global energy demand. The concept of Green Computing attempts to reduce the environmental impact of IT hardware, especially by decreasing its energy consumption—and hence carbon emissions output—in numerous ways: It can for example contribute to achieving a higher degree of capacity utilization of servers or more energy-efficient cooling systems in data centers. Another key aspect is resource efficiency and recycling. IT devices often contain dozens of different (rare-earth) elements

whose extraction damages soils, groundwater, and wildlife. Better design and production standards can result in less dependency on raw materials. Our long-term goal has to be a completely closed resource cycle. A pressing challenge in that regard is how to avoid rebound effects based on the increase in energy and resource efficiency.

From an economic point of view, it is clear that we need to tackle two challenges. First, we need to encourage companies to implement transparent and sustainable supply chains. The global market economy in turn has to reward companies that live up to their entrepreneurial responsibility. The German Federal Government sets best-practice examples by initiating multistakeholder initiatives in numerous industrial sectors along the whole supply chain, for instance, the Partnership for Sustainable Textiles. Second, public organizations need to better steer their influence in public procurement toward sustainable standards, for instance, by demanding sustainability certificates for an award of contract.

A key principle of sustainability thinking is the idea of sharing knowledge. In order to enable every human being to acquire knowledge, open Internet and data access are necessary. This groundwork allows for a transformative education dynamic, redirecting societies toward sustainable development. The UNESCO Global Action Programme on Education for Sustainable Development stresses this important feature. Digitalization can reinforce the positive educational effect of this approach, for instance, through e-learning platforms. These aspects of the social dimension of sustainability are immensely important as they strengthen education and learning on all levels, enabling future generations to meet their own needs.

A sustainable digitalization is possible. However, there are many challenges ahead that we need to tackle actively and comprehensively. The scientific community already plays a pivotal role in providing alternatives and we should continue to encourage research in this very important field.

I highly welcome this book and look forward to gaining profound insights into the compatibility of digitalization and sustainable development.

Berlin, Germany   Andreas Jung
April 2017

Preface

Digitalization of all areas of life brings dramatic changes to our societies, our democracies. It has started quite a long time ago already and is taking place in a big way right now. It is challenging our fundamental values, constitutional principles, and legal environment. The necessary answers have not yet been given. We're just at the beginning of a deep transformation to a digitalized society. It comes together with the ongoing globalization and an individualization which drives the economic developments across the globe. This is a revolution of our life which brings as many chances as dangers to all of us. It is therefore important and urgent to talk about the challenges and consequences of each aspect in this transformation. Sustainability is a very relevant one. This book collects different useful perspectives on sustainability in the digital world. Looking at governance, mobility, production, work life, and corporate responsibility, it gathers numerous relevant areas which will be subject to changes and new models through digitalization. It will be key to deepen this exchange. Since some years also policymakers debate the specific relevance of digitalization to all areas of life. Slowly we're realizing the dramatic extent in which all this will take place. Every new innovation and every change to today's life could have heavy consequences on other areas and on the balance in society, economy, or environment. It is therefore absolutely necessary to implement sustainability already in the design of new innovations and developments.

One example to achieve sustainable developments in the digital world is to get away from fragmented regulation on the digital market. The path toward a Digital Single Market in the biggest common market—the European Union—is a major step toward consistent application of legal principles and rules. In particular, the creation of unified frameworks in the field of data protection and telecommunication standards has been historic changes toward a sustainable digital environment. The EU is not only giving an answer to the cross-border nature of the digital world by saying goodbye to national competences and differences but also building a pillar for future global standards, which will need to be discussed sooner than later. It has been hard work to overcome national differences, but it will be even harder to

continue these developments without losing legitimacy or democratic principles. No matter where we will end up at the end of this deep transformation, we will need to assure that we're not sacrificing the civilizing achievements and in particular human dignity and self-determination in the liberal societies we built over the last decades and centuries. It will be therefore imperative to look very carefully on the side effects of every new step into the digital world of tomorrow, especially with regard to the sustainability for mankind and environment.

Munich, Germany   Jan Philipp Albrecht
April 2017

Preface

We experience a world in transformation. Pundits who not so long ago claimed either the end of history or the advent of a time with no geography are being challenged by everyday news. We live in an era in which knowledge is being produced and made accessible through a variety of means, yet, rather than experiencing full control we tend to feel less certain. For example, companies define the environment as a VUCA one. Volatility, uncertainty, complexity, and ambiguity are some of the features of the world we live in.

Never have strategists been so accurate in their use of the dichotomy. This is a world in which opportunities and threats abound. On the one hand, the world might have well become a hotspot, a nest full of challenges and tensions. Artist Mona Hatoum builds a large sphere in which continents are profiled in bright red neon. The viewer confronts something like a large round structure with intense red light coming out of it. No corner of the globe, we are reminded daily by media, lives unconnected and unchallenged. The red shows the tension and the urgency.

At the same time, the world has never been more conscious of the global challenges we experience. Global warming and the eventual climate change it provokes may be the just the epitome of such consciousness, but if we consider for a moment the impact of digitalization this might well just be one of the major changes we are about to undergo. Consider for a moment the economics of it.

Large manufacturers are pondering on how business models and products are radically changing. And they do it fast. London cabs observe today how Uber drivers take a big slice of a business that was assumed to be anchored in rock. At the same time, Uber is a company which does not fit the usual management structure. No managers in view and no headquarters on the map make the company a virtual one. But the bus does not stop here, Uber drivers may well be expendable and once systems become more safe. Then, who would be in need of a driver? Cars might well do the job without close supervision.

What then for job security, for long-term business plans, or for the kind of variables that economists used to consider as necessary and sufficient variables, such as labor and capital? That is, what about a world in which jobs are becoming a

precious asset. Luddites will lose the battle again; still, societies are made of people who experience common problems and get together to solve them. These are not issues that can be simply left to mutual adjustment, and, as anthropologist David Graeber has rightly pointed out, bonds came first and self-interest later.

This is a book which looks at the world's ambition to provide meaning to a term, sustainability, that has captured most of our hopes. How can we make a world more sustainable, that is, how can we be sure that our current investments in education and business are the right ones to bring long-term well-being. How can we make the most of the transformations we experience and make them work in our favor. There will be multiple avenues, and this book will rightly point to some of them.

Brussels, Barcelona   Alfons Sauquet Rovira
April 2017

Preface

Changes have been part of this world as long for as it has existed. However, the speed of changes our societies are experiencing is growing exponentially, not solely due to digitalization, but to a significant degree. It affects the ways we live and work, we learn and communicate, and also how we form options and live together.

Thus, fundamental values are challenged and are changing, with consequences for legal regulations and human principles. We are only at the beginning of learning about, let alone understanding, the consequences digitalization will have on the environment, on workplaces, and on education, to name just a few key areas. Combined with ongoing globalization and immense economic challenges, we need to find solutions that enable us to sustain not only the planet we live on but also the societies we live in. It will be a lot of work.

But, as there are two sides to every coin, and a glass can be half full or half empty, we also need to look at opportunities that a more digital world can bring. Think of dematerialization and how it can reduce burdens on the environment. Think of the tremendous possibilities in the healthcare sector and how they can help people across the globe, not only in healing, but also in the prevention of diseases in underdeveloped parts of our world.

As we are unable, and partially unwilling, to halt the progress, we need to focus on making technology a part of human lives. How can technology serve people and not the other way around? How do we make sure we don't leave parts of our societies behind? And how can we reestablish a trust in technology?

In few places is this more relevant than in education. As UNESCO states: "Education for Sustainable Development allows every human being to acquire the knowledge, skills, attitudes and values necessary to shape a sustainable future." And if you take a deeper look at the UN Sustainable Development Goals and specifically Goal 4 (Quality Education), it is clear to see that all the subgoals to this objective are only achievable with a certain level of digitalization that truly helps to make the lives of people better.

Education here has two challenges: to prepare the younger generations to design and implement a sustainable future, but also to use digital tools in meaningful ways

to reach these goals. MOOCs, which already have the potential to reach many people in societies across the world (e.g., in rural areas), enabling them to participate in world-class education, are a promising example.

This book comes at a very timely moment and I highly welcome it. We are starting to understand sustainability from an ecological perspective, but need to learn to also understand its meaning for humans, in an increasingly digitalized world. The contributions in this book will help us to provide some much-needed answers.

Cologne, Germany   Tobias Engelsleben
April 2017

Introduction

Digital Innovations have become companions in our daily life. A lot of hopes and expectations go along with this development. Connected cars could save lives from road accidents, e-health could improve medical services for people, and smart technologies could cut carbon emissions. However, despite the potential innovations and possibilities of digital development, a lot of uncertainties and open questions remain. While a lot of focus has been on innovation and new technology as well as the "Green through IT" aspect, there was little discussion on what impact this has on supporting sustainable development of the society as a whole. Can digital innovations contribute to improve the quality of people's lives, achieve equitable growth, and help protect the environment? Do they help drive progress toward United Nations' recently formulated 17 Sustainable Development Goals (UN 2015)? This publication focuses on how digital development promotes at the same time commercial growth and sustainability issues.

This book goes beyond the existing "Green through IT" thinking that enriched the public debate for many years already. It does not only focus on technology and ecology only but includes the human perspective as it looks at how people benefit from the digital world in a variety of areas, like consumption, education, participation, and mobility. Furthermore, we look at how digital development challenges us in management and leadership as well as in ethics and responsibility. It is about the shift of perspectives toward sustainable society and world at large in the three fields of sustainability: social, environmental and economic.

Fig. 1 Triple bottom line of sustainable development (see Brundtland Report 1987)

Which developments do we witness? And: where are the blocks that prevent to realize digital development toward the SDGs to be fully unleashed?

The key questions of this book is: How does the ongoing move toward a digital world contribute—positive or negative—to a more sustainable world?

Call for a Critical View

As digital development moves on and becomes more and more present in everybody's lives, it is obvious that there are still many challenges to meet, hurdles to take, and obstacles to be overcome.

First of all, there are *political and regulatory challenges* related to the awareness of sustainable development as well as data analysis and security. While at the time new insights from data are needed, differences in regulatory requirements still slow the deployment of sensors and smart technologies. As a result, they increase the complexity associated and therefore add to their cost.

Secondly, we should also reconsider our *values and ethical concepts* and the notion of responsibility in the context of digital innovation. Many developments run ahead with little planning and control. Risks are underestimated due to the wish to grow. Therefore, we might also think about laws, regulations, or norms to organize the use of digital devices, especially in the context of addicability. Also, we need to rethink critically our responsibility and ethical approach about handling digital development in the context of sustainable development. Here, strategic management and leadership issues need to be addressed.

Finally, we will have to take a close look into the *possibilities and challenges of life in the digital world* as well as new opportunities regarding access to education and participation for development. Here, digitalization offers a lot of options as

well as challenges and barriers at the same time. However, it will be shown that investment in these fields will need to increase in order to realize change in policy, company, and the environmental sector.

About This Book

This book connects several fields digital innovation through ICT with management, leadership, and ethical orientated thinking in the context of sustainable development. It aims to be inspiring, encouraging, as well as thought-provoking and critical at the same time. We brought together international thought leaders from academia as well as business and foundations to get diverse inspiring and thought-provoking input. Many of these perspectives call for a shift of paradigms. This book is for business leaders, academics, writers, and critics who care about life, value, and business development in a digital world and at the same time try to contribute to the values of a sustainable future.

Acknowledgements

The authors of this books are all renowned and leading experts in their particular field. All have been enormously cooperative in creating this book. We would like to give a special thanks to each of them for sharing their deep knowledge and personal ideas regarding digital development and thriving toward the SDGs. Furthermore, we would like to thank Christian Rauscher and his colleagues from Springer, who immediately supported the idea of the book and accompanied us with their profound knowledge and professional advice, which was very encouraging. It was also very satisfying to be supported by political representatives Jan Philipp Albrecht of EU Parliament and Andreas Jung of Parliamentary Advisory Committee for Sustainability of Deutscher Bundestag. A special thanks also goes to Prof. Alfons Sauquet Rovira and the ABIS Team for professional support. Also, we would like to thank Prof. Dr. Tobias Engelsleben, President of Fresenius Business School, as well as Prof. Dr. Martin Kreeb of the Fresenius Business School for supporting the academic approach of book.

Christiane Lohrmann
Prof. Dr. Thomas Osburg

Literature

United Nations (2016) Sustainability development knowledge platform. https://sustainabledevelopment.un.org/sdgs. Accessed 11 Nov 2016

United Nations (2014) The road to dignity by 2030: ending poverty, transforming all lives and protecting the planet. http://www.un.org/ga/search/view_doc.asp?symbol=A/69/700&Lang=E. Accessed 23 Oct 2016

Setting the Scene: The Relevance of the 17 SDGs for Digital Development

While digitalization rapidly changes our world, politicians and diplomats of all countries have agreed on a common political understanding of the common goals in a future sustainable world. In September 2015, the UN announced the 17 Sustainable Development Goals (SDGs) as a basis for the 2030 Agenda for Sustainable Development (UN 2015). Over the coming 15 years, member countries are urged to mobilize efforts to end all forms of poverty, fight inequalities, and tackle climate change while ensuring that no one is left behind. The UN developed the SDGs in cooperation with many stakeholders: NGOs and Foundation Representatives from Science, Politics, and Business.

Although the SDGs are not legally binding, governments are expected to take ownership and establish national frameworks for the achievement of the 17 Goals. Countries have the primary responsibility for follow-up and review of the progress made in implementing the Goals, which will require quality, accessible, and timely data collection. Regional follow-up and review will be based on national-level analyses and are urged to contribute to follow-up and review at the global level.

There are high expectations regarding digital developments to contribute to the SDGs such as improving people's lives: 1.6 billion people could benefit from more accessible, affordable, and better quality medical services through e-healthcare, while connected car solutions could save up to 720,000 lives annually and prevent up to 30 million traffic injuries. This helps ensure healthy lives and therefore could contribute to achieve SDG #3 (GeSi 2016). Also solutions for open education through the Internet, such as MOOCs are expected to increase education around the world. A possible contribution to SDG#4, which calls for inclusive and equitable quality education to promote lifelong learning opportunities for all. Moreover, in the environmental field it is called for a resilient infrastructure, to promote inclusive and sustainable industrialization and foster innovation. Therefore, solutions could enable greenhouse gas emissions reduction and drive market transformation for renewables, cutting carbon emissions by around 20% in 2030. A potential contribution to environmental protection is called for in SDG #13. In addition, we are facing challenges and opportunities in the markets including challenges and chances for producers, consumers, and stakeholders. Here, SDG # 9 becomes relevant: it calls for a resilient infrastructure, promotes inclusive and sustainable industrialization, and fosters innovation. Also SDG #12 which urges to ensure sustainable consumption and production patterns is to be considered. This only being a short summary of possible effects of digitalization on the SDGs, there

are a lot more expectations in what digital innovation should and can contribute to sustainable development.

Despite all these optimistic viewpoints, we have to face and acknowledge several facts, laws, and regulations and other roadblocks on the way to a sustainable future matching with the UN SDGs. This publication gives insight into chances and possibilities in crucial areas of digital development in the context of a more sustainable world.

<div align="right">

Prof. Dr. Thomas Osburg
Christiane Lohrmann

</div>

Literature

GeSI Report (2015) SystemTransformation: how digital solutions will drive progress towards the sustainable development goals, Accenture Strategy; www.systemtransformation-sdg.gesi.org. Accessed 23 Oct 2016

United Nations (2016) Sustainability development knowledge platform. https://sustainabledevelopment.un.org/sdgs. Accessed 11 Nov 2016

BASF (2016) UN sustainable development goals. https://basf.com/de/company/sustainability/employees-and-society/goals.html. Accessed 13 Nov 2016

Contents