Peter G Kirchschlaeger

Digital Transformation and Ethics

Ethical Considerations on the Robotization and Automation of Society and the Economy and the Use of Artificial Intelligence

Nomos

edition sigma

Peter G Kirchschlaeger

Digital Transformation and Ethics

Ethical Considerations on the Robotization and Automation of Society and the Economy and the Use of Artificial Intelligence

Nomos

edition sigma

The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available on the Internet at http://dnb.d-nb.de

ISBN 978-3-8487-4287-5 (Print)
978-3-8452-8550-4 (ePDF)

British Library Cataloguing-in-Publication Data
A catalogue record for this book is available from the British Library.

ISBN 978-3-8487-4287-5 (Print)
978-3-8452-8550-4 (ePDF)

Library of Congress Cataloging-in-Publication Data
Kirchschlaeger, Peter G
Digital Transformation and Ethics
Ethical Considerations on the Robotization and Automation of Society and the Economy and the Use of Artificial Intelligence
Peter G Kirchschlaeger
537 pp.
Includes bibliographic references.

ISBN 978-3-8487-4287-5 (Print)
978-3-8452-8550-4 (ePDF)

edition sigma in der Nomos Verlagsgesellschaft

1st Edition 2021
© Nomos Verlagsgesellschaft, Baden-Baden, Germany 2021. Overall responsibility for manufacturing (printing and production) lies with Nomos Verlagsgesellschaft mbH & Co. KG.

This work is subject to copyright. All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or any information storage or retrieval system, without prior permission in writing from the publishers. Under § 54 of the German Copyright Law where copies are made for other than private use a fee is payable to "Verwertungsgesellschaft Wort", Munich.

No responsibility for loss caused to any individual or organization acting on or refraining from action as a result of the material in this publication can be accepted by Nomos or the author.

Reviews

"In our day, humanity has entered a new era in which our technical prowess, especially digital technological prowess, has brought us to a crossroads (cf. LS, 102), influencing greatly our common good. It is urgent, therefore, to explore the ethical dilemmas around such technological development, and how some basic ethical consensus can help us use, especially again, digital technology for the common good. In this regard, this book 'Digital Transformation and Ethics' makes an invaluable contribution." **Cardinal Peter Kodwo Appiah Turkson, Prefect of the Dicastery for Promoting Integral Human Development**

"The 15th and 16th century explorers used compass and the stars to navigate. Today's digital transformation needs solid scientific analysis and ethical frameworks to charter the way forward in complex territories. Peter G Kirchschlaeger's work offers both rigorous science and practical orientations on key legal and policy issues: this framing is important everywhere and particularly in fragile contexts for vulnerable populations." **Dr Peter Maurer, President of the International Committee of the Red Cross (ICRC)**

"'Digital Transformation and Ethics' is a valuable overview of ethical issues in artificial intelligence, their impact on our daily lives and importance for future applications. With this timely analysis, Peter G Kirchschlaeger highlights fundamental questions pertaining to our relationship with technology and its impact on justice, freedom, and human rights." **Ai Weiwei, Artist**

"Practical, compelling, stimulating. In this outstanding book, Peter G Kirchschlaeger brings new insights to the story of digital transformation and human rights. A superb look at how robotization and automatization is progressing and supporting the transformation from a world in which digitalization has big winners and losers, to one in which digitalization hopefully contributes to more equity and balance for people and planet. An excellent read, filled with personal experiences and reflections on freedom, autonomy, responsibility, conscience and ethical judgement that will engage students, CEOs and politicians alike." **Susanne Giger, Business Presenter, Lecturer, Member of the Board of Directors of the Coop Group**

"This remarkable book calls upon us to defend human dignity from the myriad threats of the new digital age. Peter G Kirchschlaeger recognizes that digital technologies can benefit humanity by broadening access to knowledge and to vital services such as healthcare. Yet he shows how digital technologies also threaten human dignity and human rights, through impacts on employment, income distribution, political power, self-esteem and social relations. Most importantly, Peter G Kirchschlaeger argues cogently that humanity must put human rights at the core of our governance of the digital technologies, to ensure that the new machines serve the cause of human dignity rather than humanity becoming the servant of the machines." **Professor Dr Jeffrey D. Sachs, Columbia University, USA; Special Advisor to the UN Secretary-General António Guterres on the objectives of sustainable development**

"This book is about fundamental, yet rarely addressed, aspects of the digital journey – ethics and values. Highly valuable for anyone who ambitions to have a positive impact with technology." **Silvio Napoli, Chairman of Schindler Group**

"Will data-based technologies come to control us, will some humans master them toward manipulating the rest? Peter G Kirchschlaeger's book provides the ethical orientation we urgently need to hold these rapidly advancing technologies consistent with the human rights and dignity of all human beings." **Professor Dr Thomas Pogge, Leitner Professor of Philosophy and International Affairs, Yale University, USA**

"One of the great ethical challenges of our time is the rapid technological change epitomized in the digital transformation of all spheres of life. In this book, an ethicist and human rights expert offers an admirable attempt to help us come to grips with this challenge in an almost encyclopedic, critical as well as constructive, manner." **Professor Dr Hans Joas, Humboldt University of Berlin, Germany / University of Chicago, USA**

"If there was one book I would recommend to any Tech entrepreneur these days, it is this book. Peter G Kirchschlaeger wrote one of the most important and most comprehensive contributions to the current debate on Digital Transformation, Ethics and Artificial Intelligence by coversing an enormous breadth on some of the hottest disciplines in tech." **Pascal Kaufmann, Neuroscientist and Entrepreneur; Co-Founder of the Software Company Starmind International; Founder of the Mindfire Foundation**

"As an AI researcher, ethics becomes more and more critical for AI processing and robotics. I have worked in the AI area for material discovery, biomedical engineering, and machine controls. I encountered that ethics and human privacy should be the baseline of AI solutions. This new book written by Peter G Kirchschlaeger is considering such an important issue for various cases and applications. A few example areas in this book include robots, artificial intelligence solutions, data-based systems, and digital transformation. This topic is universally essential since AI is going to be popular everywhere on the earth. I globally recommend this great book to anybody interested in AI ethics." **Sungjin (James) Kim, AI Researcher; Senior Research Fellow, VP, LG Electronics**

"This book is a definitive must for everyone who is interested to learn about the intersection of AI, Ethics and Society. Peter G Kirchschlaeger's thoughts on the digital transformation from an ethical perspective represent a substantial contribution to a debate that we need to pursue on a well informed basis." **Professor Dr Dr h.c. Frank Kirchner, Director Robotics Innovation Center, German Research Center for Artificial Intelligence DFKI, Germany**

"Digital technologies are transforming our lives at a rapidly accelerating pace. Talk of 'artificial moral agents' and 'morality in design' can conceal the abdication of moral responsibility and the enrichment of a few at the expense of the many. While acknowledging the thoroughgoing intertwinement of human beings and technology, Peter G Kirchschlaeger urgently summons his readers to the task of analyzing and assessing artificial intelligence and the robotization and automatization of society. Only by asserting our moral agency can we ensure that digital technologies serve, rather than undermining, the flourishing of all of humankind and of the world. A vital contribution to a critically important undertaking." **Professor Dr Jennifer Herdt, Gilbert L. Stark Professor of Christian Ethics, Yale University Divinity School, USA; President of the Society of Christian Ethics**

"Although there is a plethora of books devoted to the problem area of ethical reasoning on the field of digital technologies, none so far has unfolded the complexity of the questions and the associated challenges to ethical thinking in such a multifaceted and systematic way as this work. It must be regarded not only as a milestone in the ethical debate. Moreover, it is valuable for interdisciplinary research, since the crucial interfaces for interdisciplinary exploration of this terrain, which is so difficult to cope with, are also opened up." **Professor Dr Stefan Boeschen, Chair "Society and**

Technology" at Human Technology Center (HumTec), RWTH Aachen University, Germany

"With so much at stake, the need for ethics and AI technology to come together is now more urgent than ever before. With this truly inspiring and exciting masterpiece, Peter G Kirchschlaeger lays out the groundwork for developing the next generation of human-friendly digital technologies." **Professor Dr Benjamin Grewe, Full Professor of Systems and Circuits Neuroinformatics, Institute of Neuroinformatics UZH/ETH Zurich, Department of Electrical Engineering and Information Technology, ETH Zurich**

"For those involved in digital transformation, and almost all of us are, this book is indispensable. The detailed scientific examination of the ethical aspects of digitization, its opportunities, challenges and risks, is long overdue and yet comes at just the right time." **Professor Dr-Ing Thomas Bauernhansl, Director of the Fraunhofer Institute for Manufacturing Engineering and Automation; Director of the Institute of Industrial Manufacturing and Management IFF, University of Stuttgart, Germany**

"A comprehensively researched scientific framework to help consider machine intelligence as an opportunity, rather than a threat, for humanity to engage in an honest, informed, and scientifically grounded dialogue about the values underpinning AI systems design, development, and deployment, and the ethical and moral implications of these values choices." **Professor Dr Maria Angela Ferrario, School of Electronics, Electrical Engineering and Computer Science, Queen's University Belfast, Northern Ireland**

"The ethical considerations of digital transformation are often dismissed with arguments about progress, efficiency, and potential job creation. This is particularly concerning for those of us living in regions where many technological advancements in this area are not even created locally, but simply imported. We find companies taking advantage of the legal loopholes or in some cases, the complete absence of any legal structures and policies addressing these developments. My hope would be that this timely and thought-provoking book prompts further discourse on a topic that requires the urgent and fervent involvement of those for whom digital transformation is having an impact – which today, means all of us." **Akaliza Keza Ntwari, Entrepreneur from Rwanda in the field of technology; one of the founders of "Girls in ICT Rwanda"; Member of the UN High-Level Panel on Digital Cooperation**

"The digital transformation is affecting our societies and lives in unprecedented ways. Thorough ethical reflection on the opportunities and dangers of this change is more important than ever – and is exactly what this thoughtful book provides." **Professor Dr Klaas Enno Stephan, Full Professor for Translational Neuromodeling & Computational Psychiatry at the University of Zurich and ETH Zurich**

"An independent, profound, and all-encompassing ethical evaluation of the contemporary technologies and artificial intelligence which daily revolutionize our lives. The author stands for ethics which is needed so that digital transformation, robotization, and the use of artificial intelligence do not simply happen, but we can consciously shape them. He understands multiple benefits of scientific progress but also reveals the immense threats that the use or abuse of new technologies and machines can pose to our human and humane nature – our minds, virtues, and freedoms, and to democratic and other societal values. He firmly defends homo dignitatis from homo digitalis and stands for social justice and sustainable development, thus reminding us that human dignity, trust, solidarity, and many other values are inalienable from human beings. Great book, a must-read for everyone who wants to be a part of the solution in ethical confrontation with some unprecedented challenges of our time." **Professor Dr Miro Cerar, Law Professor, Faculty of Law of the University of Ljubljana, Slovenia; former Slovenian Prime minister (2014-2018) and Deputy Prime Minister and Minister of Foreign Affairs (2018-2020), Slovenia**

"This is a most timely and comprehensive book on the important, impactful and multi-faceted issues surrounding 'Digital Transformation and Ethics'. From the thought provoking Prologue to the personal Epilogue II I thoroughly enjoyed this tour de force across ethics, philosophy, law, computer science, technology, society and politics." **Professor Dr Felix A. Wichmann, Full Professor and Group Leader "Neural Information Processing Group", Faculty of Science, University of Tuebingen, Germany**

"The digital revolution is full of surprises. We just arrived in the anthropocene, the age of humanity, but very soon, robots are expected to take over. Then, however, at the climax of a materialistic, technology-driven world, we see another turn: ethics and values, which almost seemed to be forgotten, are suddenly back. No doubt, this is the beginning of a new historical age! Peter G Kirchschlaeger's Book 'Digital Transformation and Ethics' places you right in the middle of the debate." **Professor Dr Dirk**

Helbing, Professor of Computational Social Science, Department of Humanities, Social and Political Sciences, affiliate of the Computer Science Department, ETH Zurich

"This new book by Peter G Kirchschlaeger offers a must read compilation and analysis of ethical questions about digital transformation, artificial intelligence as well as the changes of daily habits by online services. His issues raised, the ethical solutions offered are a rare and impressive contribution for a future paving this path of technology-based progress with profound non-technical thinking. Peter G Kirchschaeger has written a helpful masterpiece to enrich the unavoidable disruptions caused by digital technologies with Substance beyond the present digital canon." **Professor Dr Dr h.c. Guenter Mueller, Emeritus of Computer Science and Information Systems at the University of Freiburg and former Director of the Institute of Informatics and Society, Germany**

"'This trailblazing book concerns artificial intelligence (AI) and practical ethics. Its author does not much like the term AI. He points out, correctly, that it posits the possibility that machines may 'think intelligently' and 'morally'; whereas that is precisely the threshold problem that has to be resolved. He prefers to describe the automated processes of 'data-based systems'; and to do so empirically and objectively by reference to what machines and systems actually do. He explains why it is impossible to translate the bloodless language and symbols of mathematics and digital programming into the rule-transcending uniqueness of individual ethical judgements. From this starting point, he proposes the creation of an International Data-based Systems Agency (DSA) and 30 principles to govern its potential role and work in a field where the technology is moving with lightning speed. In his view, only humans can be the moral subjects of ethics. Machines and their systems can inflict death, suffering and pain; but they cannot themselves experience the same outcomes and reason to accommodate all of the applicable ethical nuances. At a time of fast moving digital technology, public and private megadata and manipulative algorithms, we are thus confronted with some of the most profound philosophical questions of our age: and the deepest practical question of them all, namely, what the human species can do to uphold the human primacy for which the author so powerfully contends." **Honourable Michael Kirby AC CMG, past Justice of the High Court of Australia (1996-2009) and Chair of the OECD expert groups on the protection of privacy and of security of information systems (1980 and 1992); Co-Chair, In-**

ternational Bar Association, Human Rights Institute (2017-2021), Australia

"A rigorous and updated book on the relationship between ethics and the ever-evolving dimensions of technologies and society – timely underlined also by the current Covid-19 pandemic." **Professor Dr Laura Palazzani, Member of the UNESCO International Bioethics Committee; Member of the European Group on Ethics in Science and New Technologies of the EU Commission; Professor of Philosophy of Law and Biolaw, Lumsa University Rome, Italy**

"This essential book discusses the technological transformation of digitalization from an ethical perspective. In the first part of the book, the necessity and added value of an ethical view of modern technologies is presented in an up-to-date and comprehensive manner.
The second part considers the mutual interactions between modern technologies as well as their application scenarios.
The third part provides up-to-date advice on the implementation of ethical issues in the use of modern technologies. Here, the focus is particularly on the protection of human rights.
Peter G Kirchschlaeger's book goes far beyond an abstract ethical view of modern technologies and gives new impetus to the discussion about the opportunities and risks of using highly efficient but also very powerful technologies.
Due to its clear concept and practical examples, the book is highly recommendable not only for ethicists but especially for engineers and managers.
The book should therefore find a firm place as an important contribution to the discussion of application scenarios of modern technologies from an ethical perspective." **Professor Dr-Ing Stephan Schaefer, Professor at the Institute of Electrical Engineering, Hochschule fuer Technik und Wirtschaft Berlin, Germany**

"Peter G Kirchschlaeger's Digital Transformation and Ethics – Ethical Considerations on the Robotization and Automatization of Society and Economy and the Use of Artificial Intelligence points in an immensely readable and highly instructive way to the critical need to understand that digital technology and AI aren't energy neutral or ecologically benign. It sounds the warning of an evolving global colonization by multinational technology-corporations in an age where technology runs ahead of regulation and technofixes are seen as untouchable silver bullets." **Nnimmo Bassey, Writer/Poet and Director of the Health of Mother Earth Foundation, Nigeria; Winner of the Right Livelihood Award**

"We fly without fear. That is only possible because of regulation. Tight regulations make airplanes safe. It is the same for AI: Regulations are required for safe and effective AI. Peter G Kirchschlaeger's book discusses the ethical groundwork. Highly recommended for anyone." **Dr Dorian Selz, Serial Entrepreneur; CEO & Co-Founder of Squirro**

"Peter G Kirchschlaeger's book 'Digital Transformation and Ethics' is a powerful and sophisticated defense of our shared ethical principles and norms as the biggest human achievement of modernity and it demonstrates that they are still valid arsenal for fighting against the widespread naive drive for the sweeping wave of digital transformation. The book will be one of the reference points for surveying and discussing the ethics of digital technology in the future!" **Professor Gunoo Kim, Professor of Law, Gwangju Institute of Science and Technology, South Korea**

"Artificial intelligence ought to be paired with human ethics or else it risks turning into artificial tyranny. Everyone interested in the mature and enlightened interaction with digital technology, one that puts it at the service of human life, rather than the other way around, should read this book. Peter G Kirchschlaeger charts a walkable path into a digital future that belongs to humans, rather than to machines." **Professor Dr Florian Wettstein, Professor of Business Ethics and Director of the Institute for Business Ethics at University of St Gallen; Vice-President of the International Society of Business, Economics and Ethics ISBEE**

"This book is a must for anyone interested in getting a broad overview regarding the far reaching issues of Ethics in our Digital Society. It delivers a profound analysis ranging from the fundamentals of Ethics all the way to its practical implications and their potential impact on humans and our social institutions." **Peter Rudin, Visionary Entrepreneur and CEO of singularity2030.ch**

"History reminds us that many of the horrors of the not-too-distant past were justified as part of the pursuit of scientific innovation and progress. Human rights emerged as an ethical language for challenging and opposing the exploitation of science to justify those atrocities. Peter G Kirchschlaeger's excellent book is a timely caution that ethics and human rights should be at the core of the new technologies now deployed in data collection, surveillance and in risk governance by public as well as private entities, if we are to avoid reproducing the tragedies of the past." **Dr Mutuma Ruteere, Former UN Special Rapporteur on Contemporary Forms of Racism, Racial Discrimination, Xenophobia and Related Intolerance**

"There is a lot of homework to be done for our societies in terms of digitalization. Peter G Kirchschlaeger provides the respective materials and the searching questions we have to deal with. This book gives a profound review of the challenging ethical issues coming up with digitalization, roboterization and artificial intelligence. And it offers stimulating perspectives for constructive dialogue between ethics and technology." **Professor Dr Arne Manzeschke, Professor of Anthropology and Ethics for Health Professions, Evangelische Hochschule Nuernberg, Germany; President of the European Research Society for Ethics Societas Ethica**

"Peter G Kirchschlaeger reflects on a digital world in the making. He comes up with proposals for embedding digitalization in a new blueprint of thoughts and actions. A blueprint geared towards honoring human rights and shaping a more humane world. In a nutshell, advanced thinking in a perpetually changing world. A great help for all those whishing to act responsibly based on clear awareness." **Patrick Hohmann, Founder and Chairman of the Remei AG**

"No digital transformation can succeed without a solid foundation of ethics. The new book by Peter G Kirchschlaeger is a comprehensive and important contribution to help decision-makers root societal applications of Artificial Intelligence in human dignity and agency." **Ambassador Amandeep Gill, Director of the Global Health Centre project on International Digital Health & AI Research Collaborative (I-DAIR)**

"This book is not just a book, it is a call for awareness, overwhelming of humanism. A dynamic synthesis of immanence and transcendence. An ode to ethics." **Robin Cornelius, Founder of Switcher SA; Founder and CEO of Product DNA SA**

"Based on a solid philosophical and ethical discourse, Peter G Kirchschlaeger reviews critically the digital (r)evolution and resulting societal development to date and where the world is heading. It becomes clear that those who drive and shape this transformation neither base their decisions on universal or agreed ethical principles, nor that they are democratically legitimized or controlled to assume and execute the power over everyone of us that they already have. Kirchschlaeger uses a vast range of sources and examples to summarize the risks and grave possible consequences if the actors and their inventions are left unattended and unregulated. He does not stop there but proposes concretely and comprehensively what must be done by governments and the democratic electorate to manage the destructive potential of the ongoing digital transformation. A very relevant

book at a most crucial time." **Christian Goeckenjan, Head of Technology & Cyber Risk Control at a global bank**

"In the tradition of Ancient African, Ethics in Maat has always permeated social relations. The same we must bring to the current relations with technological advances, they need ethics to guarantee powers without violating the humanities, understanding the importance of technology in maintaining future advances, for this, Ethics is the determining element. This stunning, philosophically sharp, and rhetorically superb book by Peter G Kirchschlaeger shows eloquently a humane path forward." **Katiúscia Ribeiro, Researcher and University Lecturer of African Philosophy and Ethics, Women's Thoughts and Community Relations, Federal University of Rio de Janeiro, Brazil**

"In a time of dramatically growing complexity, which is in its cultural dimension accompanied by an era of confusion, nothing is more needed than orientation, explanation and interpretation of presence and future. Peter G Kirchschlaeger delivers this orientation in this book in an impressive way." **Professor Dr Dr h.c. Werner Weidenfeld, Director of the Center for Applied Policy Research (CAP) of the University of Munich, Germany**

"The wide-ranging scope and sheer rapidity of transformations wrought by new digital technologies have left societies unprepared at many levels – including with regard to the ethical dimensions. This important and thought-provoking book unpacks some of the crucial ethical questions that must guide us, if humanity is to benefit from the new opportunities while recognizing the ambivalences they create." **Professor Dr Jayati Ghosh, Professor of Economics, University of Massachusetts at Amherst, USA**

"Everyone needs to read Peter G Kirchschlaeger's new book on digital transformation and ethics. This profound masterpiece of rare conceptual brilliance provides urgent and essential ethical guidance for the present and the future. It offers a groundbreaking and beautifully written analysis of uncomfortable ethical questions about digital transformation and artificial intelligence. Beyond that, it designs in a magisterial way inspiring ethical solutions for this technology-based progress." **Alessio Allegrini, Conductor, Hornist, and Founder of Musicians for Human Rights**

"Peter G Kirchschlaeger, in this extensively researched work, explores the advantages and disadvantages of digital transformation and data-based systems, which has made human existence technologically accessed but ethi-

cally it may be the largest ungoverned space of the world. Being a deep thinker, ethicist, philosopher, speaker, profound writer, and a human rights expert, Peter G Kirchschlaeger contextualizes answers to a plethora of ethical issues, challenges, opportunities and questions to the highly volatile and ambiguous realities of digital transformation distributed unequally in the globe. This ethics of human rights based, critically argued epistemological work has been developed on the strong underpinning of philosophy, ethical principles of responsibility, omni-dynamic social justice and human rights. An epiphany for every reader, a guiding tool for every policy maker, the book is truly empowering." **Shylaja Santosh, Journalist and Human Rights Educator, State of Karnataka, India**

"Greatly familiar with both the world of digital transformation and the depth of ethics, Peter G Kirchschlaeger critically examines the key terms of the debate such as 'artificial intelligence' and 'networks' and highlights the far-reaching relevance of human dignity and internationally recognized human rights for guiding the digital transformation. The book is a persuasive wake-up call to understand and implement the right to privacy and data-protection and the other human rights in the contexts of surveillance capitalism and surveillance totalitarianism." **Professor Dr Georges Enderle, Professor Emeritus of International Business Ethics, University of Notre Dame, USA**

"Developments in Robotics and Artificial Intelligence hold potential, but can also be unsettling. Critical vigilance towards them is as important as human rights-based answers to the ethical concerns. After all – as Peter G Kirchschlaeger points out – Robots and Artificial Intelligence do not represent superhuman forces, but are no better and no worse than how we humans program them and which use we make of them. With this publication, the author fills a gap and makes an indispensable academic contribution to the comprehensive consideration of digital transformation from an ethical standpoint." **Professor Dr Martin M Lintner, Professor for Moral Theology, Philosophisch-Theologische Hochschule Brixen, Italy; former President of the Internationale Vereinigung für Moraltheologie und Sozialethik**

"Will we human beings hold the leach or carry the collar as the dog? Will we take the lead and shape technology to serve human kind rather than being enslaved or subordinated to technology? The book 'Digital Transformation and Ethics' analyses in a profound manner this question from an ethical and human rights-based approach. Peter G Kirchschlaeger takes the reader on an impressive journey through the many dilemmas that we are

confronted with on a daily basis and leaves us empowered to hold the leach. Amid the expanding academic literature on new technology the book 'Digital Transformation and Ethics' stands out and will remain relevant for long." **Adj. Professor Morten Kjaerum, Director of the Raoul Wallenberg Institute of Human Rights and Humanitarian Law, Sweden; former Director of the EU Fundamental Rights Agency**

"An essential resource for all of us to read in our technologically driven world! This book explores the ethical questions related to how technology controls our lives and how humans should advocate for more ethically based approaches to the development of new technologies. This book makes a very important contribution to the discussion of how technological innovation must also consider the ethical and moral dimensions of its impact on our lives. It is essential reading not just for the ordinary citizen but for those who lead our technology driven economy and society." **Assoc. Professor Dr Nina Burridge, Honorary Professional Fellow, School of International Studies and Education, Faculty of Arts and Social Sciences, University of Technology, Sydney, Australia**

"I congratulate Peter G Kirchschlaeger on his ground-breaking book on ethics of artificial intelligence. While the technology of AI is progressing fast inevitably bringing profound changes in the life and livelihood of all people of the earth, this is high time that we consider the ethics of it and try to guide its progress on an ethically acceptable path. Already, AI is promising to be an automated technology minimizing the need of human in not only manufacturing works, but also intellectual works too. While it can solve huge problems, which are troubling us now, it may also totally devalue human labor putting the capital in supreme power. This will carry the current concentration of wealth to an impossible extent. On the other hand, AI can free billions of people from an existence in drudgery and poverty, and allow them the time and opportunity to enjoy the higher things in life. Under a dominance of AI, our existing economic and ethical system may face a totally new situation. A drastic situation like that will need a drastic intervention through a grand human consensus. Ultimately the humanity itself being at stake here, we have to look for the very core of human ethics as the main guiding light of that consensus. Peter G Kirchschlaeger's book, therefore, has not come any earlier than it should. The book has tried to look at every aspect of the ethics involved in AI, and can be instrumental in starting that very important conversation which may make AI a glory of human achievement taking the humanity to a pinnacle, not a mistake taking the humanity to its doom. I congratulate Peter G

Kirchschlaeger again for his timely effort." **Professor Dr Muhammad Ibrahim, Professor Emeritus of Physics, University of Dhaka; Founder and Executive Director of the Centre for Mass Education and Science CMES, Bangladesh**

"A great book! The author combines the best European traditions of human-based ethical thinking in a free civil society with a fine awareness of the challenges in the digital world and in AI development! Having in mind the challenging task of combining ethical values with AI in data-based systems, the author starts from human vulnerability. This goes beyond classical approaches and ends up in promoting human rights as basic principles also in the field of AI and data-based systems.
The advantage of this approach comes with its application to a variety of practical fields such as in health-care or finance. Peter G Kirchschlaeger gains a normative guideline for dealing with a human centered use of databased-systems and artificial intelligence." **Professor Dr Ulrich Hemel, Director of the Global Ethics Institute Tuebingen, Germany; Deputy Spokesperson and Member of the CyberValley Public Advisory Board; President of the Federation of Catholic Entrepreneurs in Germany**

"This amazing book helps us understanding the deep implications that technology is having and will have in our life. Never in the past technology could have shaped and modified our lifestyle and the quality of life that we are used to. This power has grown too fast and too big with no deep understanding of its long term consequences on sustainability, inequality, justice. It's the right moment to pause and reason on how to make technology serve the flourishing of all humans – guided by the illuminating thoughts by Peter G Kirchschlaeger." **Simone Molteni, Scientific Director of LifeGate**

"Peter G Kirchschlaeger provides us with a dense and insightful analysis of the ethical challenges of digital transformation. A worthwile read!" **Professor Dr Melinda Lohmann, Assistant Professor of Business Law, with special emphasis on Information Law, University of St Gallen**

"In our times in which people try to robotize human beings and to 'humanize' robots, Peter G Kirchschlaeger's new book, with its rich content and its careful clarification of concepts, shows clearly a pressing need for a different from the prevailing approach to Ethics." **Professor Dr İoanna Kuçuradi, UNESCO Chair of Philosophy of Human Rights and Director of the Centre for Research and Application of Human Rights at Maltepe University, Turkey; President of the Philosophical Society of Turkey**

"This extraordinary book of Peter G Kirchschlaeger impresses with an excellent documentation of issues in the fields of advanced technology and with a deep analysis of their relationship with ethics. He offers the clear proposition that the ethical judgement and the control must be located in humans not in technology as he reassumes in his first epilogue, thinking of a dog on a leash: 'do we humans want to hold the leash or carry the collar?' He bravely discusses opportunities and challenges from an ethical perspective and offers in his wonderful book a personal ethical and legal proposal about technological progress culminating in the 'homo dignitatis' instead of 'homo digitalis'. I dare to assure the readers of this book that they will find in it: how to confront the delicate and inevitable situation of present times in relationship with the future for humans regarding the technological progress; how to get an exhaustive understanding of actual issues of high technology; how the author unveils the serious risks that elements of high technology present to fundamental human values; how the research about the ethical problems in relationship to high technology is based in direct references taken from the more connoted actors of the analyzed problems; how the ethical criteria used by the author to solve the proposed problems are anchored in the most correct actual ethical tradition; how the ethical proposal of the author to handle the complex presented problems is sustained by the most respectable institutions oriented to the common good of all mankind; how the author discovers a very wide field for research not enough approached by ethics and morals in the last decades, but of extraordinary transcendence for the actual times and the next future; how the author brings out the most profound Christian moral principles from their evident rationality and wisdom without any explicit reference to a religious proposal.

I highly recommend this book not only for interested readers but specially for academic institutions centered in Ethics or Moral Theology. Catholic Church scholars should take profit of this wonderful work of Peter G Kirchschlaeger for their teaching and research according with the direction indicated by Pope Francis in his Encyclicals Laudato si' and Fratelli tutti."

Professor Dr Alberto Múnera, S.J., PhD, STD, Tenured Moral Professor, Faculty of Theology, Pontificia Universidad Javeriana, Bogotá, Colombia

"This book makes a valuable contribution to the field by unpacking how ethics can and should guide the digital transformation of society as well as economy." **Professor Dr Surya Deva, Associate Professor at the School of Law, City University of Hong Kong, Hong Kong; Vice-Chair of the UN Working Group on the issue of human rights and transnational corporations and other business enterprises**

"A much needed voice on one of the most relevant topics for the future of humanity. The rampant lack of ethics in the field of digital technology is one of the most dangerous threats to humanity. This much needed and eye-opening book explores methodically how we turn the wheel around." **Jéronimo Calderón, Social Entrepreneur, Co-Explorer Amanitas, Ashoka Fellow, Alumni of the Global Shapers Community of the World Economic Forum WEF**

To our daughter Mia Esther

Table of Contents

Reviews 5

Prologue 29

1 Introduction 31

2 The Correlation between Ethics and Technology 49

2.1 Introduction 49

2.2 Ends and Means 50

2.2.1 Justifying Ends 50

2.2.2 Providing Means 51

2.2.3 Way of Functioning of Technological Progress 54

2.3 Reciprocal Interactions 56

2.4 Reciprocal Challenges 61

2.5 Ethical Principles and Ethical Points of Reference for Technology 64

3 Can Ethical Judgment Be Delegated to Technologies? 69

3.1 Introduction 69

3.2 Vulnerability 70

3.3 Conscience 78

3.4 Freedom 83

3.5 Responsibility 84

3.6 Autonomy 85

3.7 Ethical Judgement by Humans 90

3.8 Overcoming the “Humans - Machines” Dichotomy Using the Interactionist Model 90

4 Critical Review of Terms 97

4.1 Clarification of Terms 97

4.2 Robots 97
4.3 Artificial Intelligence 98
4.4 Data-Based Systems 102
4.5 Digital Transformation 106
4.6 Machine Ethics – Roboethics 108

5 The Complexity of Ethics 111
5.1 Ethics Is Not Democracy 111
5.2 Ethics Beyond Principles and Norms 111

6 Instruments for the Ethical Assessment 117
6.1 Introduction 117
6.2 The Principle of Responsibility 119
6.2.1 Introduction 119
6.2.2 Short Outline of the Historical Development of the Term Responsibility 120
6.2.3 Eighth Dimensions of Responsibility 124
6.2.4 Responsibility as Ethical Principle for Data-Based Systems 131
6.3. The Principle of Justice 132
6.3.1 What Is "Justice"? 132
6.3.2 The Tension Between Law and Justice 136
6.3.3 Omni-Dynamic Social Justice 137
6.3.4 Omni-Dynamic Social Justice and Intergenerational Justice 141
6.3.5 Justice as Ethical Principle for Data-Based Systems 146
6.4 Human Rights as an Ethical Frame of Reference 146
6.4.1 Human Rights – A Minimal Standard 146
6.4.2 The Multidimensionality of Human Rights 147
6.4.3 The Characteristics of Human Rights 155
6.4.4 The Need for an Ethical Justification of the Universality of Human Rights 160
6.4.5 Justifying Ethically Human Rights Based on the Principle of Vulnerability 165
6.4.6 Universal Human Rights Protect From Exclusion 176
6.4.7 Universal Human Rights Foster Plurality 182

6.4.8 Human Rights as Ethical Frame of Reference for Data-Based Systems 186

7 Opportunities and Challenges from an Ethical Perspective 191

7.1 Illegitimate Path 191

7.2 "Dual Use" 192

7.3 Ambivalence 193

7.4 Beta Versions 194

7.5 Coerciveness 195

7.6 The Paradox of Potent Impotence 196

7.7 Risk of Anthropocentrism 198

7.8 Transhumanism 202

7.9 Medicine and Health Care and Data-Based Systems 214

7.9.1 Access to Health Care 214
7.9.2 Personalized Medicine and Health Care 215
7.9.3 Data-Based Health Care 217

7.10 Digital Transformation of Finance 231

7.10.1 Digitalization and Automation of Finance 231
7.10.2 Cryptocurrencies and Blockchain Technology 237

7.11 Automated Weapons 243

7.12 Democracy and Data-Based Systems 250

7.12.1 Data-Based Systems as Democratizing Force 250
7.12.2 Data-Based Systems as Threat for Democracy 253
7.12.3 Online Racist Hate Speech 259

7.13 Automation of Mobility 276

7.13.1 It Is Not All about "Moral Dilemmas" … 276
7.13.2 Automated, not "Autonomous" Mobility 279
7.13.3 Subjectivity of Responsibility 280
7.13.4 Security Facing the Ironies of Automation 282
7.13.5 Risks for the Human Right to Privacy and to Data-Protection 282
7.13.6 Fewer Accidents 283
7.13.7 Less Pollution 283
7.13.8 Fewer Vehicles – More Travel Miles 284
7.13.9 Automated Mobility as Disruption 284

7.13.10 Globally Unequal Distribution of Advantages and Disadvantages 285
7.14 Internet of Things 285
7.15 Internet of Humans 289
7.16 Wearables 291
7.17 Data-Protection and Privacy 296
7.17.1 It's All About Data 296
7.17.2 Data-Tyranny 299
7.17.3 Datadeology 301
7.17.4 Violations of the Human Right to Privacy and Data-Protection 303
7.17.5 Manipulation of Humans – The Example of "Nudging" 306
7.17.6 Total Manipulation – the Example of "Hyper-Nudging" 311
7.18 Reduction in Paid Jobs 313
7.18.1 Creation or Destruction of Paid Jobs? 313
7.18.2 Massive Reduction in Paid Professional Tasks – the Uniqueness of Digital Transformation and Data-Based Systems 314
7.19 Global Injustice 319
7.20 Ecological Impact 329

8 Outlook: How to Create a Future Ethically 333
8.1 Ethical and Legal Framework for Technological Progress 333
8.1.1 Data-Based Systems Should Serve Humans and the Earth 333
8.1.2 Human Responsibility 335
8.1.3 Ethical and Legal Norms for Data-Based Systems 337
8.1.4 Datethics 350
8.1.5 Human Rights-Based Data-Based Systems HRBDS 350
8.1.6 International Data-Based Systems Agency DSA 352
8.1.7 Addressing the Second Paradox of Digital Transformation and Data-Based Systems: Empowerment of Data-Based Systems and Human Fear of Powerlessness 355
8.1.8 Ethics Committees Back to Ethicists! 357
8.2 Society-, Entrepreneurship-, Research-Time-Model (SERT) 361
8.2.1 Relief as a Burden – the End of Striving for Full Employment 361

8.2.2 Unconditional Basic Income 364
8.2.3 Society-, Entrepreneurship-, Research-Time-Model (SERT) 364
8.2.4 SERT as Ethical Impulse for Interdisciplinary Dialogue 367
8.3 Equal Participation in Digital Transformation and Data-Based Systems 368
8.4 Insurance 370
8.5 Taxes 373
8.6 Patents 376
8.6.1 Patents as Conventional Instruments of Innovation 376
8.6.2 Corporations' Ethical Responsibilities for Driving Innovation 377
8.6.3 Legitimate Examination of Conventional Instruments of Innovation 378
8.6.4 The Impact of Patents on Innovation and Their Ethical Significance 378
8.6.5 Possibilities for Adaptation of Patents 384
8.7 Research 389
8.8 Education "Empowering" Reason, Not Just Training "Technical Rationality" 391
8.9 Life With Data-Based Systems 394
8.9.1 Humans and the Life With Data-Based Systems 394
8.9.2 Humans Shaping Digital Transformation and Data-Based Systems 396
8.9.3 The Responsibility of States and Non-State Actors for Digital Transformation and Data-Based Systems 398
8.9.4 What World With Data-Based Systems Do We Dream Of? 407
8.10 One World 410
8.11 Trust 411
8.12 Sustainable Development 414
8.13 "Homo Dignitatis" Instead of "Homo Digitalis" 415
8.14 The COVID-19-Pandemic and Mastering Threats in Times of Data-Based Systems 419
8.15 At Last, The Question of Focus and Priorities 422

Epilogue I 423

Epilogue II 425

References 427

Prologue

What would a dictator wish for in order to get as many people as possible under his control? He would wish that as many people as possible were connected to each other technologically, everywhere and always, and that he had access to this digital network.

What would a company wish for in order to have as much influence as possible on as many people as possible and turn them into its customers? The company would wish that as many people as possible were connected to each other technologically, everywhere and always, and that it had access to this digital network.

How would humans who would be killed by poverty or poverty-related causes wish that most financial resources were allocated?

What would humans wish for instead of being reduced to algorithms and data?

What would humans wish for instead of being innovated away?

What would humans wish for in order to be respected as bearers of human dignity and human rights?

Would humans wish to be the masters or the slaves of algorithms and data?

1 Introduction

Writing or reading a book about rapidly advancing technology-based progress initially might trigger the suspicion that the approach could be anachronistic.[1] Does the methodical approach of a book not seem to contradict the content? Is there not a danger that the colorful bouquet of arguments starts to wilt even before it starts to blossom, because reality has surpassed and outpaced the writing long before it is written? Is the variety and complexity of technology-based achievements, phenomena, products, and realities even amenable to an ethical approach in the form of a book? Do not worry. It does make sense to continue reading this book. Because neither human curiosity to discover and invent new things nor the human fascination with the questions of what humans want to be, what kind of a world humans dream of, and if everything that humans are technically able to do should really be done, are innovations of the 21st century. Both go far back in the history of humanity, and neither is at all likely to disappear any time soon.

Furthermore, ethical reflection is also distinguished by the fact that it strives to give answers in a justifiably reliable and universally binding manner to questions asking to what end, on what grounds, and why. Ethics is a science, which reflects on morals. As a scientific discipline, ethics strives for knowledge about what ought to be in a rational, logically coherent, methodological-reflective, and systematic way. Ethics aspires to a universally, even intergenerationally, justifiable notion of right and wrong and of good and bad. Universality as a necessary characteristic of ethics, ethical assertions, ethical principles, and ethical norms presupposes the fulfillment of the principle of generalizability by presenting rational and plausible arguments – "good reasons". "Good reasons" means that it must be conceivable that all humans, given their effective freedom and autonomy as well as their full equality, would agree upon these reasons – within a model of thought and not within a real worldwide referendum – on ethical grounds. The ethically required should not change on a day-to-day basis. The ethical principle of human dignity of all humans, for example, which stipulates that all humans are unique, which distinguishes them from ma-

1 All verbatim quotations originally written in languages other than English have been translated by the author.