Walter Brenner · Falk Uebernickel
*Editors*

# Design Thinking for Innovation

## Research and Practice

Springer

Design Thinking for Innovation

Walter Brenner • Falk Uebernickel
Editors

# Design Thinking for Innovation

## Research and Practice

Springer

*Editors*
Walter Brenner
Institute of Information Management
University of St.Gallen
St.Gallen, Switzerland

Falk Uebernickel
Institute of Information Management
University of St.Gallen
St.Gallen, Switzerland

ISBN 978-3-319-26098-3 ISBN 978-3-319-26100-3 (eBook)
DOI 10.1007/978-3-319-26100-3

Library of Congress Control Number: 2016933122

Springer Cham Heidelberg New York Dordrecht London


Printed on acid-free paper

Springer International Publishing AG Switzerland is part of Springer Science+Business Media (www.springer.com)

# Design Thinking at University of St.Gallen


Design Thinking Course with Students from the MOK Master in the Design Thinking Loft at the University of St.Gallen

Annual Paper bike Rally at Stanford University

Marshmallow Tower—A Classic Warm-Up Exercise in Design Thinking

Students conducting a brainstorming outside of classic lecture halls

# Preface

## Decision Makers

Whether customers, managers, politicians, or judges, all face an increasingly complex world. This complexity is driven by fast technological development and dramatically increasing diversity in culture and lifestyles, which impacts policies and regulations. With an abundance of information and the human brain's limited capacities to digest this information, or even cope with the challenges of social networks, innovative forms of analytical thinking, strategy and product development, as well as teaching and learning are necessary.

Tangible forms of interactions and idea generation allow for creative and analytically sound solutions; this is the basic philosophy of Design Thinking. The University of St.Gallen is proud that this innovative form of teaching and learning was recognized and accepted by—among others—Prof. Dr. Walter Brenner and our Master of Business Innovation program. Because our university has a strong emphasis on new forms of teaching and learning, Design Thinking (and the establishment of a related) can be seen as one of different pilot initiatives in teaching innovation.

A basic element of universities is the combination of teaching and research. The design lab—like a behavioral lab or a trading room—is part of a modern university's infrastructure for economics, social sciences, law, and political science. These infrastructures can be intelligently used, not only in teaching programs but also for services like development work for industries. We see many perspectives for Design Thinking as an important element in our vision for 2020, in which our university wants to contribute to modern economic and social challenges by

becoming a center of thought leadership. We would like to thank the pioneers in Design Thinking at the University of St.Gallen, Prof. Dr. Walter Brenner and Falk Uebernickel.

January 2016 Thomas Bieger

# Foreword

Design Thinking is one of the most fascinating concepts currently under discussion in management discourse: human-centered and based on new facilitation methods and spatial concepts. It is not surprising that Design Thinking emerged from Stanford University, in the heart of Silicon Valley; the success of many technology enterprises, as well as Internet giants, is rooted in the combination of technology and human-centeredness.

For us, the best example is Apple. The success of this company is—according to the biography of Steven Jobs by Isaacson[1]—based on the combination of advanced information and communication technology (iPhone and iPad), new business models (iTunes), human-centeredness (minimalistic approach to design), and beauty (iMac 9) demanded by Steve Jobs. With the combination of these four elements, Apple managed both to dispel the prejudice that information and communication technology is ugly and hard to use and to be a very successful and, at times, the most valued company of the world. Design Thinking has been utilized, to our knowledge, continuously for many years at Apple. The first Apple computer mouse was developed together with engineers from IDEO, a spin-off of Stanford University specialized in Design Thinking. With this background, it is now almost unanimously agreed that Design Thinking belongs in the curriculum of every leading technical university. Every engineer graduating from one of these leading universities will need to be proficient in Design Thinking. It would seem that contemporary, innovative product and service development is hardly conceivable now without some knowledge of Design Thinking.

In software development, Design Thinking is also increasingly used. Hasso Plattner, one of the founders of SAP, acknowledged the potential 10 years ago. He then initiated and financed the d.School at Stanford University and built a large area for Design Thinking at the Hasso-Plattner-Institute at the University of

[1] Isaacson, W (2011) Steve Jobs. Simon & Schuster, New York.

Potsdam. Based on concepts, knowledge, and experience from these ventures, he anchored Design Thinking as the central innovation method within SAP.

For years, Design Thinking has steadily gained influence in management. We at the Institute of Information Management at the University of St.Gallen believe ourselves to be, along with Roger Martin[2] from Rotman School of Management, pioneers in the application of Design Thinking in management. Since summer 2005, we have worked in close collaboration with Larry Leifer and Mark Cutkosky of the Center for Design Research[3] at Stanford University's engineering department on the use of Design Thinking in innovation projects for new business models, processes, products, and services. Since then, we have conducted more than 40 projects and are part of a global network of universities applying Design Thinking. We have made Design Thinking an integral part of education at the University of St. Gallen[4]; as of January 2015, it seems that this success will continue. The rectorate of the university has decided to build a new lab dedicated to Design Thinking education, a decision hard to imagine when we started with Design Thinking almost 10 years ago. It is extraordinary how influential Design Thinking has become in research and management education. Through many discussions, we (at the Institute of Information Management) realized that we are not the only unit at the University of St.Gallen working with Design Thinking, which led us to organize this book. Our aim was to gather Design Thinking friends at the university and to invite colleagues from our partner universities (also working together with us on Design Thinking projects) to contribute to this book. We are delighted that most of the colleagues accepted our invitation and contributed. We would like to especially thank the president of our university, Thomas Bieger, who wrote the preface.

For us, it was clear from the beginning that we would not write a book about Design Thinking and innovation in information systems, although we both have a strong background in this field. When we planned this book, our idea—or goal—was to write a book about Design Thinking as a tool for innovation management. The astonishing result is that the final result is a management book with a focus on innovation management. This proves to us that Design Thinking, with its effective method and tool orientation,[5] will play an important role in corporate management, innovation, and management education in the future.

The book is organized into three parts. **Part I** of this book contains an introduction from the editors, Walter Brenner and Falk Uebernickel. In this first contribution, with Thomas Abrell, we—as editors—describe our views on Design Thinking

[2] Martin, R (2009) The Design of Business: Why Design Thinking is the next competitive advantage. Harvard Business Press, Cambridge (MA).

[3] http://me.stanford.edu/research/labs-and-centers/center-design-research

[4] http://dthsg.com/

[5] There is a second book from us about Design Thinking available with a strong focus on project management, methods, and tools in design thinking: Uebernickel, F., e.a., Design Thinking: Das Handbuch (2015): Frankfurter Allgemeine Buch.

and our experiences at the Institute of Information Management with Design Thinking in research and practices over the last 10 years.

**Part II** of this book presents contributions from research and teaching. We have been able to motivate essential "players" in Design Thinking at the University of St. Gallen and recruited partners—from other universities that have worked together with us for many years in Design Thinking—to submit a contribution.

**Thomas Abrell**, one of our doctoral candidates at the Institute of Information Management, works at Airbus. He was educated in Design Thinking at Aalto University in Helsinki and is researching Design Thinking and Corporate Entrepreneurship. In his contribution, he points out four promising areas of future research to connect Corporate Entrepreneurship (or Intrapreneurship) and Design Thinking. The first theme he depicts is Design Thinking and opportunity recognition/creation, a concept at the heart of Corporate Entrepreneurship, from which Corporate Entrepreneurship emerges. Secondly, Design Thinking and Effectuation are analyzed; clues emerge that the logic of entrepreneurial expertise—effectuation—and Design Thinking may have strong overlaps in Corporate Entrepreneurship. The third theme elaborates on the intersections of Design Thinking and Corporate Entrepreneurship strategy. The connections are, thus, in strategy-making and a design-influenced Corporate Entrepreneurship strategy that aims at refining elements of Design Thinking to help corporate entrepreneurs. The fourth theme is entrepreneurial design management, with a shift of perspective—instead of ways to support corporate entrepreneurs through Design Thinking, this chapter elaborates on entrepreneurial management principles to manage the design function within corporations.

In their contribution, **Pekka Berg and Jussi Pihlajamaa** from Aalto University, **Poul Kyvsgaard Hansen** from Aalborg University, and **Ade Mabogunje** from Stanford University concentrate on the front-end phase of innovation processes. In this early phase, central attributes of the final product are defined. The authors propose a balanced design front-end model (BDEFM) to help measure radical innovation processes. The model analyzes the early phase of innovation processes from five viewpoints: input, process, output (including impacts), social environment, and structural environment. With the help of three case studies from equipment manufacturing, metal industry, and the animal feed industry, the authors verify their model.

**Amir Bonakdar** and **Oliver Gassmann**, from the Institute of Technology Management at the University of St.Gallen, present the innovation of business models. Their most important assumptions are as follows: 90 % of all business models can be traced back to 55 core patterns; with the help of these core patterns, the innovation process for business models can be systematized. In their contribution, they define how the business model navigator process can be supported through the strengths of Design Thinking. They explain how, in the three steps "Design," "Ideation," and "Integration", thinking styles and specific methods and tools from Design Thinking can be applied. With their contribution, Bonakdar and Gassmann show how specific methods and models that have been developed in Design Thinking can be selected and applied in different innovation contexts.

In their contribution, **Mateusz Dolata** and **Gerhard Schwabe**, from the University of Zurich, apply Design Thinking in information research projects. Their contribution arises from a perennial collaboration of the Institute of Information Management and the University of Zurich in Design Thinking education. The authors start with the assumption that Design Thinking and scientific work are not initially well connected and then prove the opposite. They show that Design Thinking—as overall mind-set as well as its specific methods—can make a significant contribution to strengthening research in information systems. Central focus is the creation of radical innovations to solve wicked problems. In addition, they show that Design Thinking makes an essential contribution to strengthen user orientation, for example, through applying ethnographic methods. In the second part, the two authors illustrate that Design Thinking is a practice-driven method often in conflict with established methods of research in information systems. An important insight from the contribution of Dolata and Schwabe is a very careful definition of the statement that "Design Thinking is a research method," a topic repeatedly debated in discussions about Design Thinking.

**Martin Eppler** and **Sebastian Kernbach**, from the MCM Institute at the University of St.Gallen, deal with the visualization of results during a Design Thinking project. They describe dynagrams, which they define as dynamic graphic interactive thinking tools that can be used by members of a working group and result in a joint (often digital) solution space that takes the contributions of all participants into account. They specifically research three dynagrams: the Roper Dynagram, Confluence Dynagram, and Sankey Dynagram. Eppler and Kernbach show that the digital world and application of new methods like Design Thinking require new methods and tools. Within information management (a field where we belong as editors) and other disciplines we will face great challenges in the coming years; we must expand our "toolbox" (a topic we will further explain in our own contribution). Eppler and Kernbach go one step further by introducing concrete and partly digitally supported methods and tools.

**Simon Grand**, from the Institute for Systemic Management and Public Governance at the University of St.Gallen, connects Design Thinking with management and strategy. His basic assumption is derived from Peter Drucker: ". . .the best way to predict the future is to create it." He sees Design Thinking as an essential component in an entrepreneurial understanding of strategy and summarizes his ideas in 10 practices: projecting, prototyping, evaluating, experimenting, routinizing, mobilizing, realizing, connecting, scaling, and curating. In the second part of his contribution, Grand demonstrates how these practices can be applied to the strategy process. He succeeds in showing that, through the consistent use of ideas and concepts from Design Thinking, new understanding of the strategy process and innovative processes of strategizing emerge.

**Dietmar Grichnik**, **Ronny Baierl,** and **Michael Faschingbauer**, from the Institute of Technology Management at the University of St.Gallen, illustrate the connection between entrepreneurship and Design Thinking. They draw from the

field of effectuation, concluding that there are comprehensible, documentable methods for entrepreneurship. Effectuation departs from the traditional understanding that entrepreneurs are unique personalities and entrepreneurship results from that. In their contribution, they depict, in fascinating detail, how uncertainty is confronted. They summarize principles of entrepreneurial action: future orientation, means orientation, affordable loss, contingencies, and partnership. Grichnik et al., Grand, and Abrell think in the same direction; they demonstrate that Design Thinking supports entrepreneurial thinking and action.

**Claus D. Jacobs**, from Berne University of Applied Sciences and the University of St.Gallen, introduces another principle of Design Thinking: the connection of head and hand that he describes as cultural-materialist approach. He aligns his thoughts closely with craftsmanship, which he defines as the "skill of making things right." Like Grand, Jacobs builds a bridge between strategy and Design Thinking, but with different emphasis. Jacobs develops a strategy process using research from the field of design. He distinguishes between the following steps: formulating, representing, moving, bringing problems and solutions together, evaluating, and reflecting. He shows systematically how, in each of the seven steps, Design or Design Thinking can overcome limitations of traditional strategy-making processes and lead to a new strategy-making process.

**Larry Leifer**, from the Center for Design Research, one of the inventors of Design Thinking at Stanford University and **Alexander Neff** from the Institute of Information Management at the University of St.Gallen work with context dependency in Design Thinking and design research. The starting point for their contribution is a wave of research at Stanford University dealing with autonomous driving and driver experience. Leifer and Neff discuss "complex adaptive machine systems" in this context. Through six examples at the beginning of the article, they show how important context is for interpretation. Based on this, Leifer and Neff distinguish between three distinct forms of dialogue between robot (autonomous car) and driver: information dialogue, emotion dialogue, and knowledge dialogue. In the second part of their contribution, they define their research in the design research context.

**Sven Reinecke**, from the Institute of Marketing at the University of St.Gallen (who took a sabbatical at the Centre for Design Research at Stanford University), compares marketing and Design Thinking. In his introduction, he explains that marketing and Design Thinking cannot be reduced to one method; both approaches are more like overall (leadership) philosophies. With this argument, Reinecke is in line with many other contributors, including Brenner and Uebernickel and Abrell. The author works systematically through all steps of the Design Thinking process, depicting how it supports marketing management. During this process, he finds that traditional instruments of Design Thinking, like observation, prototyping, and testing with end customers, can expand the method and toolbox of marketing. However, Reinecke also shows that an orientation of marketing processes solely to the paradigms of Design Thinking may be an oversimplification. The author

concludes that an analysis of the competition should be institutionalized in the innovation process; that, in his opinion, is a weakness of Design Thinking.

**Part III** of this book contains three contributions showing Design Thinking from a practitioner's perspective. It was never the aim of this book to cover all facets of the application of Design Thinking in companies. Nevertheless, we would like to give a glimpse and build the bridge toward the application of Design Thinking—in practice—with these three contributions, which show how Design Thinking offers immediate practical value.

**Xiao Ge** and **Bettina Maisch**, from Siemens Corporate Technology in China, show how Siemens implemented Design Thinking in China. The i.DT program has two goals: it aims at educating future innovation leaders and strengthening innovation capability. This contribution shows how Design Thinking is adapted to Chinese culture, reflected, for example, in the naming of the project rooms for design teams "Tian Gong Guan," which translates to "innovators' heaven." At the heart of this contribution are applications of Design Thinking in user-driven innovation. In their contribution, Ge and Maisch introduce the Design Thinking process applied at Siemens in China, as well as selected methods. They show that the Design Thinking process, as in the contributions of Brenner, Uebernickel, and Abrell, is applied at Siemens China with only minor changes. In conclusion, the authors show how important management support and a support ecosystem are for the successful implementation of Design Thinking in a large corporation.

**Alexander Grots** and **Isabel Creuznacher** discuss whether Design Thinking is a process, or leads toward a certain culture, from a practitioner's perspective. It should be noted that Alexander Grots was previously a partner at IDEO, one of the leading consultancy firms based on Design Thinking. Grots and Creuznacher, in line with other authors of this book, come to the conclusion that Design Thinking can be applied as both process and culture. In their contribution, they picture a Design Thinking innovation process compatible with other processes described in this book and describe elements of a Design Thinking culture.

**Michael Shamiyeh**, a well-known architect and generalist from the University of Linz, critically scrutinizes future orientation in innovation projects and Design Thinking. From a temporal perspective, Shamiyeh distinguishes three approaches to innovation: the past, present, and future as points of reference for innovation. The past is only briefly described. For the presence as point of reference, Shamiyeh chooses Nike + and the Apple sports kit as example. He shows (and this mirrors the experiences from many innovation projects) that, through discussions with real and potential customers, the potential for radical future-oriented solutions is limited. On the other hand, such solutions can actually be sold. For the future as a point of reference, he chooses the example of an engineer at Kodak, who invented the digital camera already in the mid-1970s. As history shows, Kodak did not profit from that. The author shows how important it is, on one hand, to look without restrictions into the future, and, on the other hand, he shows, realistically, that this is difficult and can be frustrating. The development phase of a dark-horse prototype, as described in the macro-process for Design Thinking by Brenner et al., can be seen as an attempt to sketch a "design from the future," as Shamiyeh calls it.

Despite different organizations, knowledge, and author experiences, the contributions in this book are surprisingly homogeneous. We illustrate how the field developed from central works like Simon's Sciences of the Artificial in the 1960s and the evolution of Design Thinking through the engineering department of the Stanford University toward a strong core today, manifested in an innovation process and a specific Design Thinking culture. This core is widely accepted in different application areas and successfully applied. In addition, several authors extended the core to improve the applicability of Design Thinking in other contexts.

To sum up, the contributions in this book lead to the following insights:

- Design Thinking is a body of knowledge that started from the design field as a conception method and from Simon's science of the artificial in the 1960s and has developed into a research and teaching discipline with a fixed place in numerous research fields, broadening steadily. The different fields analyzed in this book range from information management, engineering, innovation, and entrepreneurship to management, showing how broadly Design Thinking can be applied.

  Design Thinking is interdisciplinary, based on knowledge and insights from engineering, management, industrial design, anthropology, information management, and ethnography. Its pragmatic core and understandability allow application in many other contexts.
- Central similarities spanning almost all articles are the connection of human-centeredness of the innovation process, for customers as well as the building and testing of prototypes. Design Thinking works best when teams are heterogeneous. Many additional Design Thinking developments are described in this book; they produced specific knowledge and experience around this shared core.
- Analogous to other processes in the company, innovation processes can be structured and replicated to a certain extent. Design Thinking is a procedure to design innovation processes comprehensibly. Relying on single, unique persons with a specific genius is replaced by a reproducible process.
- Design Thinking offers a platform to answer different questions from areas such as problem-solving, design of business models, facilitation, mediation, visualization, and innovation in one process. It forces the users in these disciplines to enhance their methods and toolboxes.
- The human in different roles, for example, as customer, employee, entrepreneur, or user, is gaining favor in many disciplines. Design Thinking is a proven and robust instrument to uncover and include obvious and hidden needs in innovation-, development-, and problem-solving processes.
- Design Thinking is, despite its broad base, ultimately a pragmatic method based on a few simple principles. Iterative development, contact with humans, and visualization of results as prototypes are examples of these principles.
- To bring about big changes in companies through Design Thinking, it must be understood that company culture needs to be addressed when training employees.

This list summarizes our insights from all contributors and represents the viewpoint of the editors; as such, it is subjective. In the end, every reader needs to decide on her/his own what the take-aways are.

We thank all personalities who contributed to the success of this book. Jennifer Hehn and Barbara Rohner coordinated the book and Roger Furrer assisted with translation and formatting.

St.Gallen Walter Brenner
January 2016 Falk Uebernickel

# Contents

# About the Authors

**Thomas Abrell, M.Sc., M.A.** conducts his doctoral research in Intrapreneurship and Design Thinking at the Institute of Information Management, University of St. Gallen. In addition, he is innovation manager at Airbus as well as leading the consultancy Kombinative Oy, which specializes in intrapreneurship. With a background in business as well as International Design Business Management, Thomas Abrell specialized in user involvement, Design Thinking, and intrapreneurship.

**Pekka Berg, Ph.D.** is Research Director of Aalto University Department of Industrial Engineering and Management and founder and also Director of the Innovation Management Institute under Aalto University. He is, as well, a partner and consultant to Innoman ltd. He has worked with companies like Toyota, Volkswagen, Nokia, Panasonic, Mitsubishi, Rolls-Royce, Wärtsilä, Electrolux, Kone, Metso, Rautaruukki, UPM, and Fortum. His teaching activities in Aalto University School of Science, Aalto Ventures Program, International Design Business Management Program, and MBA program include the courses dealing with Collaborative Innovation Management and Innovation and Project Management. He has publications in the areas of design thinking, general innovation management and innovation policy, innovation measurement, management of intangibles, discontinuous innovations, rapid innovation practices, and user experience in innovation.

**Amir Bonakdar, Ph.D.** is Head of Business Model Design Research at the University of St.Gallen and Stanford University. After obtaining his diploma in business administration from the University of Erlangen-Nuremberg, he worked for several years as a consultant at SAP, helping various clients optimize and innovate their business processes. He pursued his Ph.D. at the Institute of Technology Management in St.Gallen and at the Center for Design Research at Stanford University. His research interests include business model innovation, Design Thinking, strategic innovation, and networks.

**Walter Brenner, Ph.D.** joined St.Gallen University in 2001 as a professor after having held the Chair of Information Systems at the University of Essen (Germany) for 2 years and at Freiberg University of Mining and Technology (Germany) for 7 years. His research focuses on Design Thinking, Digital Industrial Services (smart products), and Innovation and Technology Management. He authored and/or edited 30 books as well as more than 300 scientific publications. In addition, Professor Brenner serves on the editorial board of MIS Quarterly Executive and is member of the program committee of international conferences. Professor Brenner received a graduate degree in business administration (lic. oec.) and a Doctorate (Dr. oec.) from the University of St.Gallen. Prior to joining academia, Professor Brenner worked as Head of Application Development with Alusuisse-Lonza AG (Switzerland).

**Isabel Creuznacher, Ph.D.** is associate director of the "Institute for Transformation in Business and Society" at the EBS Business School (www.ebs-init.de).

She offers companies and educational institutions worldwide customized programs and seminars with a focus on the topic Innovation, Entrepreneurship and Intercultural Management, helps companies to develop new business segments, or does order-related trend research in Innovation worldwide.

She is also assigned as assistant professor in India (Christ University) and Saudi Arabia (Dar Al-Hekmar College) where she is teaching yearly compact courses "Design Thinking and Intercultural Management."

**Mateusz Dolata, M.Sc.** since 2012 is a Ph.D. student in the Information Management Research Group at the University of Zurich, where he studies the influence of IT on communication in dyads and design teams. He draws his interest from his previous studies in computational linguistics, philosophy, and media informatics. In his current research, he combines methods from those fields to discover changes in vocabulary and language use resulting from the application of particular software, hardware, or a process. He uses the obtained findings to propose improvement in collaboration support systems or strategies. He has published at conferences such as CollaborateCom, DESRIST, and European Conference on Information Systems and at adjunct events to CSCW and ECSCW. He promotes Design Thinking in his teaching activities and acts as a facilitator in research projects conducted with academic or industrial partners.

**Martin J. Eppler, Ph.D.** is the Chair of Communication Management at the University of St.Gallen, where he is also the director of the university's International Study MBA program and of the = MCM institute for media and communications management. He has been a guest professor at Georgiatech's School of Public Policy, Cambridge University (UK), Aalto University (Finland), Pacifico University (Peru), and the Central University of Finance and Economics in Beijing (China). His research focuses on knowledge management, knowledge creation and innovation, knowledge visualization in teams, and knowledge communication

among experts and decision makers. He is the author of 14 books and more than 150 academic articles. He is the inventor of the visualization software en.lets-focus.com and he has been an advisor and trainer to organizations such as the United Nations, the European Central Bank, Siemens, Daimler, UBS, eBay, Swarovski, GfK, UBS, Roche, AXA, Louis Vuitton, or Ernst and Young.

**Oliver Gassmann, Ph.D.** is professor of Technology Management at the University of St.Gallen, Switzerland, and Director of the Institute of Technology Management. After completing his Ph.D. in 1996, he was leading research and advanced development of Schindler Corporation. He has published in leading journals such as Research Policy, R&D Management, International Journal of Technology Management, Journal of World Business, European Management Journal, IEEE Transactions on Engineering Management, Journal of Technology Transfer, and Harvard Business Manager. At the core of his research is the pervading question of how companies innovate and profit from innovation. Thus, he is dedicated to discovering new approaches to the management of technology and innovation that contribute to firms' competitive advantage.

**Xiao Ge** received the B.Eng. degree in Astronautics Engineering from Harbin Institute of Technology, China, in 2010, and the M.S. degree in Mechanical Engineering from Stanford University, USA, in 2012. She is the former Innovation Specialist at Siemens Corporate Technology (CT) China. Since early 2012, together with the pioneers of human-centered innovation at Siemens CT China, she has developed Industrial Design Thinking (i.DT), set up the innovation lab and community, as well as trained/coached Siemens researchers with i.DT along with business projects.

**Simon Grand, Ph.D.** is a management researcher, knowledge entrepreneur, and strategy designer. He is founder and academic director of the RISE Management Innovation Lab (www.rise.ch) and assistant professor of Strategic Management at the University of St.Gallen, research fellow at the Zurich University of the Arts (www.creativeeconomies.com), and a member of the supervisory board of several companies. In his research, he examines the dynamic interplay between routine dynamics, strategy processes, and managerial engagement, with an empirical focus on entrepreneurial companies and technology corporations in various industry contexts. He also works and publishes on the practice of executive management, corporate governance, and management innovation. His research has been published in academic journals including Long Range Planning and Scandinavian Journal of Management and in several coauthored books: "Executive Management in der Praxis" (2011), "Mapping Design Research" (2012), "Das St. Galler Management-Modell—4. Generation" (2014, 2015), and "Routines, Strategies and Management: Engaging for recurrent creation at the edge" (forthcoming) (see also: www.simongrand.com).

**Dietmar Grichnik, Ph.D.** is Chair Professor of Entrepreneurship and Director of the Institute of Technology Management at the University of St.Gallen (HSG), Switzerland. He is the Initiator and Co-Director of the Center for Entrepreneurship and Vice Dean of the School of Management at HSG. Before joining HSG, Professor Grichnik served on the faculties of WHU—Otto Beisheim School of Management and Witten/Herdecke University in Germany. Moreover, he held a visiting professorship at the University of Melbourne, Australia, was guest professor at Harvard Business School, USA, and teaches currently at the Swiss Federal Institute of Technology (ETH) Zurich. As an advisor, Professor Grichnik has worked with start-ups and corporations in entrepreneurial decision-making and finance. He takes part in international start-up initiatives as a cofounder and business angel. He supports students and scientists on campus with the HSG Founder Lab and the HSG Founder Garage. He is responsible for the scientific lead of the Swiss Start-up Monitor on behalf of the Swiss Commission of Technology and Innovation and the Swiss National Science Foundation. He has published 5 books and more than 200 articles.

**Alexander Grots** is an independent innovation consultant and specialist in the "Design Thinking" innovation methodology. He started to work with and teach the method in 2001. His stages included the role of Managing Director for internationally acclaimed innovation firm IDEO in Germany, being in charge of setting up the School of Design Thinking at the HPI Potsdam, founder and managing director of innovation consultancy gravity-Europe, and founding a number of start-ups in the mobility, IoT, and wearables sector.

**Poul Kyvsgaard Hansen** is an Associate Professor of Technology Management and Organization at Center for Industrial Production at Aalborg University in Denmark. He holds a M.Sc. in Industrial Engineering and a Ph.D. in Technology Management. His current research focuses on various aspects of communicating complex problems and solutions. This includes both organizational and technical issues within three overall research areas: (1) Product modularization—Architectures—Platforms, (2) Innovation Management, and (3) Change Management.

**Claus D. Jacobs, Ph.D.** is Professor of Strategic Management and Organization at Berne School of Management, Institute for Corporate Development, UAS Berne, a Visiting Professor of Strategy and Organization at the University of St.Gallen, and an Associate Fellow of University of Oxford's Saïd Business School. He holds a Ph. D. from University of Dublin, Trinity College, as well as a venia legendi from University of St.Gallen. From 2008 to 2013, he was Swiss National Science Foundation Professor at the University of St.Gallen. He is member of the editorial boards of Journal of Management Studies and Scandinavian Journal of Management as well as Executive Committee Member of the Strategizing Activities and Practices Division at the Academy of Management. His research has been published in Organization Studies, Journal of Management Studies, MIT Sloan

Management Review, Strategic Organization, Human Relations, Journal of Applied Behavioral Science, and Journal of Organizational Change Management, among others. Recently, he published with Loizos Heracleous (Warwick Business School) "Crafting Strategy—Embodied Metaphors in Practice" at Cambridge University Press (2011).

**Sebastian Kernbach, M.Sc.** is project manager and research associate at the University of St.Gallen and research fellow at the brand consultancy Interbrand. His doctoral research focuses on knowledge visualization and knowledge communication with a particular emphasis on the facilitation of interpersonal interactions in Professional Services Firms. He is a trainer for visual thinking helping researchers, lecturers, and professionals to support their thinking and communication skills through the use of visualization. He studied economics and communication at the University of Lugano and Copenhagen Business School and his professional experience includes positions in marketing, communication and branding at XEROX, a Swiss startup, and Interbrand.

**Larry Leifer, Ph.D.** is a Professor of Mechanical Engineering Design and founding Director of the Center for Design Research (CDR) at Stanford University. He has been a member of the faculty since 1976. His teaching laboratory is the graduate course ME310, "Industry Project Based Engineering Design, Innovation, and Development." Research themes include the following: (1) creating collaborative engineering design environments for distributed product innovation teams; (2) instrumenting that environment for design knowledge capture, indexing, reuse, and performance assessment; and (3) design for sustainable well-being. His top R&D priorities in the moment include the Hasso Plattner Design-Thinking-Research Program, d.swiss, and the notion of a pan-disciplinary Ph.D. program in Design.

**Ade Mabogunje, Ph.D.** is a senior research scientist at Stanford University. Prior to this, he was the associate director of the Center for Design Research (CDR) in the School of Engineering and the program lead of the Real-time Venture Design Lab (ReVeL) in the School of Humanities and Sciences. Ade regularly conducts empirical studies of the engineering design process with a view to developing performance metrics for creative design teams in innovation ecosystems. He is currently investigating alternative mechanisms through which ideas and practices from science, engineering, psychology, and finance can be turned into useful design theories to guide the building of sustainable and scalable ventures in less industrialized economies. He has publications in the areas of design theory and methodology, knowledge management, design protocol analysis, engineering education, simulation studies of design teams, and emotion in engineering.

**Bettina Maisch, Ph.D.** is in charge for the Industrial Design Thinking (i.DT) Program at the Systems Engineering Group at Siemens Corporate Technology (CT). With strong support by the former Head of CT, Dr. Arding Hsu, she set up