

Preface

When I first learned to drive, I was fully and consciously concentrated on driving, on every gear change, use of the indicator, etc. After a relatively short period of time and frequent driving it started to become automatic and I could turn my attention to other things—talking with my passenger, listening to the radio, etc. A few years ago, when I started to commute to work with a more top of the range car, I suddenly had all sorts of options available: automatic drive, car phone, voice recognition, navigation system, parking sensors, proximity warning, etc.

The route to work was nearly all motorway. I began to use the time in the car more productively: teleconferences, dictations, etc. My beloved wife and my friends have always warned me of inattentiveness and accidents. Thank God that never happened, even if there were a few near accidents which would probably not had happened when driving at full attention. When I hear about automatic driving on motorways with self-steering vehicles—the automatic parking is already state of the art—it means that I will indeed soon be able to read and write while “driving” the car. Having emails read for you already works. But will I also be able to react properly in specific situations? Will I even recognize them? Will our children and grandchildren be at all capable of spatial/geographic orientation without GPS and a navigation system, or mistakenly enter the wrong way not even realizing that they are traveling in the completely wrong direction?

These banal observations on the one hand show the learning ability of people and the skills of the human brain. On the other hand, they show the ongoing expansion of the action spectrum of people with new tools—a fundamental development of mankind—starting with the first tools and hunting weapons, on to the invention of the wheel and further to the tools that the information and communication technologies provide at increasingly rapid succession.

Virtual reality and the expanding possibilities of perception through sensors, cameras, smart glasses, etc. accompany us as human beings and individuals, into a new era and on to a new stage of development in which our perception and action spectrum are significantly expanded.

Figuratively speaking, our arms are constantly expanding—the first tools primarily served as “extension” of our arms and their effectiveness—always becoming longer, swifter, more efficient, and more powerful. Organizations as “purposeful associations of people” massively change with the “length of our arms,” the might of our tools, and the extended perception and actions. The design of organizations has to be thought in new ways. We should focus in particular on the decision making processes. Their designers, members, managers, and stakeholders are challenged to use these opportunities in an evolutionary way and—partly—to take advantage of revolutionary developments. Regarding our organizations, these developments in the field of “tools” for perception and actions are likely to be seen as “disruptive technologies and innovations.” So we are challenged to “rethink” our organizations or at least think about whether they are still relevant and appropriate. This is facilitated by new perspectives and approaches.

The human brain may well be regarded as the crown of evolution and the human being as the crown of creation. A major part of the capacity of our brain is associated with the unconscious and the subconscious. Only a small part is dedicated to the conscious and the awareness, which in turn is also considerably controlled from the subconscious. Learning (e.g., to drive) takes place in the border region between conscious and unconscious.

Technological progress today is often based on the replication and simulation of natural processes and structures. The generic term for this is the bionics. In the media, the medical research of the brain is often reported with the primary goal to cure diseases, for example, in large EU Research programs (such as the Human Brain Project, HBP). There are also other scientific disciplines that strive to analyze the brain in order to drive innovation. Computer professionals try to model the brain in a reverse engineering process and—based on technical solutions to develop practical applications such as voice recognition and other systems—they aim at creating, developing, and perfecting Artificial Intelligence.

Behavioral psychologists and social scientists, on the other hand, have long tried to explore the processes in the brain and the interaction between consciousness and the subconscious with their methods, e.g., to come to a better understanding of the processes of assessment and decision making and the influences on that. From that they are trying to find methods and tools to influence purchasing behavior, group dynamics, leadership decisions, etc. They try to explore which conditions particularly promote creativity and innovation, and thus also often operate in the area of the subconscious mind and its interactions with the consciousness. Viewed in simple analogy, the structures of consciousness and the subconscious are already applied to organizations: mission statements, visions, views of the future of an organization—“Big Pictures,” corporate strategies, development of the corporate culture, etc. They aim at anchoring these “Big Pictures” in the subconscious of the people and the parties interested or affected. People are “manipulated” to positively influence the actions of the organization. That’s what—mainly—the discipline organizational behavior is all about.

This analogy to the “brain” of the organization, however, may not only be comprehended on the level of the individual person and its capacities and opportunities. Infrastructures, in particular systems and networks, but today also the design of working environments enabling innovation are essential elements of the “subconscious mind” of an organization. These infrastructures—next to mission statements and strategies—too have to be considered as part of the “subconscious mind” of the organization and thereby part of the operation of the brain of the individual person working in this organization. How to model and manage this corporate digital transformation on the one hand and to consider the field of behavioral psychology on the other hand is subject of this book.

The interactions between this “subconscious mind of an organization” and the conscious purposeful actions of employees at all levels of an organization affect the sustainable success of an organization in an increasingly volatile environment. The technological developments in Big Data, Social Media, Artificial Intelligence (AI), Augmented Reality, Internet of Things, and Internet of Everything will only be used successfully by an organization when they are carefully and purposefully woven into the “subconscious mind of the organization” and thus in its infrastructure. Successfully “wired” the new technologies can be made accessible and usable to people acting, and they can support the visions and strategies and the taking of appropriate action in the organization. Thus, the digital transformation is shaping the subconscious mind of our organizations. Finally, we are on the way to collaborate with AI and to “merge” human and AI in some sort of hybrid intelligence, becoming a constitutive part of our future organizations, when innovating our organizations. It is one of the key management tasks to shape our organizations and their subconscious mind actively instead of just “letting it happen” in order to make them fit for the future. So this book addresses managers, consultants, students as well as all people interested in the societal and economic change brought with by the digital transformation that is just happening and that will impact our professional and private life for some time.

Dear reader, this book is to encourage you “to rethink” the organizations where you work, where you have influence, or where you are just interested in. This book is intended to help you to develop ideas and innovations in this respect.

Fictional microstories—though already close to reality—should support you in the understanding of the content and the theoretical descriptions that are partly elaborated—in a sometimes metaphoric style—from analogies to how our brain and our subconscious are working. Together they form three stories of companies in three different business areas (a hospital group, a steel company, and a retailer). Guiding principles for shaping the subconscious mind of organizations provide actionable hints for how to deal with the digital transformation in the respective organization.

First, in Chap. 1—the introduction—the terminology is semantically explained in order to anchor the analogies and metaphors used. In Chap. 2, the relevant foundations of cognitive science and behavioral psychology are presented. Chapter 3 explains the elements of an organization’s infrastructure and analyzes the relevant technologies and methods as well as expectations for the future, in particular

Artificial Intelligence and “predictive modeling” along with other topics in the area of Big Data, Smart Data, etc. Chapter 4 develops a model of the “subconscious mind of an organization” and its interfaces to the “conscious mind of an organization.” Chapter 5 is devoted to the question of whether, how, and how fast the “subconscious mind of an organization” can be developed and transformed. This chapter provides guidance and guidelines how to design sustainable organizations and what has to be considered with special emphasis on decision making processes. Chapter 6 discusses the digital transformation as a societal meta-development directly impacting organizations. Based upon the subconscious mind of organizations as metaphoric view for the question of structural and process-oriented aspects of organizations as well as for methodological and technological questions of decision support and automation, a next step is suggested: To view an organization or parts of an organization as a hybrid intelligence of human and AI “Hybrid intelligence” serves as a “Big Pictures” of the future—following an obviously inevitable but influenceable development of the cultural evolution of mankind—and discusses some ideas how to approach and manage this in an organization.

Given the rapid technological development—the digital transformation—experiences, observations, and literature, as well as expectations derived from them, provide the foundation for the hypotheses developed and their argumentation and justification. Statistic or scientific derivations and findings are therefore discussed only to a lesser extent.

Notes to the Emergence of the Idea for this Book:

The cybernetic patterns described in Chap. 5 (the amplifying circuit, the balancing circuit, the element of delay, etc.) partly correspond—in an analogy view—to the basic types of control loops, as we know them from the technical discipline of control engineering. In 1992, I applied these cybernetic considerations and principles on manufacturing systems and companies and published it in German in a book with the title (translated) “Manufacturing Execution Systems—principles from control engineering applied on logistics” (Leodolter 1992). At that time, I did not know the book by Peter Senge on “organizational learning” (The fifth discipline, Senge 1990). The thoughts of Peter Senge I discovered in 1995. In an article on adaptive organizations (translated) “Adaptive organizations—a prerequisite for successful and sustainable businesses” (Leodolter 1997), I enriched my ideas from 1992 and thus expanded my reflections on the application of the principles of control engineering on management of entire organizations. In this article, I used the metaphor of the “subconscious mind of organizations” for the first time as well as the comprehensive description of infrastructure—in a wider meaning—as the foundation of organizations. From the analogy that these structures partly form the behavior of organizations, finally the metaphor of the “subconscious mind of organizations” emerged. After years of work in upper and

top management levels (CIO and CEO) in the healthcare industry and the ongoing observation and study of information and communication technologies (ICT) in the course of my professional work as CIO and my teaching position at the Technical University of Graz, and after reading the book of Daniel Kahneman “Thinking fast and slow” and the book “How to create a mind” by Ray Kurzweil, these ideas “popped up” again. The current wave of innovation in the application of ICT in organizations—under the tags Big Data, Visual Analytics, In-Memory Computing, Massive Parallel Processing, Predictive Analysis, etc. summarized as “digital transformation”—now really provides an opportunity to bring these ideas into practice. This forms the background “to rethink” organizations in order to make them more effective, efficient, and sustainable. So in this book, I would like to provide suggestions for improving the effectiveness and sustainability of organizations and complex systems and how to design these—facing the digital transformation. Having the experience of publishing the book in German in 2015, I had many discussions and presentations on this topic. The technologies—especially Artificial Intelligence—went on in their development and application. That is why I reworked the book in English adding another section with more emphasis concerning the digital transformation and discussing the collaboration and merging of humans and AI in organizations as “hybrid intelligences.”

You have 3 ways to read this book:

- The recommended option is, of course: read from front to back—that is the best way to recognize and comprehend the extensive interrelationships—backed by the microstories as examples. In Chap. 2—considerations based on behavioral psychology and cognitive science—and in Chap. 3—the elements of an organization’s infrastructure and the relevant existing and expectable technologies—concepts, theories, and technologies are introduced in order to lay a foundation for a thorough understanding of “the subconscious mind of organizations.” So readers who are already familiar with cognitive processes and psychology or technologies or both can go through the respective chapter more quickly. But they should not skip them completely because they also provide numerous “links” to the concept of the “subconscious mind of organizations,” which is briefly sketched in the introduction and elaborated as model in Chap. 4.
- To get a taste (Quick Scan)—or to remember after complete reading—the ideas are also conceivable from the fictitious microstories about a hospital group, an industrial company, and a commercial enterprise as presented in the book. Put together or read sequentially, they each provide a consistent story from the respective industry.

- The third option is fast reading—in particular focusing on the design of the “subconscious mind of organizations” by reading the summaries of the chapters and the “arrowed” guiding principles in the text. This is a more abstract access to the matter. This is also well suited to call back to mind what you read—possibly after some time.

For those readers who choose to start with the stories and/or the guiding principles, I hope that their interest is aroused so much that they will read the whole book and even remember what this book was about in 5 years, because they use this conceptual idea of the “subconscious mind of organizations” as framework or fundamental hypothesis when thinking about organizations and decision making. As you all know about your personal subconscious mind, it is easy to memorize a metaphor and remember it when needed.¹

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¹For the references to these notes, see Chap. 1.

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of Organizations

Innovative Organizations and Hybrid Intelligences

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