

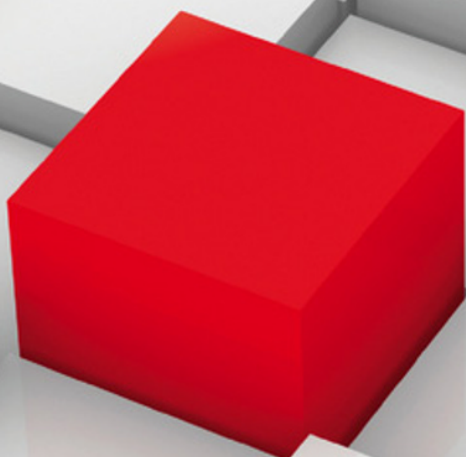


**KLAUS LEOPOLD
SIEGFRIED KALTENECKER**



KANBAN CHANGE LEADERSHIP

**CREATING A CULTURE OF
CONTINUOUS IMPROVEMENT**



WILEY

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CONTENTS

APPRAISALS	x
FOREWORD	xii
PREFACE	xvi
PART 1 KANBAN	1
1 Introduction	3
1.1 What we Care About, 4	
1.2 Who should Read this Book, 6	
2 Kanban Principles and Core Practices	8
2.1 Seeking Productivity, 9	
2.2 kanban and Kanban, 12	
2.3 Evolutionary Change Management, 15	
2.3.1 Knowledge Work: The Problem of Invisibility, 17	
2.4 Kanban Core Practices, 18	
2.4.1 Making the Work Visible, 18	
2.4.2 Limiting the WiP, 19	
2.4.3 Managing the Flow, 20	
2.4.4 Making Policies Explicit, 21	
2.4.5 Implementing Feedback Mechanisms, 22	
2.4.6 Carrying Out Collaborative Improvements, 22	
2.5 Implementation of the Core Practices in an Organization, 23	

3	Visualization	25
3.1	First Step: Defining the Extent, 26	
3.2	Second Step: Visualizing the Process, 27	
3.2.1	How Are Work Items Visualized? 28	
3.2.2	Representation of Parallel Processing, 30	
3.2.3	Representation of Activities Without a Fixed Sequence, 32	
3.3	Determining the Work Item Types, 32	
3.3.1	Visualization of Work Item Types, 34	
4	WiP Limits	38
4.1	The Advantages of WiP Limits, 39	
4.1.1	Making Problems Visible, 41	
4.1.2	Making Bottlenecks Visible, 42	
4.2	Setting WiP Limits, 48	
4.2.1	Size of the Input Queue, 48	
4.2.2	WiP Limits for Various Work Item Types, 49	
4.2.3	Consequences of Different WiP Limits, 50	
5	Classes of Service	53
5.1	Cost of Delay and Policies, 54	
5.1.1	The Class of Service “Expedited”, 56	
5.1.2	The Class of Service “Fixed Delivery Date”, 57	
5.1.3	The Class of Service “Standard”, 59	
5.1.4	The Class of Service “Intangible”, 60	
5.2	Capacities of Classes of Service, 61	
5.3	SLAs, 62	
6	Operation and Coordination	65
6.1	Daily Stand-up Meeting, 66	
6.2	Queue Replenishment Meeting, 67	
6.2.1	Backlog Maintenance, 69	
6.3	Release Planning Meetings, 69	
6.3.1	What Is a Good Delivery Cadence? 70	
6.4	Team Retrospectives, 72	
6.5	Operations Reviews, 72	
7	Metrics and Improvements	74
7.1	Metrics in Kanban, 75	
7.2	Cumulative Flow Diagram, 77	
7.3	Measuring the Lead Time, 79	
7.3.1	Throughput, 80	
7.4	Rework and Blockers, 82	
7.4.1	Blockers, 82	

- 7.5 Improvements, 83
 - 7.5.1 Theory of Constraints, 84
 - 7.5.2 Reducing Waste, 86
 - 7.5.3 Reducing Variability, 86

- PART 2 CHANGE AND LEADERSHIP 89**

- 8 Forces of Change 91**
 - 8.1 Turbulent Times, 92
 - 8.2 Turbulent Change, 95

- 9 Environments and Systems 100**
 - 9.1 Organizations Close-up, 103
 - 9.2 A Roadmap for Change, 106

- 10 Organizational and Personal Change 110**
 - 10.1 The Iceberg of Change, 112
 - 10.2 The Change Curve, 115
 - 10.2.1 Fear and Resistance, 116
 - 10.2.2 Rational Insight and Emotional Acceptance, 117
 - 10.2.3 Applying the New Behaviors, 118
 - 10.2.4 Learning and Integration, 119

- 11 Emotions in Change Processes 122**
 - 11.1 Uncertainty, Worry, and Anxiety, 123
 - 11.2 Anger and Aggression, 126
 - 11.3 Sadness and Disappointment, 128
 - 11.4 Enthusiasm, Joy, and Courage, 129

- 12 Corporate Culture and Politics 133**
 - 12.1 The Power of Corporate Culture, 136
 - 12.2 Corporate Culture and Micropolitics, 139

- 13 Conclusions for Kanban Change Leadership 142**
 - 13.1 Mindfulness, 143
 - 13.1.1 A New Paradigm for Management and Leadership, 145
 - 13.2 Communication, 148
 - 13.2.1 The Meaning of Joint Reflection, 152
 - 13.2.2 The Power of Dialog, 154
 - 13.3 Process Design, 156

PART 3	KANBAN CHANGE LEADERSHIP	161
14	From the Idea to the Initiative	163
15	General Clarification	167
	15.1 Clarify the Method, 169	
	15.2 Clarify the Organizational Context, 171	
16	Deeper Understanding	175
	16.1 The Personal Retrospective, 176	
	16.2 The Team Constellation, 179	
	16.3 The Change Dialog, 182	
	16.3.1 Empathy, 185	
	16.3.2 Delimitation, 186	
	16.3.3 Objectification, 186	
	16.4 The Team Conversation, 188	
	16.5 The Team Retrospective, 191	
	16.6 The Stakeholder Map, 195	
	16.7 The Stakeholder Interview, 197	
	16.8 Stakeholder Workshop, 200	
	16.8.1 Feedback Through the Kanban Sponsor, 201	
	16.8.2 Feedback from the Stakeholders, 203	
	16.9 Solo, Dialog, Coaching, or Training? 205	
17	The System Design Workshop	208
	17.1 Identifying the Work Item Types, 213	
	17.1.1 Filling the Stakeholder Map with Work Item Types, 214	
	17.1.2 Criteria for Decisions Concerning Clusters, 215	
	17.1.3 White Noise: Background Voices, 216	
	17.1.4 Variation 1, 217	
	17.1.5 Variation 2, 218	
	17.2 Identifying the Processes, 219	
	17.2.1 Finding the Work Steps for Our Work Item Types, 219	
	17.2.2 Simulation and Ticket Design, 222	
	17.3 Determining the Wip Limits, 224	
	17.3.1 Step 1: Finding the Right Capacities, 225	
	17.3.2 Step 2: Translation into WiP Limits, 227	
	17.3.3 Distribution of the WiP Limits for a Support or Test Team, 232	
	17.4 Determining the Classes of Service, 234	
	17.4.1 Creating Clarity between Work Item Types and Classes of Service, 235	
	17.4.2 Defining the Policies, 237	
	17.4.3 Establishing the Capacities of the Classes of Service, 238	

- 17.5 Defining the Measurements, 241
 - 17.5.1 Selecting the Appropriate Measurements, 243
 - 17.5.2 Step 1: Teamwork: Identification of Possible Measurements, 243
 - 17.5.3 Step 2: Determining the Initial Handling, 244
- 17.6 Determining the Frequency of Meetings, 246
 - 17.6.1 The Daily Stand-Up Meeting, 247
 - 17.6.2 Team Retrospectives, 248
 - 17.6.3 The Queue Replenishment Meeting, 249
 - 17.6.4 The Release Planning Meeting, 251
- 17.7 Concluding the System Design Workshop, 252
 - 17.7.1 Simulation of the Entire Kanban System, 252
 - 17.7.2 Conclusion, 253

18 Operation 256

- 18.1 Moving from a Failure Culture to a Learning Culture, 258
 - 18.1.1 Yes, I Make Mistakes, 260
 - 18.1.2 A Particular Mistake: Slack, 262
- 18.2 Facilitation, 264
- 18.3 Conflicts in Operation, 269
 - 18.3.1 An Important Stakeholder Doesn't Stick to the Agreements, 270
 - 18.3.2 The Team Relapses into Old Habits, 271
 - 18.3.3 Collaboration Is Plagued by Dysfunctional Behavior, 273
- 18.4 Carrying the Kanban Fire Onward, 275

LIST OF FIGURES 278

REFERENCES 281

INDEX 287

APPRAISALS

Kanban Change Leadership spells out not only what Kanban is but why and how it works in high-variation environments. There is deep thinking and real implementation in this impressive book. *Jim Benson—creator of Personal Kanban and CEO of Modus Cooperandi, USA.*

The authors of the book *Kanban Change Leadership* perfectly mastered the balance between writing the standard and giving the reader a hands-on guideline on how to achieve real change using simple techniques that have an extremely deep impact. Even after reading it multiple times, this book stays exciting and should be—next to David J. Andersons’ work—prominently present in every bookshelf. *Eric-Jan Kaak—CIO Tecnica Group SpA/Blizzard Sport, Austria.*

I’ve been lucky enough to follow Klaus’ and Sigi’s live presentations closely for years. Now with *Kanban Change Leadership*, everyone can have access to their insightful and practical advice regarding implementing Kanban. Change agents will be especially interested in Klaus’ and Sigi’s focus on sociological and cultural concerns (as the excellent bibliography clearly illustrates). This is highly recommended for team leaders, coaches, managers, and executives. *Jabe Bloom, Chief Flow Officer, PraxisFlow/Principle Consultant, Coherent Insight, USA.*

Finally a book for practitioners that isn’t scared of presenting useful theory as well as concrete tips. Through the entertaining use of storytelling, and drawing from their experience, they do an excellent job of tackling the more difficult topics of change and leadership. *Kurt Häusler, Software Development Manager and Kanban Coaching Professional, Germany.*

Klaus and Sigi provide a comprehensive yet approachable guide to using Kanban to manage change. Starting with a good practical coverage of the principles and practical of the Kanban method from the perspective of how to actually start using it, the

book then takes flight into deeper but still practical change management models and practices and then ties it all together in the third part leveraging lifelike stories of change to bring together and liven up all elements in an experiential manner. As an enterprise kanban coach, I found the book inspired me to aim higher, and I will also recommend it to others looking to manage change in evolutionary respectful ways such as Kanban in their organization or as a professional practice. *Yuval Yeret—Enterprise Lean/Agile Coach & CTO AgileSparks, Israel.*

The unique strength of this book is combining the necessary background (WHY?) on change with the necessary WHAT and HOW (Kanban). *Markus Andrezak, CEO überproduct GmbH, Germany.*

Klaus and Sigi's combination of Change Leadership and Kanban offers valuable insights and techniques for helping organizations learn and respond to change faster. I have found great success using these approaches over the last year and highly recommend this book for those in the field. *Cliff Hazell, Lean/Agile Coach, Spotify, Sweden.*

Kanban Change Leadership gives every change agent a set of tools to use when introducing a major change in an organization. Not only does it present the tools but also explains the underlying mechanisms that make the tools work. *Pawel Brodzinski, CEO, Lunar Logic, Poland.*

Want to meet the Peter Drucker productivity challenge? Then this book is a good start. *Håkan Forss—Lean/Agile Coach Avega Group, Stockholm, Sweden.*

"I have long respected Klaus and Sigi for their expertise in both Kanban and change leadership, and this book does a great job of integrating the two." *Mike Burrows, UK Director and Principal Consultant, David J Anderson and Associates, England.*

"This practical book explains Change Management with Kanban in a very deep and insightful way." *Vikram Sharma, Kanban Change Agent, Robert Bosch Engineering and Business Solutions Limited, Bangalore, India.*

FOREWORD

As I sit here at home in the summer of 2014 contemplating the next few years of for my business, my family, and my personal life, I realize that perhaps my children aged 12 and 9 will never actually learn to drive a car, unless they choose to do so for purely recreational purposes. The driverless car is now technically viable and commercial models may appear within the decade. The driverless car is truly a discontinuous or disruptive innovation. It will change the way we live and the next generation of adults will know a truly different lifestyle and society to the one I have grown up in. In a world of driverless cars, what is the difference between a family car, a rental car, and a taxi? Perhaps there is none? How will that disrupt existing businesses and existing lifestyles? What shifts in society will it enable?

Unlike the electric car, which uses an electric motor and lithium ion batteries, the driverless car is a truly disruptive and discontinuous innovation. The change to electric motors is on the other hand merely a continuous innovation. It doesn't disrupt the market; it merely offers an alternative technology for an existing system and operating model. It does shift the market for energy supply and it shifts the demand on natural resources, encouraging lithium mining rather than oil drilling, but life for everyday citizens doesn't change that much.

The technology industry tends to discard the value of continuous innovation—doing things better rather than differently or in a new and previously unavailable or unconsidered fashion. However, consider the world through the eyes of a 12-year-old. Children today assume that screens are touch sensitive and that they can interact with a device through the screen. They do not remember a world before the iPhone or the iPad. They've grown up in a broadband connected world. A rotary dial telephone is alien to them as is the concept that telephones are connected to the wall through wires. Continuous innovations can be easy to adopt because they don't

require a huge change in lifestyle or business model. People with mobile phones simply upgraded to the latest model of smartphones and started using the touch screens, but the combination of ubiquitous broadband wireless data and high-definition color touch screens, available as smart handheld devices, did provide tremendous opportunity for change.

Continuous innovations—making things better, easier, and cheaper—commodification, and democratization are all around us every day. Discontinuous, disruptive innovations come along every few years but the pace of these disruptive changes is accelerating. Each generation of technology innovation seems to help accelerate the pace of the next generation of discontinuous, disruptive change. Meanwhile, the world population is growing and the level of education is improving. More brainpower the world over means more knowledge workers producing more new knowledge and faster and faster innovations.

For the leaders of today's businesses this pace of innovation presents a huge challenge: business models that were solidly profitable for decades or even centuries and being threatened and disrupted. Uber is disrupting the market for taxis, a business model that is 120 years old, but only 5 years from now, driverless cars will disrupt Uber. Large businesses survive for shorter and shorter periods of time. Who would have thought, 10 years ago, that Nokia would have lost the mobile phone market and all but ceased to exist? Resilience is the new challenge for the senior leadership of big businesses.

How do you create a resilient business? How do you survive and thrive in a world that is moving so quickly where continuous innovations threaten your products and services on a monthly basis and discontinuous innovations threaten your business model every 2–5 years? The modern business must be able to change frequently and rapidly. It must have a core capability to enable and manage change. A modern business must be capable of evolving to adapt to a changing external environment full of new innovations.

When threatened with declining markets and possible extinction, businesses need to be able to experiment with new products, new services, and new models of service delivery. In turn, they may want to set the pace and stay ahead by producing their own, mostly continuous, innovations in products, services, and service delivery models. Innovations can provide a competitive edge. They can make the difference between surviving and thriving or declining and failing completely.

When a business wants to innovate, it almost certainly requires IT. IT projects are born out of a desire for a business to innovate or quickly catch up with a competitive innovation. IT projects are about change, and the service delivery from IT can provide a competitive edge if innovations can be delivered rapidly, at low cost, and with predictable outcomes. Equally, businesses can't always predict which ideas will work in the market and which won't. Evolving to stay fit for purpose requires experimentation—like generating several mutations of a species and waiting to see which produces the better result. As a result, there is almost infinite demand for IT projects because they represent experiments and guesses. The more bets we can place and the faster we can place them, the more chance we have of surviving and thriving. A strong capability in IT has become a core part of a strong adaptive, evolutionary

capability in a business. Strong, fast, reliable, predictable IT services are now core to enabling resilience. More than ever, senior executives are pressurizing IT departments for more work and more services, delivered faster and with greater predictability and ideally at lower cost. When you don't know which options will work, you'd prefer to have lots of them at a low cost per option.

So, the new world of twenty-first-century business involves an ever faster pace of innovation and a greater need than ever to respond to a changing environment with new products, services, and service delivery models. Business must be capable of adapting quickly in order to remain fit for purpose. Resilience requires a strong ability to change. Change management is now a core business skill for survival in the twenty-first century!

The Kanban method was born out of the synthesis of two ideas to solve two different but related business problems. The first problem was tendency to manage IT projects in large batches and to commit too early to specifications when the requirements were still uncertain. In 2004, I introduced the concept of a virtual kanban system, with an IT department at Microsoft. The concept of kanban systems was adapted from Toyota's use of them in manufacturing industry. Kanban systems force deferred commitment, limiting the work in progress, preventing businesses from committing too early to things that are uncertain. Kanban systems force a discussion about what should be started now and whether we have enough information to start now versus what should wait until later and until more information is gathered or what should be discarded altogether. Kanban systems have a vital role to play in a world full of increasing pace of change and lots of uncertainty.

The second problem was a very human problem. People in IT departments were resistant to adopting new methods and processes. About a decade ago, I concluded that this resistance wasn't simply explained away as laziness or bad behavior; it was actually core to the human condition. The people were resisting adopting new methods and processes because they were wired to do so. So I asked myself, what would be easier to change, the design of the humans or the way we manage change and the introduction of new working practices? I concluded that we needed a new approach to change management: we needed an evolutionary approach to change.

In the English-speaking world, change management is dominated by the model developed by the McKinsey consulting firm. This model of prescribing a defined process or designing a new process to replace an old one, and then managing a transition from the old method to the new, has been around for over 80 years. It seemed to serve manufacturing industry and related physical goods industries such as distribution or retail rather well. Despite the ubiquitous nature of this model among large consulting firms working in the IT sector, I concluded that it was an obsolete model that wasn't compatible with the human condition. Trying to impose change on knowledge workers and creative people was simply a recipe for invoking passive-aggressive resistance. Instead, we needed a way to "start with what you do now" and evolve from there, and it had to be a way that engaged the people doing the work and made change and improvement an everyday concern for them. It had to self-motivate change from within, not some change imposed by change agents from the outside.

The industrial engineering model of the twentieth century was out, and self-motivated, management driven improvement was in!

In 2007, these two ideas came together in a synthesis that we now call the Kanban method. Kanban systems and visual boards are key enablers of a culture of continuous improvement. It turns out that visualizing invisible work on what has become known as a kanban board and deferring commitment through use of a kanban system are catalysts of employee and manager-driven process improvement. Change driven from the shop floor and undertaken as part and parcel of the everyday work of the organization produces just the experimental, evolutionary change mechanism we need in order develop a core adaptive capability for business resilience. Meanwhile, the use of kanban systems improves delivery through shorter lead times and greater predictability. Kanban Change Leadership becomes a core strategy for resilience in twenty-first-century businesses.

I'm delighted that Klaus Leopold and Sigi Kaltenecker's book has been translated into English. Klaus and Sigi hail from Austria, and their work in change management has been influenced by a number of German-speaking theorists, such as Baecker, whose work is not widely known or available in the English language. Klaus and Sigi open our minds to a different slant on change management by synthesizing ideas from the German-speaking world. Change management texts in English are all too dominated by the twentieth-century model popularized by McKinsey. So it is fitting that a book about Kanban, a new approach to change in the twenty-first century, should feature the diversity of thought in the field from experts not well known to English-speaking readers. Part 2 of this book offers you insights into the human condition and a deeper understanding of why a new approach to change is needed in the twenty-first century. It will help you understand how people take change personally and how to adapt your approach rather than push against the fundamental psychology and sociology of each individual. It will help you understand that the need for change is driven by change in the environment and to comprehend your business as a system that responds to that environment. This book will explain to you how and why Kanban offers us a new approach to change in twenty-first-century businesses using knowledge workers to do creative work and why Kanban Change Leadership can help even more traditional twentieth-century physical goods businesses by providing them with IT departments more agile and adept to deliver improvement and new capabilities faster and more reliably than before. For those of you who take the time to read this book thoroughly and internalize its contents, I have no doubt that it will make you more effective coaches and leaders of change using Kanban. Your business will gain more value from a deeper more effective Kanban implementation, and both you and your business should be better equipped to survive and thrive in this rapidly evolving world of work in the twenty-first century.

Seattle, July 2014

DAVID J. ANDERSON

PREFACE

We are pleased to provide the English edition of our book on *Kanban Change Leadership*. As the kind appraisals show, this edition builds on encouraging resonance both from readers and from clients working on their specific culture of continuous improvement.

From both groups, we have learned a lot since the first German edition of our book had been published in 2012. In this regard, the current version is also a product of continuous improvement. For both the second edition in German and the English edition, we intensively reviewed the text, adapted new experiences, dropped some ideas, and changed others. The third part of our book, focusing on the practical implementation of Kanban, has probably undergone the most radical changes. Thriving on various lessons learned with many clients, we can now provide a simple four-phase model with clear goals and tried and tested tools.

As always, coming up with a new version does not necessarily mean to achieve perfection. The process of reviewing and rewriting our initial insights amplified a few question marks too. There are some limitations we were not able to overcome such as the emphasis of Kanban on team level, the rather weak focus on whole value streams, or the missing examples of portfolio or change management Kanban.

To effectively overcome these limitations, we would have to write another book—a book with a fresh approach to the broad field of Kanban, change and leadership, with different case studies, cocreating stories together with line managers and other key players, going even beyond the exclusive IT space, exploring the benefits of evolutionary change management in other business areas such as HR, finance, or graphic design. Unfortunately, we didn't find the time yet to realize this ambitious initiative—except for some current posts and articles that indicate what we have in mind for the future [1–5].

However, for the meantime, we wish you an inspiring read of this book—and a pleasant journey implementing some of the outlined change concepts and leadership tools. As always, we are pleased to receive all kinds of feedback.

Vienna, July 2014

KLAUS LEOPOLD AND SIGI KALTENECKER

PART 1

KANBAN

1

INTRODUCTION

“What should I do?” the Zen apprentice asks his master while standing in front of a tall ladder.

“You can climb the ladder, rung by rung, to the top.”

“How many rungs does the ladder have?” asks the apprentice.

“Eighteen,” the Zen master replies.

“And what should I do when I’m at the top?” the pupil wants to know as he places his foot on the first rung.

“You can stand there,” the master explains in a friendly manner, “you can enjoy the view, you can climb back down, or you can continue to climb without any rungs.”

This book has been written to give you the courage to climb further. It tells of ladders tall and short, of passionate climbers and spectacular climbs. A common feature of all climbs is that they begin with the first rung and then proceed step-by-step. Each one of these steps represents a small alteration through which you can gain new experience and improve.

We believe that this Zen story is a fitting introduction to a book about Kanban—after all Kanban is also about step-by-step change. Clear structures provide a gradual process of improvement that is relatively easy to establish. Many Kanban practices

are like simple ladders. It is due to this that Kanban is quickly becoming a sensation, enjoying widespread popularity in the world of software development.

“Kanban rocks” is how one of our customers summed it up. He, like many other Kanban fans, has reason to be thrilled. Kanban:

- Follows **simple rules**
- Is built and runs on **easy-to-master mechanics**
- Can be implemented with **relatively little effort**
- Can lead to **remarkable improvement in very little time**

Sounds good, doesn't it? However, we have not written this book just for the growing Kanban fan base. We will emphasize critical aspects and the several traps into which users repeatedly fall and present some practical guidelines for Kanban change management to help avoid these traps. In order to do so, we will investigate various starting points, identify relevant system and environmental factors, and describe the personal challenges involved in a process of continuous improvement. Ultimately, Kanban is always about the whole system. Kanban:

- Often starts with a small team but **always has its eye on the organization as a whole**
- Concentrates on technical development but is simultaneously **always aligned with economic value creation**
- Aims to improve software development processes but **requires everyone involved in these processes to be willing to change**
- Is quick to apply but **requires mindfulness in order to improve continuously**

It is relatively easy to start a Kanban initiative at your place of work. However, it is highly challenging to implement the initiative in such a way that you create a culture of continual improvement. Practice shows that a *quick-fix* approach to Kanban at the workplace will rarely deliver long-lasting change—professional change management is required to achieve a sustainable environment.

1.1 WHAT WE CARE ABOUT

Kanban Change Leadership will show you all that is necessary to properly understand change management with Kanban and be able to apply it optimally. In order to achieve this, we provide you with many maps, tools, and, most importantly, various scenarios. We draw on our own experience as Kanban coaches and change experts to enable you to read real case studies and then apply what you have learned systemically. In other words, we attempt to smuggle valuable knowledge about organizations, cultures, strategies, and emotions from systems theory into the book without losing sight of the real world. What good is the best theory in the world if you're not capable of applying it appropriately?

On the subject of appropriate action, in a study carried out by Kimberley-Clark, people were asked what they would take with them on a desert island. More than 50% of the 1000 people asked said it would be very important for them to take toilet paper. What can we conclude from this? As the German economist Günther Ortman put it, “people think practically” [1].

Practical thinking is a requisite for twenty-first-century change management. In this book, thinking is based on four fundamental principles as stipulated by David J. Anderson [2]:

1. **Kanban begins where a system is already in place.** No big change, rigorous training or process transformation is required. You have already begun climbing the Zen ladder simply by bringing about awareness of your current work processes.
2. **Kanban respects the current state.** Neither the current processes nor the existing functions are called into question. In this context, to respect is to assign meaning to that which is already there and subsequently, together with all other value-creation partners, build on this meaning.
3. **Kanban seeks incremental, evolutionary changes.** It’s all about proceeding step-by-step—not in a single, massive leap—and agreement among all essentially involved in this process of change. In other words, Kanban requires that all stakeholders in a given value-creation process have a shared understanding of the work and improvement, regardless of whether this concerns the core team, clients, suppliers, owners, or senior management.
4. **Kanban requires leadership at all levels of the organization.** In order to create a culture of continuous improvement, all involved should contribute their ideas for improvement and be able to implement them. The operationally active employees frequently best know what needs to be improved in their daily work environment—let us support them in equalizing their viewpoint with that of management and taking the next step toward improvement together.

We believe that beyond these principles a profound fundamental understanding of how a culture can create continuous improvement is necessary. Our opinion is that the following principles are relevant:

1. **Kanban is an initiative for change.** We are concerned with systemic improvement, where collaboration rather than individual performance is important. Value creation and quality of work increase due to better structures and clearer rules of play between all cooperating partners.
2. **Kanban is concerned with the overall working environment.** The improvement of this environment requires critical reflection on each individual’s fundamental mindset, expressed in terms of performance and cooperation. This in turn requires the willingness to continually work on one’s self-development.
3. **Kanban revolves around people and not around mechanisms.** It is people who drive a sustainable process of improvement, and they achieve this very

visibly through emotions: joy, courage, enthusiasm, but also anger, disappointment, and sadness. We strongly recommend that these emotions be respected and used since, ultimately, they can very much be seen as the key drivers of change.

4. **Kanban is a team sport.** You need allies to create a culture of continual improvement. You need partners who will create and sustain new value with you. You need the support of your management because you want to expose systemic problems and resolve them. And you must have your stakeholders on board because you cannot create the added value you want without their active cooperation.

These principles emphasize the complexity of the change you can effect with Kanban. It requires an approach to match this complexity, and this is the reason why simply diving into Kanban is not generally recommended—you would risk achieving short-term change at the cost of the long-term potential for improvement. In the context of the introductory story, you would climb down again after reaching the tenth rung if at all and never get to the point where you climb further, without rungs.

“It shows who is truly committed,” a colleague once said in a discussion about this limitless climbing. Be sure of your decision before making such a commitment. Use our guidelines to define your point of departure before embarking on your Kanban adventure. Try to identify the corporate culture you belong to. And assemble a training program tailored to your personal work situation from the exercises we provide.

1.2 WHO SHOULD READ THIS BOOK

There are three target groups we particularly want to reach with *Kanban Change Leadership*:

1. **Those who are fundamentally interested in Kanban:** “Hey, this is cool! What is it exactly? How does Kaizen work?”
2. **Those involved in change management in IT:** “What approaches are there? What are the unique features of a process of continual improvement? What can I personally adopt from Kanban change management?”
3. **Those considering a Kanban initiative or already underway:** “What do I have to look out for? How do others do it? What could I also try out?”

The three parts of this book correspond to these three target groups.

In the first part, we focus on the foundations of Kanban. What are the basic assumptions? How can you visualize the current situation? What is the purpose of work-in-progress (WIP) limits? What are service classes? How can you apply metrics? And much more. Part 1 establishes the technical basis of Kanban and indicates the mechanisms required.

In the second part, we explain the context of Kanban change management. What are the options for change? What can they set in motion? What are the consequences for a business? What particular opportunities does Kanban-driven change provide? Besides mechanistic formulas and processes for automatic improvement, in Part 2, we share with you a contemporary understanding of the professional process of change. Despite the fact that everyone talks about change, there is still plenty left to say on the matter.

In the third part, we relate the technical system of Kanban with the social system of business and show you, using selected case studies, how to build a culture of continual improvement. How do you start the process? How do you define your point of departure? How do you create a Kanban system tailored to your field of work? What should you look out for when using it? Part 3 provides you with a compendium of experience showing how Kanban is applied in various situations.

“I don’t know whether it will be better when it’s different,” the German philosopher Lichtenberg once said. “But that it must be different to be better, that much I know.” In this spirit, we wish you a most inspiring read and good luck.

2

KANBAN PRINCIPLES AND CORE PRACTICES

Do you know the film *Modern Times* by Charlie Chaplin? There's a famous scene where the chairman of the corporation suddenly orders the speed of the conveyor belts to be increased without warning, "Conveyor belt five is running too slowly. Double the speed!" Chaplin struggles as best as he can, trying to tighten all the screws as the products speed past. However, he always ends up falling behind—at this speed, it only takes a short sneeze for him to repeatedly get out of sync. Consequently, Chaplin is forever getting in the way of the next conveyor belt worker, who is hammering, disrupting the entire process. Colleagues and supervisors drag him back to his allotted position, but it's no use—he simply can't keep pace. And then it happens: in a wild frenzy of tightening screws, nobody can stop him any longer, and he is pulled onto the conveyor belt and swallowed up by the machine driving it. He elegantly glides between the gigantic cogs and is spat out by the machine on the return run. His accident has left its mark: he suddenly wants to tighten anything remotely resembling a screw, including his colleague's nipples and the buttons on a secretary's skirt.

Released in 1936, Chaplin's film was a harsh critique of the prevailing assembly line conditions. The following appears in the opening credits:

Modern Times: a story of industry, of individual enterprise—humanity crusading in the pursuit of happiness.

How would Chaplin stage this film today? For most of us, today's conveyor belts are desks and computers; we have better salaries now and the workers in the 1930s could only dream of the social benefits we enjoy. But in the present day—shaped as it is by knowledge work—there's always someone who still shouts, "Double the speed!" It seems that history is repeating itself. Today, knowledge workers also have to strive for good working conditions. It is no longer about the basic demands for a humane working environment such as light, breaks, and safety, but rather about the issue of time and the right to not be required to be available for the company around the clock. In a nutshell, it's about the ability to complete the work at hand within the allotted time period. Of course, there is also the flip side of the coin: global competition is often the source of huge amounts of pressure, causing organizations to reduce the two factors—quality and speed—to a single issue. Is it even possible to bring together this issue with the demands of a socially acceptable working environment? Can one be more relaxed at work while being more productive? We say yes, it is doable when you create adaptive systems in which people are able to find their own way to improvement.

2.1 SEEKING PRODUCTIVITY

Industrial assembly is all about the economic principle of optimizing the process between the amount applied (input) and the amount yielded (output). "Act in such a way that the desired accomplishments are achieved with the minimum means (the minimum principle), or, rearranged, that the accomplishments with a given amount of means are as high as possible (the maximum principle)," states Zäpfel [1]. One is thus seeking the highest productivity possible.

The idea of optimization is often so incorrectly interpreted that it suddenly states, "Use as little as possible to achieve as much as possible." Ironically, it is precisely with this perspective that we are commonly confronted in the practice of knowledge work. With unaltered processes, structures, and resources, as much input—that is, tasks or jobs—as possible is crammed into the system in the hope that as much valuable output as possible will emerge at the end.

Peter F. Drucker, one of the pioneers of modern management education, anticipated this problem 20 years ago. In his 1991 article "The New Productivity Challenge," he demonstrated how productivity in "making and moving things" has constantly increased since the onset of the industrial revolution and how this has developed and continued to nurture the well-being of (above all) Western society. Nowadays, Drucker said, productivity continues to increase steadily, but the great revolutions in production, mining, construction, and transport have already happened. He explained that the workforce has shifted from the classical areas of production into the sectors of knowledge work and services. Drucker therefore asserted right at the beginning of his article [2]:

The single greatest challenge facing managers in the developed countries of the world is to raise the productivity of knowledge and service workers. This challenge, which

will dominate the management agenda for the next several decades, will ultimately determine the competitive performance of companies. Even more important, it will determine the very fabric of society and the quality of life in every industrialized nation.

Today, we know just how right Drucker was. Knowledge-intensive sectors labor endlessly to find the button to press or the screws to tighten in order to increase the productivity of their knowledge workers. Interestingly, there are very obvious parallels between questions of optimization in industrial production and knowledge work—this will be seen in Kanban’s individual steps. Equally, however, there are very sharp contrasts between the two sectors.

But how does one define knowledge work?

KNOWLEDGE WORK

German systems theorist Helmut Willke [3] describes knowledge work as follows:

Nearly all human activities are based on knowledge in the sense that experience and knowledge play a part. Practically all forms of skilled work, above all the classical professions (doctor, lawyer, teacher, academic), are knowledge-based forms of work, based on specialized expertise that these professionals must acquire through extensive processes of education and training.

The concept *knowledge work* means something else. It describes practices (communication, transaction, interaction) in which the required knowledge is at no point in life acquired simply through experience, initiation, teaching, skill training or professionalization—nor is it implemented in this way. It is much more the case that knowledge work in this sense requires that the relevant knowledge

- Be continually revised;
- Be permanently viewed as capable of improvement;
- Be observed not principally as truth but rather as a resource, and
- Be indivisibly associated with ignorance, meaning that certain risks are unavoidably connected with knowledge work [3].

Manual work thus differs from knowledge work since ignorance—and its necessary reflection in knowledge work—constitutes a dimension that is hard to influence. The underlying problems, that is, the exercises and tasks, are also significantly more multifaceted in sectors such as software development than they are in the assembly of—in the literal sense of the word—*tangible* products. In these sectors, it’s much more frequently about inventing something completely new or refining something that