

Preface

The idea to write this book dates back many years. When I was a young management consultant, from time to time my colleagues and I would be assigned to prepare a “toolbox.” Just as a handyman needs proper tools, so do managers and consultants. Corporate managers often assume that good consultancies have excellent toolboxes enabling them to achieve awesome success in operational and strategic projects. Arguably, top management consultancies are successful in managing their projects. To my knowledge, however, such magic toolboxes do not exist. My colleagues and I never managed to complete any assignment to create a toolbox, because it was always more important for us to be working in the field in order to generate revenue. On the other hand, those few fragments of toolboxes that we did prepare were treated like secret treasures. Now, naturally, no big consultancy is willing to publish its proprietary tools. Thus, while I am convinced that a toolbox is necessary for both managers and consultants alike, I also believe that it only can be developed outside of a consultancy (albeit by someone with knowledge as to what goes on inside of consultancies).

There already exist many books dealing with management and strategy, of course, but none of them fits the aforementioned purpose. As a young consultant, I had many colleagues with MBAs or doctorates from such famous universities as St. Gallen, Harvard, INSEAD and others. They would consult their textbooks when faced with such a problem as, for example, how to create a new organization. Other than musings on academic or even scientific issues, they found nothing in such books that was useful and relevant to the questions at hand. Today, I also am an academic. My goal is to teach my students only *relevant* things that a top manager needs to know. I would love to have a proper textbook for this purpose, but I have never found one that is suitable. Therefore, I write my own

detailed handouts for lecturing. It is the summarizing of these “scripts” (as we call them in Europe) and bringing them into a form that is acceptable for students and managers alike that provided the basic content of the present book.

This book contains many, and perhaps even most, of the necessary tools for managers. But it does not contain everything that is needed. I held to two guidelines for limiting the scope of the book. Firstly, I do not comment on areas where proper books already do exist (e.g., marketing, accounting, logistics). Secondly, I am dealing only with areas in which I have thorough personal experience. The first guideline has a further implication. I thought for a long time about what literature I should cite. If I want to reference literature dealing with the topics of this book, then I would be forced to comment on those books that are not suitable for further reference. In doing so, I would create no value for the reader. Furthermore, I would have to quibble about the shortcomings of my colleagues’ works rather than to tell something useful for the reader. I will leave that manner of work to the politicians, many of whom cannot tell what is good for the country but are very good at criticizing the suggestions from other parties. All in all, therefore, I am convinced that this book will be much better if no literature is cited. The book will thus be disqualified as an academic piece of work or even as a scientific one. I am not at all ashamed of that, and, in fact, it is perhaps even something to be proud of.

During my time in business, I led about 25 major projects. They were sometimes easy, and sometimes they demanded that I develop a complicated analysis. Especially in the beginning, I tried to find answers – or at least hints – in the literature. With regard to those projects I worked on, I can definitely say that I never found anything useful in any kind of literature. The present book is designed in a way that I would have loved to have had it 15 years ago.

Finally, but very importantly, I want to say thank you to all the people who helped me to gain the necessary experience to write this book.

Former colleagues in management and consulting enlightened me during many discussions. The same is true for a long list of clients. I did the best that I could to help them to excel in their businesses. By allowing me to work with them in solving their problems, they helped me to gain the necessary practical experience indispensable for writing this book. Without that, this book would be of purely another theoretical exercise. A very special thank you goes to Gale A. Kirking for proofreading the entire manuscript. Many valuable hints improved the quality of this book.

Frankfurt am Main, December 2006

Table of Contents

Preface	V
Table of Contents.....	IX
Figures.....	XIII
1 Introduction.....	1
1.1 How to use this book.....	3
1.2 What to expect.....	5
2 Business process modeling.....	11
2.1 Choose a structure.....	13
2.2 Select a language.....	19
2.2.1 SADT.....	20
2.2.2 ARIS.....	27
2.3 Use of brown papers.....	30
3 Balanced scorecard.....	35
3.1 The general problem.....	35
3.2 An example of BSC.....	40
4 Controlling process.....	49
4.1 The four basic steps.....	49
4.2 Frequency of controlling.....	53
4.3 Problems and shortcomings.....	54
4.4 Examples.....	56
Case: Aluminum tube welding.....	56
Case: Management consulting.....	58
Case: R&D Controlling.....	59
5 Organization.....	63
5.1 Define roles and responsibilities.....	64
5.2 Defining an organization.....	72
5.2.1 Basic organizational forms.....	73
5.2.2 To engineer an organization.....	79
Case: University controlling.....	86
Case: Purchasing.....	88

Table of Contents

5.2.3	Personal conflicts.....	91
5.3	How to staff an organization.....	94
5.3.1	The bottom up approach.....	95
5.3.2	The benchmark approach.....	96
5.3.3	The feedback circuit approach.....	96
5.4	Find an optimal span of control.....	98
5.4.1	Definitions and formulas.....	98
5.4.2	Getting the optimum.....	100
5.5	Using reengineering.....	105
5.5.1	Hammer's approach.....	106
	Case: Bills payable department.....	108
5.5.2	A non-business example.....	112
5.5.3	Applying reengineering.....	114
5.6	Buzzword process organization.....	117
5.7	Myths of self-organization.....	120
6	Quantitative tools.....	125
6.1	Dealing with numbers and errors.....	126
6.1.1	How to define measures.....	126
	Case: Person's weight.....	129
	Case: Number of vendors.....	130
6.1.2	Taking into account the margin of error.....	131
	Case: Calculation of automotive parts.....	133
6.2	Applying semi-quantitative methods.....	135
6.3	Preparing activity-based costing.....	141
6.3.1	Theory of ABC.....	142
6.3.2	A simplified version.....	146
	Case: ABC at aluminum tube welding.....	147
6.3.3	Reasons not to choose ABC.....	150
6.4	Using target costing.....	153
6.4.1	The basic idea.....	154
6.4.2	An example.....	157
6.5	Commenting on chaos.....	163
6.5.1	Chaos in science.....	163
6.5.2	Chaos in the business world.....	168
	Example: Warehouse locations.....	171

6.5.3	Dealing with chaos.....	174
	Example: Chaotic project.....	179
6.5.4	Conserved quantities.....	184
7	Operations management.....	189
7.1	Plan and forecast the business.....	189
	Example: Reasonable planning period.....	193
	Example: Quality of planning.....	195
7.2	Using benchmarks.....	197
7.2.1	Definition of benchmarking.....	197
7.2.2	Mistakes to avoid.....	201
7.3	Learning curves.....	204
7.3.1	Theory of learning curves.....	205
7.3.2	Controlling with learning curves.....	207
7.4	Soft skills.....	210
7.4.1	Defining goals.....	211
7.4.2	How to give and receive feedback.....	217
7.4.3	Managing meetings.....	220
7.4.4	Leading and managing.....	226
8	Appendices.....	235
8.1	Appendix SC.....	235
8.2	Number of vendors.....	240
8.3	Errors.....	241
8.4	Comment on nonlinear ABC.....	243
8.5	Logistic map and Liapunov exponent.....	245
8.6	Numerical solution of transcendental equations.....	248
	Index.....	253

Figures

Fig. 2-1: Mailing process in four steps	11
Fig. 2-2: Mailing process in two steps.....	13
Fig. 2-3: Unstructured Process	14
Fig. 2-4: Structured Process	14
Fig. 2-5: Process chart.....	17
Fig. 2-6: Process ordered by departments	18
Fig. 2-7: SADT rules.....	21
Fig. 2-8: Baking a pie top view.....	22
Fig. 2-9: Baking a pie in three activities	23
Fig. 2-10: Process to decide on make or buy: top view	24
Fig. 2-11: Process to decide on make or buy: estimate potential.....	25
Fig. 2-12: Process to decide on make or buy: decide	25
Fig. 2-13: Principle of ARIS	27
Fig. 2-14: Baking a pie in ARIS (top view)	28
Fig. 2-15: Brown paper	30
Fig. 3-1: The four perspectives of BSC	37
Fig. 3-2: Translating the vision.....	38
Fig. 3-3: Example of goals and measures	40
Fig. 3-4: Process of German rail	42
Fig. 4-1: Controlling process	50
Fig. 5-1: Organization chart.....	63
Fig. 5-2: Table of activities	65
Fig. 5-3: Definition of RACI.....	66
Fig. 5-4: RACI charter of activities	66
Fig. 5-5: RACI charter for make or buy process	68
Fig. 5-6: Organization by tasks	73
Fig. 5-7: Organization by products	75
Fig. 5-8: Organization by markets	75
Fig. 5-9: Bundling of activities	82
Fig. 5-10: Central purchasing	88

Fig. 5-11: Decentralized purchasing.....	89
Fig. 5-12: Organization with $\langle SC \rangle = 11/4$	98
Fig. 5-13: Typical plot of W_{tot}	103
Fig. 5-14: Optimal span of control SC_{opt}	104
Fig. 5-15: Original purchasing process	109
Fig. 5-16: Reengineered purchasing process.....	110
Fig. 5-17: Traditional car theft.....	112
Fig. 5-18: Automated car theft	113
Fig. 5-19: Reengineered car theft	114
Fig. 5-20: Process organization	118
Fig. 5-21: "Traditional" organizations	118
Fig. 6-1: Semi-quantitative analysis	137
Fig. 6-2: Semi-quantitative analysis of strategies A, B and C	139
Fig. 6-3: Arbitrary process with N activities	143
Fig. 6-4: Three steps of manufacturing aluminum tubes.....	148
Fig. 6-5: Calculation of cost factors	149
Fig. 6-6: Comparison of old and ABC cost calculations.....	150
Fig. 6-7: Starting situation for target costing.....	154
Fig. 6-8: Given cost distribution of wheel	157
Fig. 6-9: Evaluation of product features versus product functions (I_{fi}).....	158
Fig. 6-10: Connection between importance measures and component costs.....	161
Fig. 6-11: As is cost distribution and target costs.....	162
Fig. 6-12: Regimes of one or two warehouses depending upon c_1 and c_2	173
Fig. 6-13: Removing complexity from a project	181
Fig. 7-1: Growth model for uncertainty u	190
Fig. 7-2: Exponential growth of uncertainty	192
Fig. 7-3: Uncertainty for $u_1 = 1\%$, $u_2 = 5\%$, $p_1 = 3$ months, $p_2 = 1$ year .	194
Fig. 7-4: Planning from 2003 to 2006 and its uncertainties	195
Fig. 7-5: Measures of quality (u_0) for plans of Fig. 7-4.....	196
Fig. 7-6: Typical display of (US) benchmarking process.....	198
Fig. 7-7: Faulty benchmark of cost	202
Fig. 7-8: Typical form of decreasing cost due to learning.....	205

Fig. 7-9: Decreasing cost if $t_{1/2}$ is given..... 208

Fig. 7-10: Average cost $\langle c \rangle$ over a period T 209

Fig. 7-11: Questions to define a target 212

Fig. 7-12: Target for kickoff meeting (incorrect)..... 216

Fig. 7-13: Target for kickoff meeting (possible definition)..... 217

Fig. 7-14: Roles and responsibilities in a meeting 224

Fig. 7-15: Classification of leadership style 231

Fig. 8-1: Homogenous organization..... 236

Fig. 8-2: Organizational chart with homogenous layers 237

Fig. 8-3: Completely homogeneous organizational chart 238

Fig. 8-4: Typical cost function: cost = cost(volume) 244

Fig. 8-5: Logistic map, onset of chaos 246

Fig. 8-6: Solution for u_0 and τ for $q = 1.1$ to $q = 1.9$ 250

Fig. 8-7: Solution for u_0 and τ for $q = 2$ to $q = 5$ 251

All figures above are available online. Please contact the author at mg@alumni.caltech.edu.

1 Introduction

This book is designed for everybody who wants to learn how to manage or to improve existing management skills. A manager is a person who decides what to do and, in part, how to do it. The underlying aim is normally to be as efficient as possible. In the language of most businesses, that means to be as profitable as possible. One may ask how efficiency is defined or what profitability exactly means and how it is measured. Applying a suitable definition and measurement procedure is one skill a manager needs (although this book does not cover it), but there are many more skills required. Examples are how to determine whether a business is developing in the right direction or who should do what. This book aims to teach these kinds of skills. They are taught here in the forms of methods and tools.

Management, in the sense addressed in this book, has been around ever since big companies came into existence. About 100 years ago, Frederick W. Taylor presented his principles of scientific management. His were among the first major theoretical thoughts about management. Many more thinkers have followed him right up to the present. Today, most managers have formal educations in business and management. The MBA is probably the best-known such degree. Most MBA degrees are offered by business *schools*. I intentionally use the word “school” here rather than “university” because, while I personally associate universities with teaching science, I do not regard management as science. Please note that this does not mean that a manager does not need to be smart. On the contrary, good management requires high intelligence in the same way as does science. But that does not imply that management is a science. The task of a scientist might be, for example, to understand how the universe formed. The corresponding task of a manager is to make the

production of a universe most efficient. In this example, the task of the manager is far more difficult than is that of the scientist. But it is absolutely not science. Of course, humankind is not yet producing universes. The things humankind does produce are pretty simple by comparison, and the science underlying that production was typically well understood long ago. Otherwise, production would not be possible. Consider a vacuum cleaner as an example. The science behind it is trivial, and its basic engineering is only a bit more complicated. But to reduce the cost to produce a vacuum cleaner, now that is a challenge. Perhaps this is why academics in management especially feel compelled to emphasize over and over their scientific approach. Besides feeding their own vanity, this results in a business education that is overly theoretical. Although business schools are a step in the right direction, they still are often too academic in their approach. One way to overcome this problem is to learn by doing, and in general that is not a bad method. Experience is so important in management that most people who become CEOs are over the age of 50. By contrast, scientists becoming professors are often under the age of 40. While Nobel Prizes are awarded mostly to people in their retirement years, these are usually for discoveries made between the ages of 25 and 45. Obviously, to be a top performer in management requires more years than to achieve the same in science. In my opinion, there are three reasons for this (the first of which is clear from the remarks above):

- Most relevant education takes place on the job.
- Management is more difficult than science.
- To be a leader as well as a manager requires a certain age.

As I have mentioned, learning by doing is good in any discipline. It entails some waste, however, if the wheel must be invented over and over again. To minimize this loss is one of the goals of this book. My second claim would probably be welcomed by business academics but dismissed by scientists. I have worked extensively in both of these worlds, and I can confirm it without reservation. Management is a far

younger discipline than is science, and its basic rules are still undiscovered. The content of this book represents one small step toward identifying those rules.¹ Please note that while management is more difficult than science, this does not imply that managers are smarter than scientists. Another point as to why management is more difficult than science is closely related to the third point above. Management has to do with people, and people are far more complicated than are, for example, elementary particles. Although management is distinct from leading, the two skill sets are often intertwined. (For a thorough definition of management and leadership, please see 7.4.4.) Leading involves people and the relations and emotions between them. To understand such things is rarely possible before the age of 40.

In addition to these general remarks, I will provide two sets of practical hints in this introduction. One is about how to use this book (1.1). The other states what kind of learning one may expect from reading this book or parts of it (1.2).

1.1 How to use this book

This book is a “toolbox.” When somebody buys ordinary tools, some manual is normally included. Here I will present a “manual” for this book. The book is designed for anybody who wants to learn something about management. Students of any field (not necessarily business) who plan to work in management should read this book in order to prepare themselves for their future jobs. Managers and consultants at any level, meanwhile, will find guidance for solving most of the problems they face in their daily work.

¹ Some parts of this book deal heavily with numbers and mathematical formulas. These parts are definitely easier than science. In order to find those areas where management is more difficult than science, one has to look through the parts where there are no formulas.

As is probably true of most authors, I would love if many people would read this book from beginning to end. It is not a handbook or even an encyclopedia of methods and tools. Rather, the chapters are ordered in a way that makes reading most interesting and easy. Up to chapter 5, it is necessary to have at least a reasonably sound knowledge of the respective chapters preceding.

This book contains no exercises. For anybody already working in business, the best exercise is to apply the suggestions from this book to solve daily problems. In any case, it will be useful while reading to reflect on how the ideas presented here can be related to day-to-day problems or situations in one's real world. For most readers, it will be necessary to *work* their way through the book. Therefore, it may be necessary to read particular passages several times. Parts of this book deal with difficult topics², and difficult things are by definition not understood on the spot.

Readers looking for ready-made methods or tools will do so in vain. Any method or tool must be understood first before one can use it. Even then, it should be adapted to the specific situation and need. I intentionally designed the book in this way. I have two objections to books with ready-made remedies. First, it is scarcely possible to find a real business situation where the suggested solution actually fits. Second, blindly employing such remedies often leads to situations where they are used beyond the range of their applicability. As we often said as consultants: "A fool with a tool is still a fool." In part, this book may be understood as a helping hand. But just as a helping hand is indispensable for toddlers, eventually one must learn to walk on one's own.

I tried hard to write this book in such a form that no special knowledge would be necessary in order understand it. It was my goal to write a book useful for university freshman, graduate students, and

² I favor Einstein's remark here: "Everything should be made as simple as possible but not simpler."

experienced managers or consultants. By and large, I think I achieved this. In the field of business, though, a knowledge of such basic terms and concepts as revenue, cash flow, or return on investment is helpful. Typically, a business major will learn these things within his or her first term. Some chapters involve some mathematics, but a good high school graduate should be able to master it. The appendices go beyond this level, but understanding the appendices is not essential to comprehending the book. Nevertheless, some background knowledge can be found there. In a very few places, the book deals with mathematics beyond the high school level (7.1 or 7.3). It was unavoidable there. Even that mathematics, though, is not beyond that taught during the first year at university in most fields.

1.2 What to expect

As stated several times already, this book explains the skills necessary to manage a business. The general goal of *every* business is to be profitable. The only variation is whether to be profitable in the short run or long term. (In principle this applies even for charities and nonprofit organizations.) A manager has only two ways to improve profitability. One is to lower costs and the other is to increase revenue. All other concerns such as high quality products, motivated employees, or investing in high technology are useful only if they are helpful in lowering cost or increasing revenue. From this, one might conclude that a manager has to know just two things (you guessed it): How to lower cost and to increase revenue. One could argue, therefore, that this book should have had two chapters only. One should be called “How to lower cost” and the other “How to increase revenue.” Books are available that deal with one or both topics. Typically, they are in the form of “100 ideas for...” They might be quite useful, and especially if a manager has to solve a specific problem in the short run. In my opinion, though, they are not suitable for long-term considerations and a thorough understanding.

Therefore, I have taken a different approach here. I am explaining typical things a manager has to do in order to achieve his or her major goal. Please note that none of these should be done for their own sake. The reason for applying the methods and tools presented here is always to increase revenue or to lower cost, at least in the long run.

The arguably most essential task a manager has is to organize. In short, organizing means to decide “who should do what” and “who is reporting to whom.” Chapter “5 Organization” of this book deals with this problem. One may consider the organization of an entire company or just the organization of next week’s work. The logic behind it is always the same. Please understand that to change an organization never reduces costs directly. The change may lead to increased revenue because one can serve the market better, or cost savings created by other means may require a new organization. To organize is an almost daily job of a manager, and especially if it is defined as broadly as it is here. Therefore, chapter 5 – or more precisely 5.2.2 – is undoubtedly the most important one in this book. Nevertheless, just reading these 12 pages is most likely of very limited help. Almost everything written here prior to 5.2.2 is essential for understanding that section (and many other methods and tools presented here).

Chapter 2 is about business process modeling. In simple terms, it is a standard way to describe what is done in a business. Obviously, one must first write down what is done before one can think of organizing it. Besides its being indispensable for organization, process modeling is mandatory for controlling (4), balanced scorecard approaches (3), reengineering (5.5), activity based costing (6.3) and many more activities. I am aware of no manager who does not need to know about it, and a big chunk of all consultants’ revenues comes from modeling processes. Please note that it is by no means limited to IT problems, such as introducing a new ERP system. I deliberately stress here its importance outside the IT world. (For IT applications, some useful literature can be found. Otherwise, there is none other available.)

The third chapter deals with the buzzword “balanced scorecard” (BSC). In simple terms, this is about finding the right quantities to indicate how the business is getting along. There are thousands of publications on this topic. Here, I will focus on the basic ingredients, and I will stress typical problems and mistakes. One of the key findings is that balanced scorecard is the one and only method for determining performance indicators. Therefore, it is clear that the idea of BSC is much older than the publications of Robert S. Kaplan and David Norton on the subject. While they are not the inventors of BSC, Kaplan and Norton are the people who made BSC happen – and that is arguably a much bigger achievement. A second finding that is not so common but is nevertheless important of chapter 3 is that BSC is closely related to organization. To find proper performance measures may require a change of the organization.

In chapter 4 (controlling), I show how to use the performance indicators defined via BSC. As is the case with BSC, there are many books and publications on controlling. I will emphasize the basic steps and the typical but fundamental mistakes that occur. Again, it will become clear that controlling is very closely related to organization. In order to make a proper controlling possible one has to choose a certain organization. (Indeed, chapter 5 will make clear that enabling a proper controlling is *the* construction rule for a new organization.) A second rarely considered finding of chapter 4 is the fact that, for reasons that are fundamental, controlling is not always possible. The consequences of this should be clear. First, attempting to control under such circumstances is a complete waste. Second, management is scarcely possible in such a situation.

Chapter 5 deals with organization, as mentioned above. Some additional, related topics are discussed there. In 5.3, I will explain how many people should be working in a single organizational unit. A fairly new approach of using a so-called feedback circle is discussed in 5.3.3. The number of people one person leads is commonly referred to as a span of control. In 5.4, I will show that there is an *optimal* span of

control (typically 8 to 10). Values below and above this optimum will lead to higher costs. In 5.5, I will demonstrate that reengineering is a very proper tool and not just a fashionable buzzword from the 1990s. Process organization is sometimes considered a new organizational form. In 5.6, I will make clear that it is the (one and only reasonable) way to find an optimal organization. "Self-organization" is considered a situation where an organization changes (for the better) without any interference by the management. In addition to discussing its usefulness and difficulties, I will clearly affirm in 5.7 that it has nothing to do with such almost spooky things as violating one of the most fundamental laws of physics (increase of entropy).

In chapter 6, I will shed light on some quantitative methods and tools that are often used. One quite general conclusion will be that, in calculating, one must always take into account a margin of error (6.1.2). By doing so, one will see that quite a few cost calculations are a complete waste of time because their margin of error is too high. There even are situations where it is quite impossible to decide whether a particular product leads to a profit or loss. So-called semi-quantitative methods are used to evaluate, for example, a strategy by assigning scores to certain features. In 6.2, I will show the typical mistakes that are made, and especially if the total score is built by multiplying the individual scores. 6.4 explains a neat tool to determine the (market-driven) target cost of a product and its components. 6.5 will lead to the frontier of research in management. Here, the chaos theory is applied to show that very small causes can result in enormous effects. Consequently, one can show that, for example, supply chain networks are sometimes fundamentally not manageable. The same can be true for complex projects. Therefore, a fundamental change in management approach is necessary.

In chapter 7, additional tools and methods to manage an operation are scrutinized. The central task of planning is reviewed in 7.1. By applying a simple model, it is possible to calculate the margin of error of a plan or forecast. Long-term planning can easily lead to a margin of

error of, say, 100%. That points to severe consequences for the usefulness of business plans. In the next tool discussed (benchmarking), one compares two businesses. The goal of 7.2 is to point out mistakes that are avoidable. In the third subchapter learning curves are discussed. Everything that is done repeatedly will lead to learning, and normally to higher efficiency. The exact form of such learning curves is derived in 7.3. The result is indispensable for any kind of controlling where learning is involved. This book ends with some hints on soft skills (7.4). This important topic can easily fill an entire book. The aim here is to encourage the reader to think about it thoroughly.

