
HOLISTIC MANAGEMENT

Managing What Matters for Company Success

WILLIAM F. CHRISTOPHER



WILEY-INTERSCIENCE

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HOLISTIC MANAGEMENT



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When it comes to managing affairs, we characteristically try to deal with that dismantled system—piece by piece—rather than to redesign the totality so that it actually works.

Stafford Beer, *Platform for Change*, John Wiley & Sons, 1975

Objectives are needed in every area where performance and results directly and vitally affect the survival and prosperity of the business.

Peter Drucker, *The Practice of Management*, Harper & Row, 1954

To all those working with the application of system science and cybernetics in the management of business enterprise, and to all those seeking the keys to success and sustainability for their companies.

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Foreword

This challenging and exciting book, written by my mentor Bill Christopher, presents two fundamental management concepts that will be new for many readers. First, the book presents what we have learned from system science and cybernetics that changes and improves the way we manage the company. Second, the book presents best practices in the key performance areas defined by Peter Drucker that improve the level of organization capability and performance results for any business enterprise.

You will discover in this book the new system science and cybernetics for managing business operations clearly explained in full detail. A chapter for each of the key performance areas gives the reader the basic and fundamental knowledge needed to manage these areas successfully. Both concepts—systems, and key performance areas—will generate in the reader a tremendous synergetic effect . . . for the reader, for the reader's team, and consequently for the company. This outstanding publication will greatly contribute to excellence in developing superior leadership.

From this book we learn key ingredients to simplify and achieve personal targets, with this good work and spirit contributing also to the company goals in the fundamental key performance areas described by Peter Drucker as the areas that determine company success. This book teaches us how to increase the company's greatest asset, the organization's intellectual capability, its "Collective IQ." The company's people and their capability is the company's greatest value, even if this asset is ignored in the company's balance sheet.

I encourage business people to study this book. They will see that this publication is an essential tool for success whether they run their own business or work at any level of a large corporation.

Throughout his career, Bill Christopher, always positively minded in trying to help people, has been practically involved in difficult, real business problems. Working together with management teams in many different companies, Bill uses the knowledge that's in this book, and his personal business acumen, experience, and common sense. The team uses its practical and specific knowledge of their business. Together, they always find solutions to all problems.

I am only one of many business people who have taken the challenging opportunity to apply the recommendations given in Bill's numerous books written over his career and in seminars, brainstorming, and our meetings. Certainly, my success in my business career is largely due to Bill Christopher and the management fundamentals described in this book. I have continuously applied these fundamentals with my international team to reach business goals and key target account objectives.

The key players in my team of five people of different nationalities and origins, working smartly together with a good attitude and spirit, are Georges Matile and George A. Zarb. This team has been successfully operating for more than 30 years in putting into practice the management concepts and business strategy of Bill Christopher, setting and achieving objectives in the seven key performance areas.

Concrete results sum up as follows: Our team has first been operating with positive results in expanding our core business (automatic equipment for precious metal plating) in all major European countries. Then we created new enterprises in microcomputer technology to expand and diversify from our main business. We made one of the first industrial applications of the Intel 4 bits microprocessor 4004 in 1971, and created a set of microcomputerized nautical instruments for racing sailing boats which prepared the ground for Switzerland to win the America's Cup in 2001. Then we expanded our core business in Asia. We made a first joint-venture in Japan, then built a factory in Singapore, then in Batam (island of Indonesia), then Hong Kong, and then we built a factory with our Hong Kong partner in China. Thanks to Bill Christopher's concepts of management and global business knowledge, when we sold our company in 2003, we had customers in more than 50 countries. Most of our customers, such as Intel, GE Aeronautics, HP, Siemens, Swatch, Rolex, and Patek Philippe, were in high-technology fields. Bill Christopher's ways of making a company

globally more successful are also applied today in new companies operating with both present and tomorrow's technologies.

I could mention many successful business enterprises that operate today according to these principles. Two personal examples I would like to mention briefly; the cases of my two sons who are currently applying with success the fundamentals of management described in Bill's book. Each of them is operating in different directions of human activities: one in art, the other in the top-end of business aviation.

Fred, 32 years old, is an artist leading a technological team to develop a new process for painters and sculptors using industrial equipment. This new process will allow painters to produce paintings that can be displayed outdoors year-round, exposed to sand, sea, and snow, over a temperature range of minus 40° to plus 40° Celsius. This art project is using the fundamentals of management described in this book to develop and provide this process to artists worldwide.

My other son, Mike, 37 years old, is Founder and Chairman of Global Jet Concept, a leading European company in the high end of corporate business aviation. His company manages and operates a fleet of more than 50 aircraft from major manufacturers (Airbus, Boeing, Bombardier, Gulfstream, Dassault). Instead of going to university for his advanced education, Mike went straight into practice in luxury service industries, first with Hilton Hotels, Geneva, then Aeroleasing, where he became director of sales and marketing for Europe. After this company was acquired by TAG Aviation, Mike formed Global Jet Concept, receiving from me the fundamentals of business that I learned from Bill Christopher.

Much of what I do now is in the movie and entertainment industry. I find that the management principles described in this book are also very much needed in this Industry.

Consequently I can affirm that this book is unmatched in its synthesis of new and traditional bases of management. It is useful for everyone: young as well as senior managers operating in the full spectrum of life activities.

For industry professionals planning the future, the contents in this book will be a contributor for reshaping their business models and company activities to meet the evolving needs in the fast-coming, booming Digital Mobile Business (DMB).

After reading Bill Christopher's masterpiece of a book, you will keep changing and challenging all the time. Good answers don't last forever. But what is presented in this book, the fundamentals, endure. Methods, tools, and technologies continuously evolve. Although

technological tools available drastically change, the fundamentals of management found in system science and key performance areas will remain.

To conclude, I would like to state that you will learn and discover in this challenging book all the ingredients to become yourself a high achiever and a successful decision-maker. You will also be able to relax away from your working life. Your company and your private life will both benefit.

Thank you, Bill, for all you have done in guiding and helping us lead successfully our multinational corporation. And fruitful reading and pleasant rewards for your readers.

*Lausanne, Switzerland
July, 2006*

Antoine D. Savary

Preface

This book presents two recently developed knowledge areas that can significantly improve the management and the performance of business enterprise: system science and cybernetics, and the key performance areas that determine company success.

The principles discovered in system science and cybernetics are embedded in Stafford Beer's Viable System Model (VSM) presented in this book. This model and the principles it represents give us a new way to structure and manage the company. The VSM structure and management more realistically describes what the company is and how it works than does the conventional view of the management hierarchy. Stafford Beer was a leading pioneer in the applications of system science and cybernetics in government, business, and other organizations. He developed the VSM to communicate this new understanding of what our organizations are and how they work. This book presents the VSM and its system science and cybernetics and how this new knowledge improves organization capability and performance results. Chapters 1, 2, and 3 discuss system science, the VSM, and their applications in business enterprise.

The prevailing view of company success is the size of the profit number. But not enough is understood about where profit comes from. Profit is not what the company does. Profit is a result from what the company does, if the company does what it does well. What the company does is create and keep customers in ways that enable the achievement of all company goals. In 1954 Peter Drucker wrote in *The Practice of*

Management that eight key performance areas determine success for all companies: market standing, innovation, productivity, physical and financial resources, profitability, manager performance and development, worker performance and attitude, and public responsibility.

For over 40 years I have studied these areas, worked in these areas, and participated in professional societies working in these areas searching for best practices, the newest and best methods and technologies. In the companies I worked for, we included goals in these key performance areas in plans and budgets, and monitored progress with new and different kinds of performance measures.

Instead of accounting measures to measure and improve profitability, we used “management economics” measures, pioneered by Joel Dean, professor at Columbia University. And we used management economics also for the dollar measures in the other key performance areas. Where there were profit problems, the management groups in those businesses were able to improve profitability and achieve desired goals using management economics concepts and measures.

In 1976, working with Stafford Beer in applying the VSM and its system science in the corporation I then worked for was a eureka moment for me. The VSM teaches us how to structure and how to manage the company using the discoveries of system science. Best methods and technologies in the key performance areas teach us how to be successful in all those areas that determine company success, including profitability. The VSM teaches us how to structure and how to manage. Best practices in the key performance areas teach us what to manage, and gives us the needed methods and tools.

This book presents this new, different, superior leadership strategy: the VSM and system science for structuring and managing the company, plus best practices in the key performance areas that determine company success.

The VSM and system science gives a new, realistic way to see and understand what our company is, and how it works, and a new way to manage this viable, immensely complex, purposeful, probabilistic enterprise. The new concepts, the new understanding of what the company is and how it works, derive from more than 50 years of discoveries in this new, integrating science, general system science and cybernetics.

General system science gives us a holistic understanding of science, nature, and our human systems, including the system that is our business enterprise. From system science and cybernetics we learn some fundamental principles for the effective structure and control of

business operations. We also learn how to include in structure a capability for change, innovation, and growth. This book is written specifically for business management. The principles and the methods apply equally well for management in government, nonprofits, NGOs, and organizations of all kinds.

System science had its beginnings in the mid-twentieth century. As knowledge in the many disciplines of science accumulated and more and more interrelated, scientists began to search for a more complete understanding at a higher level. They found this understanding in general system theory and cybernetics. Disciplines enable specialization. Specialization loses synthesis. We specialize in the parts and lose an understanding of the whole. The VSM and its system science and cybernetics teach us how to manage the whole to better manage all of the parts.

In recent years, Stafford Beer has applied the VSM and its system science and system thinking in organizations of all kinds, including both government and private sector organizations, and especially corporations. Beer is preeminent among scholars and practitioners of system science and cybernetics applied in business management. His Viable System Model, and the system science and cybernetics embedded in it, enable us to see with new eyes, and manage in new ways, to make our organizations more successful, and more enduring.

In times of turmoil, information on what's happening fits less and less with our models and our prevailing perceptions. Dissonance increases. Then suddenly, and quite unexpected, comes a simplifying revelation, restoring order at a higher level of understanding. Scientific revolutions provide examples. $E = mc^2$ explains more and predicts more than all the accumulated literature of classical mechanics. System thinking and Beer's Viable System Model explains more and enables us to predict more than all the literature of traditional business management. With system thinking and this Viable System Model we understand our company in a new, and different, and simpler, and more realistic way. And we greatly improve company performance.

System thinking and the viable system model give us a holistic view of how everything fits together and how everything works and relates. A system, including a company when understood as a system, is much more than the sum of its parts. A business system exists for a purpose—creating value for customers in ways that enable the company to achieve its other goals, too. This book presents technologies and methods needed to achieve company goals in all the key performance areas that determine company success. The viable system model's structure and

management principles make these technologies and methods effective throughout the company to create company success.

Included in this book are advanced (and evolving) methods and technologies for planning and budgeting, creating and keeping customers, quality and productivity, innovation, improving organization capability, sustainability in the company's social and ecological environments, and profitability—all integrated with this new viable systems model and system thinking.

My friendship with Stafford Beer began in November 1976. In the spring of 1976, Paul Rubinyi and I were on the same speaker program at a conference in Cleveland, Ohio, USA. Paul was systems partner for Ernst & Ernst in Montreal, Canada, and in his speech was advocating the VSM and its system science as a new and better way to manage business enterprise. In the work we were each doing, we found much in common. At that time I was director of marketing in a \$4 billion manufacturing company, and also had the unique responsibility for working with company businesses that had special problems. Typically these special problems were profit problems, which, of course, were a consequence of what were the real problems. Working with the people in those businesses and using their knowledge of their business operations, we were always able to resolve the problems and improve performance. Solutions were always found in change and improvement in whichever of Drucker's key performance areas were the source of the problem.

Paul had recently engaged Stafford Beer to work with him at Ernst & Ernst. Paul suggested that he could arrange for Stafford to work with management people from my company in using the VSM and its system science to improve company performance. Paul also recommended Stafford's books and I read three of these books, as Paul and I kept in touch over the following weeks. It worked out that a learning session was scheduled with Stafford for three days, in November 1976.

My work with the management groups in company businesses to improve profitability related well with the system science in the Viable System Model. In Drucker's key performance areas we used new and different management methods and technologies. We used new and different performance measures and a new structure of information and feedback, many derived from the existing chart of accounts. We determined the economics of company operations and usually found solutions more in operations improvement, product development, and marketing and sales than in cost reduction. We used management economics measures calculated from the chart of accounts, rather than the traditional accounting measures calculated from the chart of accounts.

By the time of our session with Stafford in 1976, I had worked with dozens of businesses in fourteen countries and had a lot of experience with new and better management practices in Drucker's key performance areas that determine company success.

With this background, my work with Stafford and Paul was a revelation. Here was a way to see a company as a viable, very complex, purposeful, probabilistic system; what it is, how it works. The work I had been doing with new and better management practices in the key performance areas integrates well into the VSM way of structuring and managing the company. The VSM and best practices in the key performance areas that determine company success combine to offer a compelling strategy for company leadership—The VSM and system science plus best practices in the key performance areas. The constant is the VSM and system science. The best practices, the methods and technologies in the key performance areas, continually evolve, while their fundamentals endure.

Over the last 30 years I have been working with the VSM and best practices in the key performance areas, always with success. I did not discover the system science and the new and better methods and technologies in the key performance areas presented in this book. I learned them from others, and in using them over the years developed further what I had learned. Lessons learned are presented in this book.

To understand the VSM and system science, begin by reading the first three chapters of this book. Chapter 1 discusses the idea of “systems” and system thinking, and what general system theory has discovered about the way systems behave that is useful in the structure and management of businesses. Chapter 2 presents Stafford Beer's Viable System Model as a model for all systems, including the viable, very complex, purposeful, probabilistic system that is a modern corporation. We see the corporate VSM and the systems 5, 4, 3, 2, and 1 within the corporate VSM and their functions. We see the recursive nature of company structure with all business units also described by the VSM. We see and understand a new company structure, and new management principles. We see communication channels and the information flow and feedback that moves all actions toward the achievement of company goals. We include the outside environments as part of company structure.

The five case examples in chapter 3 tell the stories of application experience using the VSM to change and improve performance. Chapter 4 introduces seven key performance areas that determine every company's success. Chapters 5 through 11 discuss “best practices”

management methods and technologies, and performance measures in these key performance areas:

- Chapter 5. The Viable System Model and Planning and Budgeting. This chapter proposes continuous plans and continuous budgets. Continuous planning and budgeting of what matters for company success is now possible using the methods described in this book, and much more effective than annual budgets and the analysis of variances.
- Chapter 6. The Viable System Model and Creating and Keeping Customers. The purpose of every company is to create and keep customers, in ways that enable the company to achieve desired goals.
- Chapter 7. The Viable System Model and Quality and Productivity. Creating and keeping customers requires quality products and services, and continuous improvement in all that the company does.
- Chapter 8. The Viable System Model and Innovation. Innovating the new, different, better creates the company's future, short-range and long-range.
- Chapter 9. The Viable System Model and Organization Capability. The company is its people. Their effectiveness in these key performance areas determines company success. The VSM structure and management principles continuously develop organization capability.
- Chapter 10. The Viable System Model and Public and Environmental Responsibility. The company must relate successfully to communities, governments, and its environments. The VSM includes these environments and the company's communication links with these environments.
- Chapter 11. The Viable System Model and Profitability. Profit results from all the above. Profit pays the costs of creating the company's future, and rewards investors.

Chapters 5 to 11 also explain how the VSM company structure and management methods make the best practices presented in these chapters more effective in achieving desired results in these key performance areas.

This book presents new and useful management knowledge; knowledge that can immensely improve company performance. And this

knowledge can be learned and applied quickly. Learning and applying the VSM becomes an experience in rapid knowledge transfer, the new discipline defined as the discovery, learning, and reuse of knowledge, adding to the organization's intellectual capital. I have found that a few days working with management groups can impart a beginning understanding of the VSM and system science. In a week a management group can discover where improvement in the key performance areas is needed and how to go about it.

Among those I'm indebted to for what you read in this book I would especially like to recognize and to thank:

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Think about what you read in this book. It’s real. It works.

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Using the VSM to Design a Non-Viable System: The Case of the Social Security System for Teachers in Colombia

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From System Science—A New Way to Structure and Manage the Company

Over the post World War II years of the 20th century business success depended mostly on variables business people could get their hands on, understand, and manage reasonably well. “Out there” were opportunities, and the world provided resources to transform into product and service values to develop those opportunities. Environmental antennas were tuned to market needs, technology, and competitive actions, increasingly global. All these provided a flow of information and resources that spurred great economic growth. From 1950 to 2000 world population increased from 2.5 billion to 6.0 billion, up 140%. Over those same 50 years, global economic output (in 2001 dollars) increased from \$7 trillion to \$46 trillion, up 557% [1]. These trends, and where they are going, change everything.

A TIME FOR CHANGE

Over the later years of the century new and different environmental influences developed; accumulated. What we could control became less and less the key to success, and change “out there” more and more important. In all dimensions, the world changes, kaleidoscopically, and

fast. This new world of challenge and change presents both threats, and opportunities. For the timid change is frightening; for the satisfied change is threatening; for the confident change is opportunity.

For the wise, their guide for the times ahead will be system science, cybernetics, and a viable system model (VSM) for organization structure and management. For the turbulent times ahead, the VSM with its system science and cybernetics gives us a new and different view of our company and how it works, and gives us new management principles that greatly improve company performance.

Everything in our experience can be thought of in systems terms. Nothing stands, or happens, on its own, in natural systems, and in the system that is our company. Everything relates and interacts within a system, and in relationships with other systems, and it is the system and these interacting relationships we need to understand and manage. As Stafford Beer wrote [2]:

It is characteristic of man's way of thinking to contemplate entities rather than systems: to disconnect systems rather than to relate their parts; to record inputs and outputs to systems rather than to measure systemic behaviour itself. When it comes to managing affairs, we characteristically try to deal with the dismantled system—piece by piece—rather than to redesign the totality so that it actually works.

The VSM with its system science and cybernetics gives us a way to understand the totality of our company and how it works, and gives us better ways to structure and manage the system that is our company.

With the VSM and system science we see the company with new eyes, and manage in new ways. Figure 1.1 illustrates a simplified system model of a company. This model will be developed in more detail in Chapter 2. A system model is much different from the typical organization chart. The system model doesn't show people and titles. It shows functions and relationships. It includes the environment outside the company. It includes communication channels and specifies information flow. Stafford Beer, a pioneer in the application of system science and cybernetics in management, developed the system model presented in this book, the Viable System Model (VSM).

SYSTEM SCIENCE AND THE VIABLE SYSTEM MODEL (VSM)

Over the years, the hard sciences and the soft sciences developed in an increasing number of separate disciplines. As we learned more and

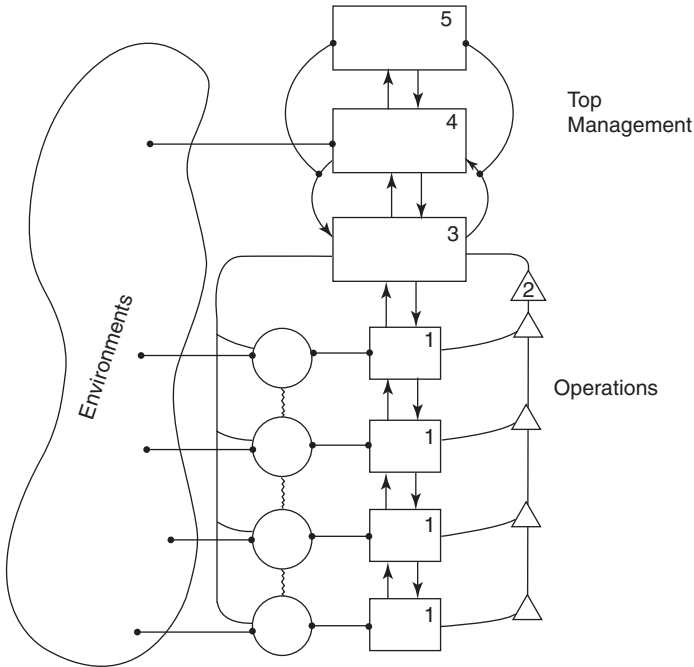


Figure 1.1 A simplified viable system model

more about each, each began to intrude into the realms of others. Physics and chemistry intruded into biology; biology into sociology, and the boundaries of the social sciences blurred. The sciences, whether technical or social, became more and more interrelated. Scientists began to realize that reality can not be understood completely through classification and analysis. Something more was needed. The “something more,” a synthesis, was discovered and developed over the years following World War II by Ludwig Von Bertalanffy, Norbert Wiener, Ross Ashby, and others. The work of these pioneering scientists discovered and developed a new science—system science and cybernetics. System science defines what systems are, their characteristics, and how they function and interrelate. Cybernetics, a part of system science, is the science of communication and control in systems. From system science and cybernetics we now have a general systems theory which tells us all that science now knows about how things work, interrelatedly, in nature, and in human society.

Instead of analyzing the parts, system science takes an holistic view. System science gives us an holistic world of holistic parts. Systems science studies the total system and sees systems with holistic parts

interacting within the system for a purpose. In a natural system, that purpose is survival. In a system that is a corporation, purpose is survival and something more. Companies are purposeful. They have a purpose more than survival. They have goals they intend to achieve. System science offers management a new view of the company showing more clearly what the company is and how it works. With this new view and understanding, management will manage differently, increasing the capability of the organization to accomplish desired results.

System science has discovered that all systems share common characteristics and behaviors, and these have been identified and described. We now have scientific knowledge of how feedback and communication within the system enables a complex system to interact in ways that will achieve its purpose.

In recent years Stafford Beer, Russell Ackoff, Paul Rubinyi, and others have applied system science to the operation of business enterprise. In systems terms, a business unit, a business group, a company, a corporation are each a viable, very complex, purposeful, probabilistic system. The complex, probabilistic system that is a corporation has the kind of structure and the characteristics discovered by the new system science. But without a knowledge of system science we don't see the structure, and don't understand and make use of some of the characteristics of system behavior that can much improve performance.

System science does not tell us how our company or business unit *should* function. System science tells us how our company or business unit *does* function. And that is different from the views most commonly held by management people today. When we understand how to use system science, we will be able to design and manage the system that is our company or business unit so that it can more effectively achieve its purpose. Stafford Beer developed the viable system model (VSM) to represent and describe the system science and cybernetics needed to manage effectively a business, a corporation, or any other kind of organization.

A simple analogy may help in understanding the value of system science in management. The human body is a very complex system and has functioned in the same way for many thousands of years. But to deal with the health and the pathology of the body, quite different methods have been used by "experts" of different cultures and different times. The physician of ancient Greece, the Mayan priest, the Australian aborigine, the Indian medicine man, and the blood-letting barber were all treating the same system, the human body. But their interventions weren't always helpful. Over more recent years our knowledge of

the system that is the human body has increased tremendously. With new knowledge, our treatment of the body's pathology has much improved, and life expectancy has increased by decades. Might we not also expect improvement in our management methods as we increase our understanding of the system that is our business enterprise?

System science gives us new ways to steer the business enterprise to the achievement of its purpose. Seeing with new eyes shows as new ways to manage today's complexities and more successfully achieve desired results. Internal measures and interactions with the environment provide continuing feedback that coordinates all efforts toward the achievement of company purpose. This same feedback provides information for changes in structure when needed to improve performance.

BENEFITS FOR MANAGEMENT

When we use systems science and the VSM to structure and manage our company:

- We learn, adapt to change, and evolve so that we are able to maintain continuing success over time, under changing circumstances
- We are neither centralized nor decentralized; we are both at the same time
- Control is not imposed from a higher level. Control is designed into the structure so that each unit can be self-controlling
- Feedback from the work itself enables self-control
- Measures of progress toward objectives provide on-going guidance toward desired objectives
- Since measures reduce complexity they are developed with great care not to lose information that matters
- Information is available where and when needed for decisions and actions
- Each level does its own planning. There need be no passing of planning documents between levels
- Budgets can be prepared in days or hours, not months
- Recognizing and coping with error is part of learning and continuous improvement
- Each unit succeeds by measures of success developed in that unit in consideration of the purpose of that unit
- Unit successes contribute to the achievement of company goals

System science and system thinking give us a new way to see and understand our company. This new understanding at all levels provides prompt awareness of threats and opportunities, and new ways to manage for improving performance.

The times we work in are filled with change signals. Technology change signals new threats and new ways for creating value. Terrorism signals new threats. Ballooning world populations with many uneducated, unemployed, and poor signal both threats and opportunities. Changes in our ecosphere signal threats, and offer opportunities. How well do prevailing business structures and business practices detect these and other signals, and take actions needed for survival and long-term success?

New successes will be different from the old. Environmental changes—technical, commercial, economic, political, social, and ecological—signal new needs, new opportunities, new threats. New and different information and new inventions will be needed. Structuring the company using system science principles increases awareness of threats and opportunities, and improves the ability for quick response.

In the sciences, in society, in industry, in technology, in our understanding of nature; in all that we do or are aware of, complexity abounds; and grows explosively. How do we find the fundamental simplicities to guide us? Years ago a scientist and corporate executive commented to this author that civilization is a race between complexity and simplification. At that time, in the 1950s, the race seemed challenging, but manageable. But today that race has new dimensions not foreseen in the 1950s: (1) hugely expanding, and conflicting, human populations worldwide, (2) rapid expansion of industrial production to meet ballooning needs, (3) derivative of these first two, threatening changes in the ecosphere that is the home of all life, including ours, and (4) growing social instability. How do we structure and manage our business enterprise for success today and sustainable success through the years ahead?

System science and cybernetics give us a great simplifier for the complexities of management. That's the message of this book—simplifying the complexities of management at a new level of understanding; improving control; improving performance.

ORIGINS OF SYSTEM SCIENCE

System science and system theory developed from the work of pioneering scientists striving for a more complete understanding of the growing

complexities in the separate disciplines of science. When complexity grows beyond comprehension, and the new learning no longer fits prevailing conventions, there can suddenly appear new knowledge that simplifies all the complexity at a new level of understanding. System science and general system theory offer that new level of understanding for business management.

The work and writing of Ludwig von Bertalanffy, Robert Rosen, G. J. Klir, W. Ross Ashby, Norbert Wiener, and many others has advanced system science to the point of an established general system theory that we can now apply in many realms, including management. In his book, *General System Theory*, Bertalanffy states that “. . . systems theory is a broad view which far transcends technological problems and demands, a reorientation that has become necessary in science in general and in the gamut of disciplines from physics and biology to the behavioral and social sciences and to philosophy. It is operative, with varying degrees of success and exactitude, in various realms, and heralds a new world view of considerable impact [3].”

Those not interested in seeing and understanding their company in a new and different way might ignore system science, thinking, “that’s just a theory.” But a scientific theory is not something to be ignored. In all realms, science studies, analyzes, assembles data, reports findings, proposes hypotheses. Then, from all that’s known, comes theory. Scientific theory is the understanding that best fits all that’s known about that subject area. All the research, all the facts, all the studies, all the data support the theory. Denying theory is denying the existing knowledge on that subject. Instead of denying system theory, embrace it. Business people who learn about system theory and apply what they learn in structure and operations, will improve the capability and the performance of their organizations.

Stafford Beer’s viable system model (VSM), used with a knowledge of the system science and cybernetics embedded in the model offers a new understanding and a new way to structure and manage businesses and other organizations and institutions. But before we can use the model, we need an understanding of the science of systems.

WHAT IS A SYSTEM?

We use the word “system” every day, in ordinary conversation. A computer becomes a computer system; a furnace, a heating system. Manufacturing resource planning (MRP) is a software system, as is customer

relationship management (CRM). The software industry seems to have claimed the word “system” as a proprietary attribute of their products. To get a driver’s license we “follow the system.” Note how often we hear, or see, or use the word, “system.” Sometimes the meaning is clear, and specific; sometimes fuzzy. But always it is combining something with something in addition. That’s true in system science, too. But in system science we will be specific in how we define “system.” In system science, “system” is not the system of everyday conversation.

We can begin with two broad classifications of systems:

Deterministic
Probabilistic

Deterministic systems can be simple, or complex. See Figure 1.2. In a deterministic system we know all the parts, what they do, and their relationships with other parts. When the system fails to work properly, we know how to find and fix the problem. To improve the system we know where improvement would be beneficial, and we know how to go about designing an improved system. A home heating system is a simple, deterministic system. The thermostat is the controller, automatically controlling room temperature to the setting on the thermostat. We used to set the thermostat manually. Now, with digital technology, we program the thermostat for a week for desired temperatures each hour, each day, for both heating and cooling. We can even program remotely.

An automobile is a complex, deterministic system, with the driver-controller and many built-in controllers all activated when the driver drives the car. We know all the parts of the system, what they do, and how they do it. A fleet of cars (company cars, delivery cars) is a more complex system. Each car is a deterministic system, but the fleet management part of the system, how all the elements will perform—cars, drivers, scheduling—is probabilistic.

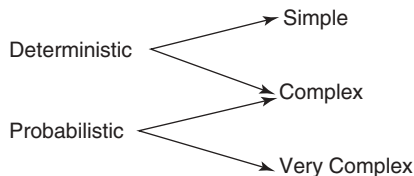


Figure 1.2 Kinds of systems