ENGINES OF PROSPERITY
TEMPLATES FOR THE INFORMATION AGE

GERARDO R UNGSON & JOHN D TRUDEL

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ENGINES OF PROSPERITY
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Imperial College Press
Dedication

To my brothers and sisters: Victoria (Titus), Trinidad Jr. (Doody), Renato (Nato), Esther (Loida), Thelma (Emy), and Rafael (Binky)

G.R.U.

To my wife, soul-mate, and friend, Pat

J.D.T.
Preface

Most knowledgeable, thoughtful people now concede that there has never been any time in history when the human race has faced so much change. It is, paradoxically, both the best and worst of times. Opportunity abounds, but the economic, societal, and technological foundations of the Machine Age are crumbling. Confounded by chaos and heavily pressured for results, most Western managers have no better ideas how to compete than to endlessly copy each other, cut costs, and buy up rivals.

Not every firm is declining, of course. The situation is much like the national “quality crisis” in the early 1980s, a time when the exceptional U.S. firms were still the best in the world, but the average company was markedly inferior to its global competitors. (In both eras, good profits were often being delivered by increasingly uncompetitive firms.) The U.S. still excels at innovation, so many small U.S. firms do well — until they get large enough to show up on the radar screens and are savaged by global predators.

“A Nation at Risk” noted that if a foreign government had imposed our present educational system, we would regard it as an act of war. Fully 67% of the population say the American Dream is getting further out of reach. Globalization impacts national politics, sometimes in ugly ways. Foreign lobbying and political “donations” make the very issue which founded our nation — taxation without representation — once again timely.

Our society is having trouble focusing on, much less coming to grips with, these issues, for two basic reasons. The first is that in an age of information overload, reality can be made elusive. Alvin Toffler, the futurist, now says, “The sophistication of deception is increasing faster than the technology for verification. That means the end of truth.”
Many politicians, executives, corporations, and governments are exceptionally effective at misdirection and covering up unpleasant truths. It is hard to fix problems when much of what we believe to be so, is not.

Exacerbating this fog of confusion is the fact that one of the strongest forces in today’s society is denial. Much as in Rome during its decline, there is a tendency to use events to divert attention from troublesome systematic issues. In an age where most experts agree that the crucial international conflicts are economic, the British note that, “America is addicted to wars of distraction.” The War on Poverty and The Cold War are now irrelevant, persistent involvement in squalid third world conflicts wastes valuable resources and accomplishes little or nothing, and the War on Drugs has been extremely expensive and largely counterproductive, if not disastrous.

Clearly, the world is going though a major transition. When this transformation is completed, it will look very different. This upheaval will change everything, but the focus and maximum stress point is economic. In the future, world power and national prosperity will increasingly depend on the ability to compete in high value added product-market areas. The winners will develop new societal models for business, economics, government, and education.

Most important is that the new basis of competition is knowledge. The strategic resource today is empowered minds and unique knowledge. Where nations once fought wars over trade routes and natural resources, future conflicts will be over the ability to produce and market uniquely valuable products. As never before — and in direct conflict with Machine Age models — human spirit, talent, education, and intellectual property protection will become central to prosperity. It is a time for renewed character, leadership, and spirituality, but these are scarce.

Those societies that can effectively apply knowledge for economic gain will prosper. Those that cling to Machine Age models and economics will fall to third world living standards. This trend is already well established, and a common strategy in smart nations is to seize the high ground, the “sunrise industries.” (It is well accepted that the
smartest people in Japan work in MITI. Few, however patriotic, accuse
the U.S. government of being smart.

A small number of key industries will constitute worldwide "drivers" of growth that allow high value added and strong barriers. Economic, technological, and social developments will change competitive patterns, innovations will upset current growth trajectories, and smart multinational and transnational firms can reinvent themselves. The dynamics that undergird growth, development and renewal are rooted in non-linear cost and demand patterns characterized by ever increasing returns and escalating growth. We call these the "Engines of Prosperity."

Competing in this new environment requires a different managerial mindset, not one that is fostered by mainstream theories. Unfortunately, such behavioral change is difficult, and very much so for those who thrived under previous models. Old Think beliefs and behaviors persist, and, in fact, still dominate. One common form of insanity is to keep repeating the same actions and hoping for different results. Detroit did this with large cars, Tektronix with analog oscilloscopes, Apollo with workstations, DEC with mini-computers, IBM with mainframes, and Washington DC and Eastern Europe with Megastate bureaucracy.

We do not offer "sound bite" or prescriptive solutions. Because our arguments may appear unfamiliar or complex at times, we present them in their entirety for perspective:

- Despite the imperatives to change, deep-seated conventional beliefs and assumptions are difficult to change. Managers use defensive behaviors — denial, inertia, scapegoating, and calibration to justify old thinking. Learning to succeed in the new environment calls for effective unlearning of old ways (Chapter 1).

- Business has entered a new age: a knowledge-based society. Machine Age templates are poorly suited to managing new knowledge. World power and national prosperity will now be determined by the ability to compete in global markets of the Information Age. This dooms the Megastate and traditional hierarchical silos. Leaders in winning
firms create new product-market spaces profitably under non-linear, chaotic situations (Chapter 2).

• One of the drivers of the Information Age is globalization. This refers to the deepening linkages and interconnectedness of economic activities on a worldwide scale. A new global mindset is needed, along with discarding old notions that foreign goods should be disparaged. Ethnocentric attitudes are ill-fated when applied to understanding, competing, or cooperating with new contenders (Chapter 3).

• The drivers of the new technology have shifted from government "mega-programs" to the commercial sector. Today’s PCs exceed the power of Cold war supercomputers. Cryptographic technology is migrating to mass market PC applications. The Internet, developed to allow survivability during a nuclear attack, now offers hope for truly global commerce. (Chapter 4).

• Traditional and conventional approaches to strategic management, rooted in classical economics and strategy, are inadequate for the new age. Newtonian thinking, functionalism, and equilibrium are increasingly replaced by quantum thinking, holism, and ordered chaos. These provide the foundations for the Engines of Prosperity (Chapter 5).

• The new Information Age is impelled by industrial transformations brought about by the capability of digital technology. The roots of this industrial upheaval are grounded in five basic factors we call the engines: learning curves, demand amplification, technology generators, bandwagon and "lock-ins" and competitive imitation, innovation/disruption, and the unbundling of the firm’s value chain (Chapter 6).

• In a world soon dominated by ordered chaos, the emerging management edict will be governed by paradox — when to build, when to destroy, when to harvest, and when to grow. As the yin-yang of managerial action, New Think templates force us to confront the open-ended nature of the future of any business (Chapter 7).

• Managers trained in action, reductionistic thinking, and narrow focus become very frustrated when trying to learn productive Information
Age behavior. The most dangerous time is when managers schooled in old think make gestures at change. Acts like ordered downsizing don’t help. Reflection, practice and learning lead to deep conviction that makes change possible (Chapter 8).

- Today’s contemporary business calls for a different type of leader — one who demands an unwavering commitment to change, learning, and unlearning. We should discard the “coyote-type” training in favor of that of the roadrunner. The strengths are different, and so are the mental processes and motivations (Chapter 9).

- Institutions matter. New institutions will develop to accommodate the requirements of an environment characterized by the Engines of Prosperity. Whether Americans use institutions to their advantage, or choose to ignore them, constitutes the final challenge (Chapter 10).

While our book is not oriented toward offering simple solutions, some broad guidelines might illustrate the spirit of our position:

- Simplicity, while intellectually appealing, may not work. Corporate America shows its penchant for the quick fix, sound bite solutions, and the next cute idea. Well, the world is complex, and, while others, and we, can cast it simplistically, there is no substitute for the hard work of understanding this new environment.

- Complexity matters. Complexity should not be confused with obtuseness. Chaos theory suggests that relatively “simple” patterns can be revealed in messy, chaotic settings. This is what we try to do with the “engines.”

- Think organically. We have been socialized to analyze and segregate wholes. Yet, corporations are part of a larger world. Firms that have continuously outsourced are beginning to realize that something intangible gets lost in the process. We need to revert back to holistic thinking. Otherwise, one will not understand the “engines.”

- Reengineering management is not the answer. It started with a simple idea — let’s forget functional silos and concentrate on process, like selling. As a result, the reengineering industry was born, perhaps
creating more harm (about 40 million jobs have disappeared since 1993) than good. Reengineering does not work for non-linear or chaotic processes. It is a powerful medicine, but its limits and side-effects warrant more careful examination.

- **Recognize uniqueness.** There are severe limits to competitive imitation. Even Microsoft might not be able to do in 1998 what it had successfully done ten years ago. "Engines" illustrate why success in one company is not applicable to another.

- **Institutions matter.** Forget the criticisms levied at Asian cultures and work habits. Each country brings its own competencies to the competitive arena. We have our own in the United States. We should work harder at nourishing them. The "engines" force us to recognize our underlying strengths and weaknesses.

*Engines of Prosperity* is a joint product of an academician and a business practitioner, both of whom share a deep concern about the inadequacy of current models and practices. While we interviewed a number of managers from different knowledge-based industries, our book is not a product of "joint-research" in the traditional sense of hypothesis testing. Instead, we approached this book as a platform of shared ideas, borne out of our individual research and experience. Finally, while we draw heavily from chaos and complexity theories, our intention was not to write another book on this subject (there are a number of influential books that are referenced in our work). Rather, we have used such theories to explain the underpinnings of Information Age thinking that might help both business practitioners and academicians to better understand this new environment from the standpoint of their real-world experiences.

Gerardo R. Ungson
John D. Trudel

Portland, Oregon
1998
Acknowledgements

This book is a product of many studies, interviews, and consultations that spanned close to five years of intense collaboration. We met in a symposium on America’s Industrial Policy, sponsored by Intel Corporation, in June 1992. While we spoke on different approaches to industrial policy, it was evident that we both shared some deep misgivings about what we, in this book, call Old Think. This led to meetings of auspicious beginnings, where John would attempt to frame patterns from his myriad business experiences, while Gerardo (“Buddy”) would take John’s numerous episodes and attempt to place them into theoretical categories.

In the process, we became indebted to many people who would read our work, present criticisms, or simply provide encouragement to go on. Buddy’s interest in high technology began in 1982, when he was a visiting professor at the Haas School of Business, University of California-Berkeley. Corporate officers from Serafini Associates facilitated his field interviews with a number of high technology firms in the Silicon Valley. In Berkeley, he also met Professors John Zysman and Michael Borrus from the Berkeley Roundtable on the International Economy. From them, he developed a better appreciation of the institutional context of international high technology competition. He benefited from reading their papers and publications — their continuing influence is clearly evident in this book. We would also like to thank our students, Tak Yu Tong, Yssai Boussi, Ambrose Than and Henny Muliany, all from the Lundquist College of Business, for their assistance in our early research work.

Ideas for this book came about from people who devoted their valuable time for interviews. Companies included SSI, SEEQ, Intel, S-MOS, Hewlett Packard, LSI Logic, Signetics, Daisy Systems, Anthem
Electronics, Electric Scientific Instruments, Prometrix, Exel Microelectronics, Integrated office Systems, Fujitsu, Ashton Tate, Olivetti, and Philips Gloeilampenfabrieken. In extended trips to Korea, Samsung, Hyundai, LG Group, and Daewoo also provided valuable information on how their international strategies are shaped.

Of course, John has deep roots in knowledge-based industries, having started in Collins Radio Company, worked for several firms in the defense sector, and formed several new ventures. His last corporate tenure was a lengthy career with Tektronix, culminating in the position of Business Development Manager for their entire corporate Research and Development Laboratory, at the time one of the best in the world. His management consulting practice, under the aegis of The Trudel Group which he founded, brings him in daily contact with technologists and executives of first rate knowledge-based companies.

Trudel's clients over the past decade have included Bellcore, Cray, Exabyte, Intel, Lexmark, National Semiconductor, Sun, Illustra, Tektronix, and hundreds of others. All have added useful knowledge, even those (from large, established CAE-Link to tiny, stillborn Ty-Clamp) that did not survive. We offer special thanks to Will Swope and Pat Gelsinger of Intel, tough clients who provided high-bandwidth, mind-stretching interactions in the early years of The Trudel Group.

In addition Mr. Trudel serves as a National Examiner (one of five) for Product Development Management Association's "Outstanding Corporate Innovator" Award, which gives him the opportunity for detailed study of best practices across many industries. We are indebted both to the winners of this award — from John Fluke and Hewlett Packard and Kodak to 3Com and Herman Miller and others — and to the dozens of applicants who shared their insights under non-disclosure agreement. Finally, as a columnist for Electronic Design and Upside, and a crusader for preservation of patent rights, he has collected a network of thousands of fans, from all over the country and the world. All these experiences and contacts helped shape this book.

Early drafts were critiqued by Harry Lonsdale, who implored us to get to the point, while keeping the writing simple. Various portions of the draft were read by a number of Ph.D. students at the University of
Oregon, most notably Paul Fouts, who studied technology trajectories for his dissertation. Jim Goes and Seung Ho Park, now established professors in their own right, also provided numerous suggestions. Nic van Dijk from IME Consultants of the Netherlands and Alan Meyer from the Lundquist College of Business provided sharp critiques on the limitations of strategy in examining knowledge-based industries. Dennis Finnigan, consultant emeritus, helped us polish the book for CEOs and top management, while Tom Dagostino and Bill Sessa helped us make sure it addressed the issues of high tech middle managers.

We are especially indebted to Pat Trudel, who lovingly read every draft, making sure the book was upbeat for, relevant to, and readable by “normal people.” Mary Mannin Morrissey helped provide spiritual inspiration and context, as well as the viewpoint of a mass-market author.

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Gerardo “Buddy” Ungson
John D. Trudel
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