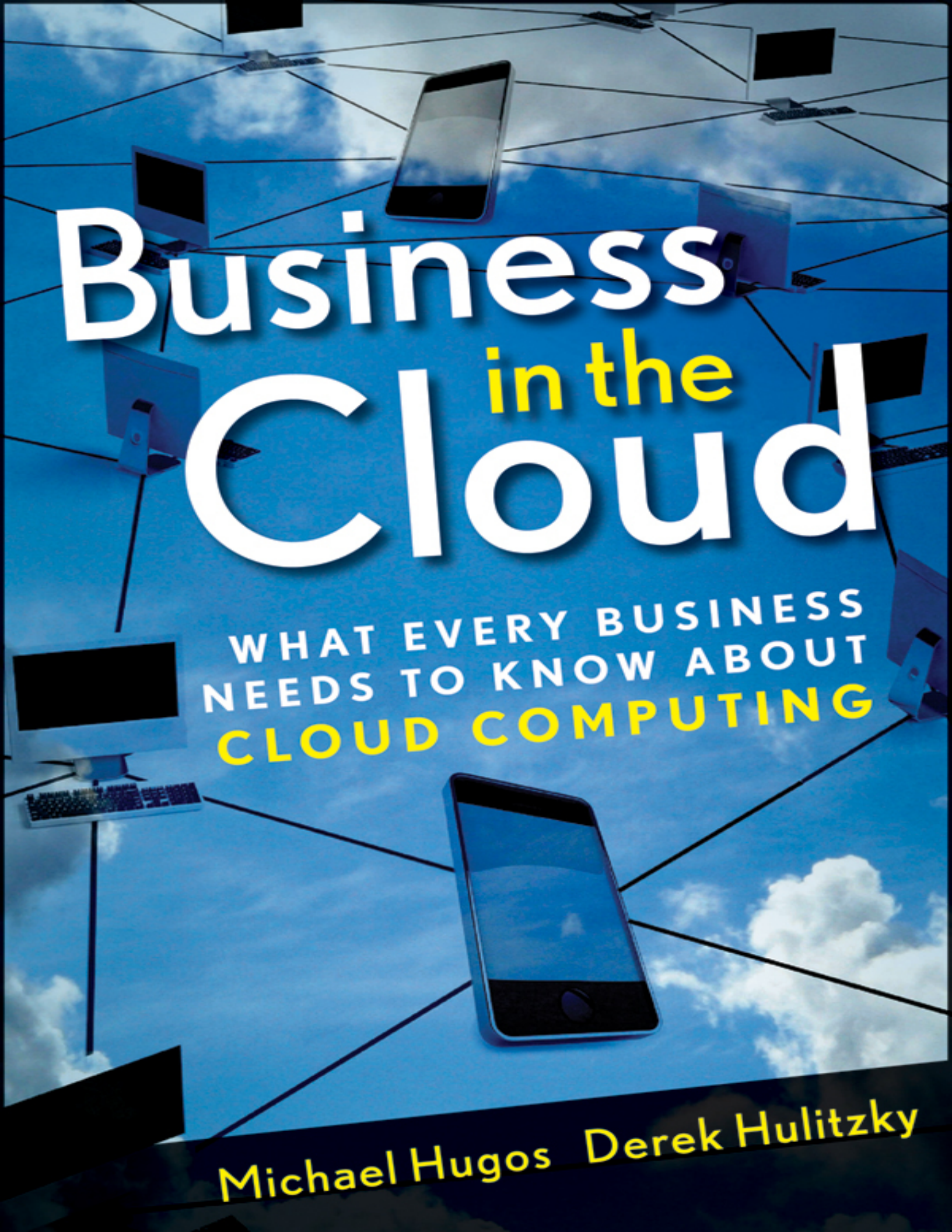
Business in the Cloud
WHAT EVERY BUSINESS NEEDS TO KNOW ABOUT CLOUD COMPUTING
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*Michael Hugos: To my wife Venetia Stifler*
*Derek Hulitzky: To my parents and my children*

# Contents

# *Praise for Business in the Cloud: What Every Business Needs to Know About Cloud Computing*

In *Business in the Cloud*, Michael Hugos and Derek Hulitzky explain the many changes that cloud computing is bringing to technology, organizations, and industry ecosystems. Their book is a tutorial written in simple language to help readers understand the potential of the cloud to transform every industry in the years ahead. *Business in the Cloud* is highly recommended for anyone who wants to take advantage of the many opportunities being brought by cloud computing to business and society.

*—Irving Wladawsky-Berger*

*Chairman Emeritus, IBM Academy of Technology;*

*Strategic Advisor, Citigroup; Visiting Professor, MIT;*

*Visiting Professor, Imperial College*

The Weather Channel is making cloud computing a cornerstone in its architecture to support severe weather events like hurricanes and nor'easter blizzards. *Business in the Cloud* is a concise but informative insight into cloud computing, is a great tutorial to quickly educate yourself (without vendor biases) on the options and capabilities of cloud computing, and should be read by all business and IT leaders responsible for their organization's infrastructure.”

*—Dan Agronow*

*Chief Technology Officer,*

*The Weather Channel Interactive, Inc. (TWCi)*

In today's complex business environment, flexibility and efficiency are the difference between the companies that flourish and those that perish. *Business in the Cloud* is an excellent resource to help business leaders think through the practical implications of how to best leverage the technical infrastructure required to thrive in the twenty-first century.

*—Larry Bonfante*

*Chief Information Officer,*

*United States Tennis Association;*

*Founder, CIO Bench Coach, LLC*

When a new technology platform emerges, business leaders need to understand its implications for their companies. Michael Hugos and Derek Hulitzky shift the cloud computing conversation from speeds and feeds to business opportunities and benefits. If you lead an organization that integrates business activities with technology—and today, that means everyone—this is a must-read book.

*—Bernard Golden*

*Chief Executive Officer, HyperStratus*

Whether you're currently operating in the cloud, considering moving to the cloud, or just trying to understand the meaning of cloud computing, *Business in the Cloud* explains the potential of this new model for success. A comprehensive work covering all facets to consider for the delivery of business solutions, opportunities, and customer satisfaction, *Business in the Cloud* is a must-read for all business executives tasked with leading in today's technology-mandated world.”

*—Michael J. Twohig*

*Executive Vice President and Chief Administration Officer,*
*Clean Harbors Environmental Services, Inc.*

Michael Hugos and Derek Hulitzky have finally given us what is missing in the swirl of all the “cloud” hype—a context. In a highly accessible manner they successfully set the stage to enable businesses to strategize and maximize the true value of cloud computing. From organizational implications, to the raw economics, to the technology itself, they provide a needed step forward and have advanced the field.

*—Dr. Howard A. Rubin*
*Chief Executive Officer and Founder,*
*www.rubinworldwide.com*

*Business in the Cloud* lays a solid foundation of the technical components that enable business growth and innovation potential in the cloud. It offers a compelling case as to why the cloud should be a part of every IT leader's strategic plan now. This book is a must-read for every business executive looking to understand how it is vital that technology align with the enterprise in our new Internet age.

*—Jessica Carroll*
*Managing Director, Information Technologies,*
*United States Golf Association*

*Business in the Cloud* delivers great insight into the genesis of cloud computing—and its business application—from two guys with their feet planted firmly on the ground.”

*—Enzo Micali*
*Executive Vice President, Technology & Operations/*
*Chief Information Officer, Harris Interactive*

At the end of the day, the cloud computing ecosystem advances the capability for systems to work for people

—rather than people working for systems. And as a technology, it is equal to—or greater than—the invention of the local area network (LAN). *Business in the Cloud* does a great job of translating the real-life thinking and effort required to adopt cloud computing—and captures the profound change potential across technology infrastructure, applications, and IT professionals.

*—David Giambruno*

*Senior Vice President and Chief Information Officer, Revlon*

*2009 CTO of the Year—InfoWorld*

Cloud computing may likely be the next foregone conclusion, driven primarily by two key forces: (1) a flexible pay-as-you-need operational cost model and (2) the growth of software-as-a-service (SaaS) solutions and application offerings. If needed improvements in security and performance monitoring come as promised, it will sway CIOs to let go of their data centers and shift to the cloud paradigm. *Business in the Cloud* provides both business leaders and IT executives with everything they need to make an informed decision on the shift to cloud computing.

*—Gregory S. Smith*

*Chief Information Officer and author of Straight to the Top: Becoming a World-Class CIO and How to Protect Your Children on the Internet: A Road Map for Parents and Teachers*

# *Preface*

The level of debate and confusion in many areas of our lives makes many things hard to see, yet also makes one thing perfectly clear. The intensity of debate and confusion are proof in themselves that big changes are under way. We have arrived at what has been variously called a “tipping point” or an “inflection point” or a “perfect storm.”

Tried-and-true formulas and business models from the last 50 years no longer deliver the results they once did, and it is still far too soon to see the exact nature of the new formulas and business models that will replace them. Yet, again, this makes one thing quite clear. For the foreseeable future, organizations need to learn to thrive in environments of continuous change. Change itself will be a constant fact of our lives.

Therefore, if change is the one predictable thing in a world where so much else is so unpredictable, companies optimized to deal with change will certainly be more successful than companies not optimized to deal with change. That is why successful response to change is the new business imperative, and the practices and technologies that bring it about are the basis for sustainable prosperity in this century.

Cloud computing arises from the combination of technologies that have been developing over the last several decades. And the ongoing rapid evolution of cloud technology is driven by the pressing needs of organizations to cope with change in their markets and change in their financial situations. In a time where information and communication technology is now mission critical to every facet of business operations and where safe bets are hard to find, it is safer to explore new

markets and new ventures on a pay-as-you-go basis instead of investing a large sum of money up front and hoping the investment pays off.

Cloud computing makes this possible. It can be quickly rolled out; it can be quickly scaled up to handle increased volumes if business takes off; and it can be just as quickly discontinued or scaled back to cut costs if business does not take off. This variable cost operating model allows companies to replace capital expenses with operating expenses, and that is critical to any organization operating in high-change, unpredictable environments. Cloud computing enables companies to best align operating expenses with revenue and protect their cash flow and operating profits.

In addition to its financial impact, cloud computing also affects how companies structure their organizations, how they manage and coordinate their daily operations, and how they engage and motivate their people and their business partners. In this book we explore each of these areas and show how they interact with each other. To further illustrate key points we draw on our own personal experience in business and technology and we use case studies and insights from industry thought leaders and practitioners.

This book is divided into three parts. The first two chapters provide a basis for understanding and discussing the changes we are going through. They discuss new organization structures companies are adopting and new economic realities that companies need to address. The next six chapters define cloud technology and describe strategies, tactics, and lessons learned that companies can use to adopt cloud computing and to put it to effective and profitable use. The last two chapters expand upon the information in the previous chapters and offer insights into successful

business practices and operating models as well as thoughts about the global, cultural, and societal impact of cloud computing.

We have worked hard to make this book accessible to a broad audience of readers from business, technical, and academic backgrounds. As best we could, we balanced the need for a comprehensive framework to understand cloud computing and its business impact with the need for a simple and direct discussion of the key points without delving so deeply into specific details that we lose the interest of a large number of our readers. Our intention is to give you a body of knowledge and insights that enables you to engage in a thoughtful and spirited conversation with others about how to navigate the profound changes that are reshaping the way we use technology and the way we conduct business.

We would love to hear from you regarding questions, comments, or issues you have about the book and the ideas we put forth. Please feel free to contact us; our email addresses are shown below.

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# *Acknowledgments*

We want to thank all the people who helped us with our research and shared their insights and opinions about cloud computing and its impact on business. Some of these people are named in the text of the book and others are not, yet all of them have contributed to our thinking and the ideas we present here.

In alphabetical order, these people (and their companies when relevant) are:

Yuri Aguiar – Ogilvy Worldwide
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Russ Young – LTech
Jeff Kaplan – THINKstrategies
Ken Male – TheInfoPro

# *Chapter 1*

# *The Evolution and Future of Corporate Business Structures*

In 1991, Ronald Coase won the Nobel Prize in economics after a lifetime of influence that began with the 1937 publication of his renowned paper entitled “The Nature of the Firm.” In this paper, Coase asked (and then answered) the lofty question of why corporations form in a free market economy. Coase's point was simple: If there really are free and efficient markets, then a corporation can get any service it wants from a free market of independent contractors. Despite this free market, however, he cited the range of additional costs related to searching for, contracting, coordinating, and eventually paying for these services. And he showed how these costs ultimately made it more expensive to secure services in the open market versus bringing them in-house.

Coase went on to say you could measure the size of a firm by the number of contractual relations it creates, and by the number managed internally versus externally. As a result of the added expense related to external relationships, he showed how companies could then bring more and more of their contractual relationships inside in order to gain efficiencies and lower their transaction costs. This approach is what drove the creation of big, vertically integrated corporations in the twentieth century. That was the world according to Coase in 1937.

Today, a company is still motivated to bring more and more of its transactions in-house, but only until the cost savings gained are offset by other costs. Those other costs come in the form of management information overload and the resulting inefficiencies in decision making and allocation of assets.

Many companies are now bumping up against those limits. In particular, with the spread of the wireless Internet, mobile computing and business application services delivered over the Internet, it is becoming easier and less expensive to manage external contractual relationships and transactions. Instead of being optimized for internally focused inside-out communications, companies are being transformed and reoptimized for outside-in communications.

The classic hierarchical organization structure of twentieth century companies is being redesigned and this gives rise to the network organization structure of the virtual enterprise. In the virtual enterprise the activities performed internally are those that directly add value to the company's products and which its customers pay it for doing.

Irving Wladawsky-Berger is a former co-chair of the President's Information Technology Advisory Committee under Presidents Clinton and Bush, a visiting lecturer at MIT's Sloan School of Management, a strategic advisor to Fortune 100 companies, and a former IBM senior executive. He describes today's environment like this:

> Since we can now use technology, the Internet and open standards to begin to automate, standardize and integrate business processes, those transaction costs described by Ronald Coase are dropping precipitously. Consequently, the whole nature of the firm, and what it means to run an efficient business, is going through very extensive changes. These are not easy changes.

> Not only is there a great deal of innovation required to automate and integrate business processes, but perhaps more important, there are even greater changes in culture required to transform Industrial Age business models to something more appropriate to our Internet era.[1]

By having common standards for common transactions like purchase orders, order processing, billing, accounts payable, and so on, firms gain tremendous flexibility and they can change and adapt easily as situations evolve. Weaving technology into these transactions, and combining them with common service delivery standards, improves a company's ability to deal with a wider ecosystem of service providers. This enables companies to shift their culture and their processes so they have access to the talent and services as the need arises.

This redefines the basic culture of the firm. This notion of learning how to collaborate has become a key driver of wealth creation. Firms learn to live in their marketplace or they lose touch with their customers and cannot follow them as needs and desires change. With industrial technology the object is efficiency and low cost, with service technology the object is customer satisfaction in whatever form that may take for the markets being served.

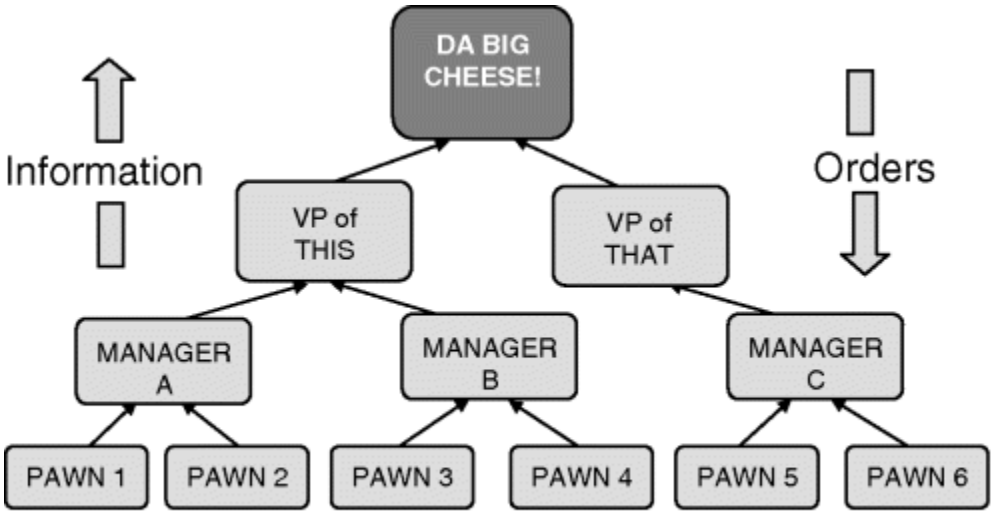
# Example of a New Corporate Organization Structure

The days of the traditional pyramid-shaped corporate hierarchy as a viable business model are coming to an end. The past 20 years have produced some winners and some losers, and some of the biggest losers are companies that built themselves into huge

conglomerates that were supposed to be too big to fail. Instead they are proving the truth of the saying, “The bigger they are, the harder they fall.”

It's not that companies can't be big and grow revenue to many billions of dollars. It's that they have to swear off that fatal tendency to organize themselves as hierarchical pyramids where most people are powerless drones who just follow orders while the important decisions are made by a small group of powerful executives at the top of the pyramid. Given the pace of change, companies need something more agile and responsive. As shown in Figure 1.1, an inevitable consequence of organizations using the pyramid-shaped hierarchy is that there is a decision-making bottleneck at the top of the organization. No small group of executives, regardless of their smarts, hard work, or sophisticated computer systems, can make all those decisions in a timely or competent manner.

**Figure 1.1** Traditional Organization Structure




Centrally controlled hierarchies move SLOWLY because only a few people know what the strategy is and everybody else waits for permission to act.

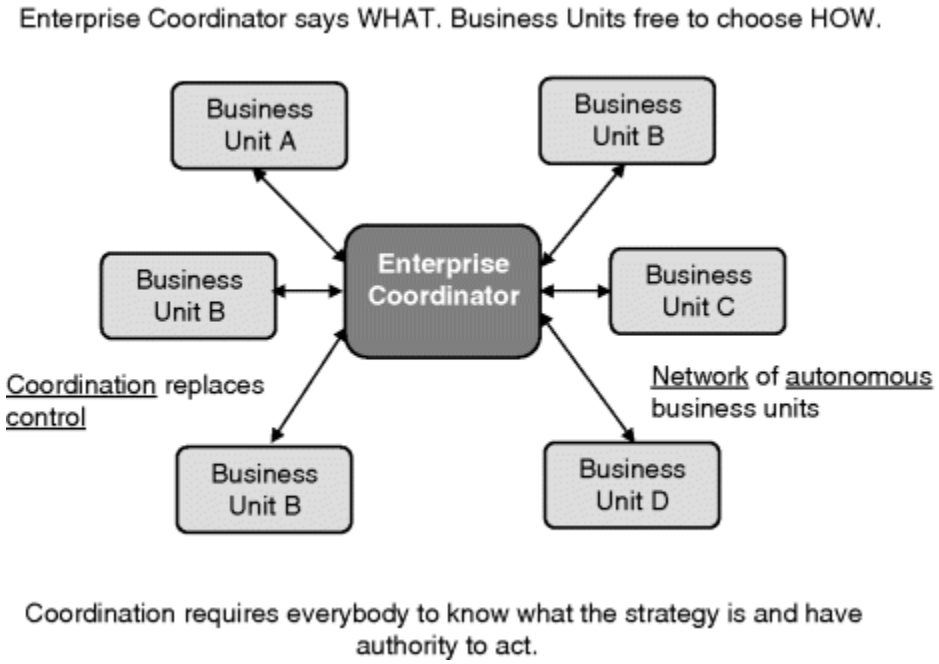
People at the top of corporate hierarchies are overwhelmed by the sheer volume of decisions they have to make; they are too far away from the scene of the

action to really understand what's happening; and by the time decisions are made the actions are usually too little and too late. Companies suffer the consequences of this performance by staggering from one bad decision to another like punch-drunk boxers who can't understand what's happening and can't understand why they keep getting hit.

Cisco Systems got hit hard in the collapse of the dot-com bubble in 2002 when their stock went from around $77 a share to around $11. But they took that opportunity to learn some lessons that many other companies are only now starting to consider. Because human nature is what it is, it often takes a “smack-up-side-of-the-head” event to send a wake-up call and get us to consider new ideas and try out new ways of doing things.

The good news is that we really can learn from mistakes when we decide to do so. Cisco used to be a traditional pyramid-shaped corporate hierarchy where all the important decisions were made by a small group of senior executives at the top of the organization chart. Then they fell on hard times. What has emerged in the past several years is an agile enterprise with a network organization structure (see Figure 1.2) where decision making is decentralized out to some 500 managers and the whole operation is powered by Internet-based collaborative technologies like blogs and wikis and social media tools, some of which they have built themselves.

**Figure 1.2** New Organization Structure




Now instead of a small group of executives telling everybody else what to do, people have authority to figure out for themselves what to do. People are motivated to coordinate, cooperate, and collaborate with each other by a financial incentive system that rewards them for their common successes instead of rewarding each manager for their individual successes.

Cisco's CEO John Chambers makes the case that Cisco's new business model is “the best possible model for how a large, global business can operate: as a distributed idea engine where leadership emerges organically, unfettered by central command.”[2] Cisco is also sharing what they've learned with big customers like AT&T, General Electric, and Procter & Gamble.

Is there a winning business model here that other companies could put to use? What kind of IT systems architecture would best support this type of business model?

# Model of a Responsive Organization

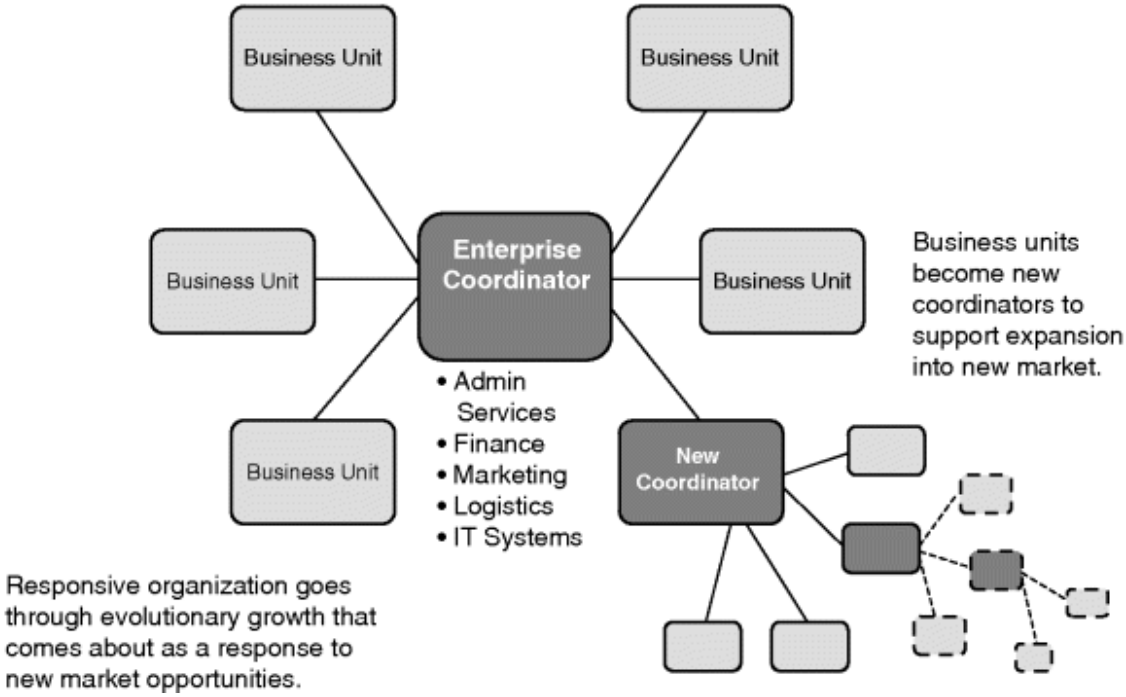
The business model used by Cisco and other responsive organizations is to give their business units a high degree of autonomy in how they reach their business goals and encourage them to constantly explore their markets and look for new opportunities. The business units in these companies are organized as networks instead of hierarchies simply because network organization structures allow for greater business unit autonomy.

These companies support their network organization structure of autonomous business units by using a shared services model. In this model there is a central enterprise coordination unit that sets goals and overall strategy and provides the other business units with administrative, finance, and systems support services. This frees the business units from taking on those tasks and those expenses so they can focus on the activities that generate revenue. This also enables the company to take advantage of economies of scale in delivering these support services.[3]

As they grow, these companies keep their organizations from evolving into rigid hierarchies by following a practice of forming new business units to pursue new products and markets. Instead of letting one original business unit get larger and larger as it grows its business and enters new markets, that original business unit takes on the role of the enterprise coordinator for a host of new business units. And these new units handle the growth of existing businesses and the expansion into new markets. This is illustrated in Figure 1.3.

**Figure 1.3** Structure of Agile and Responsive Organization

Each business unit has its own sales force and operations capability to do work. Business units get all other support services from enterprise coordination hub.




The evolution of corporate organization structures like this is driven by the convergence of economic necessities with technological capabilities. The need to be responsive to evolving customer needs and desires creates networks where decision making is pushed out to operating units closest to the scene of the action. And these network operating structures are supported by a mix of telecommunication and computing technologies that enable services to be delivered anywhere at any time over the Internet.

This mix of technologies and services is now known as “the cloud” or as “cloud computing.” The industry research firm International Data Corporation (IDC) defines cloud computing as “Consumer and business products, services and solutions delivered and consumed in real time over the Internet.”[4]

In the words of an article entitled “The Long Nimbus” published by the *Economist* magazine about the impact

of cloud computing on company organization structures, “Businesses are becoming more like the technology itself: more adaptable, more interwoven and more specialized. These developments may not be new, but cloud computing will speed them up.”[5]

These trends combine to produce companies and operating procedures that are much more fluid and flexible than what came before. Instead of procedures moving in a predictable straight-line fashion from start to finish (as in linear assembly lines), business processes now move in patterns that are circular and iterative and constantly adjusting to meet changing circumstances. These new processes are not industrial in nature; they are cybernetic in nature.

# A Cybernetic Economy

Jeremy Rifkin is a senior lecturer at the Wharton School's Executive Education Program and has spent 10 years as an advisor to the European Union. He is president of the Foundation on Economic Trends and author of several bestselling books on the impact of scientific and technological changes on the economy, the workforce, and the environment. He is also the principal architect of the European Union's “Third Industrial Revolution” economic sustainability plan, which addresses the triple challenges of the global economic crisis, energy security, and climate change. His most recent book is *The Empathic Civilization*.[6]

In this book he states that the Internet and mobile computing and digital media are giving rise to what he calls the third industrial revolution and business models that are “cybernetic, not linear.” Instead of the linear, start and stop assembly line model of the twentieth

century's second industrial revolution, business is now about access to services instead of ownership of products. Business is no longer about transactions that record one-time purchases but is instead about "an ongoing commercial relationship between parties over time."[7]

Instead of purchasing music CDs, customers now buy membership in organizations that provide them with access to huge libraries of music, which they can access for their personal use. Instead of buying a car, many people are turning to membership in companies like Zipcar and iGo that provide them with the use of a car when they need one. Successful companies increasingly focus on wrapping their commodity products in blankets of value-added services that are constantly tailored to meet evolving needs and desires of specific customer segments.

Even for the most basic products, the shift toward a service orientation is evident. Take commodity products like floor wax and mops and consider this question: Do customers want floor wax and mops or do they want shiny floors? In most cases customers want shiny floors, not wax and mops. The profit opportunities and areas for business growth lie in innovative and responsive services that a company can wrap around its otherwise commodity products.

Those companies that consistently offer customers the right blend of products and services can consistently earn profits that are two to four percent higher (and sometimes more) than industry averages. This service-based additional profit can be thought of as the "agility dividend."[8] And this agility dividend is perhaps the most promising and sustainable source of profits for companies in our real-time global economy where products by themselves are so quickly commoditized.