

**THE DIGITAL ADVANTAGE: HOW
NATIONS WIN AND LOSE THE
SILICON SWEEPSTAKES**

Table of Contents

Preface

Chapter One The Law of Unintended Results

How can the United States demonstrate global best practices in some information and communications technology markets, such as software and computing, but woefully lag in others, such as in wireless and broadband services?

If the information revolution was supposed to “change everything” how did over on trillion dollars in investment largely evaporate in three years?

How can incumbent telephone companies successfully argue the need for governments to create incentives for investment in next generation networks while at the same time claiming the existence of robust competition eliminates or reduces the need for any other sort of government involvement?

Why have nations failed to bridge the Digital Divide despite having created subsidy mechanisms that invest billions annually in never achieved solutions?

If the ICE marketplace has become so robustly competitive where are the usual consumer benefits of lower prices, diverse choices, and customer service?

Why does it appear that incumbent ventures can belatedly embrace new technologies yet eventually extend their market power by acquiring or extinguishing most competitive threats through mergers and acquisitions?

Why have nations, including the United States, lost their comparative and competitive advantage in ICE products and services?

Will the Internet become a non-neutral collection of networks whose owners control access to content, applications and software?

The Indictment: A Legislative, Regulatory and Judicial Process that Disserves the Public

Rent Seeking Stakeholders Support FCC Assumptions

Rent Seeking Versus Profit Seeking

Chapter Two Feast and Famine in the ICE Age

Lost Opportunities--How the U.S. Lost ICE Leadership

Favorable Rules of the Game

Knowledge Intensity and Other Human Resources

The ICE Culture Wars Between Bellheads, Netheads and the Contentheads

Revenge of the Bellheads

A Clash of Cultures

The Bellhead Persona

The Nethead Persona

The Contenthead Persona

Netheads Dominated Early Internet Development, Because Bellheads Saw No Harm in It

Implications for Bellhead Domination of the Internet

They Just Cannot Seem to Get Along

Open Business Environment

Closed Business Environment for ICE Infrastructure Sectors

Favorable Collaboration with Universities

Chapter Three How the United States Lost its ICE Infrastructure Leadership

Supply Side Deception

Hired Gun Economists and Other Academics Create New Rules

Wall Street and the Power of the Purse

Satellite Case Study

How Capacity Swaps Generated Billions in Fake Revenues

Creative Interpretation of the Constitution and Lesser Laws

Confiscation of ILEC Property?

Schizophrenic Judicial Reliance on FCC Expertise

The Standard for Deference to Agency Expertise

Examples of Non-Deference to FCC Expertise

Examples of Deference to FCC Expertise

Federal Preemption Minimizes Innovation and Experimentation at the State Level

Chapter Four Case Studies in Checkbook Politics and the Politicization of ICE Policy Making in the United States

The Presumption of Robust Competition

With All This Competition Going On, Why Should the FCC Have to Create Incentives for Investment in Infrastructure?

How the FCC Emphasizes Politics, Doctrine and Expediency Over the Public Interest

Lies, Damn Lies and Statistics

The FCC's Broadband Market Penetration Statistics

The Scourge of Undisclosed Sponsored Research

Ala Carte Access to Cable Television Programming

Targeting Cable Television for Disproportionately More Regulation

Doubting the FCC's Commitment to Consumer Protection

Examples of Cable Television Regulation Not Matched for Other Sectors

Abrogation of Exclusive Service Contracts in MDUs

Leased Commercial Access Report and Order

Cable National Market Penetration Cap of 30%

Streamlining Video Franchising

Requiring an Alternative to Mandatory Cable Company Set Top Box Rentals

The FCC Does Not Apply Similar Subscriber Device Attachment Freedom in Other ICE Markets

Tilting the Competitive Playing Field—Robbing VoIP of Its Competitive Advantages

The Radio Spectrum Sweepstakes

Lax Merger and Acquisition Scrutiny

AT&T-BellSouth

Sale of Adelphia Assets

Chapter Five Best and Worse Practices in Promoting Access to Basic and Advanced Telecommunications Services

The Universal Service Mission in the United States

Four Types of Universal Service Promotions

Macro-Level Problems with the Current System

Marketplace Distortion

Poor Calibration of Benefits and Burdens

Inflexibility

Explicitness in the Burden Triggers Avoidance Strategies

USF Primarily Supports System Narrowband, Dial Up Service

Micro-Level Problems With the Current System

The Status Quo Serves the Interests of Several Powerful Constituencies

Accepts Costs With Few Auditing Safeguards

System Prone to Abuse

Emphasis on Service Subscriptions

Potential for Substantial Future Deficits in USF Funding

Best Practices in Promoting Access to Basic and Advanced Services

A Limited But Strategic Role for Government

Reshaping the Mission

Longer Term Challenges and Remedies

New Broadband Infrastructure Stimulus Plans

Conclusion

Chapter Six Understanding the Cause and Effect of the Dotcom Implosion

Technological Explanations for the Dotcom and Telecom Implosion

Moore's Law Applies to Both Information and Telecommunications Technologies

Technological Innovations Failed to Stimulate Sufficient Demand

Convergence Proved Difficult to Implement and Exploit

Most Technologies Still Have High Sunk Costs

Legacy Facility Retrofits Proved Costly and Difficult to Achieve

Marketplace Explanations

Flawed Assumptions

One Stop Shopping Proves Difficult to Implement and Sell

Absence of Compelling and Legal Content

Gold Rush Exuberance Drove a Quest For Shelf-Space Without Regard to Near Term Revenue Prospects

Low Interest Rates Triggered a Migration From Bonds to Stocks and Venture Financing; Vendors Willing to Finance Deals

Business Fundamentals Apply to ICE Industries

Executives Talked Up Stock Prices So That Options Paid Off Handsomely

Y2K Stimulated a Short Term Cash Infusion Possibly Misinterpreted as Evidence of an Ongoing Information Revolution

Legal and Regulatory Explanations

Implementation of Legislation Generated More Litigation Than Competition

The '96 Act Failed to Gauge Incumbent Carriers' Willingness to Forgo Existing Revenue Streams for New Market Opportunities

Appellate Courts Accorded the FCC Little Deference and Rejected "Rough Justice" Policies

Procompetitive Trade Initiatives Lowered Restrictions on Foreign Ownership and Reduced Market Entry Barriers

Governments' Efforts to Cash in On the Rising Tide Through Spectrum Auctions and New Carrier Licensing Added a Debilitating Financial Burden

Near Term Outcomes

Incumbents Leverage Investment in Exchange for Favorable Deregulation and Relaxed Antitrust Enforcement

Telecommunications has Lost Its Public Utility, Low Risk Status as Well as Its Growth Market Cache

The Way Forward

Chapter Seven Digital Literacy Fundamentals

Being Digital

Data Replaces Voice Packet Switching Replaces Circuit Switching

Broadband Replaces Narrowband Networks

The Importance of Low Latency

Intelligence Migrates from the Core to the Edge

Wireless Rules

Networks of the Future

Cloud Computing and Remote Access to Content and Applications

The Faster, Better, Smarter, Cheaper and more Convenient Templates

Faster Telecommunications Lines Offering Higher Bit Rates and Greater Throughput

Better Depends on Individual Perception

Smarter Than What?

Cheaper

More Convenient

A Steep Learning Curve Coupled With High Risks and Rewards

Greater Flexibility and Opportunities at a Price

Chapter Eight Challenges, Opportunities and Dichotomies in the ICE Landscape

Convergence

IP-Centric Environment

Conflict

Competition

Consolidation

Empowerment

Compromise and Coordination

Privacy

Contradictions

Platforms Instead of Channels

Content Rules

Increased Risks

Cannibalization and Disintermediation

Social Networking

Surveillance

Positive Network Externalities

Electronic Commerce

More or Less: Options, Regulation and Value?

Chapter Nine The Impacts of Technological and Market Convergence

The Political and Social Stakes

Digital Liberty

Carrier Freedom

Proliferating Video Access Options

The Media Server

The End of Appointment TV

Time and Place Shifting

Intelligence at the Edge Instead of at the Core

Broadband Flavors

Upgrading Legacy Networks

Digital Subscriber Links

Cable Modems

Broadband Over Power Line

Decoupling Access and Content

One Stop Shopping and the Triple Play

Content Creator Dilemmas: Do New Technologies Promote Piracy or the Development of New Markets, or Both?

Do New Technologies Promote Piracy or the Development of New Markets?

Finding a Balance in Digital Rights Management

DRM Flags and the High Definition Multimedia Interface

Analog Holes

How New Technologies Help Make New Markets

Rethinking Subscription Television

Prospects for Today's Cutting Edge Devices and Services
Consequences of a Bit Commodity Transport Environment

Internet as All Things to All People

The Death of Distance and Other Service Distinctions

Arbitrage and Gaming Opportunities

Examples of Regulatory Arbitrage

Grey Market Strategies

Leaky PBXs

Resale of Private and WATS Lines .

International Call Reorigination

Voice Over the Internet Protocol

CLEC and Wireless Carrier Call Termination

Bit Transmission as a Commodity Business Versus Bit Discrimination and Differential Pricing

It's the Software and Other Applications That Matter

Turnabout as Fair Play?

Risk of Preempted Technology and Service Options

Why Consumers Don't Have Much Use for CableCards

Use Limitations Imposed by Cellular Carriers

ICE Technologies Promote Both Narrowcasting and Broadcasting

Cutting Edge Versus Bleeding Edge Technologies

The Power of Time, Device and Format Shifting

Challenges to Incumbents

Consumer Empowerment

Less Elegant But Cheaper Technologies May Predominate

Impact of Market Convergence

Winners and Losers in Market Convergence

Impact on Consumers

Customer Surveillance

The New Home Box Office/Digital Home

Impact on Suppliers

The Costs and Benefits of One Stop Shopping

Cannibalization

Convergence Leads to Strange Bedfellows

Chapter Ten Best Practices in Capturing the Benefits of Convergence

The Rewards

The Opportunity for Smarter, Better-Calibrated Regulation

The European Union Has a Better Strategy

The Risks in Technological and Marketplace Convergence

Wrong-Headed Unregulation

DSL Migrates From Telecommunications Service to Information Service

Chapter Eleven The Role of Government—What Legislatures and Regulators Should Do to Stimulate and Support ICE Development and Competition

The Shift to Light-Handed Regulation

Should Government Act Prospectively or Intervene After Competitive Harm?

What Anticompetitive Practices Have Occurred in ICE Markets?

The Need for Open Access and Compulsory Interconnection Requirements

Risks in Extending Legacy Regulation

Recent Examples of Regulatory Arbitrage

Universal Service Funding Liability

Stimulating Traffic that Triggers High Access Charges

Achieving Best Practices in ICT Development

The Role of Government in ICT Incubation

What Works?

Indigenous Comparative Advantages

Acquired Comparative Advantages

Government Vision, Strategy and Stewardship

Supply Side Stimulation: Underwriting Research, Funding Pilot Programs and Community Champions

Demand Side Stimulation: Promoting Digital Literacy, Aggregating Demand and Delivering E-Government Services

New Challenges to Developed Nations

Finding the Right Balance in Next Generation Network Regulation

What is Net Neutrality?

Network Neutrality Initiatives and the Internet's Evolution

Phase One: Active Government Stewardship

Phase Two: Privatization Creates a Hierarchy of Operators

Phase Three: The Dotcom Boom Stimulates Several Hundred Billion Dollars in Internet Infrastructure

Phase Four: Retrenchment and a Proliferation of Interconnection Options

Wireless Network Neutrality

Reasons Why ISPs Oppose Network Neutrality

The Need for Network Neutrality Rules

Permissible and Impermissible Discrimination

Chapter Twelve Unresolved Issues

Regulatory and Market Failure

Co-opting or Minimizing the Impact of Academic Research

The Need for, and Lack of Peer-Reviewed Academic Research

Institutional and Practical Constraints on Academic Research Achieving a

Sustainable Competition Policy that Maintains a Level Competitive Playing Field

The Risk of a Cable/Telco Duopoly

Chapter Thirteen Conclusions

The Way Forward for Incumbents

Local Broadcasters and Broadcast Networks

Newspapers

The Music Industry

Advertisers

The Challenge to Consumers and Society

Know the Lingo

Watchout for Upselling, Lock-in and Lock-out

Improving the Regulatory Process

An Independent, Unpartisan Process

Narrowly Targeted Incentives

Emphasize Old and New Media Literacy

The Way Forward

Notes

Recommended Readings

Preface

As a University Professor and parent, I have a “fly on the wall” vantage point to observe the skills, attitudes and desires of early adopters as they beg, borrow, steal, and occasionally buy new products and services in the information, communications and entertainment (“ICE”) marketplace. I marvel at my students’ youthful hand-eye coordination and their apparent ability to handle multiple tasks simultaneously. However, I also am amazed at their lack of sophistication regarding the developments of trends, the consequences of ICE developments, such as convergence of technologies and markets, and strategies for becoming smart consumers.

Most of my students offer rather limited support for government regulation of the ICE sector. Such a libertarian attitude may stem less from a philosophy objecting to government meddling in the marketplace and more from a sense that they can hack or evade any technological, regulatory, or legal restriction they do not support. Many people appear to reject government oversight as unnecessary, ineffectual, or too costly, but they readily blame legislators and judges when the market fails to deliver what they want on terms and conditions they expect. For example, some of my students who bought Apple iPhones quickly objected to usage limitations imposed by AT&T and Apple. My students signed and accepted a “take it or leave it” contract that authorizes AT&T to impose conditions on how the phone operates, including a prohibition on using the phone over competing networks.

Apple apparently did not need to secure explicit user acceptance of unilaterally imposed limitations on which music storage formats the phone supports, or which software applications the company will permit users to launch. Notwithstanding such acquiescence, some of my students resorted to “self help” to remove operational limitations. They “unlock” handsets to access other carriers’ networks, and they “jailbreak” handsets to use unauthorized software

applications. By taking the law into their own hands these students risked “bricking” the phone, i.e., rendering it inoperable. They also voided the warranty.

Rather than violate carriers’ unilaterally imposed locks and limitations, wireless subscribers could seek regulatory and judicial remedies, but few consider these options affordable, or feasible. Ironically, just about every wired telephone user, readily assumes the “right” to purchase any type of telephone, to connect that handset to the telephone network without consent from the company providing service and to use the handset on different telephone networks when relocating. While there are some technological differences between a telephone that acquires service using radio spectrum and one that acquires service via a closed circuit wire, a consistent regulatory policy and consumer expectation would establish the same usage and access freedoms for both types of service. Yet most consumers either resort to “hacking” their handsets, or tolerate the limitations, despite the inconsistency, unfairness, and possible illegality in carriers rules that substantially thwart wireless subscribers’ handset freedoms.

Many of my students also know how to hack copyright protection software and technologies even as they consider anything available over the Internet free for the taking. They know how to “untether” music from services that tie content to a specific device. They can “rip” music by creating a compact disk copy, or format change making it possible to copy and distribute the content. Yet most of my students think nothing of paying \$3.00 for 20 seconds of a song converted into a mobile telephone ringtone, have no idea how assorted fees can add twenty percent to their mobile telephone bill, and have little sense of how digital technologies will change their lives as both consumers and citizens. They can spend countless hours surfing the Internet, but have a hard time using the Internet for applied research beyond a Google search.

They may read blogs, but they have not thought much about the impact of the Internet on politics, journalism, social cohesion, religion, race relations, sexuality and the like.

In a course on ICE technologies I teach at Penn State University I encourage my students to develop a template for considering whether and how use of the Internet as a medium for communications and commerce makes sense. After the initial wonderlust fades, the Internet will replace existing options if and when the Internet-mediated option offers an experience that is: faster, better, smarter, cheaper and/or more convenient.

I would like for my students and you to develop digital literacy and sophistication about ICE technologies, markets, and impacts. Additionally I would like you to understand how the regulatory process in the United States and in other nations largely disserves the national interest, because stakeholders have mastered the art of gaming the regulatory process to their advantage. Few consumers share my outrage when the regulator agrees to tilt the competitive playing field to the advantage of a particular company or technology, or when the regulator agrees to reduce or eliminate rules based on bogus assumptions about how competitive markets have become. Consumers appear to lack interest, or have little worry that eliminating government oversight can result in higher costs, fewer choices, greater intrusions on one's privacy, reduced innovation, and less social and commercial benefits accruing from new technologies.

Consider this example. In an increasing number of grocery stores, consumers have the option of registering for a frequent shopper discount card that provides weekly discounts, other promotions and the opportunity to pay for groceries using a check. Many consumers have jumped at the opportunity to save money even as they may have not considered the full consequences in using the barcode scanning of their frequent shopper card. Most consumers have not thought about what supermarket operators do with the data collected. One does not

have to be an alarmist, privacy-obsessed zealot to worry about the consequences in the ability of grocery store owners to “mine” data acquired online, via telecommunications links, as consumers “vote” with their dollars at checkout.

Beyond the issuance of coupons based on your individualized shopping behavior, might the grocery store owner share or market such data with other vendors? In a worse case scenario, the grocery store operator shares data about tobacco, alcohol, and sugar consumption with insurance companies and others that might use the information to calibrate your next premium. Even if I stood to save money in this fine tuning, I would not appreciate such proprietary information about my consumption patterns created and widely disseminated. Most of us would not appreciate a car rental agency surreptitious tracking the speed, location and treatment of cars to determine what rate to quote next time.

Of course both the supermarket and the car rental companies can justify their actions on grounds that consumers consented to such data mining and dissemination in exchange for possible discounts. I favor marketplace driven transactions, provided both parties fully understand the nature and scope of the transaction. However, I suspect few consumers have complete understanding about the extent of unregulated dissemination and analysis of consumer data. For a short period of time Amazon used data mining to estimate the price sensitivity of consumers. Amazon offered the same book at different prices based on a prediction about a specific consumer’s willingness to pay. The company abandoned this pricing tactic when consumer advocates and individuals objected. Suddenly data mining became a means to discriminate on the basis of estimated price sensitivity rather than a new opportunity for consumers to save time and money.

When Radio Frequency Identification (“RFID”) chips replace or become embedded in a shoppers’ discount card, making manual scanning unnecessary, consumers can more quickly check out of the supermarket and grocers can possibly acquire more information about consumer behavior before arriving at a check out line. In light of RFID mobility and data processing speed why not install them in passports to facilitate quicker processing at national borders and the accumulation of more data? The law of unexpected consequences comes into play everywhere in ICE markets, and in the case of RFID passports, the possibility exists that terrorists can tune the frequency used by RFIDs to identify American passport holders in a crowd.

Mining supermarket discount card data, rental car speed and RFID tracking represent just of few of the challenges presented when information processing and telecommunications converge to achieve offer faster, better, smarter, cheaper and more convenient outcomes. But we need to consider whether and how these outcomes offer sustainable benefits. Few consumers know that the self-scanning check out process takes longer than the old school option of relying on a cashier. Self-scanning might offer a better alternative if long lines lead to the cashier who offers a smarter, or at least better qualified checkout experience than a computerized voice prompt. Currently the scanner offers no discount even though in the long run the potential exists for the computerized option to reduce the number of employees. On balance, and with a more nuanced examination, the scanner option appears to offer more benefits for the grocery store operator than the consumer, but the convenience factor and lines might shift the balance on any given visit.

I have written this book with an eye toward enhancing readers’ digital literacy. By this I mean that citizens need a broader range of competency beyond the ability to make a gadget or service work. I believe users of ICE technologies need to understand better the impact and

consequences of such use. I fear that most of us do not fully appreciate the downsides and trade-offs presented by technological innovations, partially because the upside of novelty, new opportunities for personal expression and the perception of a faster and better option predominates.

Additionally I worry that we have become far too confident in the ability of unregulated markets to achieve an efficient and fair allocation of resources. Stakeholders, which benefit from streamlined to eliminated regulations, have the financial resources and incentive to come up with both credible and false justifications. National Regulatory Authorities, such as the Federal Communications Commission in the United States, far too readily buy into the wisdom of markets, despite ample evidence that in ICE sectors, markets do fail through manipulation and anticompetitive conduct, as well as resource allocations that do not provide enough access to ICE technologies and services as governments and their constituents might wish. Broader notions of democracy, citizen participation in their governance and free expression may support market countervailing regulations in the ICE sector.

Digital literacy provides the basis for consumers of ICE innovations to understand the benefits likely accruing to others such as advertisers, information brokers, and vendors of equipment and services. In addition to the criminal element, which can exploit enhanced access to private financial information, legitimate commercial players in the ICE economy stand to benefit from our use of ICE technologies and services. Fair enough, particularly in light of the fact that these vendors broker access to many ICE services in exchange for our exposure to commercial pitches. I am more than willing to trade my possible attention to commercial messages in exchange for the opportunity to view valuable content, because in most instances I

can operate as a free rider who consumes the content without buying the advertised goods and services.

However, most consumers of ICE services do not appreciate fully the expanded opportunities that advertisers and ICE vendors have in an Internet environment to reduce the opportunity for free ridership, to offer the same product or service at different prices, and to identify and target individual consumer preferences and vulnerabilities. While Internet boosters herald unprecedented consumer “empowerment” and the shift in the balance of power to consumers, I believe the Latin phrase *caveat emptor*, meaning buyer beware, applies as never before. ICE vendors do not operate as charities and have no desire to offer goods and service free of charge if they otherwise could realize and maximize a profit.

Technological innovations make it possible, as never before, for ICE vendors to know your buying habits and predilections. Such knowledge, derived lawfully from data mining, to which we have consented, and unlawfully by various tracking software, helps ICE vendors pitch customized products and services. In a positive light, this means that a book vendor such as Amazon can suggest additional book purchase options based on Amazon’s analysis of your buying habits and the purchases of others who have bought the book that you may buy. A travel vendor, such as Hotwire, once surprised me with an e-mail reporting that fares and hotel rates had dropped for a destination I had searched previously.

In a darker disturbing view, vendors can get a better sense of our intensity of preference, what economists call demand elasticity, and better calibrate prices based on such demand. ICE vendors capture the surplus consumers otherwise would accrue when buyers can acquire a good or service below their maximum acceptable price. So much for the balance of power tilting inexorably to the consumers’ side.

Digital literacy can provide a longer term opportunity for balance. If knowledge generates power, then a depth of understanding beyond making a gadget work will accrue ample dividends. The challenge of digital literacy requires ICE users to become students and assume responsibility to master not just the intricacies of gadget use, but a sense of how gadgets and the services they access function in terms of broader issues such as the marketplace of ideas and commerce.

Suppliers of ICE equipment and services could make these tasks easier as could governments. But perhaps all too predictably vendors appear to sense an advantage flowing from confusing consumers, while governments fail to appreciate the need to avoid tilting the competitive playing field in favor of one group of stakeholders who have managed to leverage lobbying, campaign finance, or ideology to secure an artificial advantage.

This book will provide a better idea of the high stakes in ICE convergence and the migration from analog to digital technologies. Additionally the book will identify how and why many incumbent, players want to blunt change to preserve market share. With an objective of thwarting progress to safeguard existing revenue streams and market niches, incumbents, such as telephone companies, lobby legislatures, litigate in the courts, and pester regulators to create unnecessary financial incentives for their reluctant and belated migration to digital technologies and markets.

For example, telephone companies long hesitant to provide video services over their networks in competition with cable television operators, now seek to make up for lost time by securing a single statewide or national franchise unlike the municipality-specific authority cable operators had to secure. The telephone companies successfully have characterized the franchise process as a barrier to market entry and the consumer welfare gains accruing from competition.

In another light, the franchise process ensures that video content distributors pay attention to community needs and operate their networks in the public interest.

The digital literate consumer understands that every stakeholder offers a distorted view of a public policy issue. For example, incumbent telephone companies emphasize the need for government-sponsored financial incentives to make long overdue investments in next generation infrastructure. The telephone companies have succeeded in forestalling investment ostensibly because of regulator-created uncertainty and the duty to interconnect their networks with competitors. But in reality these companies failed to predict the speed in which technological change triggered consumer migration from wireline to wireless telephone options and reduced margins for local and long distance telephone service. Put another way, if regulators, legislators and judges had not bought hook, line and sinker the need to “incentivize” network investment by incumbent telephone carriers these companies would have had to act sooner on the basis of self-preservation and competitive necessity.

Instead of hands off reliance on market-driven ICE convergence, governments ironically have become unnecessary underwriters of network investment by favored groups. Such meddling in the marketplace, normally antithetical to many small government advocates, has stimulated belated investment by one group of stakeholders at the expense and likely market exit by several other groups, including ventures providing competitive alternatives to incumbents’ local and long distance telephone services.

I worry that the United States will lose its global ICE leadership. This nation can no longer serve as a test bed for cutting edge applications, in light of inferior network access, locked-down access to network features and network operators preoccupied with litigating and

extracting maximum possible regulatory accommodations instead of working tirelessly to improve consumers' value propositions.

Just as consumers need to understand how seemingly benevolent companies lock down and limit choice and the versatility of the devices they sell, consumers also need to understand how governments often fail to serve the public interest. This book has the twin goals of enhancing consumers' digital literacy in the marketplace and in the halls of government.