

Chasing Moore's Law: Information Technology Policy in the United States

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According to Moore's Law, the number of electronic switches that can be placed on a single computer chip will double every 18 months. This ever-quickenning advance in technological development provides the backdrop to William Aspray's *Chasing Moore's Law*. Aspray explains that "Moore's Law stands as a metaphor for the rapid, incessant course of technological innovation that is occurring in the computing and communications field."¹ This fundamental tenet of the computing world provides a starting point for a look into the ever-widening gap that technological advancement creates with humanly created laws and political solutions. More often than not, legal and political solutions have trouble keeping pace with the rapid change of the technological field. By the time this book rolled off the printing press in 2004, many of its ideas and proposals had already become outdated by technological advancement.

Chasing Moore's Law is a series of essays about heady technological, scientific, and legal subjects. However, the intended audience of *Chasing Moore's Law* are those readers who do not have immense technological education or backgrounds, including those who determine policy, conduct computing research, and those in the educational fields. The book is also highly suitable for use in examining the development of technology in contemporary culture and how technology has impacted our culture.

¹ William Aspray, *Chasing Moore's Law: Information Technology Policy in the United States* (SciTech Publishing Inc. 2004), ix.

The first chapter examines the development of information technology (IT) research and development funding. The chapter traces the concept of IT research and funding from the United States military. The Allies' victory in WWII was largely attributed to its significant IT advantage. As a result, government and, more specifically, military funding of IT developments reached its peak during the Cold War and "the Space Race" with the creation of the Advanced Research Projects Agency (ARPA). ARPA's focus was to assure that the United States maintained the lead in supplying state-of-the-art technology to its military and to assure that the military was not surprised by the technological advances of its adversaries. ARPA was soon renamed the Defense Advanced Research Projects Agency (DARPA) and focused on short-term research with obvious military applications. This research and federal policy led to the creation of ARPANET (the precursor to the Internet) and fueled academic research by allowing universities and other non-profits to own patents for their federally-funded inventions. While IT funding from the federal government has shrunk, it has certainly not vanished and will remain for the foreseeable future because it drives today's economy.

Chapter two deals with the convergence of traditional telecommunications technology with computers. It explains the history of the storage, information creation, and sharing capabilities of computers and modern telecommunications systems. Early on, a single computer was a valuable business tool but the market for single computers was small. Once the power of many computers having the ability to communicate with each other was realized, the computing and telecommunications industries became inextricably linked. The combination of the two industries created the IT industry. This chapter examines the difficulties in regulating this relatively new industry. The

telecommunications industry has a long history of regulation but the information and computing industries have no history of similar regulation. This chapter explains how the two have combined, how the new industry is regulated, and what can be expected in the future as high-speed Internet access becomes as pervasive as telephone service.

The Internet was created on the basis of self-governance with early users adhering to strict guidelines created by the few early users of the Internet. The Internet has become a central focus in daily life and is vital to national and economic security. Chapter three examines the libertarian philosophy of Internet users and the jurisdictional issues involved in the United States' governance of the Internet. It traces the development of domain names from Internet Protocol (IP) numbers, the rise of viruses and spam, cyber squatting, and the various laws, regulations, and bodies that govern them. Internet access for the disabled and the necessity of making the Internet and websites accessible to that portion of the population is also closely examined.

Chapter four examines the political issues associated with the use of the Internet including which sets of federal, state, and local laws govern corporate operations, the rules for taxing products and services sold on the Internet, computer and Internet voting systems, and the highly-profitable Internet pornography and gambling industries. The transnational nature of the Internet makes it difficult to determine which community standards and rules should be applied to it. This is complicated even more by the fact that the rules for determining which laws govern the Internet are still undecided in the United States. The chapter focuses on three main political issues regarding taxation and the Internet. The first is whether to tax the Internet, second what products and/or services to tax, and third, whether to collect use taxes for the Internet. It also explains the benefits

and pitfalls of recent attempts at e-voting and how the venture may become possible out in the future. Lastly, the chapter examines the easy availability of Internet pornography and gambling and the necessity of regulating those industries because of their availability to children.

An important concern regarding the Internet is the security of critical infrastructures and chapter five examines the fine line between securing these infrastructures and leaving them vulnerable. As online activity increases and is utilized more and more by the workplace, government, and other parts of daily life, it becomes even more necessary to secure computing networks. Privacy comes with several competing interests such as privacy versus protection, protecting companies versus increasing knowledge, interaction versus restriction, and regulation of the private sector versus the stifling of innovation. This chapter uses the release of the Slammer worm to examine the many issues and tension regarding computer security. Security regulators look to the phone system as a guide for developing regulations for the Internet since security or the public nature of the Internet was not a top priority when the Internet was first developed. It also examines issues such as product liability regarding security in products distributed by software developers. The chapter also explores federal legislation in security areas such as the development of the Digital millennium Copyright Act (DMCA) and the Patriot Act. Awareness is the future of security strategy and the more aware users are, the more secure computing and the IT industry will be. More information is needed to adequately secure computing because it is a relatively new concern and secure computing will require sacrifices in performance and usability.

Chapter six examines the evolution of privacy rights during the rise of the Internet. It begins by looking at lawsuits filed against companies for gathering Internet users' data and creating profiles of individual users. From the advent of the computer age through the Cold War there were fears about the ease of gathering and categorizing information of individuals. The major players in IT privacy are the government, Internet service providers, technology manufacturers, and non-government watchdogs who make the public aware of its rights and lobby for more privacy rights. Various sources of privacy protection including the Constitution, common law, and statutes are also examined in depth. The chapter provides an intriguing history of the development of privacy concerns in the IT age, how those concerns have been dealt with by government, corporate America, and individuals, and finishes with prospective solutions to privacy concerns in electronic information and communication.

One of the most intensely-discussed concerns in the computer age has been the protection of intellectual property. Chapter seven is an essay that discusses the development of computer technology and the way in which it can edit or infringe upon copyrighted works. It starts with the example of the movie *Star Wars: The Phantom Menace* and how a fan digitally edited out a character and widely distributed the edited version of the movie over the Internet. The dynamic between tech-savvy consumers who want to use their purchased material in any way they see fit and the intellectual property industry is examined. The chapter provides a brief and easy to understand history of copyright and intellectual property from fair use to first sale and how the digital revolution has altered these principles. It then examines the Digital Millennium Copyright Act and several cases that have enforced it, including the sensitive issue of

peer-to-peer file sharing. Open-source software and the future of the protection of intellectual property as well as new ways of thinking of intellectual property conclude the chapter.

With the rise of IBM, Apple, and Microsoft, the IT industry has become a hotbed of antitrust litigation. A brief definition of antitrust is given as are explanations of several antitrust statutes including the Clayton and Sherman Acts. Several cases are also examined in the context of the acts. Chapter eight looks at the role the FTC plays in antitrust litigation and enforcement. Early antitrust cases against IBM and AT&T provide a historical backdrop for more recent litigation involving software and operating system giant, Microsoft. The chapter takes a close look at cases involving Microsoft, why they were brought, how they were resolved, and what the decisions in those cases mean for the future.

Chapter nine explains how discrepancies in the ownership and use of personal computers quickly created what is known as the digital divide. The divide is between wealthier communities that can afford computers and Internet access and poorer communities that cannot provide access to computers and the Internet. In today's tech-driven world, computer use is an indispensable skill and the digital divide addresses the disadvantages of those who do not have access to or experience with computers. Several federal programs have aimed to shrink the gap in the digital divide and chapter nine examines many of them. The chapter also includes arguments that throw the existence of the digital divide into doubt and attribute it to market forces, such as the late adoption of Compact Discs or DVDs in poorer communities.

Lastly, *Chasing Moore's Law* examines the role of IT in the workplace. It takes a close look at the history of the dot-com boom and shortage of IT workers in the United States during that time. Solutions to the lack of workers are examined, including long-term solutions to train more workers and medium-term solutions in which current workers would be trained by companies and the company would receive tax credits in return for providing training. It also examines a short-term solution to what was the IT worker shortage: increasing the number of foreign workers. Each of these solutions is examined and debated from the viewpoint of the government, employers, and IT employees. The chapter concludes by looking at the way IT employment and its current status can affect the drafting and implementation of IT policy.

Chasing Moore's Law raises many important issues in the IT realm. It does a more than adequate job of raising pertinent issues such as the digital divide, IT regulation, Internet security, and intellectual property. Each chapter is examined through a historical perspective which provides a thorough background for the reader to understand the overall issue and how it developed. The book also does a good job of presenting several sides to each issue it examines. This allows the reader to come to his or her own opinions and decisions on the issue. In the end, the book does exactly what it sets out to do; it provides information on policy development for those people who are in the position to shape the future of those issues.

Chasing Moore's Law is a great source of history, policy, information, predictions, and solutions as to where current technology law has been, is currently, and where it is heading. Anyone from the casual Internet user who wants to learn about the history of the Internet and how it is run to sophisticated techies to university professors

and students will find this book helpful and informative. The book provides an introductory and easily-understood look into the history and development of issues relating to information technology. The basic issues in information technology are presented in an easily-understood manner and in a way will not frighten even the least tech-savvy computer user. *Chasing Moore's Law* was a highly enjoyable and informative read and it is perfect for anyone who is interested in developing IT policy and those who are simply interested in gaining general information about the history, policy, and governance of IT issues.