The Information Technology Revolution and the Transformation of the Small Business Economy

A Collection of Essays

Released by

The American Consumer Institute
Center for Citizen Research

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About this Report

Over the years, a large body of work has cited the importance of small businesses and their contributions to the economy, including reports by the Small Business Administration that small businesses add as much as 65% of all of the new jobs created during an economic recovery. Research suggests further that the collective health of small businesses is a reliable predictor of the health of the overall economy.

Similarly, numerous studies have hailed the benefits of information technologies (IT) on the general economy. Studies have estimated that the widespread deployment and use of broadband and Internet services, as well as the purchase and use of IT goods and software, have added hundreds of billions of dollars of economic output and created millions of new jobs. One Department of Commerce report found that the use of IT goods and services contributed to nearly all of nation's productivity, and suggested that declining IT prices were responsible for a one percent lower annual inflation rate. Computers, software, cloud computing and broadband services are revolutionizing society, changing how consumers shop, get news, play games, bank, read books, share pictures, communicate, listen to music, and watch programming.

The information economy is also changing how and where business is conducted. IT goods and services are transforming markets and industries, leveling economies of scale and affecting where businesses locate, how they operate and how they reach their customers. This has profound implications for small businesses, and by association, the economy as a whole.

What is the interdependence between small businesses economy and the IT sector? To address this question, this report provides a collection of essays written by leading economists and public policy experts that discuss the important link between information technologies and small businesses as suppliers and consumers of these goods and services.

We would like to thank the authors, who freely donated their time and essays for inclusion into this report. This work/research was funded by the Ewing Marion Kauffman Foundation. The contents of this publication are solely the responsibility of the Grantee.

About The American Consumer Institute

The American Consumer Institute Center for Citizen Research is an independent nonprofit 501c3 educational and research institute founded in 2005. The Institute's mission is to identify and analyze trends and public policies to better understand their consequences on consumers and the general economy. For more information, visit www.theamericanconsumer.org.

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Foreword

Everett M. Ehrlich

The story has it that Nobel Prize winning economist Ronald Coase, a person whose intellectual insights were so sound that they are claimed by all points across the political spectrum, was contemplating the nature of centrally planned economies when he hit upon a question – how large "should" a firm be? In fact, why do firms exist at all? His acclaimed answer was that firms will expand until they reach the point where markets can coordinate information more expeditiously than can administrative hierarchies. In a simple example, a housepainter puts an assistant on payroll because that is simpler and, once transactions costs are considered, cheaper than going to the market and finding an assistant every day. And so General Motors in the mid-20th century became a vertically-integrated colossus because coordinating production could be done just as effectively through the pyramidal organization as through contracting for raw materials and componentry.

Coase's magnificent insight is Square One on the journey to understanding the IT revolution because the meaning of the IT revolution is this: the price of information is falling by orders of magnitude. When James Watt invented the steam engine to solve the problem of pumping water out of mine shafts, he cut the price of mechanical work in half. Moore's law tells us that the price of information, as measured by the power of a microprocessor, is cut in half every 18 months – the equivalent of several Industrial Revolutions every decade.

This comparison has important implications for the structure of our economy and, specifically, for small business. Because the implication of Coase's insight is that as IT slashes the cost of information, the pyramidal business organization will collapse – the Internet will prove a better way to coordinate activities than "sneakernet," as we called it in the computer industry two decades ago, in which a person writes a schedule or a plan, puts on her or his sneakers, and distributes it to recipients.

And pyramidal organizations *did* collapse when IT slashed information costs. In their place, our economy developed a myriad of *interstitial markets* – markets for components, services, or other activities that were once satisfied by vertically-integrated organizations. Auto companies now routinely produce only about 30 percent of the value of their product – the rest is brought to them through transactions, partnerships, supply chains, and the like. Administrative backrooms are now automated and outsourced. The computer industry itself has gone from a competing set of "stack" entities – IBM, Amdahl, and the "Bunch" (Burroughs, Univac-Sperry, NCR, Control Data, and Honeywell) – that made their own chips, wrote their own operating systems, offered their own domain-based solutions, and managed their own environments to competitors that now specialize in one slice of the "stack" – Oracle, Microsoft, Novell, Cisco, Intel, Globalfoundries, and the like.

And specific to this collection of essays, the same dynamics make it possible for small firms to imitate the traditional advantages of big ones. IT allows companies to pursue the "interstitial" markets that dis-integration of the large firm has created – for example, to provide engineering or design services that do not require immense scale and that manufacturing companies once provided for themselves. The same technology lowers the cost of finding new customers or of entering new markets, allowing a small company to find business opportunities at lower cost. And it makes the minimum scale needed to function far smaller, simply because it reduces the cost of information and learning. A generation ago, if you knew one fact about a person, you could speak to them in a matter of seconds – that "fact" was their phone number. Today, if you know one "fact" about any fact, image, idea, statistic, or any other datum, you can find it even more rapidly – that fact is an Internet address.

What a spectacular leveler, therefore, IT has proved to be. And by so doing, it has expanded the role of small business in the modern economy – that role being a cauldron from which new companies spring.

The work done by the economists working with the Census Bureau's Longitudinal Research Database has changed our view of economic growth in this regard. It has shown us that, even when aggregate employment changes only by small amounts, very high simultaneous rates of job creation and destruction are being netted out. It also shows us that the bulk on new jobs are created at establishments that are starting up or growing rapidly and, conversely, that most jobs lost are in establishments in free fall.

In short, economics is coming upon a fundamental precept – that growth and change are inseparable. An economy grows when new and better firms, establishments, products, and production techniques replace old ones. The cauldron of small business is a central part of this story. Not all small businesses are heroic, but some of them truly will be, and they will leap out of the cauldron, expand rapidly, and be part of the ongoing transformation that we call economic growth.

And so Coase's musings unwittingly anticipated the major transformational force in the modern economy – the ability of firms to be flatter, less integrated, and smaller which, in turn, has improved our ability to change and grow. The pyramidal business organizations of the last century, like their counterparts in ancient civilizations, ended up serving as the tombs of their creators. The IT Revolution has created a new model of a faster, smaller, more nimble, and more focused firm, and a new group of entrepreneurs is racing to fill it. This collection of papers describes various aspects of that transformation and, for that reason, is invaluable in understanding the economy at hand.

The 21st Century Small Business Economy

Steve Pociask

Introduction

Small businesses, those with fewer than 500 employees, are a key driver of growth, job creation and the general health of the economy, accounting for over half of the nation's economic output, as measured by the U.S. Gross Domestic Product.[1] Most small businesses are sole proprietorships, with business income receipts having averaged only $58,257 in 2008.[2] Besides proprietorships, some small businesses are partnerships and others are incorporated. There are approximately 27 million small businesses in the U.S., including 21 million that are so small that they have no employees.[3] The Small Business Administration estimates that 52% of small businesses are home-based businesses.[4]

Despite their size, small businesses are a significant contributor to job creation, accounting for 99.7% of the employing firms in the U.S.,[5] and responsible for 65% of new jobs (net) in the economy over the last 17 years.[6] The smallest employers, those firms with just 1 to 4 employees, account for half of all of the jobs added to the economy.[7] Business failures are high for small businesses, averaging an annual turnover rate of 10% and running three times higher for non-employer firms. Despite the high turnover, 26% of small businesses continue to operate after 15 years.

Small businesses are very common among professional, scientific and technical services, as well as retail establishments. The industries with the most small business employees include healthcare (8 million), accommodation and food (6.9 million), construction (6.2 million), retail trade (6.1 million) and manufacturing (5.9 million), as well as professional, scientific and technical services (5 million).[8] The construction sector has been heavily depressed by the pervasive drop in home prices and the glut of houses for sale, as evidence by a 17.1% unemployment rate among construction workers as of February 2012.[9] Overall, small businesses are present across all the major sectors of the economy, including 43% of workers in high-tech industries.[10] **Figure 1** summarizes those industries where small businesses have the greatest number of employees.

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[1] For example, see Kathryn Kobe, "The Small Business Share of GDP, 1998-2004," Economic Consulting Services, LLC, April 2007, summarized at http://archive.sba.gov/advo/research/rs299tot.pdf.

[2] From IRS TaxStats, "Table 1. Number of Returns, Total Receipts, Business Receipts, Net Income (less deficit), Net Income, and Deficit" and "Table 3. Form 990 Returns of 501(c)(3)-(9) Organizations: Balance Sheet and Income Statement Items, by Code Section, Tax Year 2008," U.S. Internal Revenue Service.

[3] Figure taken from http://www.sba.gov/sites/default/files/files/us10.pdf; and graph derived from "Private-Sector Firms by Employment Size of Firm, 1977 – 2009," U.S. Small Business Administration, Office of Advocacy, at www.ces.census.gov/index.php/bds. Also see "Frequently Asked Questions, Small Business Administration," Office of Advocacy, available online at http://www.sba.gov/sites/default/files/sbfaq.pdf.

[4] "Frequently Asked Questions," Small Business Administration, Office of Advocacy, available online at http://www.sba.gov/sites/default/files/sbfaq.pdf.

[5] Graphic derived from "Private-Sector Firms by Employment Size of Firm, 1977 – 2009," U.S. Small Business Administration, Office of Advocacy, and www.ces.census.gov/index.php/bds.

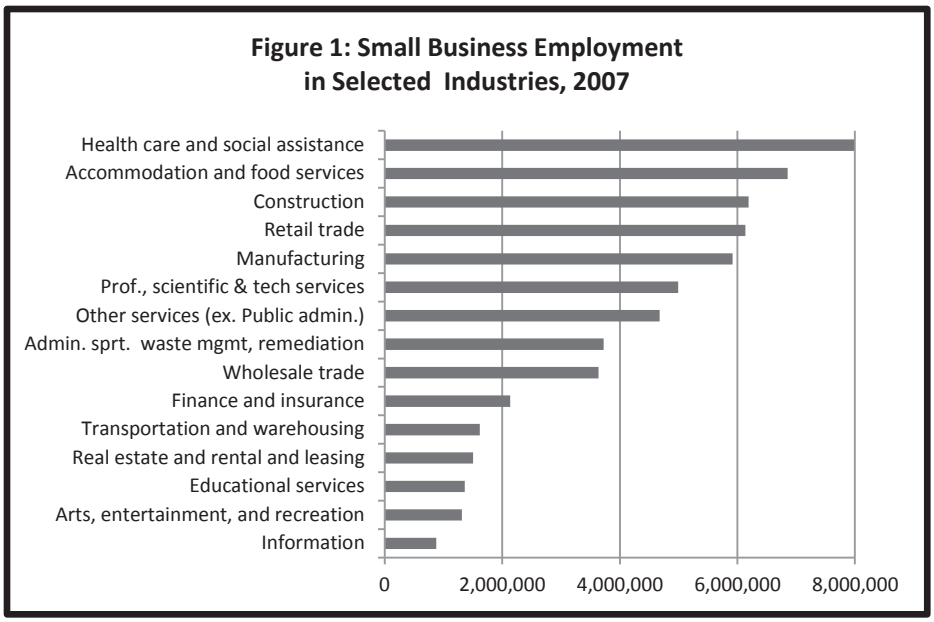
[6] "Frequently Asked Questions, Small Business Administration," Office of Advocacy, available online at http://www.sba.gov/sites/default/files/sbfaq.pdf.

[7] "Private-Sector Firms by Employment Size of Firm, 1977 – 2009," U.S. Small Business Administration, Office of Advocacy at www.ces.census.gov/index.php/bds. Table 2 shows that 53% of net job change from 2004 to 2007 was attributable to firms with only 1 to 4 employees.

[8] The employment data used in this paragraph and in Figure 1 come from "Employer Firms and Employment by Firm Size and Industry, 2007," The Small Business Economy, p. 124, U.S. Small Business Administration, Office of Advocacy, 2011.

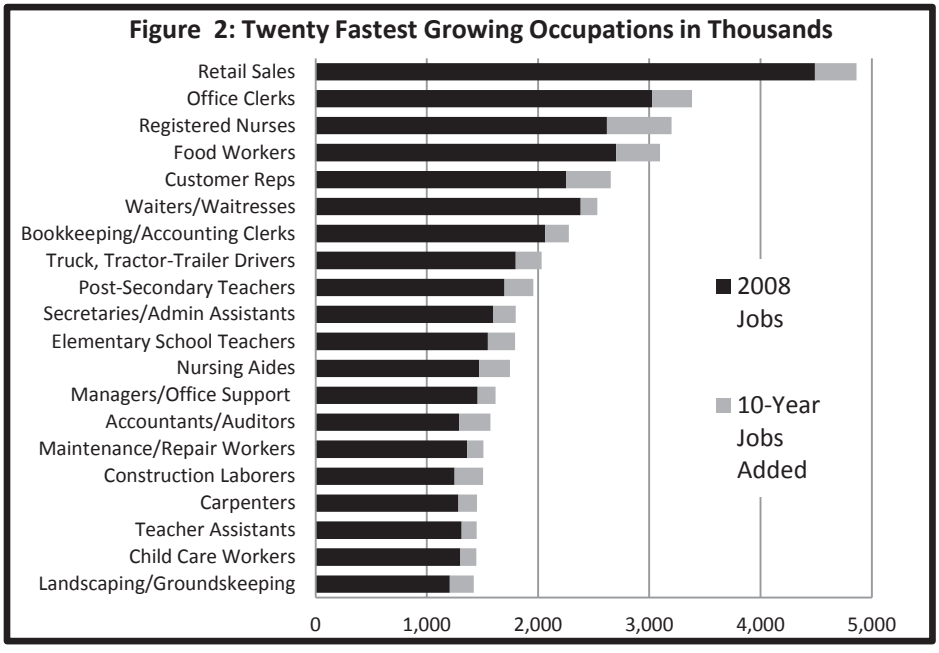
[9] "Unemployed Persons by Industry and Class of Worker, Table A-14, U.S. Bureau of Labor Statistics, March 9, 2012, available at www.bls.gov.

[10] "Frequently Asked Questions," Small Business Administration, Office of Advocacy, available online at http://www.sba.gov/sites/default/files/sbfaq.pdf.



Small businesses are very diverse.[11] Of the 27 million small businesses, women-owned companies accounted for nearly 8 million firms, 7.6 million employees and $1.2 trillion in annual revenues. Similarly, minority-owned (5.8 million firms) and veteran-owned firms (2.4 million firms) generated $1 billion and $1.2 billion in annual revenues, respectively.

Figure 2 shows the 10-year projected job growth of the twenty fastest growing occupations.[12] Because, in this case, the fastest growing occupations coincide closely with industries having the largest number of small business employees, the outlook for continued small business growth appears promising.

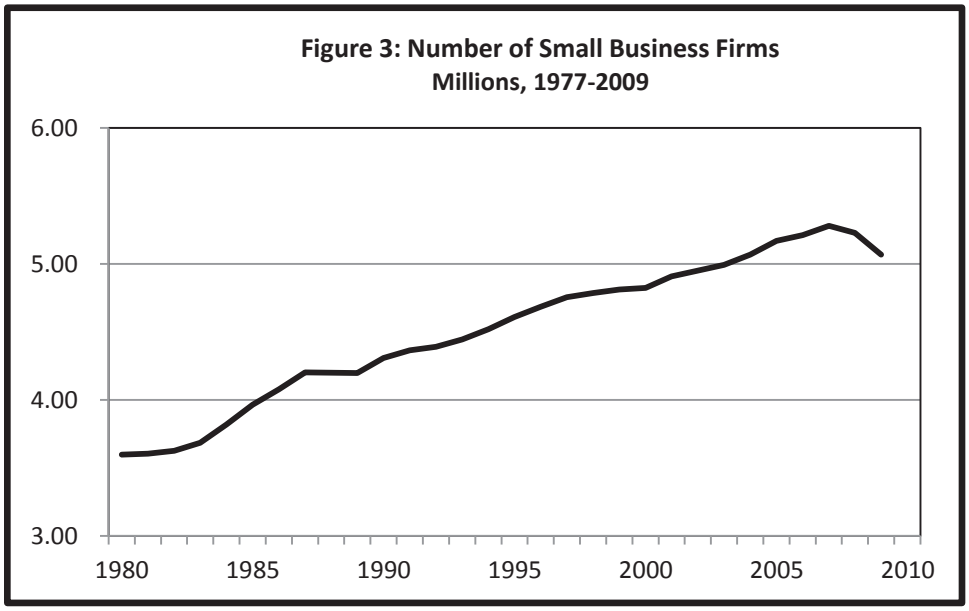


[11] "Frequently Asked Questions," Small Business Administration, Office of Advocacy, available online at http://www.sba.gov/sites/default/files/sbfaq.pdf.

[12] Employment Projects from "Occupations with the Largest Job Growth," Bureau of Labor Statistics, Table 1.4, available at http://www.bls.gov/emp/ep_table_104.htm.

A Leading Indicator

Small business employment can show disproportionate and early reactions to changes in the economy – like the proverbial "canary in a coal mine." Many small firms are more vulnerable to economic downturns. For example, during the first three quarters of 2009, small businesses accounted for 60% of the decline in employment.[13] As **figure 3** shows, the number of small businesses declined from 5.3 to 5.1 million in 2009.[14]



Conversely, small businesses create jobs much more quickly during an economic recovery, providing rapid growth in personal incomes and reductions in unemployment. The Ewing Marion Kauffman Foundation reported that "newly created and young companies are the primary drivers of job creation in the United States" and that "these firms create more new jobs than their older counterparts, as well as a higher average number of jobs per firm."[15] Small business jobs are also remarkably resilient:

> *"The jobs created by startups when they come into existence do not disappear overnight. In fact, they are remarkably durable. When a given cohort of startups reaches age five, their employment level is 80 percent of what it was when it began."*[16]

One study analyzed the impact of "Gazelles" – small businesses with exceptional growth rates – and found these companies to be young firms.[17] From 2004 to 2008, 95% of the Gazelles had fewer than 20 employees and were often in the professional and construction industries. The study found these high-impact and high productivity firms represent only 6.3% of businesses but account for nearly 11 million

[13] See, "The Small Business Economy: A Report to the President," Small Business Administration, 2010, p. 5, http://www.sba.gov/sites/default/files/sb_econ2010.pdf.
[14] Graphic derived from "Private-Sector Firms by Employment Size of Firm, 1977 – 2009," U.S. Small Business Administration, Office of Advocacy, and www.ces.census.gov/index.php/bds.
[15] "U.S. Census data showing new and young firms as the primary source of new jobs come at a critical time for policymakers," Ewing Marion Kauffman Foundation, Nov 5, 2009.
[16] Michael Horrell and Robert Litan, "After Inception: How Enduring is Job Creation by Startups?" Ewing Marion Kauffman Foundation, July 2010.
[17] Spencer L. Tracey, "Accelerating Job Creation in America: The Promise of High-impact Companies," Corporate Research Board, LLC, under contract for the Small Business Administration, Office of Advocacy, July 2011.

new jobs every four years.[18] Gazelles are clearly a main contributor to new job creation. However, as would be expected, the recession and subsequent slow economic recovery has dampened this growth.

Barriers to entry and general economic conditions can affect small business development and business failures. Currently, small businesses face a weak sales outlook, economic uncertainty, limited access to capital markets[19] and political inaction as obstacles to a more robust economic recovery.[20] Longer term, taxes and regulations pose further challenges.[21] In addition, healthcare costs can represent another barrier for small businesses, compared to other businesses.[22]

Access to Capital

During the last recession, access to capital has been a major obstacle for small businesses. Tightened lending and contracting economic growth sharply reduced small business growth and, as previously noted, led to decline in the number of firms. Overall, U.S. gross private domestic investments dropped 17.0% in 2008 and plummeted by 25% in 2009. The investment environment improved by 17.9% in 2010, but has slowed to a 4.7% increase in 2011.[23] As the economy rebounds, both commercial bank lending and venture capitalist funding increased since 2010. Yet, small businesses are still a bit cautious of expansion. In the fourth quarter of 2011, just 7% of small businesses thought it was a good time to expand.[24] This is in contrast to the 29% of small businesses that had planned to make capital expenditures just four years earlier.[25]

Small business investments are sometimes funded in ways similar to those of large businesses, but for the smallest firms, personal assets, such as houses, are often used to raise equity or working capital for the proprietors.[26] For non-corporate firms, the depressed value of the real estate has constrained home equity loans, pushing them to more banking lending. However, bank lending fell during the recession and has remained below pre-recession levels. In fact, banks rejected 60% of small business applications during 2011, suggesting that access to capital remains an obstacle to small business expansion.[27]

Information Technologies, Entrepreneurship and Innovation

Small businesses have an important role in the economy. They initiate innovation, encourage technological adoption and stimulate international competitiveness. The examples of garage startups becoming commercial giants have given small businesses the reputation as the place where innovation

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[18] Ibid.
[19] For example, see Joe Peek, "Bank Liquidity Pressures and the Availability of Bank Credit to Small Firms: Was the 2007-2009 Credit Crisis Different?" Gatton College of Business and Economics, University of Kentucky, under contract of the Small Business Administration, Office of Advocacy, September 2011.
[20] "New Study Finds Economic and Political Uncertainty Top Impediments to Small-Business Growth," National Federation of Independent Business, Nov. 22, 2011.
[21] Nichol V. Crain and W. Mark Crain, "Impact of Regulatory Costs on Small Firms," Lafayette College, under contract for the Small Business Administration, Office of Advocacy, September 2010.
[22] "Health Insurance in the Small Business Market: Availability, Coverage, and the Effect of Tax Incentives," Quantria Strategies, LLC, under contract with the Small Business Administration, Office of Advocacy, September 2011, at http://www.sba.gov/sites/default/files/files/rs386.pdf.
[23] "Real Gross Domestic Product and Related Measures: Percent Change from Preceding Period," Table 1, U.S. Dept. of Commerce, Bureau of Economic Analysis, available online at www.bea.org.
[24] William C. Dunkelberg, "NFIB Small Business Economic Trends," National Federation of Independent Business, Nov. 2011, p. 17.
[25] Ibid.
[26] "Frequently Asked Questions about Small Business Finance," U.S. Small Business Administration, Office of Advocacy, Sept. 2011, p. 4.
[27] Alan Daley, "How to Create New Jobs, Spur Innovation," *The Hill's Congressional Blog*, January 19, 2012.

begins. In fact, the Small Business Administration reports that "small innovative firms produce 16.5 times more patents per employee than their larger counterparts."[28]

Information technologies are facilitating startup development, providing scalable operations, increasing productivity and expanding coverage into markets beyond the neighborhood and throughout the world. Research on the effects of cloud computing technologies predicts sizable productivity enhancements stemming from small business adoption of customer relationship management, web/e-commerce and collaboration platforms. In fact, McKinsey and Company expects an annual 1.9% labor productivity pace over the period ending in 2020, due to cloud computing services.[29] The widespread deployment of broadband and high-speed wireless services to residential areas provides easy access to the Internet and applications for home office startups, and often at little or no incremental costs over normal household spending. By using the web, work-at-home offices can compete in retail without any significant overhead costs, or they can provide vendor services in areas like healthcare, supply-chain management and other business services. Of course, taxes and onerous regulations could pose impediments to industry innovation and small business adoption of information technologies.

Small businesses have an important competitive role in both the national and global economies. These businesses have a sizeable international presence, export a wide array of products and offer a variety of services. In 2007, they accounted for $312 billion in exports, contributing to three-tenths of all U.S. exports.[30] In fact, computers and electronic products, machinery (except for electrical), chemicals, transportation equipment, and miscellaneous manufactured products account for two-thirds of these exports.[31] Yet, the nation's innovative edge has slipped over the last decade, as *non-U.S.* shares of utility patent applications increased from 45.6% to 50.6%[32] Encouraging small business entrepreneurship and the infusion of technology into the marketplace are important aspects to spurring and maintaining the U.S. international competitiveness.

Summary

Small businesses are a vital part of the economy, providing a significant portion of economic output and creating nearly 65% of U.S. jobs. However, small businesses appear to be more adversely affected by economic cycles and regulatory obstacles. This means that policies that act as barriers to startups will inevitably deter market entry, expansion and innovation.

In addition, these businesses are an important source of innovation and technology for the 21st century economy. As such, the essays to follow will focus primarily on the inextricable link between small businesses and information technologies. These technologies – including cloud computing, e-commerce, software and application, and broadband services – are leveling the one-time comparative advantage between firms of different sizes, thereby changing the structure of the economy. The result is a fundamental shift in the nature of the firm and small businesses' importance to the information technology sector and the overall economy.

[28] "Frequently Asked Questions," Small Business Administration, Office of Advocacy, available online at http://www.sba.gov/sites/default/files/sbfaq.pdf.
[29] Zoe Diamadi, "Winning in the SMB Cloud," McKinsey and Company, July 2011, p. 3.
[30] "2010 The Small Business Economy," U.S. Small Business Administration, p. 37.
[31] Ibid, p. 44-45.
[32] 90% of U.S. patents are utility patents defined as "patents for invention." For statistics, see "U.S. Patent Statistics," U.S. Patent and Trademark Office www.uspto.gov/web/offices/ac/ido/oeip/taf/us_stat.pdf.

Small Business Employment and the Information Economy

Erwin A. Blackstone and Joseph P. Fuhr Jr.

Introduction

The 2009 recession may be officially over, but many workers still face a disheartening job market. More than half of private sector employees work in the small business segment, where recovery is slow, but better than for those in large companies. The Federal Reserve expected the economy to grow just 1.7% in 2011 and 2.7% in 2012, accompanied with high levels of unemployment. Merrill Lynch expected 1.8% growth in 2011and just 2.1% in 2012.[33]

Despite the troubled U.S. and global economies, information technology (IT) and service initiatives have strong potential for stimulating economic growth, creating jobs, boosting productivity, spurring innovation and increasing consumer welfare. Under favorable conditions, initiatives in 4G wireless broadband, cloud computing, and "Big Data" are expected to create millions of new jobs, and make substantial contributions to GDP. IT has been helping small business in its dual role as consumer and provider of those innovations.

This study documents some of the important relationships between the IT sector and small business, particularly for job creation. IT innovations may be exactly what the small business segment needs to reverse its depressed outlook and revive its tendency to recover early after a recession.

The Information Economy

IT has a tremendous impact on the economy by increasing economic output and jobs.[34] Former Chairman of the Federal Reserve Board Alan Greenspan says "IT has produced a fundamental change in the U.S. economy, leading to a permanent improvement in growth prospect."[35] Similarly, Harvard Professor Dale Jorgenson acknowledges that IT is a vital segment of the economy with respect to investment, growth and job creation, saying these technologies are "crucial for the rapid development and diffusion of the Internet, perhaps the most striking manifestation of information technology in the American economy."[36] McKinsey reports that the Internet is responsible for 10% of GDP growth over the past 15 years and 21% recently.[37]

The information economy – applications, services, software and equipment –provides consumers means for shopping, communication, working, banking and entertainment. They support telecommuting,

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[33] "Fed Foresees Far Weaker Growth than It Had Earlier," *Associated Press*, November 2, 2012 http://www.npr.org/templates/story/story.php?storyId=141922301.

[34] One common definition for IT adds two sectors for "computer and electronic products" (computers, communications, semiconductors and other electronic manufacturing) and "information services" (publishing, recording industries, broadcasting, telecommunications, data processing and other information services). For a similar approach see "The Digital Economy: 2003," Economics and Statistics Administration, U.S. Department of Commerce, December 2003.

[35] Alan Greenspan, "Challenges for Monetary Policy-Makers," Speech, Board of Governors of the Federal Reserve System, October 1990.

[36] Dale W. Jorgenson, "Information Technology and the U.S. Economy," *The American Economic Review*, Vol. 91, No. 1, March 2001, p. 6.

[37] Richard Dobbs, "What Business Can Do to Restart Growth", McKinsey & Company, Sept 2010, http://www.mckinsey.com/en/Features/Growth/What_business_can_do_to_restart_growth.aspx.

teleconferencing, e-commerce, telemedicine and other applications that save consumers and businesses travel expense, traffic delays, and reduce greenhouse gas emissions.[38]

Part of the information economy's successes are in the way components of services, applications, software and equipment interrelate, compete and complement each other, thus spurring innovation, investment, and process improvement – all of which increases consumer welfare, economic output and creates jobs. As Martin Bailey and Robert Lawrence write, "When innovation occurs in one area, there are benefits. But when complementary innovations occur together, the effects can be greatly increased. The combination of rapid advances in computer power, software, and communications capabilities form such a set of complementary innovations."[39]

If these technologies were fully used to develop a national electronic medical records system, it has been predicted that the result would increase medical service quality, save the industry $140 billion per year,[40] and eliminate unnecessary medical intervention and errors, thus saving $282 billion in total cost and preventing nearly 800,000 deaths per year.[41] In a 2011 study of IT-induced health care benefits, McKinsey estimated that the savings could be $300 billion per year.[42]

The Small Business Segment

At the end of 2007, small businesses employed 50% of U.S. private sector employees,[43] and it rose to 55% in the first quarter of 2010[44] due to job losses in the large business sector. In the wholesale and retail trade, health care and information sector 78% to 90% of all firms have an annual payroll below $500,000,[45] and the smallest of them are the self-employed with 9.6 million unincorporated and another 5.5 million individuals who were incorporated at the end of 2009.[46]

Small business firms react more quickly to economic conditions than do larger companies. In 2009, small firms accounted for almost 60% of the job losses.[47] However, small businesses can also grow rapidly. Small businesses created 64% of the net new jobs between 1993 and 2008. Employees of small businesses tend to be paid less than employees in large firms, but the difference dissipates when comparing a similar cohort group, such as full-time employees with college-diplomas.[48]

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[38] One study estimated that more than 1 billion tons of greenhouse gas emissions would be reduced by over 10 years because of broadband services, software and equipment, including 206.3 million (U.S.) tons of emissions from e-commerce, 247.7 million tons telecommuting, 28.1 million tons due to reduced office construction, 312.4 million tons because of direct energy savings, 199.8 million tons, from teleconferencing, and 124.2 million tons from reducing first class mail and newspaper subscriptions. See Joseph P. Fuhr, Jr. and Stephen B. Pociask, "Broadband Services: Economic and Environmental Benefits, The American Consumer Institute, October 31, 2007.

[39] Martin N. Bailey and Robert Lawrence, "Do We Have a New E-conomy?" *American Economic Review*, American Economic Association, Vol. 91(2), pages 308-314, May 2001, p. 310.

[40] "HHS Fact Sheet – HIT Report At-a-Glance," United States Department of Health and Human Services, Press Release, July 21, 2004.

[41] Gary Null, Carolyn Dean, Martin Feldman and Debra Rasio and Dorothy Smith, "Death by Medicine," *Life Extension Magazine*, March 2004.

[42] "Big data: The next frontier for innovation, competition, and productivity," McKinsey Global Institute, May 2011.

[43] "2010 The Small Business Economy," U.S. Small Business Administration, 2010, p. 124, http://www.sba.gov/sites/default/files/sb_econ2010.pdf.

[44] "Distribution of private sector employment by firm size class," not seasonally adjusted, U.S. Bureau of Labor Statistics http://www.bls.gov/bdm/table_f.txt.

[45] "Employer Firms, Establishments, Employment, and Annual Payroll by Payroll Size, and Industry, 2006", U.S. Small Business Administration, (percentages derived), http://www.sba.gov/sites/default/files/files/us_pay_mi.pdf.

[46] "2010 The Small Business Economy," U.S. Small Business Administration, 2010, p. 5.

[47] "2010 The Small Business Economy," U.S. Small Business Administration, 2010, p. 2.

[48] Brian Headd, "An Analysis of Small Business and Jobs," U.S. Small Business Administration, March 2010, p. 5.

Small Business Roles in the Information Economy

The small business segment is an avid consumer of IT and in many cases a producer of IT applications, hardware, software, customization, and operations. As consumers, they share most of the attributes of household and large business IT users. As producers they have advantages in nimbleness, low overheads, specialization and localization that allow them to succeed where as large business lacks those advantages.

In 33,000 firms with payroll below $500,000, IT and services are the main line of business. They focus on business and entertainment software, communications and its equipment and maintenance, and outsourced operations and training. They are where large businesses outsource these functions to small businesses in order to increase efficiency. For most small businesses, IT is harnessed as a tool to better deliver the products and services that are their main line of business. Applications such as telecommunications, customer relationship management, e-commerce, and supply chain management are common tools that help small businesses boost sales, cut capital and expense costs, keep an accurate tally and give managers a timely grip on operations.

Clusters of complementary hardware, software, communications and applications are often called a "platform." The common look, feel, and interfaces of these platforms ease the path for small businesses to become an application ("app") provider. The use of platforms saves small business both time and expense for promotional, communications, and engineering functions needed to bring a new product to market. Examples of small business IT initiatives through platforms include: authoring in Amazon's publishing system for delivery via Kindle; music and iPad app producers retailing through Apple's store; professional services through smart phone carriers; and even specialized medical equipment manufacturing and retailer applications through Microsoft's Kinect.[49]

Economic Output and the Information Economy

Numerous studies show a strong link between IT investment and the health of the U.S. economy. IT manufactured output accounted for a mere 2% of Gross Domestic Product (GDP) during 1990-1995,[50] but IT capital investment contributed to nearly 30% of GDP growth for the same period.[51] Increases in IT investment produce a much larger increase in U.S. economic output.

In 2009, private investment in IT and communications infrastructure was $430 billion, including $244 billion in software, $75 billion in equipment (computers and peripherals) and $111 billion in communications structures.[52] In 2009, IT personal consumption was $616 billion, of which $294 was for communications and $322 for other IT services.[53] The Phoenix Center found that a 10% drop in IT investment would cause a loss of 130,000 IT jobs per year for 5 years and an indirect loss of nearly 200,000 jobs for the same period; for each million dollars in investment in IT around 24 jobs are created.[54]

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[49] Chris Nuttall, "Microsoft eyes broader use of game controller," Financial Times, October 31, 2011
[50] "Digital Economy 2002," Appendix, Table A-3.2, based on the gross product originating for all IT manufacturers.
[51] Dale W. Jorgenson, "Information Technology and the U.S. Economy," Presidential Address to the American Economic Association, New Orleans, January 6, 2001, p. 27.
[52] Patrick S. Brogan, "Wireline Network's Role in the Information," Webinar, U.S. Telecom Association, Washington, DC, September14, 2010.
[53] Ibid.
[54] T. Randolph Beard, George S. Ford and Hyeongwoo Kim, "Jobs, Jobs, Jobs: Communications Policy and Employment Effects in the Information Sector," Phoenix Center, Bulletin No. 25, October, 2010, pp. 1-23.

Nearly 8 million small business employees work in health care and another 6 million in retailing where McKinsey sees massive benefits from expanded investments in IT. Physician and related health practices will play crucial roles in the forecasted savings of $300 billion per year. Retail margins are expected to jump 60% as a result of using more intense IT applications.[55]

Productivity Benefits and the Information Economy

IT investment, including investment in broadband networks, has provided an important catalyst for operational efficiency in the U.S. Kevin Stiroh showed that industries with higher capital stock in telecommunications and computing equipment experienced higher productivity gains.[56] In the recent economic recession, IT-intensive industries experienced a 3.1% improvement in productivity, while less IT-intensive industries had a decline in productivity of 0.3%. Effectively, IT-intensive industries are responsible for *nearly all* of the productivity gains experienced in the economy in recent years.[57] McKinsey estimates deeper use of IT applications will produce an additional annual productivity growth of 0.7% for health care and 0.5-1.0% for retailing.[58] These two sectors are dominated by small businesses.

Even in more prosaic industries such as construction and auto repair, small business efficiencies are made possible by IT and mobile communications. Tradesmen in the field are now able to handle inquiries or order parts and materials without interrupting work. This not only saves time, but allows them to serve the customer better.

Price Benefits and the Information Economy

Jorgenson contended that "the relentless decline in the prices of information technology equipment has steadily enhanced the role of IT investment as a source of American economic growth."[59] According to Jorgenson, computers have been the predominant impetus to faster growth, but communications equipment and software have also made important contributions.[60]

Productivity is evident in business and personal operational efficiency and technical change, but we also see its benefits in terms of lower prices. IT products and services continue to offer more for less, driving down per unit costs. IT prices have fallen relative to the prices of other goods and services. In fact, the IT sector has been credited with reducing overall inflation by as much as 1% per year.[61] Figure 1 (below) shows the average decline in consumer prices for various technology related products and services. Compared to average consumer prices, IT goods and services prices have generally decreased, at least in real terms.[62]

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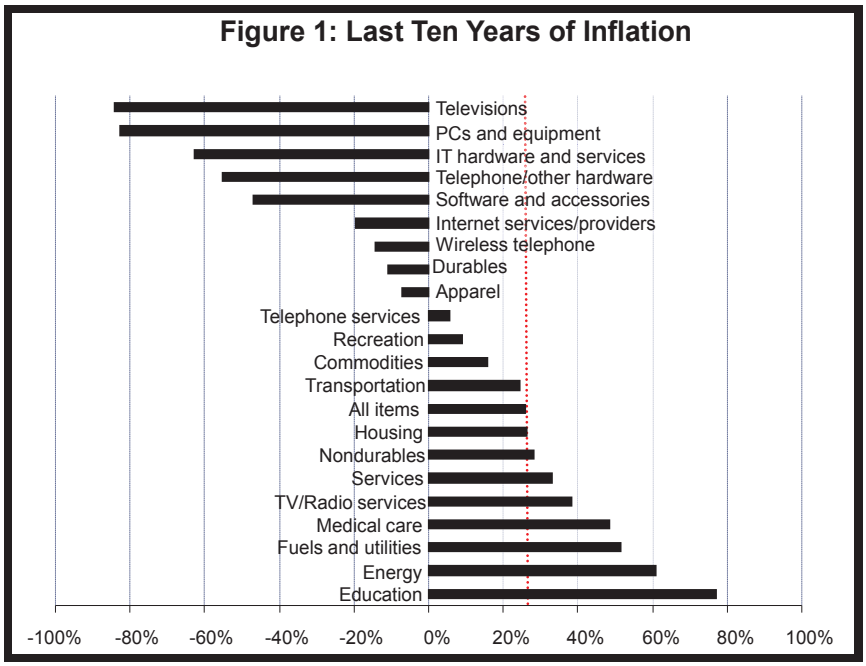
[55] "Big data: The next frontier for innovation, competition, and productivity", McKinsey Global Institute, May 2011.
[56] Kevin J. Stiroh, "Investing in Information Technology: Productivity Payoffs for U.S. Industries," *Current Issues in Economics and Finance*, Federal Reserve Bank of New York, 7:6, June 2001.
[57] *Digital Economy 2003*, Economics and Statistics Administration, U.S. Department of Commerce, Dec. 2003.
[58] "Big data: The next frontier for innovation, competition, and productivity", McKinsey Global Institute, May 2011.
[59] Dale W. Jorgenson, "Information Technology and the U.S. Economy," *The American Economic Review*, Vol. 91, No. 1, March 2001, pp. 1-32.
[60] Ibid, p. 2.
[61] Estimates have varied over the years. See *The Emerging Digital Economy II*, United States Department of Commerce, June 2000; and *Digital Economy*, United States Department of Commerce (various years).
[62] The data are from the Bureau of Labor Statistics, Consumer Price Index, and downloaded October 29, 2010 from www.bls.gov. A decrease in real terms means that prices have decreased relative to the general inflation rate.



Entry and Increased Competition as a Result of the Information Economy

Relatedly, the information economy has facilitated market entry. Specifically, low cost technology for monitoring alarms and sensing devices, which involves computer technology, has allowed entry of smaller alarm security companies increasing competition in that industry.[63] In general, the decline in prices of computers and their increased power has allowed even small companies access to sophisticated IT and computerizations, which reduced capital costs of entry and increased competition.

Jobs and the Information Economy

IT investment has led to increased economic activity, and created a multitude of new well-paying jobs – jobs that pay almost twice that of other private sector jobs.[64] The 2010 Census shows a median wage of $50,000 for college graduates, and a median of $80,000 for majors in Information Science, Computer Engineering or Science and Mathematics and Computer Science,[65] considered "high demand skills." The creation of IT jobs can have large spillover effects into other industries. One report estimated that every Microsoft job creates 6.7 additional jobs.[66]

Over the past decade, IT jobs have grown rapidly. According to the BLS between 1999 and 2008, over 688,000 new IT jobs have been created, an increase of 26%.[67] IT employment grew four times faster than employment as a whole. IT represents 7.3% of non-farm employment in the U.S.[68] There are over 9.5 million IT related jobs of which 5.5 million are in the IT industry and 4.0 million occupations are outside of the IT industries and utilize, implement, produce, distribute or enable IT. IT jobs pay very well. In

[63] Trevor Bradley and Charles Sedgwick, "Policing beyond the Police: A First cut Study of Private Security in New Zealand," *Policing and Security*, vol. 19, no.4, December 2009, p.480.
[64] *Digital Economy 2002*, Chapter 5, p. 41.
[65] "From College Major to Career," *Wall Street Journal*, November 7, 2011.
[66] Michael Mandel, "The New Business Cycle," *BusinessWeek*, March 31, 1997 and "Tech 21: The Keystone Spirit: Putting Technology to Work," no. 21, January 1996, p. 44. For most industries, multiplier effects are generally between1.5 to 2.0.
[67] Robert Atkinson and Scott Andes, "Looking for Jobs? Look to IT," Webmemo, The Information Technology & Innovation Foundation, Washington, DC, April 22, 2010.
[68] All of the data in this paragraph are from Brogan, 2010.

2008, the average IT worker earned $74,500 annually while the average U.S. worker earned only $42,263.[69]

Small business workers are 26% of the total information sector employment. These jobs include network and IT administrators/analysts, computer system design and support, computer and software programming and content and advertising occupations. This excludes the multiplier effects of jobs created outside the IT sector to support IT firms and employees as well as the consumption expenditures of all these employees which bolster the economy.

During the 1990-91 recession, industries such as software, computer systems design, and data processing services were less cyclically affected than other industries, and grew twice as fast during the subsequent recovery.[70] Michael Mandel has suggested that policies focused on spurring these tech services could play a key role in reinvigorating the economy.[71] For instance, from October 2007 to October 2009, the total number of American households with broadband service grew by 25%[72] and by August 2010, broadband was available in 66% of American homes.[73] Broadband and recent vintage laptops are a consumer platform suitable for video entertainment, Internet telephony, education, and the more established office functions. Broadband and faster devices have expanded the addressable market for firms like Vonage, Netflix and Amazon (Kindle), and in turn, created bigger opportunities for creating and sales of video, interactive games and other entertainment from producer firms, many of which are small businesses.

New Opportunities for Job Creation

An International Data Corporation (IDC) study states "the purchase of 310 desktop computers (with monitors) is enough to create 5 U.S. jobs consisting of 0.6 jobs in the production of the computers, 2.7 in those IT companies outside the production of the hardware, and 1.7 in IT – using organizations."[74] Software, applications and services are all complements for the computer, and can represent one or two times the purchase price of the computer.[75] However, these figures do not seem to include the multiplier effect from the income generated by the employees who then spend that money, stimulate the economy and thus create even more jobs. In IT as a whole 80% of IT budgets are spent on "maintenance" activity.[76]

IT goods and services benefit nearly everyone while creating jobs. For example, one study reported that a $10 billion investment in health IT could result in 212,000 new or retained U.S. jobs for a year of which 121,675 would be in small businesses.[77] Similarly, a $50 billion investment in smart power grid, of $10 billion for each of 5 years, could result in 239,000 new or retained jobs on average for each of the 5 years of which 524,225 will be in small businesses.[78] IT provides advantages to those looking for jobs.

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[69] Robert Atkinson and Scott Andes, 2010.
[70] Michael Mandel, "The Coming Communications Boom? Jobs, Innovation and Countercyclical Regulatory Policy," Policy Memo, Progressive Policy Institute, July 2010.
[71] Ibid.
[72] Robert Shapiro and Kevin Hassett, "A New Analysis of Broadband Adoption Rates by Minority Households," Georgetown Center for Business and Public Policy, Washington, DC, June 22, 2010.
[73] Aaron Smith, "Home Broadband 2010", Pew Internet & American Life Project, Aug 11, 2010.
[74] John Gantz, Mario Morales, Anna Toncheva and Thom Rubel, "The U.S. Stimulus and Job Impact for IT Purchases," White Paper, IDC, August, 2009, p. 1.
[75] Ibid, p. 2.
[76] Rachel King, "How cloud computing is changing the world," *Business Week*, Aug 4, 2008.
[77] Robert Atkinson, Daniel Castro and Stephen Ezell, "The Digital Road to Recovery: A Stimulus Plan to Create Jobs, Boost Productivity and Revitalize America," The Information Technology & Innovation Foundation, Washington, DC, January 2009, p. 2.
[78] Ibid, p. 2.

Broadband benefits telecommuters, and it allows the elderly, physically challenged and rural populous to have a better chance at gainful employment. In fact, U.S. companies have been able to keep jobs from going offshore, by employing sales representatives working from home, a phenomena known as *homeshoring*.[79]

IT is a major contributor in total output, productivity gains, price containment, and job creation. Small business has been a beneficiary in its dual role as consumer and provider of IT services.

Future Job Creation

Employment in the IT industry and of IT professionals is projected to increase by over a million jobs by 2013 from a base of 10.1 million in 2009. This represents growth of 1.6% a year in a period where overall employment is expected to shrink. The IT market will drive the creation of nearly 13,000 new businesses between now and the end of 2013.[80] BLS projects that a 1% average annual increase in jobs will occur from 2008 to 2018.[81] By 2018 output is projected to be $1.9 trillion which represents an increase of nearly $760 billion.[82] By contrast annual growth in GDP is projected to be only 2.4%.[83] The net jobs gain is estimated to be 750,000, of which 720,000 will be very high paying jobs. Computer systems design, hosting, related services, and other IT jobs are projected to grow by 3.8% annually.[84] IT sector jobs with the fastest growth rates include software publishing (10.5%), data processing, hosting, related services, and other IT (9.3%) and telecommunication (5.5%).

Figure 2 displays the relationship between jobs and revenues,[85] as the number of jobs per $10 million in revenue. The ratios give a sense of historic labor intensity among these firms and is a reasonable indicator of how changes in public policy may influence future revenue growth and thus jobs. The data show that for every $10 million in revenue IT firms create 23.6 direct jobs. Some sub-sectors have special relevance to the small business segment.

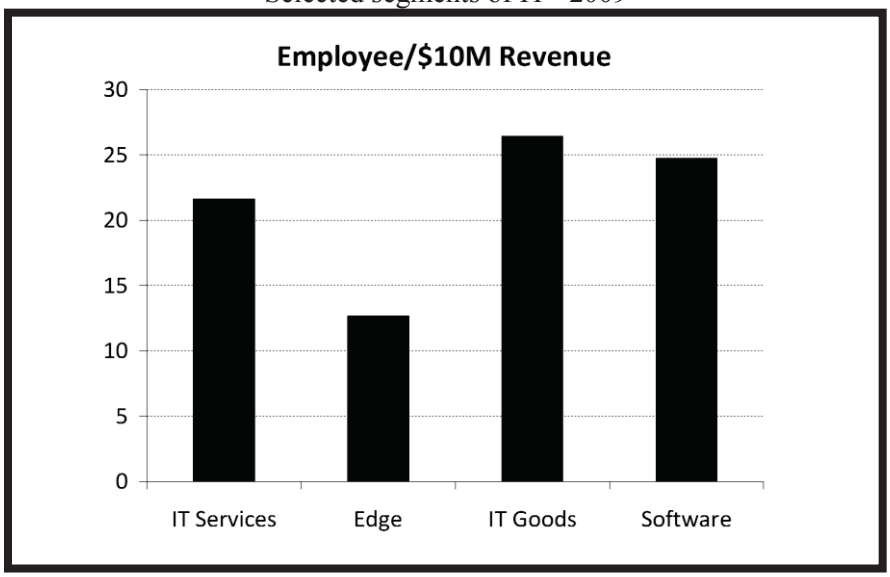
Communications

More than 2.4 million American jobs depend directly or indirectly on the wireless industry. Wireless workers are paid 50% more than the national average.[86] Wireless services grew 16% annually from 1992 to 2007. In 1994, Hausman estimated that consumer welfare gains were $50 billion per year as the result of the availability of wireless services.[87] Today that number is much higher.[88] The wireline industry

[79] Joseph P. Fuhr, Jr. and Stephen B. Pociask, "Broadband Services: Economic and Environmental Benefits," The American Consumer Institute, October 31, 2007, p. 5, 21 and 22.
[80] "Aid to Recovery: The Economic Impact of IT, Software, and the Microsoft Ecosystem on the Economy," IDC, Framingham, MA, October, 2009.
[81] Kritina J. Bartsch, "The Employment Projections for 2008-18," *Monthly Labor Review*, Nov. 2009, pp.3-29.
[82] Rose A. Woods, "Industry Output and Employment projections to 2018," *Monthly Labor Review*, November 2009.
[83] Ibid.
[84] Ibid.
[85] The chart combines SEC filed 2009 data from the following companies: Microsoft, Adobe, Oracle, CA Technologies, Intuit, Google, Yahoo!, Amazon, eBay, Cisco, Motorola, Apple, Dell, IBM, Corning, Intel, Hewlett-Packard, Texas Instruments, Advanced Micro Devices, Qualcomm, EMC Corporation, Western Digital Corp., AT&T, Verizon, Qwest, Comcast, Time Warner Cable, Cablevision, Direct TV, DISH, Sprint, US Cellular and Metro PCS.
[86] "Wireless Industry Makes Substantial Contributions to U.S. Economy," News Release, CTIA, Washington, DC, July 9, 2009, from written *Ex Parte* communication to FCC Commissioners, GN Docket No. 09-51 and WT Docket Nos. 08-165 and 09-66, filed July 9, 2009.
[87] Jeffrey Hausman, "Valuing the Effect of Regulation on New Services in Telecommunications," in *Brookings Paper on Economic Activity*, Microeconomics, 1997, editors, M.N. Bailey, P.C. Reiss and C. Winston, 1997, pp.1-37.
[88] Harold Furchtgott-Roth, "The Wireless Services Sector: A Key to Economic Growth in America: 2008 Report," January 2009.

employs 485,000 people and its workers' wages are around 44% greater than the national average.[89] Wireline invests 40% of the total $60 billion in annual broadband investment.

Figure 2: Jobs for Each $10 Million in Revenue
Selected segments of IT– 2009



Source: SEC Reports

Broadband

Two studies confirmed that ubiquitous deployment of broadband services would create 1.2 million new jobs, both direct to building and maintaining a broadband network as well as spillover effects into other industries.[90] One study reported that for every one million dollars of broadband investment, 18 new jobs are created in the economy.[91] The other estimated that every worker employed in manufacturing and constructing a broadband network produces 4.1 other workers elsewhere in the economy.[92] A third study said broadband deployment would result in very high productivity gains, create 212,000 direct and indirect jobs, and produce a massive $634 billion in economic output.[93] In 2011, McKinsey concurs with the longstanding theme that the expansion of broadband access and performance is needed to cope with rising demand and innovation.[94]

In a study of 4G wireless broadband, Deloitte finds that "U.S. investment in 4G networks could fall in the range of $25-$53 billion during 2012–2016, causing $73-$151 billion in GDP growth and 371,000–

[89] Brogan, 2010.
[90] This result was reported in two independent studies using different methodologies, see Stephen Pociask, "Building a Nationwide Broadband Network: Speeding Job Growth," TeleNomic Research, Herndon, VA, February 25, 2002; and Robert W. Crandall, Charles L. Jackson and Hal J. Singer, "The Effect of Ubiquitous Broadband Adoption on Investment, Jobs and the U.S. Economy, Criterion Economics for the New Millennium Research Council, September 2003.
[91] This was the assumption used by Crandall, Jackson and Singer, 2003, p. 14.
[92] Pociask, 2002.
[93] Thomas W. Hazlett, Coleman Bazelon, John Rutledge and Deborah Allen Hewitt, "Sending the Right Signals: Promoting Competition through Telecommunications Reform," A Report to the U.S. Chamber of Commerce, Washington, DC, September 22, 2004. The authors are from the Manhattan Institute, Analysis Group, Rutledge Capital and the College of William and Mary, respectively.
[94] Richard Dobbs, "What Business Can Do to Restart Growth", McKinsey & Company, Sept 2010 http://www.mckinsey.com/en/Features/Growth/What_business_can_do_to_restart_growth.aspx.

771,000 new jobs"[95] In the study, Deloitte says; 58% of small businesses use DSL, 9% use cable dedicated access,[96] and some small businesses would find 4G mobile broadband the best option, especially for employees "away from the office."

An investment of $10 billion in broadband network infrastructure is estimated to stimulate new employment over time with as many as 268,500 jobs as a result of direct, indirect and induced effects attributable to externalities associated with what the authors called "innovation spillovers."[97] Atkinson also estimated that a $10 billion investment in one year in broadband networks will support 498,000 new or retained U.S. jobs for a year of which 262,500 will be in small businesses.[98] Also, the employment growth rate in a community with broadband access was one percentage point greater than a community without broadband.[99] For every one percentage point increase in broadband penetration, employment increases by 0.2 to 0.3% or around 293,000 nationally in the U.S. economy.[100]

One study of small and midsize firms found that those with a strong web presence grew more than twice as quickly as those with a minimal or no presence, and created more than twice the number of jobs.[101] While 90% of small businesses operate websites, improvements in broadband speed, cloud services, and consumer use are likely to attract deeper investments.[102]

Software

According to IDC, the 120,000 "partner" firms in the Microsoft ecosystem employ over 1 million people. At an average of 8 people per partner, those firms are typically "small business. IT-*using* organizations that work with Microsoft, software or the products or services based on it employ another 2.5 million people.[103]

Computer and video game companies directly and indirectly employ over 20,000 people. Direct employees average nearly $90,000 in yearly income. In 2009 annual revenues were over $20 billion. The video game industry also accounts for $6.1 billion in sales of complementary goods.[104]

Google estimates that it creates over $1.1 trillion in economic activity and this estimate excludes cost savings to consumers, the economic impact of employees as well as the economic impact of Google Maps

[95] "The impact of 4G technology on commercial interactions, economic growth, and U.S. competitiveness," Deloitte, August 2011.
[96] Ibid.
[97] Robert Atkinson, Daniel Castro and Stephen J. Ezell, 2009. This study utilized input-output tables and related multipliers linking activities in different industrial sectors to each other published by the US Bureau of Economic Analysis of the Department of Commerce.
[98] Robert Atkinson, Daniel Castro and Stephen Ezell, 2009, pp. 1-2.
[99] William Lehr, Carlos Osorio, Sharon Gillett and Marvin A. Sirbu "Measuring Broadband Economic Impact," presented at the 33rd Research Conference on Communications, Information and Internet Policy. Arlington, Va. September 23-25, 2006.
[100] Robert Crandall, William Lehr and Robert Litan, "The Effects of Broadband Deployment on Output and Employment: A Cross-sectional Analysis of U.S. Data," Working Paper, Brookings Institution, 2007.
[101] Richard Dobbs, "What Business Can Do to Restart Growth", McKinsey & Company, Sept 2010, http://www.mckinsey.com/en/Features/Growth/What_business_can_do_to_restart_growth.aspx.
[102] "The Impact of Broadband Speed and Price on Small Business," Columbia Telecommunications Corporation, November 2010, http://www.sba.gov/advocacy/7540/12828.
[103] "Aid to Recovery: The Economic Impact of IT, Software, and the Microsoft Ecosystem on the Economy," IDC, Framingham, MA, October, 2009.
[104] "Video games and the Economy," Backgrounder, Entertainment Software Association, available online at http://www.theesa.com/gamesindailylife/economy.asp.

and You Tube.[105] Companies such as Google and Facebook increased employment by 3.1% over the period from Dec. 2009 to May 2010.[106]

Cloud Computing

According to Etro "cloud computing is an emerging general purpose technology that could provide a fundamental contribution to efficiency, in the private and public sectors, as well as promote growth, competition and business creation."[107] Firms can rent computing power, high value software and dynamically changing bandwidth – as much as and when they need it. This decreases a firm's fixed cost, making entry easy for small and medium sized firms and thus increasing competition. Amazon, Google, Microsoft, Cisco, IBM, AT&T, [108] and many others offer "cloud services."

Etro estimates that cloud computing could result in the creation of a million new jobs in the European Union.[109] IDC estimates cloud services could add more than $166 billion in net new business revenues to the U.S. economy between the end of 2009 and the end of 2013.[110] This in turn will create jobs.

McKinsey sees four important areas for small business use of cloud services as a replacement for traditional, capital intensive and on-premise IT applications: customer relationship management, e-commerce, collaboration, and supply chain management. Cloud applications offer higher reliability, scalability and integration between the business and its customers. This is especially attractive because cloud services are priced like rent rather than like capital investments. The availability of cloud services is expected to reduce IT application costs by 23% for customer relationship management and 50% for general use CPU and storage.[111]

Mobile Apps

Mobile Apps permit small businesses to operate more efficiently and generate more time for sales promotion and entrepreneurial activities. Small businesses already make substantial use of smartphones. A 2010 study reported that 49% of small business owners use smartphones as compared to 17% of consumers in general. Small business owners estimate that use of smartphones' mobile apps saves an average of 5.6 hours per week of their time, 11.33 hours of employee time for a total current savings of $17.6 billion annually.[112] Noteworthy, 10% of small business firms reported adding at least one employee, and as the authors state, given the difficult economy, such employment generation is impressive.[113] Some uses of mobile apps include on-site acceptance of credit cards, routing trucks more efficiently, and reducing the necessity for on-site supervision, thus saving on driving time and other costs.

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[105] "Google's Economic Impact: United States: 2009," Google, Mountain View, CA, May 25, 2009.
[106] Michael Mandel, "The Coming Communications Boom? Jobs, Innovation and Countercyclical Regulatory Policy," Policy Memo, Progressive Policy Institute, July 2010.
[107] Federico Etro, "The Economic Consequences of the Diffusion of Cloud Computing, Employment and Output in Europe," *Review of Business and Economics*," Vol. 54, 2009, p. 1.
[108] Jon Brodkin, "10 cloud computing companies to watch," May 18, 2009, *Network World*, http://www.networkworld.com/supp/2009/ndc3/051809-cloud-companies-to-watch.html?page=2.
[109] Federico Etro, "The Economic Consequences of the Diffusion of Cloud Computing, Employment and Output in Europe," *Review of Business and Economics*," Vol. 54, 2009, p. 2.
[110] "Aid to Recovery: The Economic Impact of IT, Software, and the Microsoft Ecosystem on the Economy," IDC, Framingham, MA, October, 2009, p. 3.
[111] Zoe Diamadi, "Winning in the SMB Cloud," McKinsey and Company, July 2011.
[112] Ibid, pp. 10-13.
[113] Ibid, p. 19.

Conclusion

Recent studies point to 1.6 million new jobs by 2020 due to expected investments in Big Data, up to 771,000 jobs associated with 4G wireless broadband investment and uses, and 524,000 for a possible smart power-grid investment. Cloud computing is estimated to create a million jobs in Europe, and is likely to do the same in the U.S. Cloud computing will help small businesses cut a quarter to a half off their IT costs. As with every IT innovation since 1990, small business is expected to participate in these stimuli and enjoy substantial jobs gains, demonstrating its great potential. It has also lowered entry barriers and enhanced the ability of small business to compete.

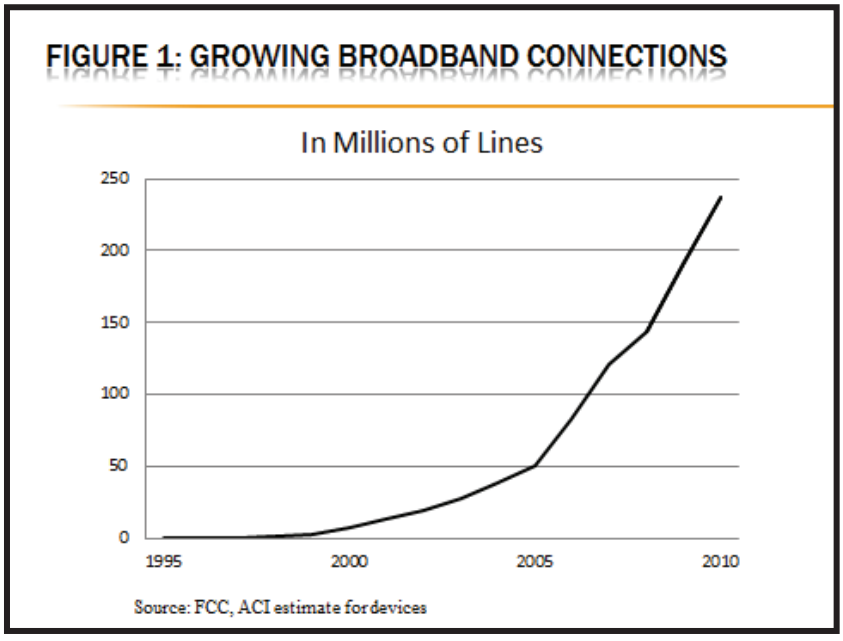
The New Generation of Technology Driving Small Business

Wayne Brough

Introduction

Technological innovation is prompting a transformation as significant as the industrial revolution. Indeed, technology is expanding the gains of the industrial revolution in important ways. As Kevin Kelly noted, we have entered the age of "mass customization."[114] The cyberspace revolution has taken the mass production techniques that spurred the industrial revolution and refined them by combining the benefits of mass production with the ability to customize output to more aptly fit the needs of specific individuals. Importantly, the new technological innovations are available to businesses of any scale, and small businesses are among the greatest beneficiaries of these technological advances. New technologies are promoting specialization by reducing information costs, allowing producers and consumers to readily find one another despite vast geographic differences. The advent of social media, such as Facebook and Twitter, has only amplified this process, allowing businesses and consumers to self-identify in ways that expand marketing opportunities utilizing cyberspace.

More and more, we have become an information economy, and individuals seek out information much the way they shop for any other good or service. With the help of technology, the online information available to businesses and consumers has increased exponentially. Newsprint eventually gave way to broadcast as a primary source of information for consumers. These media were soon joined by cable television and satellite programming as the number of news and information outlets expanded. More recently, the Internet has opened the floodgates, connecting millions of users worldwide to a seemingly limitless supply of information. Small businesses, advertising to a select audience, now have access to billions of potential customers around the world. Today, there are more than 2 billion Internet users worldwide, a number that has grown by more than 400 percent since the year 2000.[115] As Figure 1 shows, the means by which American consumers connect to broadband services continues to accelerate.



[114] Kevin Kelly, *New Rules for the New Economy*, Viking Press, 1998.
[115] "Internet World Stats," available at http://www.internetworldstats.com/stats.htm.

Understanding the Nature of the Internet

The Internet and the cyber-world that it created are good examples of what economist Friedrich A. Hayek referred to as a spontaneous order, which is a system that has emerged from the actions of many individuals without central design. As such, the Internet has emerged as a mechanism to convey information and coordinate the activities of millions of diverse individuals, each with his or her own views about fairness, justice, and appropriate human behavior. In such a dispersed institutional setting, informal constraints on individual behavior become an important component guiding usage and practices for the Internet.

There is an inherent conflict between the nature of this medium and the top-down, centrally determined rules addressing copyright, fraud, and consumer protection. Fortunately, the Internet has seen the spontaneous emergence of social norms and voluntary boundaries that allow different communities of individuals to choose the rules of conduct under which they act. Indeed, one of the virtues of the Internet is that it allows individuals to select the community with which they choose to interact. The spontaneous and radically federalist nature of the Internet has profound, yet poorly understood, implications for the governance of cyberspace.

Privacy, for example, is an issue that lends itself to this type of analysis. Both formal and informal constraints have developed to address individual concerns over privacy. Case law and regulation protect privacy concerns, as does informal disapprobation of invasive behavior by others. In fact, Internet companies such as Yahoo, Google, and Facebook are constantly adjusting their approaches to privacy in response to consumer feedback.

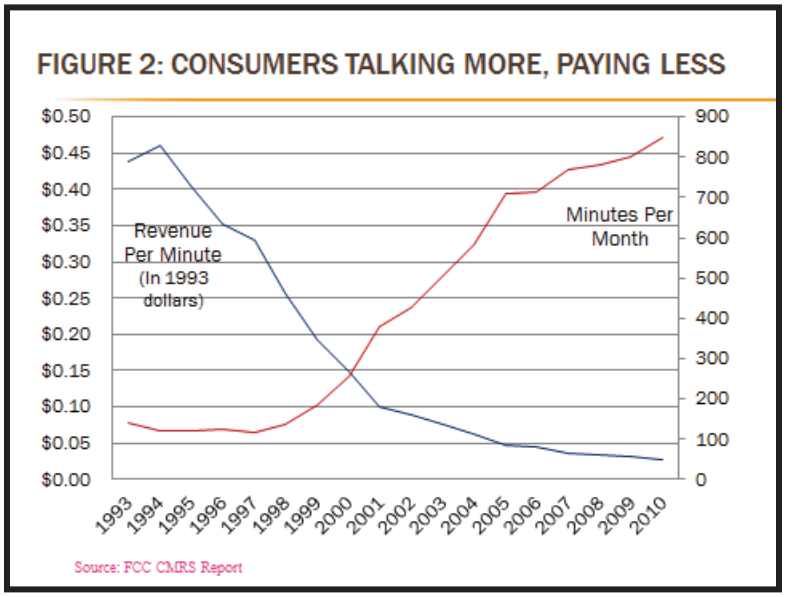
Regulating the Internet

It is clear that a social transformation is underway, although it is much less clear where the transformation is leading. In a freely ordered society, the transformation will continue, perhaps endlessly, as individuals and entrepreneurs find new opportunities and new technologies to bridge gaps and extend the new cyber-world. However, businesses are confronted with an array of important questions pertaining to the Internet that can dampen the economic potential of the online world. Issues such as privacy, the taxation of Internet transactions, and access to the Internet are the stuff of numerous government hearings, commissions, and studies. Net neutrality mandates, SOPA, and privacy regulations all have the potential to alter the landscape of the Internet. Regulations and the threat of taxation loom large for e-commerce. Both government policy and businesses seeking refuge from the intense competition of the Internet may introduce barriers that ultimately limit the consumer's choice or access to information in the unfolding world of cyber-communication.

Government regulations on a number of different and older technologies—broadcast, telecommunications, and cable—have shaped the current debate over the Internet, and unfortunately in many instances, these regulations are not transferable to the emerging technologies. And as the Internet expands, so too will efforts to introduce regulation. This is nowhere more demonstrated than in the FCC's recent imposition of new rules for the Internet, stretching its authority and challenging Congress's oversight of the agency. Such government intrusions have the potential of thwarting the development of the Internet.

Business interests are also an integral element of the governance structure of the Internet. Competition is a powerful force that drives innovation while keeping downward pressure on consumer prices (see Figure 2). Innovation has accelerated the spread of information in ways that facilitate a more dynamic

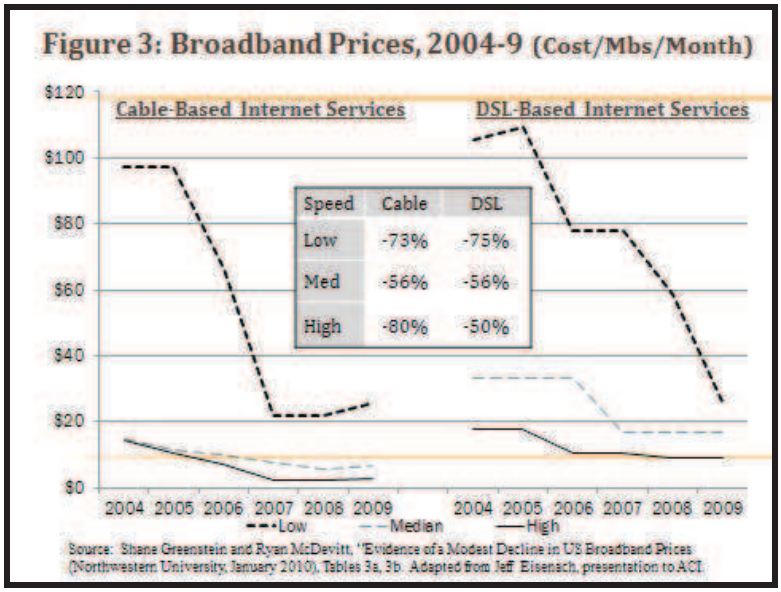
marketplace. As entrepreneurs identify new market niches and opportunities for innovation, information flows more readily, expanding the potential market. In fact, in 2010, there were more than 250 million websites and 152 million blogs. In the year 2010 alone, Facebook added 250 million new users.[116] Clearly the market is expanding, providing a new platform for both businesses and customers.



New Technologies, New Opportunities

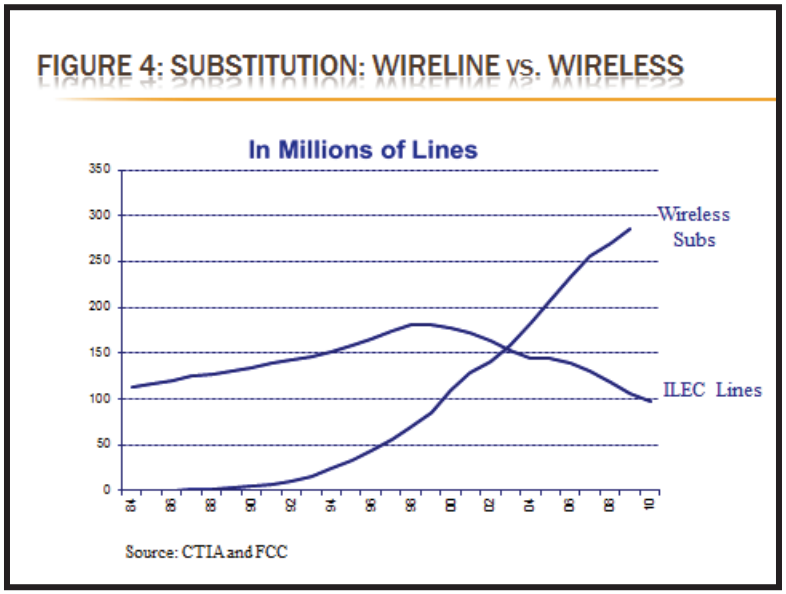
Today's technologies have transformed the way we live, touching almost every aspect of our lives, from how we talk to others, to how and what we listen to, to what we watch and where we watch it. Cell phones, iPads, DVRs, and video streaming services are at the forefront of a technological revolution that is providing dramatic consumer benefits. While not as visible, the benefits go well beyond simple entertainment to such important areas as telemedicine and distance learning. Indeed, the entire technology sector is in the midst of a transformation; technological convergence has altered the landscape significantly with the lines blurring between voice, cable, satellite and Internet providers. Today's consumers have greater choice and more innovative products available at competitive prices. But these gains tend to be in those areas beyond the reach of regulation. For example, consider the changes in wireless communications, perhaps the sector of the industry with the lightest hand of regulation. Prices have fallen, new services and plans have been introduced to accommodate all types of consumers, and today's phones continue to add new features at a rapid pace, from new voice mail and email options to cameras and streaming video (see Figure 3).

[116] Pingdom, Internet 2010 in Numbers, available at http://royal.pingdom.com/2011/01/12/internet-2010-in-numbers/.



These dramatic changes demonstrate how bits and bytes have come full circle to reshape the market while redefining those who are subject to regulations originally designed for wireline competitors. The new market includes communications providers, application providers, content providers, and others vying for consumers. Undoubtedly, this competition will generate new business models and new services that will challenge regulators struggling to fit them into an outdated regulatory regime.

The tremendous increase in wireless broadband provides a good example of how business models change in ways that confound regulators (see Figure 4). Thriving new ecosystems emerged as iPhones, Blackberries, and Android systems are providing applications wirelessly. Developers produce apps for the specific handset technologies, which for some regulators suggest that the openness of the Internet is under threat and may require regulatory intervention. Yet competition is thriving in these "walled gardens," with strong price competition and expanding consumer surplus.



As Thomas Hazlett, David Teece, and Leonard Waverman note, competition across platforms is intense and creating new markets and a larger marketplace.[117]

It is our thesis that policy makers, legal specialists and antitrust economists have failed to properly understand such systems development processes. The phenomenon at hand involves not only technological innovation, but it also involves the creation and co-creation of markets. Such contributions are important to the development of the economy and to competition. Yet there is little analytical apparatus in economics in the subfield of industrial organization/antitrust economics that attaches significance to this phenomenon. Accordingly, the probability is low that the regulatory agencies—in the case of telecoms: the FCC, the FTC, and the DoJ—will make good decisions. Indeed, there is a penchant to take the market creation and co-creation functions for granted and then intervene if the innovator is "too successful."

Modernizing our communications networks has important implications for both consumers and regulators. For consumers, this is an opportunity to expand choice and innovation. New high-speed fiber networks can deliver consumers state-of-the-art video programming over phone lines that would compete directly with local cable companies. Not only can these networks provide hundreds of channels of programming, they also have the capability to offer time-shift capabilities (e.g. DVRs or video on demand) that offer consumers greater control over their video technologies. New wireless platforms are expanding the frontiers of competition even further.

But as new technologies emerge and broadband expands to an even greater population, the Internet is showing its age. Streaming video is replacing the static web page, and real quality of service (QoS) issues are developing. Regulations that effectively freeze the Internet's development at a stage that may be inappropriate for future use patterns. In an age of video streaming and torrents, it is not surprising that new tools for network management may be required.[118] One study notes, "Greater bandwidth and processing power alone will not solve all congestion and QoS problems on the Internet. This is because the Internet involves the use of scarce resources, and when treated otherwise, theory and evidence suggests that congestion will become a problem, undermining convergence and the development of services that require superior QoS statistics."[119] The advent of cloud computing will only exacerbate strains on the existing infrastructure as broadband connections become more important for day-to-day computing activities.

At the same time, a more dynamic Internet creates more opportunities for entrepreneurs. A faster and more agile Internet paves the way for more powerful applications and a larger audience. It must be remembered that those upgrading the Internet can only generate profits by providing a product that consumers are willing to purchase. Investments in the future of the Internet are not made to deter consumers; rather, expanded deployment and better traffic management are efforts to bring more consumers online. This encourages more participation by consumers and more opportunities for developers of both content and applications.

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[117] Thomas Hazlett, David Teece, and Leonard Waverman, "Walled Garden Rivalry: The Creation of Mobile Network Ecosystems," George Mason University Law and Economics Research Series, Nov. 21, 2011, available at http://ssrn.com/abstract=1963427.

[118] BitTorrent is a peer-to-peer file sharing protocol that allows the distribution of very large amounts of information across the Internet. One study found that "it only takes about 10 BitTorrent users bartering files on a node (of around 500) to double the delays experienced by everybody else." Cited in Leslie Ellis, "BitTorrent's Swarms Have a Deadly Bite on Broadband Nets," *Multichannel News*, May 8, 2006, available at http://www.multichannel.com/article/CA6332098.html.

[119] *The Economics of IP Networks—Market, Technical and Public, Policy Issues Relating to Internet Traffic Exchange*, Study for the European Commission, The Wik Consult, May 2002, p. 162.

The technology revolution has been a driving force in boosting productivity and expanding economic output in the United States. One study notes that, "in the United States IT was responsible for two-thirds of total factor productivity growth between 1995 and 2002….and virtually all of the labor productivity growth." Perhaps one of the most significant beneficiaries of the Internet revolution has been small business. The Internet provided new opportunities to expand the market and reach new customers, create new niche markets, and outsource traditional activities such as payroll and accounting. New opportunities for using the Internet are constantly being developed. In many ways, technology and innovation allowed small businesses to challenge big business in ways never possible before. Mass customization strengthened niche markets, offering alternatives to products generally dominated by big businesses.

Small business has the potential to be a large winner due to increased broadband deployment. In his book *Long Tail,* Chris Anderson argues that the Internet allows for extreme niche markets that small (and large business) can exploit.[120] Through lower search costs, both retailers and consumers create markets that are not limited by geography. Amazon, eBay, and many others have exploited this opportunity very well. But it is not just the large firms who can profit from the long tail markets; small firms are serving these markets as well. For instance, independent music bands are able to reach potential fans who can listen to music for free (or for a small fee) that would never be heard without the ability to share audio files over the Internet.

Such niche markets are a good example of Adam Smith's famous proposition more than 200 years ago that "the division of labor is limited by the extent of the market." Broadband deployment has allowed connections between disparate buyers and sellers to create markets in virtually anything, which is why, for example, listeners can hear many music artists that they may not hear otherwise. The wide reach of the market and cheaper distribution costs have provided numerous small businesses an expanding set of opportunities.

Yet these opportunities require a fast and reliable Internet, especially when transferring content such as music, videos, or online gaming. While such uses clearly require more bandwidth than other Internet transactions, they compete for space with all data transfers and must queue together to reach end users. More bandwidth and better network management are enhancements that would help all small businesses—not just those with audio or video content—and foster greater Internet commerce. Net neutrality mandates may inhibit such improvements, to the detriment of all business.

Small businesses do not have an easy time competing with larger firms, but the Internet provides new avenues for that competition. As Anderson notes, for firms like Netflix and Amazon, "their huge libraries of less-mainstream fare set them apart, but hits still matter in attracting consumers in the first place. Great Long Tail businesses can then guide consumers further afield by following the contours of their likes and dislikes, easing their exploration of the unknown."[121] Again, these businesses are filling in voids that larger businesses do not capture, but doing so requires a reliable network.

Another 2007 survey by Wells Fargo shows the enormous benefits that small businesses gain from the use of the Internet. Not inconsequential is the response of small business owners when asked what would occur if they lost Internet access: More than one-third of the firms thought the loss of Internet connectivity would have a major negative influence on their firm, with 18 percent stating it would put them out of business. [122]

[120] Chris Anderson, *Long Tail*, Hyperion, 2006.
[121] Quoted in Chris Anderson, "The Long Tail," *Wired*, available at http://www.wired.com/wired/archive/12.10/tail_pr.html
[122] https://www.wellsfargo.com/press/20070410_SmallBizTech?year=2007.

From the survey results, it is clear that small businesses find Internet connectivity important for success, with one-fifth expecting to fail *because* of a loss of Internet access. The implication is that, at a minimum, the reliability of the Internet is a main concern to the small business person.

This massive increase in broadband use will put enormous pressure on the backbone of the Internet. Capacity will be strained to the limits with users requiring streaming video, Internet telephony, potential medical usage, and so forth. This demand will require both more bandwidth and better management of what is becoming an increasingly scarce resource. Even more importantly, newer applications and content require constant "jitterless" Internet connectivity.

Conclusion

The Internet is clearly one of the largest transformational events of the last 100 years, generating what some have referred to as an e-revolution, with an economic impact akin to the industrial revolution of the 19th century. In fact, the Internet has touched almost every aspect of the economy, expanding markets, boosting productivity, and enhancing consumer welfare. One study notes, "The deployment of Internet business solutions has yielded to date a cumulative cost savings of $155.2 billion to U.S. organizations. U.S. organizations that are currently deploying Internet business solutions expect to realize more than $500 billion in cost savings once all Internet solutions have been fully implemented by 2010."[123]

Clearly, the Internet has a tremendous potential to create conduits of information that individuals can use in the marketplace. At the same time, contrived restrictions on access to this information can limit the Internet's usefulness and dampen its economic potential. Questions of policy—regulation, taxation and access—as well as characteristics of the market—scarcity, privacy and competition—must be addressed in order to develop a better understanding of Internet and its potential. Most importantly, Internet policies must aim to generate the incentives for the capital investments required to expand the broadband infrastructure.

[123] See, for example, Hal Varian, Robert Litan, Andrew Elder and Jay Shutter, "The Net Impact Study," available at http://www.netimpactstudy.com/nis_2002.html.

Cloud Computing – A Small Business Dream Come True

Peter Christy

In the last ten years we've seen remarkable changes in the IT available for business. In stark contrast to the past when technology innovation required investment in technology infrastructure and operational competence, some of the most exciting advances require almost no IT technology and are much more accessible to small businesses that historically have been unwilling or unable to invest in IT. The result is a remarkable change in the feasibility of small businesses to benefit from business automation. A perfect example of this is *cloud computing*.

Cloud computing is an imprecise term used to mean a wide variety of things, but what they all have in common is that the computing resource or service used is somewhere else ("in the cloud") rather than on your premises, and accessed via the network. In this sense, cloud computing is nothing new since various timesharing services have been around for decades (AOL and CompuServe are well known examples). What is new over the last decade is the performance and availability of broadband connections over the Internet (and hence the performance and interactivity of cloud-based applications). This has enhanced the ease of creating cloud services for others to use and allowed rapid growth in available cloud-based services.

The value to a small business of cloud-delivered services is simple: Software as a Service (SaaS). The only reason to invest in IT is to get the benefit of the use of some application or service. Historically, the price to be paid for use of an application included buying and operating the computer, installing and maintaining the operating system (e.g. Windows) and installing, configuring and maintaining the application. These are real capital and operating costs, and they create a dependence on some level of IT competence, a challenge for a typical small business that is likely unable to hire and/or retain IT specialists (or even to intelligently select a Value Added Reseller or service provider to arrange for these services).

With modern cloud computing, the SaaS provider takes care of all the IT elements, and the small business sees the benefit. The user connects a PC to the Internet via a browser and uses the application or service (or equivalently downloads an application for a smart phone or tablet).

SaaS isn't new. Many businesses have used "cloud" payroll services like ADP or Intuit for years and SalesForce is broadly used for sales management and customer relationship management. What is very different about SaaS today is how much easier it has become to create a SaaS service and how cost effective it is to run it – the benefit of modern cloud technology.

A Peek under the Cloud Covers

Cloud computing builds on a progress in multiple dimensions. Some we are all familiar with:

- Broadband and cellular data connectivity continues to improve and provide faster and cheaper access via the Internet from both wired and mobile devices.

- Mobile devices have evolved rapidly. It's hard to remember that the iPhone was only introduced in 2007 and the iPad even more recently considering how much these categories of devices have revolutionized our personal and professional use of IT.

There have been equally revolutionary changes in how the programs and services available on the Internet can be built, that have resulted in dramatically lower costs and increased speed of deployment. Building a system like ADP payroll meant building data centers, buying and powering servers, arranging for network connectivity, managing day-to-day operations and finally implementing, maintaining and evolving the payroll application.

Today, a handful of bright programmers can create a payroll service (or anything else they can imagine) without ever buying and operating a single server because they are using development and production resources in the cloud, which are owned and operated by others. Furthermore, modern service developers only need pay for the computer power they need, when they need it. Best still, if they design the application well and usage takes off beyond their wildest dream, they can rent more capacity on an as needed basis.

Amazon Web Services (AWS, a part of Amazon the online retailer) is the pioneer in providing these services on demand. Their story shows in turn how cloud services build on remarkable technology progress.

Cloud Infrastructure

AWS is implemented in large scale data centers built with commodity (high-volume, low-cost) server systems, operating almost completely automatically representing a remarkable change from how data centers were, until recently, built and operated.

The last ten years yielded continued improvement in the performance of the servers ("Moore's Law"). More importantly with respect to cloud computing, over the past decade the industry moved to "multi-core" designs where various processors are fabricated on each CPU chip, enabling and accelerating improvement in the cost and power-efficiency of server CPU's.

Ten years ago, an enterprise data center would have much greater manual intervention, and would have been built from "high-quality" "enterprise grade" servers and storage systems. Google pioneered the use of cost-optimized inexpensive components, and showed you could build systems that were reliable and operable with minimal staff. AWS depends on the "Moore's Law" progress in semiconductors, and builds on Google's experience building large, power-efficient, inexpensive and highly automated data centers and systems.

AWS wouldn't have been possible without two other innovations: architectural convergence and virtualization. Ten years ago, applications ran on a diversity of computer instruction set architectures: the Intel X86, Sun SPARC, IBM Power, HP Precision, etc. A given application had to run on the corresponding server or it would not function. The X86 won the architecture war, and all new applications are created for that architecture. AWS is built from X86 servers only but today that's adequate to run essentially any application.

Virtualization is the final key enabler. Virtualization lets multiple workloads share the resources of a single server without regard to what software stack they use. Virtualization enables AWS to offer customers a virtual server on shared hardware with minimal constraints on the software stack, while simultaneously increasing the cost efficiency of sharing the hardware resources.

In summary, a modern cloud platform like AWS takes advantage of the continuing progress in semiconductor technology to pack a remarkable amount of computing power into its data center, at a dramatically low cost because of the use of automatically operated commodity servers. The architectural victories of the X86 lets AWS only use X86 servers, and serve a broad spectrum of customers. Virtualization lets many different customer workloads share common server resources. AWS puts this all together to offer "virtual" servers, available on-demand, for only as long as you need them, capable of running almost any modern application or service.

Elastic Computing Business Model

Elastic Computing was an important innovation in the AWS business model. Amazon chose to offer a very pure elastic payment model: you pay for what you use with fine grain control and if you use one

virtual server for one hour you pay for just that and no more. As importantly, AWS resources are available, on-demand and the resources (the number of virtual servers available) can be increased and decreased as needed.

Because Amazon needs to have capacity in reserve to satisfy on-demand requests, the price per virtual server hour is marked up considerably over their cost. That notwithstanding, the price of AWS resources is less expensive than most of their customers can provide for themselves internally because of the use of modern technology, commodity servers, automated operation, and sharing of resources. AWS is a real bargain for most consumers, especially when used in an elastic manner.

An application or service developer can use platforms like AWS to develop, test and deploy an application. The costs of running an application are much lower than the customer could have done because of the modern and automated environment, and the ability to only pay for the virtual computer resources that are actually needed at any moment.

Supporting a Cloud Application

Delivering an application as SaaS has benefits to the developer comparable to the benefits to the user. The user doesn't have to operate the computer on which the application runs; therefore, the developer doesn't have to support the customer in these activities. Historically a developer created new versions of the application from time to time and then waited for the customers to upgrade to the new version. As a result each customer had a very different operating environment, and the application developer had to be able to support them all.

The support costs for a modern SaaS offering are dramatically less because all customers run on the same software and hardware, and because a fix to the application is immediately available to all consumers. A SaaS developer can focus a greater percentage of their resources on the development and improvement of the application, and nothing on the support of diverse, different customer installations.

Cloud Web Presence and Customer Relationship Management

For all the same reasons, cloud computing makes it much simpler for a small business to have an effective web presence The cloud alternative is especially important given the rapid advances in finding, capturing and relating to your customers via search technology and social network interactions.

Advantage over Big Business

The cloud offers more to the small business than it does to large business. This is because it is easier to begin using a new, cloud delivered service than it is to change what you're already using. Many larger businesses started with a standard application package, customized it to their specific use, and operated it themselves. SaaS applications can usually be customized, within the bounds that enable cost-effective shared development and support. It is much easier to adapt the SaaS usage as an alternative to nothing than to convert from what you have. The dramatic improvements in cost-effectiveness offered by cloud platforms, and the dramatically simplified and accelerated development process for SaaS applications is creating a wealth of new applications and services to help automate and optimize business operations. It's a lot easier to start using a new service than to convert from what you've been using in the past, both for the employees in the business that have to use the new service, and for the internal IT staff that is currently delivering and supporting it.

Summary

IT in support of business is evolving more quickly than ever before as evidenced by the rapid progress in smart phones and tablets, all connected to the Internet. In stark contrast to the past, small businesses are

better enabled to take advantage of these advances than larger businesses. It is really an “IT for small business” dream come true, enabling small business to fully benefit from all these advances, at a much lower cost than was possible before, and without investing in IT competence or resources.

How the Web Changes Advertising Models

Steven Titch

In a move that sent ripples through the advertising industry last year, Ford Motor Co. used Facebook's social networking platform as its primary avenue to introduce the 2012 Ford Focus. In a November address to web entrepreneurs in Washington Ford's Digital Marketing Manager Scott Kelly said that Facebook[124] serves as a powerful vehicle to connect with the 18-29 age demographic which has become extremely difficult to reach via broadcast and print.

Further adding to the media buzz was the way that Ford built the introduction of the 2012 Focus around as "the Doug," a shameless, lecherous, politically incorrect hand puppet made of bright orange felt. Despite being a fictional character, Doug was given his own Facebook page and made regular posts on the Ford Focus Facebook page. Doug, however, was too edgy for broadcast TV. Instead, Ford, used top-tier Hollywood talent that produced a series of promotional videos featuring Doug. These videos were produced solely for YouTube, the Internet-based video sharing site, where he became a star.

When the web-based Doug campaign was launched in March 2011, Ford's goal was to attract 10,000 Facebook fans. In four weeks, the campaign had 35,650 fans. By early May, Doug's weekly videos had 1.7 million views, 67 percent of the goal with several months left in the campaign.[125]

Ford found that through web advertising it could identify, create and nurture a community of customers – both current and prospective who share an enthusiasm for the Focus. This type of community building is a new concept in advertising. Advertising and promotion have long been a one-way communication. The advertiser would tell customers about its product or service and the customer would choose whether to buy based on that information. Word-of-mouth had a role, but its scope was limited. When customers were offered a chance at feedback, it was usually through highly-structured focus groups.

The Internet allows advertisers to harness consumer feedback and word-of-mouth on an unprecedented scale. The Focus Facebook page is not a static ad; it is a central point where the car manufacturer and its customers communicate ideas, criticisms and recommendations, and have those thoughts instantly promulgated to millions of customers' networked friends and acquaintances.

A Confluence of Trends

Web marketing and advertising represents the practical result of a confluence of Internet trends that together fundamentally change the way advertising content is created and delivered. These trends are:

- Increased search engine sophistication;
- The evolution of Web 2.0, a term applied to describe the web's ability to accommodate real-time user feedback, discussion, commentary, social networking and the creation of online communities; and
- Mobility.

Ford serves as an example of how a multinational corporation is using the Web to stimulate interest, promote brand awareness and create a following for its products. However the advertising tools on the web are highly democratic and are equally as accessible to small, local businesses as they are to Fortune 500 companies.

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[124] Scott Kelly, digital marketing manager, Ford Motor Co., keynote address at DCWeek conference, Washington, D.C. Nov. 12, 2011, attended by author; also documented at http://digitalcapitalweek.org/2011/11/dcweek-opening-keynotes-wrap-up/.
[125] Jennifer Van Grove, "Sock Puppets & Social Media: Inside Ford's Risky Marketing Campaign," *Mashable*, May 18, 2011, available at http://mashable.com/2011/05/18/ford-focus-doug-campaign/.

In addition to its functional benefits, the web changes the fundamental economics of two important advertising measurements:

- Cost per thousand (CPM), the traditional measurement to determine the cost of an advertisement relative to the number of people it will reach.
- Demographics, or the particular subgroup of an audience at which an advertisement is aimed and to which the product or service will have most appeal.

The monumental shifts that the Internet has created in terms of ad delivery and economics offer consumers a completely new array of information about products in the market. They give smaller companies and individual entrepreneurs the ability to attack market segments previously out of reach and strengthen relationships with current customers. In short, the web can scale down advertising costs to the point where a small or home-based operation can create an ad campaign, target demographic and make fast adjustments based on real-time data with a limited budget.

Policy Concerns

Because web-based advertising relies heavily on consumer web surfing data it raised concerns about personal and consumer privacy concerns. Web-based advertising also threatens established business models of entrenched media businesses, particularly newspapers that serve local markets. For example, AMC Theatres, the movie exhibitor chain, pulled back on newspaper advertising, turning instead on web-based applications such as Flixster, RottenTomatoes.com, Internet Movie Database and others to reach consumers.[126]

These concerns triggered a reaction in political circles. Agencies such as the Federal Trade Commission (FTC) and the Federal Communications Commission (FCC) historically have been involved in the regulation of media content and advertising. Both agencies, along with allies in Congress, are seeking a role for the government in regulating new media, including advertising. Members of Congress, including Sen. John Kerry, suggested the federal government step in to subsidize newspapers that are losing revenue to Internet advertising. The FCC, in its National Broadband Plan, suggested that portions of the Universal Service Fund be used to support money-losing print operations.

The correct policy course on web advertising should be to go slow. Innovation is occurring rapidly, and while there are legitimate consumer concerns. The market has reacted to consumer pushback much faster than the government has. When Facebook members complained that their personal information was being too widely shared, the company improved its privacy controls. When some felt that Google StreetView went too far in showing identifiable persons or private driveways, Google took offending photos down.

Newspapers and magazines threatened by the Web are strengthening their online presences. Local reporting once done by smaller newspapers is being done remotely by bloggers and videographers who can easily spread information via YouTube, Facebook and Twitter. These efforts can benefit from Web advertising because it supports the delivery of free content.

On balance, web-based advertising platforms are highly beneficial to consumers and businesses alike. In addition to supporting an array of free content and applications from weather and traffic to TV on demand, they also support applications that are unique to the Internet. Search engines like Google and Bing, organize vast amount of information on the Internet and place it at our fingertips. Social networking sites like Facebook and LinkedIn allow us to stay in touch with friends, family and professional colleagues.

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[126] Sean F. Driscoll, "AMC Theatres pulls back on advertising, promotional prices," *Register and Star,* Rockford (Ill.), June 8, 2011, available at http://www.rrstar.com/businessrockford/x461784534/AMC-Theatres-pulls-back-on-advertising-promotional-prices.

Google and Facebook are familiar to even casual users of the Internet. Still, most user experience is concentrated on the consumer side. The way these sites and others work for advertisers is less known. It is worth a quick look at the way these sites function because hasty and poorly drafted policy could disrupt inherently beneficial processes.

How Google Advertising Works

Newspapers sell print; broadcasters sell airtime and search engines sell keywords. Pricing in print is based on ad size (full page, half page, etc.) and in broadcast on duration (30 seconds, 1 minute, etc.). The other factor is audience reach. In print, cost of an ad rises with circulation; in broadcast, cost rises in line the station's ratings.

On the web audience metrics can vary widely. Because of this, Google sells keywords on an auction basis, and calls this program *AdWords*. In AdWords, advertisers bid for keywords. When a user inputs that keyword in a search field, Google's systems immediately conduct an instant automated auction, awarding ad placement to the highest bidder for the "pizza" keyword. The keyword search by itself doesn't generate revenue. Google does not bill the advertiser until the user clicks on the ad or text, hence keyword bids are expressed in terms of cost-per-click, or CPC.

Moreover, advertisers can tailor keyword bids by user location or time of day. That's why a keyword search for "pizza" in a large city may yield substantially different results than a search for "pizza" in a nearby small town.

The ability to set geographic and location parameters for keywords creates significant opportunity for small businesses. A national pizza chain may have the resources to bid 5 cents per click for the keyword "pizza" nationwide and may win a considerable number of placements on that basis. But the chain is paying for that scope. It's not unimaginable that the ad could easily reach 1 million clickthroughs, which would cost the national chain $20,000.

But what if a local pizza shop in a small town bids 7 cents per click for any Google "pizza" search within a much smaller market area? Since the geographic coverage of the ad is limited, the ad might be highly effective even if it gets only 1,000 clickthroughs due to the limited geographic coverage of the ad. At a CPC of 7 cents, the cost of the ad to the small pizza shop would be just $70 and will have successfully outbid the national chain for page placement in its local market.

By contrast, a print ad, which could be as much as $200 in small local paper, may run only one day, and may be seen by a small number of people who, might not be interested in buying a pizza. The web ad, however, will be delivered (or "served") to the customer who searches "pizza" on his smartphone and is likely to make a purchase. Not only does the customer discover the local business, but he can immediately click through to a menu and a phone number. The ad meets a consumer need while proving cheaper and far more effective at generating sales for the business.

Proposed laws that would prevent or restrict a collection of location information from browsers and phones would undermine this model, hurting consumers who look for alternatives and small locally-owned businesses looking for a competitive leg up. Privacy concerns are valid, but users are already given the choice to opt out of location disclosure, to not use search engines or Web portals, such as Yelp and Foursquare, to find services.

Targeted advertising and Google AdSense

Google AdSense, a component of AdWords, extends the CPC-driven advertising model to third-party websites. Google acts as an online advertising agency, serving ads to site owners across the web and dividing revenues, generally taking 40 percent and the partner web site gets 60 percent. All that is

required is that the website owner inserts a small line of code on the site. Google AdSense even allows individual bloggers to make money from their sites. Admittedly, most see only supplemental revenues, but the more popular a blog becomes, the more ad revenues it is likely to gain from the increased traffic.

What makes AdSense effective is that it delivers advertising based on the search terms that a user has employed and the web sites he or she has visited. Google is able to serve ads to users that align with their tastes and interests. This targeted, or behavioral, advertising has generated some controversy. Some users view it as an invasion of privacy. Sen. Jay Rockefeller has introduced a "Do Not Track" bill that would regulate the amount of data browsers could collect and transmit to search engine companies like Google. Similar legislation has been proposed at the state level. If enacted, these laws would be severely damaging to web-based advertising, and most likely would bring an end to much of the free content currently available to consumers.

Let's go back to our local pizza store owner. After his success with AdWords, he now wants to create a small button ad with a discount coupon. With AdSense, the shop owner knows that Google will deliver, or "serve" the ad to users who 1) are in his general area; 2) often search for pizza and visit other pizza delivery sites; 3) visit food delivery sites in general; and 4) have other interests that algorithms indicate to correlate with individuals who regular order pizza delivery, such as an interest in sports, DVD rentals, etc.[127] The next time a user who fits Google's profile of a likely pizza customer visits an independent sports blog covering his local team, he might see the pizza ad with a coupon. When the customer clicks on the ad, he gets the discount and the local sports blogger, gets ad revenue.[128]

Like keywords, ad placement is auctioned, and geographic and cost parameters can be set.[129] Factors aside from a bid might determine placement. For example, an ad that generates a large number of clickthroughs may be given priority even if competing bids are equal or more.

This is another way web advertising puts local businesses on a competitive footing with larger players.

Although supporters of "Do Not Track" laws are concerned with the collection of personal information, no discrete information, such as financial data, health status, age, sex and profession, is gathered. To be sure, algorithms are good enough to make inferences, but these are educated guesses based on statistical correlations of millions of data inputs across a huge population of users. The fact that Google can do this so well speaks to the talent and ingenuity of its people. Yet, such audience correlation in advertising is not new. It's why you see Chevy trucks advertised during the World Series and Cadillacs advertised during the Masters golf tournament. Google's behavioral tracking is audience research on a massive scale. Targeted advertising is integral to the ease, utility and economy of the web. Legislators and regulatory agencies risk a backwash of unintended consequences by attempting to throttle it.

Facebook and Social Networking

Facebook advertising uses similar auction models and targeted ad approaches to Google buts adds the dimension of social networking. The company leverages its international membership 651 million users[130] to allow advertisers to reach a cross-section of interested parties. In providing a path to these groups, Facebook performs a legitimate and valuable service for advertisers that is neither improper nor unethical. For businesses to function they must connect with markets. Certain market segments, such as the coveted

[127] These are generalities for purposes of illustration. It is not the author's intent to suggest how Google or other search engines use algorithms to place ads.
[128] Full disclosure: between 2009 and 2011, the author produced a Web site and blog that used Google AdSense. The blog did not realize any revenues from the service.
[129] Google also works with major advertising accounts through its DoubleClick unit. But these involve more specialized placements and, while they use targeted advertising methods, are beyond the scope of this paper.
[130] "How Many Facebook Users Are There?" website available at http://howmanyarethere.net/how-many-facebook-users-are-there/, downloaded May 3, 2011.

18-29 demographic (and increasingly 30-49 demographic), have become difficult to reach any other way besides the web. This is the market need Facebook fills.

For advertisers, Facebook facilitates the creation of online communities. This is what many web sites, commercial or not, aim to do: build a sizable group of individuals who share an enthusiastic interest and keep them coming back. Some, like RottenTomatoes.com, can become influential. Others may remain small and relatively unnoticed but develop a loyal core following. Web communities can be tight or loose. A single user may be a member of many communities.

The Web 2.0 concept, exemplified by reader comments on news sites, user reviews on Amazon.com, celebrity "tweets" and YouTube video footage that "goes viral," is what differentiates the web from other media. Now that the platform is mobile and users can be reached anywhere at any time, it is that much more powerful.

Facebook is extremely economical. It costs a business nothing to create a Facebook page. From there, it can communicate regularly with "friends" and "fans" photos, videos and links; offer coupons, discounts, to create discussion and buzz.

After that, Facebook offers a series of options that advertisers can use to spread their message among Facebook communities, such as the "Like" button. The average Facebook user has 130 friends,[131] so one "Like" conveys a Facebook presence to a significant number of other users and encourages searching by others.

Facebook recently added "Sponsored Stories," which appear on the right side of the Facebook page. "Stories" is something of a misnomer. Advertisers buy the ability to send status updates to the friends of a Facebook user when she mentions the advertiser or the advertiser's product. These updates appear on the right side of the Facebook page—space identified as sponsored advertising which is another way to generate interest and spread information quickly at very low cost.

Since its inception, the Internet has allowed anyone to become a communicator. It has long been described as an electronic version of the backyard fence over which neighbors once conversed. Social networking continues to break down traditional barriers that would require advertisers and publishers to pro-actively take steps to grow an audience. Now, social networking sites do much of the work for them.

Ford Motor Co. was among the first to take advantage of this, showing how these new web media platforms can be used to engage customers and prospects in innovative ways. The "spokespuppet" campaign for the Focus showed that web media can effectively reach, inform and entertain a targeted market, perhaps better than traditional print or broadcast can. Google and Facebook are at the vanguard, and they will no doubt trigger others to bring more innovations to Internet networking. Consumers will benefit from the two-way relationships targeted advertising, social networking and mobility that both support and enhance. Businesses can gain a better grasp on their customers in much faster timeframes and react accordingly. Content and applications developers will have a way of generating advertising revenue so that their services remain free. Internet entrepreneurs who develop the sites, programming and applications that undergird the system will see their ideas and investments bear fruit. Best of all, the platform can scale to accommodate all. It is truly a win-win for consumers, businesses and America's high-tech industry. They will all be well-served by a regulatory climate that embraces innovation and applications experimentation.

[131] Ibid.

Case Study: An Online Presence Resuscitates 'Buggy-Whip' Sales

Bruce Edward Walker

The Internet often is depicted as the bête noire of traditional bricks-and-mortar retailers. As soon as the traditional tech-savvy household plugged in a dial-up modem to a computer in the 1990s, consumers opened up their wallets, gave up credit-card numbers to web-based retail operations, and waited at the door for UPS to deliver goods purchased from pioneers of Internet retailing like Amazon.com, eBay, and Barnes and Noble.

The Internet was and still is perceived widely as the latest onslaught against stores possessing a physical "nexus" that have managed to survive previous threats from catalog retailers, nationwide retail chains, mega-malls, and big-box stores. Corner shops selling goods to a small town just can't compete with the scale available to online retailers – or so the theory goes.

In fact, while the Internet has helped to spawn several 21st century Goliaths of retail, it also allowed thousands of Davids to arise using the power of a strong brand, a unique project and a broadband connection. For every Amazon and Apple online there are literally hundreds of small businesses specializing in everything from rare collectible items to niche products and services.

In the last decade especially, independent retailers have employed the Internet to gain market visibility and achieve the same scope enjoyed by their larger rivals. Instead of relying on foot traffic in a high-rent neighborhood, these small businesses can set up shop anywhere – or even forgo a traditional brick and mortar boutique entirely, selling products and services from the comfort of their own home.

The rise of high-speed broadband was the first piece to make this new e-commerce possible, but the explosion of online tools has also been a boon to the small business community. For example, a small business can launch a website and employ search-engine optimization and online advertisements to micro-target consumers using specific search terms or similar websites can allow small businesses to cheaply and effectively gain traffic. As a result, some small companies are able to increase exponentially their market exposure beyond their immediate geographical location and become a player in the online "borderless" economy.

Social media is another tool that can help improve a small business' brand recognition and boost sales. Positive reviews and word-of-mouth to travel across multiple platforms and reach a diverse crowd of potential customers. Before the Internet, a small restaurant owner had to rely on local newspaper ads and his neighbors to make sure that dinner service was full each evening. Today, a positive review on Yelp.com can be enough to make customers from miles away with no familiarity of the community seek out the area's most famous kebabs.

The Internet, however, isn't just a tool for cutting edge start-ups, it can also help reinvent and revitalize small businesses that have been around for decades. While the online marketplace allows customers to shop around for the best generic brand television at the lowest price it has also been a savior to the specialist, allowing collectors and enthusiasts to find the niche items they crave. Before the Internet, finding a classic car of a particular make or model could take years. Now it just takes a visit to Craigslist or Cars.com.

In no industry, however, is this example more prominent than for music. In its heyday, shops and recording studios relied on the sales of records and, later, cassettes and compact discs to make their profits. The rise of the Internet not only threatened local shops because of cheaper costs online, but also accelerated the shift from hard copies to digital downloads found on iTunes and Amazon. While some local stores were unable to keep up, others seized the opportunities available online.

One such example is Warren Westfall, owner of the used compact disc, video cassettes and discs, and vinyl emporium, The Record Collector, in Ferndale, Michigan. Westfall notes that the advent of digital downloads on the Internet stalled sales of newer music that represented the bulk of his sales since he opened in 1981. Westfall, however, was an early adaptor of the Internet and his online presence now accounts for 20 percent of his sales.

"I'm in what I call a 'buggy-whip' retail business," Westfall said. "The last surviving manufacturer of buggy whips made a good product and had survived competition from all of the other buggy-whip makers," he explained. "The automobile was still coming and what you made was becoming increasingly irrelevant. What I sell is the equivalent of buggy whips."

Westfall continued: "In the digital age where downloading and streaming are becoming the increasing rule every day, the number of potential customers is dwindling as fewer have a desire for 'hard-copy' media."

Instead, Westfall says the iPod, smart phones, and other devices connected to the Internet are where his customers increasingly download and store entertainment media. "The sound or picture is not as good as the hard copy," he says, "but increasingly most people do not care" because they willingly sacrifice their preference for high-quality sound and video reproduction for the convenience of acquiring and storing music and films.

"Sometime in the late 1990s," Westfall says, "I began selling on Amazon and eBay. I initially thought it was extra or found money seeing that I thought my real business was to be found 'over the counter.'"

Westfall explains that the Record Collector once depended on radio play to expose his customers to the music they eventually hoped to purchase. "MTV was the beginning of the end for commercial radio," he says. "With the Internet, the business model for radio became broken and this fact applied equally to me. The age of the mass market for video and music sales essentially was over," he said.

"Niche is now the rule and that makes what I sell increasingly difficult," he says. "No longer is there a large audience being exposed to the same music, which made it easier for someone like me to decide what to carry."

According to Westfall: "The Internet makes living in a self-imposed cultural ghetto easy in that people can experience only what they want to experience," he said. "All unwanted exposure is easily filtered out. How that impacts me is that people increasingly are not exposed to what I sell and have no idea what it is."

Westfall notes that changes in radio formats also had a desultory impact on the Record Collector's foot traffic. "Detroit had several jazz outlets on the radio that appealed to a wide range of listeners," he says. "From traditional to smooth jazz, you could hear it all with a simple flip of the radio dial. "Today, Detroit's smooth-jazz station is gone, and public radio is the only vehicle for a more sanitized jazz experience. If public radio eliminates its world-music programming, how are my customers going to hear it and hopefully decide to buy it from either myself or from the few remaining new media sellers?"

The Internet opened up new sales horizons for the Record Collector, says Westfall, due to the limited market he catered to in Detroit, which was, coincidentally, one of geographical locations hardest hit by the U.S. recession of the past several years.

"eBay and Amazon have become for me the way to sell inventory that I think I can no longer sell in my store," Westfall says. "A good example is the collection of 40 or 50 Romanian LPs I bought last year

from a customer for $0.50 each. There is no Romanian community of any substance for me to market this to in southwest Michigan. The Internet is almost the only way I can expect to sell them. And I have sold most of them online for $6 to $10 each. In my store I probably still could not sell them for a dollar each."

Westfall says that eBay has become essential in the Record Collector's sales strategy. "No one is going to walk into my store in Ferndale, Michigan, and spend almost $600 on a classical LP that I received in an eBay auction," he says.

"Truth be told, if I had received the opening bid of $10, I would have been as happy as it represents $10 more than I would have received trying to sell it at my store, because classical vinyl at the retail level is now almost nonexistent. On the Internet, I can sell a legitimately rare item and get fair market value.

Westfall notes that online sales present another type of overhead in the sales commissions charged by eBay and online financial institution PayPal, which can amount to nearly 20 percent of an online transaction. "I really do not begrudge eBay or PayPal earning a percentage of the profits," he says. "This is inventory I could not sell at my store with my limited marketing ability. The old retail adage is location, location, location – and eBay and Amazon represent great location."

Westfall says that Internet sales currently represent 20 percent of the Record Collector's sales. "Almost half of those sales are out of the country," he says. "Because of those sales I now have international customers who [virtually] come to my retail store in search of the kinds of music they are looking for. None of this would happen if not for the Internet."

Westfall notes that the Internet also helps him to research the prices he puts on items in his store. "My customers typically know the value of an item they find at my store by checking online first, he says. "If I can see what I can purchase an item for online, then so can my customers. I have to price to be competitive," he says.

"I feel the Internet is an essential part of my company's sales," Westfall concludes. "To ignore it would be my death knell."

Westfall's story is like so many other small businesses of today. Although some "buggy-whip" industries are destined to fade away as newer products replace them, other small businesses will continue to emerge and prosper because of the opportunities found online. There will also be a demand for the best food, the most unique fashion and the most cutting-edge gizmos. For the small businesses who produce these and thousands of other products and services, the Internet will allow them to reach more customers and ultimately sell more products.

America's Entrepreneurs App-Up

Karen Kerrigan

Technology is transforming America's entrepreneurial sector, and small business owners are fast-becoming major users of mobile applications (apps) to run their enterprises. Apps on mobile devices are helping small business owners save time, reduce costs, increase revenue and productivity; work more effectively; and better serve customers. In fact, there seems to be an app for almost every business need, and entrepreneurs are quickly tapping into a range of business solutions made possible through mobile technologies.

Mobile apps are allowing small business owners and their employees to perform typical office or computer desk-top functions on a mobile basis thereby saving time by streamlining tasks that normally that take up hours each day. They are enabling business owners and their sales teams to find and land new customers more quickly and service existing ones more effectively and efficiently. From brainstorming to number crunching, deploying crews to job quotes, invoicing to on-site sales, prospecting to communicating – indeed, and to borrow a phrase from Apple, "there's an app for that."

An AT&T Small Business Technology Poll released in March 2011 reported on how powerful a tool the mobile app has become for small firms. According to the survey, 38 percent of business owners who use mobile apps reported that their firms could not survive (or it would be a major challenge to survive) without them. With 96 percent of respondents in the survey reporting they currently use wireless technologies in their businesses, and with 40 percent saying all their employees use wireless devices or technologies to work away from the office (this number will grow to 50 percent by 2012), it is easy to see how mobile technologies will dominate day-to-day business in the not-too-distant future.

In this challenging and uncertain economic environment, entrepreneurs continue to search for solutions and tools that will help them better compete. It is not surprising that entrepreneurs are turning to technology, and specifically mobile devices and apps, to help solve key business challenges.

Economic Conditions Force Small Businesses to Change

The Great Recession was a wakeup call for many small business owners who readily admit that they put off leveraging technology to improve business operations. The depth and severity of the downturn shook many from their complacent mindset. In their search for solutions to help them survive the recession's immediate tumult, many small businesses invested in technology or turned to innovative broadband enabled tools. During the full first year of the recession in 2008, small to midsize firms invested $82 billion on technology, according to research firm IDC. That was a 6.2 percent increase from 2007.

Unquestionably, innovative tools made possible through broadband and wireless technologies have fostered a business technology culture where entrepreneurs are now looking to technology to resolve key business challenges. Seventy-four percent of respondents surveyed in an April 2011 *Business Journals* "SMB Insights" report identified the Internet as "one of their most valuable business tools," which was up from 65 percent the previous year.

Practical Solutions that Help Drive Business Growth, Cut Costs

Small business owners will embrace new technologies as long as they meet specific needs and there is evidence that such investments save time and money. They are looking for solutions to help increase sales and tame rising business costs – two major challenges that confront at them daily. For many small business owners, getting more productivity from labor is critical to survival and growth. And, being able to direct more hours of human capital (including the entrepreneur's own time) into growth producing

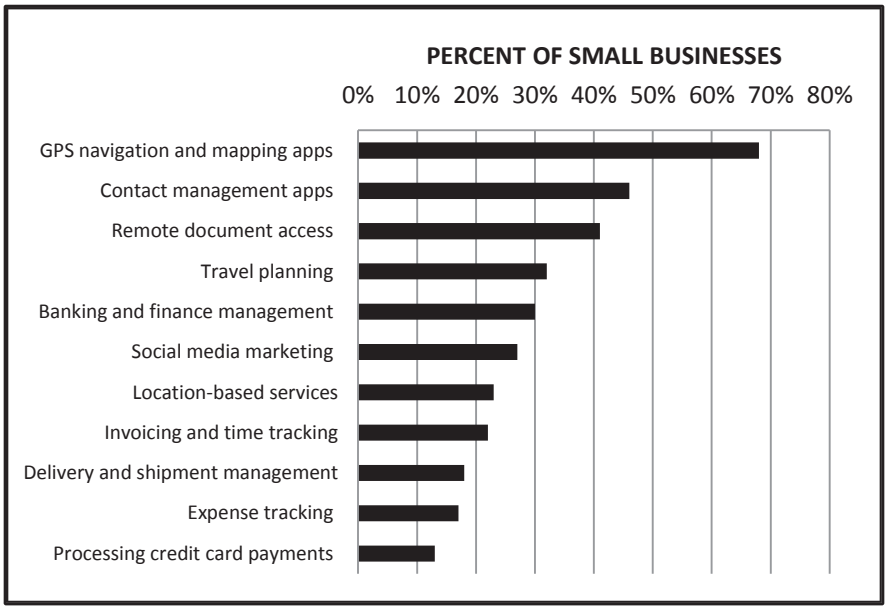
areas – such as sales, marketing and innovation – is key to business sustainability in today's challenging and competitive global marketplace.

Mobile apps are allowing small business owners to do just that. An April 2011 survey conducted by TechnoMetrica for the Small Business & Entrepreneurship Council (SBE Council), found that the use of apps by small businesses is saving enterprises both time and money. As a result, small business owners have been able to direct these savings into growth producing activities.

In fact, of the small businesses surveyed that use mobile apps, 49 percent said they were able to spend more time on increasing sales and generating new business revenues due to their use of mobile apps. Thirty-six percent of small businesses said that mobile app use allowed them to cut overhead costs, providing "more cash flow flexibility" and 10 percent said they added new employees because their adoption of mobile apps produced cost savings or new revenues that justified the new hires. An impressive 51 percent of the small businesses surveyed said they were "more competitive and better able to maneuver thru the uncertain economic period" due to mobile app usage.

Time is Money: Mobile Apps Saving Small Businesses Both

According to SBE Council's April 2011 mobile apps survey noted above, the following apps are the most widely used by small businesses:



Many of these apps are focused on helping firms operate more productively and efficiently. They are saving time and money. Time freed from administrative work, redundant tasks, unnecessary trips or meetings means more time for high value work. Through SBE Council's survey of small business owners, it was found that mobile apps are saving small businesses millions of hours of time each year. For example, the survey also found that firms save an average of 5.6 hours (a median of 4.0 hours) of time each week due to their use of mobile apps. That means the firm saves 291 hours per year – precious time that can be devoted toward innovative projects and building the business.

Seventy-five percent of firms using mobile apps also report saving employee time – an average of 11.3 hours (a median of 5.0 hours) saved on a weekly basis. These hours of employee time saved translate into a bundle in annual savings. SBE Council chief economist Raymond Keating estimates that 1.28 million small firms are saving 725.3 million employee hours annually due to their use of mobile apps. Based on

average pay for employees in small businesses, total current annual savings are estimated at a conservative $17.6 billion per year.

It is clear that many small business owners who are not using mobile technologies and apps in their firms are missing out on extraordinary cost saving opportunities. In fact, Keating estimates that if all small employer firms (less than 20 employees) were to take advantage of mobile apps, 2.34 billion employee hours could be saved annually, for a total cost savings of $56.85 billion.

Mobile apps are providing entrepreneurs and their employees with more time, which means they have more of this key resource to grow their businesses.

The Small Business "App"ortunity

After experiencing one of the deepest recessions since the Great Depression, and now laboring through an under-performing recovery, the fact that mobile apps are boosting competitiveness for many small businesses is a welcome economic positive. Mobile apps provide tremendous savings for small businesses and, as their usage spreads, so will the time savings and gains in terms of business opportunities and revenues, costs savings, competitiveness and jobs.

The success that small businesses are experiencing with mobile apps has only heightened their interest in using more of these tools. The TechnoMetrica "Mobile Apps" survey found that 50 percent of small-business mobile app users plan to increase their app exposure and use by getting more apps, using their current apps more, or both.

As business owners share their successes and best practices in leveraging technology to improve operations and sales, it encourages fellow entrepreneurs to adopt technologies across business operations. The integration of mobile technologies into business operations has caught fire, and will play an important role in helping business owners and their employees save time, trim costs, and increase sales. In turn, the benefits will spread throughout the economy, given that small businesses serve as a wellspring for economic growth, job creation and innovation.

The Small Business Tech Economy: Mobile Apps and Exportability

Morgan Reed

The emergence of the mobile app economy had a profound impact on the software industry, providing new opportunities for small business developers. Small businesses can now sell software directly to consumers, overcoming traditional supply chain challenges. Although the biggest market opportunities exist in BRIC countries – Brazil, Russia, India, and China – with high piracy rates, shadow trade issues and language barriers, the business model of low-cost apps coupled with smartphone platform security provides small software developers with the first real chance to safely reach new customers in these fast-growing markets.

The Explosive Emergence of the App Economy

The evolution of mobile technology has led to a renaissance in the software industry. The explosive rise of smartphones and tablets, as well as the applications ("apps") stores that power them, allowed for the creation of mobile apps that lack the daunting overhead found in regular "off the shelf" software. This combination of device and store is bringing transformative change to the software marketplace. Small companies that once wrote exclusively for big software platforms at the enterprise level are now able to create innovative products and sell them directly to consumers. Small business entrepreneurs no longer need to be plagued by up-front marketing costs, publisher delays, and piracy – longstanding barriers to entry that our industry has battled for the past two decades.

Beyond software development, the changing landscape in the mobile market had a profound effect on our nation's economy. While the country has endured an extended recession and uninspired recovery, the smartphone and tablet industry experienced tremendous growth. Five years since the introduction of the first iPhone, over a third of all phones in use by Americans today are smartphones, totaling 111 million units. That figure represents an increase of 75% in the past year alone.

In a very short period of time, these devices have transformed the way Americans communicate and absorb information. Mobile phone buyers are attracted to smartphones because they make access to information immediate and ubiquitous. They also bring substantial computing power to the handset. The apps that run on these devices are the vehicles to this information and productivity. Whole ad campaigns are built around the appeal of mobile apps. When Apple launched its App Store in 2008, developers sold the first independently developed applications for mobile phones. Since then, over one million new apps have been created.

The app market has grown to a five billion dollar industry in four years and analysts expect that number to reach $54 billion in the next four. Surprisingly, this growth is not a "big company" Silicon Valley phenomenon. Of the 500 best-selling mobile apps, 88% are produced by small businesses. In a majority of cases, these are micro businesses with less than 10 employees. The nature of this industry allows developers to live almost anywhere, and nearly 70% of the businesses are located outside of the state of California.

The Biggest Export Markets Have Traditionally Been Perilous to Small Business Software Developers

As app sales are growing exponentially in the U.S., export markets present the next giant pool of app consumers. Smartphone adoption in Europe is outpacing the U.S., but the rapidly modernizing markets of the BRIC nations unquestionably represent the most exciting growth opportunities for exports. Unfortunately, these countries have traditionally held little promise for small business software

developers because of the widespread problem of piracy. Four countries have software piracy rates ranging from 54% to 78%.

China is the worst offender of the four, and its example illustrates the problems faced by small businesses that consider entering these markets. With stolen software representing four out of every five programs in the country, the joke among developers is that "you only sell one copy to all of China, so you better charge a lot for it." This pervasive view of China means that independent software developers aren't losing sales – they haven't even bothered to try selling in China.

That is unfortunate for app developers given the tremendous size of these markets. China alone has five major telecommunications companies, the largest of which has a customer base double the population of the entire U.S. with 650 million subscribers. The second largest provider, China Unicom, is almost an afterthought with a subscriber base of 200 million.

The sheer size of China's mobile user base is incredible, but what is more amazing is how quickly they have moved to adopt smartphones and apps. With a 35% smartphone adoption rate, 111 million Americans are potential app buyers. According to the China Internet Network Information Center, more than 277 million mobile users have access to mobile apps or at least HTML5 based web apps. As their adoption rate dramatically increases, we could soon see a total of Chinese smartphone user base 3 or 4 times the size of the U.S. market. Similar growth is also being seen in the other BRIC nations.

So How Does Mobile Change Things?

Thankfully, small business software developers are not always destined to be excluded from the export marketplace. The emergence of app markets and the curated store model represent a unique opportunity for software developers to combat piracy in the U.S. and abroad. Smartphones present an extraordinary opportunity for small business software developers to compete in the world's fastest-growing markets because the security of the platform provides ease of authentication, offloading transaction costs overhead, and lower marketing costs.

Smartphones tend to provide a more secure development platform. On the mobile platforms where app makers earn most of their revenue, the devices only allow for the installation of pre-screened apps through a tightly controlled single point of entry. Referred to as *curated app stores*, this platform model excludes bad actors from mainstream venues. App store operators like Apple deserve great credit for proactively encouraging developers who innovate and deterring those who expropriate. Since it is not possible to purchase any software for a mobile Apple device that the company has not screened and approved, that leaves no room for pirated or counterfeit goods.

Mobile app developers also discourage piracy by primarily relying on low-cost ad-supported and "freemium" business models. "Freemium" are apps that are very low cost or free, but earn additional revenue when the user buys supplementary features. Smartphone users know that as a result of the low-cost/high-volume strategy pursued by most app developers, even sophisticated apps are often extremely inexpensive ($0.99) or free as a result of ad-supported or "freemium" business models. These low-priced and free offerings deter most would-be pirates. Even in the BRIC countries, a 99-cent app is not an unreasonable expense at the annual per capita income levels from Russia, at $18,945, to India at $3,248. To combat those that do take the risk, smartphones possess unique identifiers to make it easier to authenticate authorized users. In high piracy markets, app developers can use features like unique device IDs to ensure that only properly acquired software can run on a mobile device.

In China, currency problems created a difficult barrier for developers. Until November 2011, the Apple iTunes store in China required purchasers to use U.S. dollars. This discouraged a large number of users from purchasing apps, and instead, developers found that the Chinese were hacking the Apple hardware

itself to allow pirated software. After Apple began allowing purchasers to pay with Chinese Yuan (or RMB), the iTunes store saw explosive growth. And while we do not yet have a full quarter's worth of data, developers are reporting newfound success in getting paid for apps in China.

In other nations, shadow trade restrictions and piracy issues exist that can slow the growth of mobile app exports, but overall, the future looks bright. Even with smartphone platforms that offer only modest protection against developing-world piracy, the sheer size of these potential markets may still make them appealing to small business developers. It is now increasingly clear that the first personal computing device owned by many in the world's fastest-growing markets will be a smartphone. And as smartphones replace mobile phones, even in the developing world, the resulting markets for mobile apps will be enormous.

What Does the Future Hold?

Today, Earth is home to about 6.9 billion people and about 5 billion mobile phones. Already, smartphones account for 35% of all mobile phones sold, with annual growth rates for smartphone use at 90% in places like China. As a result, Forrester estimates that in 2012, global revenues from mobile applications stores will surpass $15 billion, an increase of 209% from 2011 revenues.

But that is just the tip of the iceberg. In 2012, the vast majority of that $15+ billion will be generated in developed nations with relatively small populations. But as smartphones penetrate and then dominate developing-world markets over the coming decade, the number of potential app customers and the size of the potential markets for low-cost or ad-supported apps will expand enormously.

The chart below highlights the opportunities and challenges posed by the four rapidly developing BRIC nations.

Country	Number of Mobile Phones	2010 Software Piracy Rate
China	961,700,000	78%
India	973,000,000	64%
Russia	234,400,000	65%
Brazil	229,500,000	54%

Although small business software developers face serious challenges today in these countries, the benefits of the app store model amplifies the scope of opportunity that will arise during the next decade's transition from traditional mobile phones to smartphones.

These figures make the longer-term growth potential of mobile applications quite clear. These four countries alone could eventually provide apps developers with over two-and-a-half billion potential customers.

Consumer Information Technologies are Spawning Home-Based Businesses

Steve Pociask and Joseph P. Fuhr Jr.

Introduction

Information technologies are leveling economies of scale, permitting some small businesses to operate more cost efficiently and enabling them to compete head-to-head with their larger, urban-based counterparts. Since Internet services and related web applications provide access to borderless markets, some businesses no longer need to be physically located near their customers and, in fact, can operate from anywhere – even from a private residence.

This essay focuses on the smallest of businesses – home-based businesses – and analyzes the comparative costs of these businesses versus those that operate from a commercial office.[132] We find that information technologies are enabling small business to flourish and avoid commercial office space, which saves costs and increases productivity.

Participation Rates: Working from Home

Technologies are being utilized in connection with various work-at-home business activities, including telecommuting, home-based, mobile-based and homeshoring.[133] Many of these activities included self-employed workers. Of the 27.3 million firms in the U.S. in 2008, nearly 21.4 million (78%) are non-employer firms.[134] Of employer-firms, nearly 85% are in service industries with many of these being very conducive to home-based working arrangements.[135] Dampening the expansion of these activities are zoning laws and homeowner covenants that can limit the operation of a business from the home.[136]

Most of the same information technologies available to businesses are available to residences, including broadband services, which are nearly ubiquitously deployed.[137] Similarly, software, web applications and cloud computing offer home-based businesses the ability to seamlessly interact with customers, business

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[132] For general definitions: cloud computing covers applications and tools that permit the online sharing of software, computing and equipment/infrastructure services to perform applications involving storage, computations, data processing emails and communications, and other online applications; Big Data refer to those technologies used in data sets that are so large that standard desktop and statistical applications are insufficient; and 4g services are the fourth generation wireless communications (broadband) services.

[133] *Telecommuting* is the use of telecommunications technology to allow *employees* to work from their homes, and avoid the use of transportation to commute to and from work (see W. Leonhard, *The Underground Guide to Telecommuting*, Addison-Wesley, 1995); t*elework* is the use of telecommunications to work anywhere other than the home office, such as telework sites, satellite offices and remote locations (see J. M. Nilles, Managing Telework: Options for Managing the Virtual Workforce, John Wiley & Sons 1998); and *Homeshoring* "is the transfer of service industry employment from offices to home-based employees with appropriate telephone and Internet facilities" (see Macmillan English Dictionary at http://www.macmillandictionary.com/new-words/050530-homeshoring.htm). Mobile-based businesses include an estimated 20,734 franchisees that drive various mobile vans or trailers equipped to provide special services – from dog grooming to remodeling. The place of business may be either a private residents or mobile unit. Louise Lee, "Chained to the Road," *Wall Street Journal*, November 4, 2011, also see http://online.wsj.com/article/SB10001424052970204346104576637301989209890.html?mod=WSJ_hps_sections_smallbusiness.

[134] "Private Firms, Establishments, Employment, Annual Payroll and Receipts by Firm Size, 1988-2008," U.S. Small Business Administration, Office of Advocacy, data provided by the U.S. Census Bureau, www.sba.gov.

[135] U.S. Small Business Administration, Office of Advocacy, data provided by the U.S. Census Bureau, Nonemployer Statistics, at www.sba.gov.

[136] "Zoning Laws for Home Based Businesses," U.S. Small Business Administration, www.sba.gov/content/zoning-laws-home-based-businesses.

[137] According to FCC data, 0.07% of census tracks in the U.S. reported no fixed residential broadband connections during 2010. See "Internet Access Services: Status as of December 31, 2010, FCC, October 2011, tables 28 and 29. These data do not include satellite services, which are available to virtually every U.S. household. The widespread availability of wireless data services permit hot spot and Wi-Fi Internet connections, some at 4g speeds.

partners, suppliers and workers. Given the widespread availability of various information technologies to consumers, the potential for the creation of home-based businesses is greater than ever.

In 2006, 14.7 million individuals worked from home nearly every day,[138] and 40% of the working population had the potential to work from home at least part of the time.[139] With 139 million persons employed in the U.S,[140] the percent of full-time home-based workers is about 10%, and about 29% of workers report working at least one day per month from home.[141] Today, according to the SBA, 52% of small businesses are home-based.[142] Moreover, the potential for expanding home-based working could be significant, provided that workers and employers continue to see the benefits of working remotely.

Table 1 provides summary data on employment and firm size of small businesses and provides some indication of those industries more likely to be home-based businesses, including agricultural, healthcare professionals, food services and construction. In many cases, professional, scientific, technical, real estate, rental and leasing, and information services businesses, such as consultancies, can be very conducive to working from a private residence.

Table 1: Employment by Industry and Firm Size – 2007

Industry	Total	< 20	< 500	% < 500
Total	120,604,265	21,770,236	59,866,924	50%
Health care and social assistance	16,797,647	2,584,531	7,989,889	48%
Accommodation and food services	11,564,864	2,103,968	6,854,722	59%
Construction	7,267,883	2,716,985	6,190,401	85%
Retail trade	15,759,928	2,812,805	6,138,628	39%
Manufacturing	13,320,172	1,183,346	5,917,710	44%
Prof. scientific & tech services	8,179,941	2,337,713	4,995,367	61%
Other services (ex. public admin.)	5,519,773	2,564,247	4,676,920	85%
Admin, waste mgmt. remediation	9,983,661	1,045,142	3,724,173	37%
Wholesale trade	5,964,850	1,228,469	3,635,834	61%
Finance and insurance	6,548,868	787,097	2,134,636	33%
Transportation and warehousing	4,395,432	549,464	1,618,079	37%
Real estate and rental and leasing	2,224,175	778,516	1,503,479	68%
Educational services	3,039,385	270,296	1,363,682	45%
Arts, entertainment, and recreation	2,008,567	365,867	1,313,243	65%
Information	3,399,313	248,162	877,184	26%
Mgmt. of companies and enterprises	3,121,402	15,807	383,588	12%
Mining	700,887	72,532	282,278	40%
Agriculture, forestry, fishing & hunting	172,105	74,583	144,111	84%
Utilities	622,757	19,449	110,345	18%

Source: "2010 Small Business Economy," U.S. Small Business Administration, p. 124.

Running a vibrant business from a non-commercial setting has historically been challenging. Today, however, there are more online tools and lower cost options available to help with advertising, getting

[138] Dieringer Research Group, Telework Trendlines for 2006, commissioned by WorldatWork, February 2009.
[139] H Scott Mathews, "Telework Adoption and Energy Use in Building and Transport Sectors in the United States and Japan," *Journal of Infrastructure Systems*, Vol. 11:1, 2005.
[140] "Employment Situation Summary Table A. Household data, seasonally adjusted," U.S. Bureau of Labor Statistics, November 4, 2011.
[141] Dieringer Research Group, Telework Trendlines for 2006, commissioned by WorldatWork, February 2009.
[142] See "Frequently asked questions," Small Business Administration, Office of Advocacy, January 2011, at http://www.sba.gov/sites/default/files/sbfaq.pdf.

access to customer markets and transacting business. For example, businesses can easily: 1) utilize online marketing applications, such as search advertising and websites; 2) tap into online marketplaces such as Craigslist, Angie's List, Amazon, Overstock or eBay for targeting Internet-based buyers; and 3) transact business and do banking using e-commerce tools. These technologies have given entrepreneurs more options at lower cost, which has increased the ability of home-based businesses to compete.

Home-Based Businesses and Office Space

A home-based office can provide a significant savings over commercial leases. Lease prices for conventional office space can typically run between $12 and $48 per square foot per year, averaging $21.25 across the country.[143] If a one or two-person firm found a space that was suitable (e.g. 250 square feet with a window) and available (e.g. few commercial owners would lease so little space), the lease payments would be just the start of the outlays. Capital costs can be substantial for leasehold improvements, including electrical wiring and lighting, carpeting, security, draperies and signage. Recurring expenses for power, maintenance and repair, snow removal, trash and janitorial service can double the lease costs. As an example, a 250 square foot office could average $880 plus amortization of leasehold improvements, or about $930 per month.[144] Commercial leases may require additional costs, such as parking spaces.

Office rentals may be a lower cost option compared to a commercial lease. Cubical and executive office space rents at an average of $720 per month with modest amenities – including a local telephone number, answering service, business address, paper file storage, desk and chair, mail and package handling and access to fee-based services such as printer/copier, broadband services and Wi-Fi, as well as long distance service.[145]

However, home-based businesses can be the low-cost option, compared to commercial leases or office rentals. Many home-based businesses likely need only a comfortable office space that allows them to get the job done. A small office with electrical outlets, broadband and telephone connection, PC and printer, desk, chair, good lighting, and paper file storage are sufficient. If a home-based business owner has an occasional need to meet clients in a more commercial setting, a virtual office can be rented with similar amenities to those of a commercial office, with prices between $99 and $285 per month, depending on location and services. In summary, a home-based office, even one with access to a virtual office, costs significantly less compared to other leasing and rental options. If inventory management is part of the equation, climate controlled storage runs about $75 per month, which ends up being less expensive than leasing commercial office space.[146] Because of technologies, location is less important, making home-based businesses a viable business option. Of course, working from home requires having business tools and applications, which requires access to affordable information technology.

Information Service Needs for Home-Based Workers

IT needs of home-based workers are dependent upon the industry in which they work and the role their businesses play within it. Retail trade and construction firms will likely need inventory tracking software, but healthcare may not. For retailers who use eBay, IT needs could be as simple as a low-cost option for

[143] Courtney Rubin, "Washington, D.C. Office Space Most Expensive in U.S.," *Inc. Magazine*, http://www.inc.com/news/articles/2010/10/washington-dc-rents-top-those-in-nyc.html.

[144] For example, $550 carpeting, $200 signage, $1,500 electrical and lighting, $200 draperies, $500 security. Conservatively, this assumes zero interest and no cost differential commercial office and home office furniture. That equates to $3,000 over 5 years or $50 per month in addition to the monthly lease.

[145] This (late 2011) figure is based on a sample of quotes taken for 8'x8' cubicles and 13'x13' executive office rentals in Miami, FL; Portland, ME; Denver, CO; Temecula, CA; Nantick, MA; Bradenton, FL; Chicago, IL; and Princeton, NJ.

[146] For example, Public Storage recently offered a 10'x10' indoor 1st floor unit in Jacksonville, Florida for $76 per month, http://www.publicstorage.com/ReservationDetails.aspx?st=794&sz=236566&key=938332.

posting high volumes of listings and for tracking inventory. Some may need offsite and secure records storage, and voice and data communications. Those who travel beyond the home to customer, supplier or job site may need mobile communications. In particular, those in small businesses such as health care, professional, technical and information services and real estate can take advantage of high-bandwidth services such as 4G mobile. Professional, scientific, technical, real estate and information services will likely need or greatly benefit from high-bandwidth collaboration and conferencing tools. All businesses need promotional tools which are integral components of successful businesses. For retail, eBay, Amazon or Overstock may be adequate. Other industries, such as professional, scientific, technical and information services, may need Facebook, LinkedIn or a more sophisticated media relations service to promote their specialized skills, burnish their reputation, and engage in social networking.

Retail companies need to make arrangements with credit card companies and firms such as PayPal to harvest both small ticket and high volume sales. Many will find that conventional wire transfer and check deposit is adequate, and many will want online banking, easy-to-use bookkeeping, invoicing and accounting software such as QuickBooks and TurboTax for Business. Most can get by with low-end client PCs or laptops, or a tablet/smart phone and fax arrangement. However, technical and retail businesses may need advanced gear, larger data storage capacity, multiple screens, barcode readers, special printers, a Wi-Fi network and specialized software such as Photoshop, AutoCAD or Office 365.[147] The capital costs are generally modest – perhaps $2000 for a PC, screen, printer, broadband modem, Wi-Fi, operating system and common office software. Desktop, laptop, iPads, computers, software and cell phones are often priced similarly regardless of whether the business operates from home or a commercial building. Sometimes, what businesses gain by making large volume purchases is lost in customization.

Communications Services

In many cases, home-based businesses can reduce broadband and communication costs to be competitive with larger firms. Residential telephone services are significantly less expensive than business services and require no additional local usage pricing. In terms of broadband, home-based businesses can choose from residential or higher-priced business services for their DSL, Cable, fiber or wireless broadband options, depending on bandwidth, email and service bundling requirements. Some home-based businesses may choose to buy a *residential* service bundle because it is $25-$63 per month cheaper than the business equivalent. However, business service bundles are available from communications carriers across the U.S. at prices near $100 per month. For the home-based business, routers permit adding a second computer without duplicating broadband costs, which can also be shared with other household members during off-peak times at no additional costs. In this way, home-based businesses could help pull-through broadband uptake for both business and personal use. Alternatively, if a household already subscribes to wireline telephone or broadband services and already owns computing equipment, the incremental cost of connectivity could be as little as zero; whereas the cost of operating from a commercial office would require duplicative equipment, software and services.

Cloud Service

For very small businesses, cloud services may be as basic as having offsite redundant storage space ("storage as a service"), accessing software like Office 365 ("software as a service"), and flexible infrastructure that allow such companies to utilize the cloud provider's equipment on an as needed basis ("infrastructure as a service").[148] Bundled cloud service components are often priced on a monthly "per-seat" basis. For example, ComCenters.net operates a virtual office service with an optional cloud component that bundles storage and Office 365 for $49 per seat per month. Rackspace and others offer

[147] For example see www.photoshop.com, www.usa.autodesk.com/autocad and www.microsoft.com/en-us/office365.
[148] Examples: http://aws.amazon.com/s3 for storage as a service; http://www.microsoft.com/softwareplusservices/ for "software as a service: and http://www.dellempowers.com/Cloud for "infrastructure as a service."

similar cloud storage and far more sophisticated e-commerce, website download, and computing-on-demand services geared towards larger clients. CSC offers a cloud "telepresence" service, a great way for small business to deliver live high-grade presentations remotely, without travel time and expenses.[149]

Small businesses will increasingly participate in cloud and Big Data applications in order to contain costs, maintain security and avoid the complexities of network maintenance and design. McKinsey and Company found that small and medium businesses would derive special value in cloud services. The software and infrastructure, such as a cloud computing services, are expected to cut small business IT costs by 23% and 50% respectively.[150] These services offer home-based offices the same web-based functions, features and capabilities as large businesses – but at scalable costs – thereby avoiding the high fixed costs and technical staff of large businesses.

Other Cost Considerations

There are many cost benefits shared by home-based businesses – savings from not commuting to work and additional energy savings. By one estimate, the typical worker pays $688 annually for work-related gasoline, and that represents a direct savings for telecommuters.[151] Logically, the same savings apply to all home-based workers. The avoidance of commuting saves on average 53 minutes per day.[152] For a home-based businesses worker who takes advantage of that time, it is an 11% hike in productivity.

Finally, electric power consumption by home offices is less than power consumption in commercial office settings. One estimate found that home offices use less energy than a commercial office, by 3000 to 4400 kWh per year.[153] For example, at a price of $0.1059 per kWh the savings averages $392 per year.[154]

Summary: Comparative Costs of Home-Based Businesses

What has changed in the last decade is that information technologies are a driving force that has enabled small home-based businesses to thrive and to do so at scalable costs. Scalability of technology costs provides lower transactions costs and increases productivity, which can level operating costs across competitors of larger size. More importantly, if it were not for the fact that computing, broadband, software and web applications were nearly ubiquitously available to homes, many of the smallest of businesses would need to be located in more costly commercial office space, which would adversely affect the viability of such businesses. As a result of scalable and affordable IT products and services to consumer homes, the avoidance of a commercial office space and other costs have become a catalyst for the creation of home-based businesses.

Information technologies are leveling economies of scale, lowering business transactions costs, improving productivity, and inexpensively expanding access to broader geographic markets. These factors have enabled home-based businesses to operate at lower cost points, grow and be successful. In short, information technologies to consumer homes have changed the landscape for business competition, fueling entrepreneurial startups for these smallest of firms.

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[149] http://www.csc.com/managed_network_services/offerings/.
[150] Zoe Diamadi, "Winning in the SMB Cloud," McKinsey and Company, July 2011.
[151] U.S. Department of Transportation, Bureau of Transportation Statistics, "From Home to Work, the Average Commute is 26.4 Minutes," Vol. 3:4, October 2004; and Rockbridge Associates, "U.S. Workers Waste $3.9 Billion Annually by Not Telecommuting," July 2006, www.rockresearch.com/news_071206.php. With rising fuel prices, the actual savings is likely to be much higher today.
http://www.bts.gov/publications/omnistats/volume_03_issue_04/html/entire.html.
[152] U.S. Department of Transportation, Bureau of Transportation Statistics, "From Home to Work, the Average Commute is 26.4 Minutes," Vol. 3:4, October 2004, http://www.bts.gov/publications/omnistats/volume_03_issue_04/html/entire.html.
[153] J. Romm, "The Internet and the New Energy Economy," Center for Energy and Climate Solutions, Global Environment and Technology Foundation, 2002.
[154] The average retail price per kWh was 10.59 cents in August, 2011, www.eia.gov/electricity/monthly/index.cfm.

Hidden Cost: The Magnitude of Federal Regulation in the U.S.

W. Mark Crain and Nicole V. Crain

The sharp economic downtown in 2007 and government responses to it fueled a renewed debate about the proper role of federal regulations. As an indication, a Google search of "U.S. regulation" yields over 600 million results as of January 2012. The continuing debate concerns the degree to which the regulatory burden has contributed to the decline in U.S. competitiveness, and by implication, whether regulatory relief would provide positive tonic for a stalled U.S. economy. Alternatively, advocates passionately argue that regulations are woefully inadequate for the tasks of protecting consumers, the health and safety of citizens, and environmental quality from inevitable market failures.

The ongoing exchange over regulatory policy frequently lacks adequate data and rigorous analysis. Congress enacted the federal "Regulatory Right-to-Know Act" in 2000, a major attempt to make information about the costs and benefits of regulations far more transparent and widely available than before. This act requires the U.S. Office of Management and Budget (OMB) to submit an accounting statement and report that includes an estimate of the total annual costs and benefits of federal rules and paperwork "to the extent feasible." In an effort to enhance further the information available to policymakers, the U.S. Small Business Administration (SBA) began in 1995 to commission comprehensive studies on the cost of federal regulations and how these costs were distributed among firms of different sizes.

Estimated Cost of Federal Regulations

We authored the most recent study for the SBA on federal regulations (Crain and Crain, 2010). That study estimates costs based on regulations in effect and available data through 2008. We summarize the methodology and major findings of that report here and offer further discussion based on subsequent policy developments and feedback. We emphasize that these cost estimates include only federal regulations, not state or local, and, importantly, the costs do not include complex and far-reaching financial and health care federal regulations that were enacted after 2008. We also emphasize that drawing conclusions about the desirability of specific regulations goes beyond the scope and objective of our study. For example, such conclusions require an examination of the benefits and the costs, and consideration of alternative regulations that might achieve similar results at lower cost.[155]

The relevance of the study is to offer a regulatory cost accounting and a broad picture of how the regulatory burden is distributed across businesses of different sizes. Specifically, we find that small businesses bear a disproportionately large share of the regulatory burden, which was estimated at $1.75 trillion in 2008.

The cumulative cost of regulation in daily life is relatively hidden, but it is paid for by individuals in their roles as taxpayers, consumers, and business owners. Federal employees decide the specifics of legislative intent and create the rules by which businesses must live. Taxpayer funds provide the resources government agencies expend to promulgate, monitor, and enforce regulations. In contrast to the considerable detail available about the federal budget process, the costs and benefits of regulation are opaque. Consumers have no obvious way to estimate how much they pay or what they receive in return for this cost. Businesses may have more information about the cost of regulation but they too are touched by regulations whose costs are hidden. For example, energy costs are typically one of the largest

[155] Likewise, normative considerations on the subject of sentiment for the environment or various species are beyond the scope of this paper.

expenses for a business, and yet a business is not likely to know how much energy costs are increased by upstream regulatory compliance.

This opaque nature of regulatory costs necessitates several methods used in combination to estimate the total cost. OMB's annual reports to Congress often provide useful data compiled from federal agencies. However, as OMB states, agencies are only required to estimate compliance costs for "major" rules, those where the costs are expected to exceed $100 million.[156] In addition, agencies frequently declare costs to be "inestimable." Moreover, the OMB annual reports include regulations issued by executive branch agencies, which means that regulations issued by independent agencies (e.g. Securities and Exchange Commission, Federal Trade Commission, Federal Communications Commission, and so forth) are not included in the annual accounting.[157] This means that burdensome economic regulations such as import restrictions, antitrust policies, telecommunications policies, product safety laws, and many other restraints on business activities are implemented outside of the OMB regulatory review process and are not included in OMB figures.[158] In summary, the aggregate costs and benefits reported by OMB lack some important components, and for this reason other sources are necessary to obtain a more accurate depiction of the U.S. regulatory landscape.[159] The gaps in OMB data were made whole by regression analysis and by the analysis of publicly available data or information from previous studies.[160] We briefly describe these estimation procedures, which separates regulations into four categories: economic, environmental, tax compliance, and the Occupational Safety and Health Administration (OSHA) and Department of Homeland Security. For all businesses within these four categories, we further estimate the distribution of regulatory costs among small, medium, and large firms.

We estimate the cost of economic regulations with regression analysis using the World Bank's *Regulatory Quality Index* (RQI) as a measure of a country's regulatory burden.[161] The regression model estimates the relationship between a country's GDP per capita and its RQI value, while controlling for a number of standard variables that explain economic differences across countries. We find that less stringent regulations systematically enhance a country's aggregate economic activity, as reflected by the level of its GDP per capita. The magnitude of the effect, as indicated by the estimated coefficient on the RQI variable, is used to derive the cost of economic regulations. Specifically, it allows us to project how much the U.S. economy is diminished relative to a regime of minimal regulations. This estimation procedure puts the cost of economic regulations (as reflected in lost GDP in 2008) at $1.236 trillion (in 2009 dollars).[162]

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[156] Copeland and Maeve (2011) report that between 2004 and 2010 some 23,003 final regulatory rules were issued, of which just 518 were "major."

[157] Exec. Order No. 12,866 §1(a), 58 Fed. Reg. 51,735 (Sept. 30, 1993).

[158] Regulations implemented directly through the legislative process are also outside the OMB review process.

[159] On this subject, OMB (2009, p. 23) states that "…it would be highly desirable to obtain better information on the costs and benefits of these rules." The OMB reports provide in tabular form information that is available from the General Accountability Office (GAO) about the costs and benefits of regulations issued by independent regulatory agencies. As OMB (2009) notes, monetized costs were reported for only two rules issued by independent regulatory agencies for the period 2007-2008.

[160] The costs of workplace regulations are based on updated estimates from the study by Joseph Johnson (2005). Tax compliance costs are based on a report from the Tax Foundation (2005). The allocation of costs across employment classes was made possible by the use of Census data published by the SBA Office of Advocacy.

[161] Prior studies for SBA used the OECD's Product Market Regulatory Index, but it is available for fewer countries and for fewer years than the World Bank's Regulatory Quality Index. The correlation between these two metrics of regulation is highly statistically significant. This means that even if the World Bank surveys did not intend to capture the regulatory environment, our analysis suggests that it does. The Congressional Research Service estimated a related regression model with different variables in an attempt to estimate the cost of regulation. Their regression results on the Regulatory Quality Index were not significant, and yet the authors used the result to estimate the cost of some regulations. The more appropriate interpretation of their result is that regulation imposes no cost on the variable of interest. This finding is clearly at odds with previous studies.

[162] For a comprehensive discussion of the specification, see Crain and Crain (2010). For comparison, when the equation was estimated without the country fixed effects variables, the estimated coefficient on the *World Bank Regulatory Quality Index* was

The estimated cost of environmental regulations uses OMB data and Hahn and Hird (1991). Because OMB only takes into account the costs of major regulations, many regulations are omitted in OMB's annual reports. For example, these regulations were less than 1 percent of EPA's rulemaking at the time of our analysis. Also, beginning in 2003 the OMB annual reports include only regulations issued in the prior ten years, which eliminates some costly regulations.

We use cost estimates from the OMB report for 2001, which includes its earliest cost accounting, and Hahn and Hird (1991) as a beginning estimate of the costs prior to 1988. To include environmental regulations promulgated through 2008, we used data for newly reviewed regulations from OMB's annual reports for 2002 through 2009. After adjusting for inflation, the cost of environmental regulations in 2008 was between $175 and $280 billion in 2009 dollars. While OMB and Hahn and Hird include "low" and "high" cost ranges in their reports, we used the high estimates because cost data for a number of important environmental regulations was unavailable.[163]

The third regulatory cost category is for federal tax compliance.[164] We compiled data from the Internal Revenue Service and, in some cases, from the Tax Foundation on the amount of time required to complete each type of tax form, and the number of filings for each type of form. The total number of hours required for compliance is nearly 4.3 billion per year, with businesses devoting about 2.3 billion hours and individuals and nonprofits devoting about 2.0 billion hours.

Multiplying the hours spent on compliance by an hourly wage rate that reflects either the value of the preparer's time (in the case of individual filers) or the hourly compensation rate for human resources professionals (in the case of business filers) yields the cost estimate.[165] The federal tax compliance estimated cost was nearly $160 billion in 2009 dollars, including the combined costs on individual filers, nonprofit organizations, and business filers. The estimated cost of compliance for businesses alone was $96 billion, accounting for 60 percent of the total tax compliance costs.

The last cost category includes regulations promulgated by OSHA and the Department of Homeland Security. We relied on three data sources for these estimates: Johnson (2005) for OSHA regulations prior to 2001, OMB (2009, Table 1-2) for OSHA regulations from 2001-2008, and OMB (2009, p.18) for all DHS regulations. After adjusting these figures for inflation, the 2008 cost of these regulations was $75.2 billion in 2009 dollars.

Table 1 summarizes the results for the four categories and the total cost of regulations for 2008 was $1.752 billion (denominated in 2009 dollars). To put this cost in perspective, $1.75 trillion is equal to 14 percent of U.S. national income.[166] When combined with U.S. federal tax receipts, which equaled 21 percent of national income in 2008, these two costs of federal government programs in 2008 consumed 35 percent of national income. Unlike the budgetary process, however, federal regulatory costs are more difficult to aggregate and there are loopholes that allow for the promulgation of regulations without the transparency that comes from careful financial analysis.

0.142 and significant at the 1 percent level. In other words, the parameter estimate used for the cost of economic regulations was on the low end of the range of estimates.

[163] For comparison, if the mid-point of the high and low estimates were used, the cost of environmental regulations would decline by roughly $50 billion, making our estimate of the total cost of regulation about $1.7 trillion.

[164] The federal government requires a host of additional forms that also impose recordkeeping and reporting burdens. However, these non-tax-related reporting and compliance requirements are largely tied to specific economic, environmental, or occupational safety and health and homeland security regulations. This means that the cost estimates for the other regulations likely will account for most of the non-tax-related compliance and reporting burden.

[165] Tax preparers' rate for individuals or human resources professionals' rate for businesses. Hourly rate sources were the U.S. Bureau of Labor Statistic's website.

[166] Milton Friedman put the estimated burden of government mandates and regulations at roughly 10 percent of U.S. national income in 2003. See Milton Friedman, "What Every American Wants," *Wall Street Journal,* January 15, 2003, p. A10.

Table 1. Summary of Regulatory Compliance Costs in 2008

(Billions of 2009 dollars)

Type of Regulation	Cost Estimate
All Federal Regulations	$1,752
Economic	$1,236
Environmental	$281
Tax Compliance	$160
Occupational Safety and Health, and Homeland Security	$75

Allocating Costs across Sectors and Business Sizes

To determine the share of costs borne by businesses of different sizes, we first allocate costs between businesses and "others" (which includes individuals and state and local governments). The costs were further allocated between business sectors of the economy and, within these sectors, to firms of different sizes. The North American Industry Classification System (NAICS) devised by the U.S. Census Bureau divides American businesses into distinct industry types. We used five broad industry categories: manufacturing, trade, services, health care, and other (a residual containing almost all other nonfarm employers).

Data available for these categories include the number of small, medium, and large firms by industry type. We follow the U.S. Small Business Administration convention of defining small firms as those having up to 20 employees, medium firms as having 20 to 499 employees, and large firms employing at least 500 people.[167] Figures for the number of people employed and payroll by sector and size of firm are also available. Using this data we calculate the percent distribution of American business by sector and business size, shown as Table 2 below.[168]

[167] U.S. Small Business Administration, Office of Advocacy, "Statistics of U.S. Businesses: Firm Size Data," website: http://www.sba.gov/advo/stats/data.html. The U.S. SBA Office of Advocacy contracted with the U.S. Census Bureau to provide employer firm size data that is available for the five categories of business sectors used on our analysis. The last year for which data were available at the time of our study was 2006.

[168] See Crain and Crain (2010), Table 8, p. 35.

Table 2. Size Distribution of American Business
(As a Percentage of Private Industry Employment)

	Sector Share of All U.S. Industry					
Size Measure	Manufacturing	Trade	Services	Health Care	Other	
No. of Firms	5	17	51	10	17	
Employees	11	18	46	14	11	
Annual Payroll	13	14	47	13	12	
	Percent of Firms, by Sector					
	Manufacturing	Trade	Services	Health Care	Other	All Sectors
<20 employees	75	90	90	88	91	89
20-499 employees	24	10	10	12	9	10
500+ employees	1	0.1	0.4	0.1	0.1	0.3
	Percent of Employees, by Sector					
	Manufacturing	Trade	Services	Health Care	Other	All Sectors
<20 employees	9	19	19	15	26	18
20-499 employees	36	27	32	33	38	32
500+ employees	56	54	50	52	36	50
	Percent of Payroll, by Sector					
	Manufacturing	Trade	Services	Health Care	Other	All Sectors
<20 employees	7	17	15	17	21	15
20-499 employees	31	32	26	28	38	29
500+ employees	62	50	59	55	41	56

Several factors affect the cost distribution among different sized firms. One such factor is the Regulatory Flexibility Act (RFA). Under the RFA, agencies are required to assess the effect of regulations on small businesses. Another consideration is that, because of economies of scale, some heavily regulated sectors are more likely to be dominated by large firms.

Breaking down the $1.75 trillion dollar cost of regulation estimate by type of regulation and by firm size reveals that small businesses bear a disproportionately large share of the burden. The cost per employee of environmental regulations is more than four times higher in small firms than in large firms. With respect to tax compliance, the cost per employee is three times higher in small firms than in large firms. The cost of occupational safety and health, and homeland security regulations are also higher for small versus larger firms, but the magnitude of the difference is smaller. However, the cost per employee of economic regulations falls most heavily on large firms.

Considering all federal regulations, all sectors of the U.S. economy, and all firm sizes, federal regulations cost $8,086 per employee per year in 2008. For firms with fewer than 20 employees, the cost is $10,585 per employee per year. The cost is $7,454 in medium-sized firms, and $7,755 in large firms. In other words, we estimate that small firms' regulatory compliance costs are about 36 percent higher than that of medium firms.

The Regulatory System in the 21st Century

We reiterate that our analysis (in response to the mandate from SBA) focuses on the cost side of the regulatory ledger and how these costs are distributed. We do not examine benefits, which might indeed

be quite substantial. As such, our analysis is insufficient for cost-benefit analysis, and tackling the benefits side of regulation would be a logical next step toward achieving a rational regulatory system.[169]

Regulatory policy and reform moved to the front burner in the wake of the great recession and the 2012 election cycle. Our $1.75 trillion cost estimate is often used in these discussions. Republicans argue that regulations impose a burden on the economy and that, given an unemployment rate hovering near nine percent, action should be taken to reduce this constraint on growth. Recognizing the importance of this issue, the Obama administration has undertaken steps to create a "21st-century regulatory system." The vision for this system is one that "protects public health and welfare while promoting economic growth, innovation, competitiveness, and job creation."

President Obama ordered a government-wide review of federal regulations for the purpose of modifying unnecessary regulations or reducing the cost of regulations where possible. "In August [2011], 26 agencies released regulatory review plans with over 500 reform initiatives. A mere fraction of the new initiatives will, alone, save more than $10 billion over the next five years; as progress continues, we expect to be able to deliver savings far in excess of that figure."[170]

Some of these savings are actually benefits cloaked as cost savings, and this just highlights the difficulty in estimating federal regulatory costs and benefits. For example, the bar code rule for medicine is expected to save $93 million over 20 years. It is not clear that this is a cost saving rather than a benefit of regulation because the rationale is that the bar code rule for medicine will prevent costly adverse events.

More easily interpreted is the 2011 Environmental Protection Agency ruling to exempt dairy producers from the Spill Prevention, Control and Countermeasure (SPCC) program. The SPCC was designed to reduce the likelihood of oil spills. Before the exemption, it was possible that dairy farmers would have to comply with the SPCC program because dairy products contain animal fat, which by some interpretations is a type of oil. Exempting dairy farmers from complying with the rule is estimated by the Obama administration to save over $100 million per year.[171] Of course, this is a cost saving with respect to relaxing a potential expansion of a regulation that was never in force. Similarly, the largest cost saving specified was from *not* implementing new regulations for lead dust, at roughly $300 million per year, or presumably $1.5 billion over five years.

According to the EPA, "Taken as a whole, recent reforms, already finalized or formally proposed, are anticiapted [sic] to save up to $1.5 billion over the next five years." [172] At press time, EPA had reported completing five reviews and having an additional 35 underway.

In any event, a regulatory reduction far in excess of the $10 billion figure will have to occur for any significant change to take place, even if some of the specific rule changes are heartening. Even $10 billion amounts to only 0.6 percent of the estimated cost of federal regulation.

Concluding Remarks

This estimate of the 2008 cost of federal regulation sheds light on the effect of costly regulations implemented over a span of decades without regard for the cumulative burden these regulations place on the economy. It may be that there are compensating benefits, but no study has definitively estimated the benefits of regulation so any claim that the benefits at least equal the costs has little empirical basis.

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[169] The few studies that attempt a cost-benefit analysis do not afford a comprehensive analysis of all federal regulations.
[170] http://www.whitehouse.gov/economy/reform/paring-back-unnecessary-regulations Accessed 12/30/2011.
[171] See http://www.epa.gov/oem/docs/oil/spcc/fs_milk.pdf and ibid.
[172] http://www.whitehouse.gov/sites/default/files/other/2011-regulatory-action-plans/environmentalprotectionagencyregulatoryreformplanaugust2011.pdf, p. 5.

In 2011, President Obama called for increased transparency, and for departments and independent agencies to produce plans to reassess and to streamline existing regulations. It is too early to tell whether this initiative will significantly reduce the burden of regulation on businesses, and small businesses in particular. The saving estimates to date that have specific action plans are a tiny fraction of aggregate regulatory costs.

Conclusion

John W. Mayo

Ev Ehrlich introduced this volume by calling to mind the prescient insights of Ronald Coase who observed that firm and industry structures were likely to be determined by the relative costs of market-based (extra-firm) and internal (within-firm) transactions. He pointed to the essays, which you have now had an opportunity to read, that highlight the dramatic changes in the cost structure faced by firms in the wake of the information technology (IT) revolution. In particular, the essays in this volume document and describe changes in costs that have been brought about by the emergence and proliferation of the Internet, cloud computing, and the development and increasing use of wireless technologies and applications.

A particular thrust of the essays centers on the interplay between the rapidly changing world of IT and the structure and role of small businesses in the larger economy. After documenting the baseline importance of small businesses to economic activity, employment growth and productivity, the essays turn to specific considerations of how changes in IT are affecting small businesses. The essays make persuasive arguments that while the emergence of the Internet, web-based applications and wireless technologies have important growth-enabling features for all businesses the most powerful of these are reserved for small businesses. With advances brought about by IT, the ability of small entrepreneurial businesses to quickly gain efficient scale to compete with larger businesses is enhanced. Additionally, on the demand side of markets, IT advances create the ability of small businesses, regardless of their geographic location, to access wholesale and retail customers effectively. These changes collectively enhance the already significant role of small firms in driving economic growth and jobs in our economy. On the policy front, the implicit (and sometimes explicit) implication of the essays is that it is important to fashion public policies that facilitate the ongoing development of IT investment and the ability of small businesses to use these technologies unencumbered by unnecessary regulations.

While important in their own right, the essays also contribute to a larger inquiry. In particular, understanding the drivers of and deterrents to economic growth has been a central focus of economists since before the publication of Adam Smith's *The Wealth of Nations*. The ongoing inquiry identified many factors, including *inter alia* capital accumulation, the presence of abundant natural resources, the establishment of a reliable system of property rights, and the presence of favorable institutions as critical building blocks for an economy to realize economic growth. While many factors have been identified, however, no single or simple formula emerged for policymakers to focus on as they seek to promote growth. Thus while growth is likely to be best stimulated through a portfolio of sound public policies, a particular focus on the role of information and communications technologies as a stimulant to economic growth has emerged in recent decades. For example, Waverman and Röller (2001) provide a detailed simultaneous equations model estimate of the relationship between telecommunications infrastructure investments and economic growth in 21 countries, finding that greater levels of IT have led to enhanced economic growth.[173]

The current set of essays contribute to this dialog, providing a variety of factual, conjectural and reflective perspectives on the broad contribution of IT to economic growth with a particular focus on small business. While readers will not find the answers to all our questions regarding the contributions of small business and IT to economic growth in the essays here, the essays surely provide insights and reflections that move us closer to that goal.

[173] Röller, Lars-Hendrik and Leonard Waverman "Telecommunications Infrastructure and Economic Development: A Simultaneous Equations Approach," *American Economic Review*, Volume 91, September 2001, 909-923.

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