# Economic Value of the Advertising-Supported Internet Ecosystem

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# Summary of Findings

Direct employment in the U.S. Internet ecosystem doubled in four years. A million new jobs were added to the million that existed in 2007. When indirect employment is added, the number of people who owe their jobs to the Internet is 5.1 million. Through the years of the 'Great Recession' and the very slow climb back, the Internet has defied the general pattern of unemployment and business revenue stagnation.

While growth was fast in the consumer-facing layer among the household names like Facebook, YouTube, and Twitter, it was even faster in the less glamorous layer that supports them. Jobs grew fastest in digital advertising agencies, ad networks, ad exchanges, customer analytics firms, and listening platforms. The engine of growth was not just firms like Twitter, but firms that used their data.

The consumer support layer is thus the unsung hero of the last four years of U.S. innovation. Consumers get the benefits of the Internet at low cost, and often for free, because entrepreneurs are building out analytical tools and support services to run them leaner, and to create new revenue sources that let even free services be profitable.

The consumer-facing layer contains many more firms, smaller firms, and younger firms, than those lower down the tree. In absolute terms it added more jobs (365,000) than the consumer support services layer (245,000). The consumer-facing layer is where entrepreneurs come face to face with consumer demand or its absence, so it is the layer where all growth originates. But it grew from a larger base, so it grew at a slower rate in the past four years (70%) than the consumer support services layer (229%).

The ecosystem touches every U.S. congressional district. We found less growth in aggregate and in percentage terms in the megaplexes of Microsoft, Google and Yahoo than in the tiny entrepreneurial ventures dispersed across every state and county, living by the grace of cloud computing, merchant platform services such as Amazon, brokers such as Craigslist, advertising media like YouTube, small finance providers like Kickstarter, payment facilitators such as Square , and social networks, recommendation engines, and search engines that helped small sellers to find customers even though they lacked the resources to build broadly recognized brands.

Sole proprietors and very small firms were, consequently, big winners. They contributed 375,000 full time equivalent jobs of the two million in the Internet ecosystem. Many were selling on Amazon, eBay and Etsy. Many others were self-employed web designers, writers and programmers. We counted 35,000 full-time equivalent jobs in app development alone, and the number of moonlighters was an order of magnitude larger.

The mobile Internet is a phenomenon of the last four years. Smart phones, barely a consideration in the 2007 report, outsold personal computers in 2011. As they deploy, consumer access to the Internet ecosystem will become ubiquitous. Mobile devices enable a broad range of location-based services to be offered to marketers and consumers, and new levels of market research and analysis.

# Chapters

# Chapter 1: Introduction

## 1.1 Purpose of the study

This study was commissioned by the Interactive Advertising Bureau (IAB) to understand the size, scope, and benefits, both social and economic, of the ecosystem of businesses in the United States that owe their existence to the Internet. It follows, to the extent possible, the structure and method of an earlier study also commissioned by the IAB. The earlier study was published in 2009 based on data from 2007 (referred to hereafter as the 2007 study.) This study relies on data from 2011 and, when available, from the first two quarters of 2012.

In commissioning these two studies, the IAB seeks to quantify the role that advertising on the Internet plays in helping the ecosystem to thrive and expand. The goal of the authors is objective, to determine the extent of the Internet ecosystem. The goal of the IAB is to support advocacy, which while it needs to be acknowledged, did not influence the authors' goal. The IAB and the authors share a common interest in objectively determining what contribution advertising makes to supporting the Internet infrastructure and the ecosystem that lives on it. Like most infrastructure, the Internet is funded in a number of ways: there are fees paid by traffic to owners and builders for access to the Internet, and there are purchases of equipment and services to build and operate elements of the Internet. But, unlike the traffic on some infrastructure systems, Internet traffic is a valued audience for advertisers. Therefore some funding takes the form of payments by marketers to owners and operators for the right to advertise to

the traffic. Advertising lessens the cost that each user must pay to receive the benefits of the Internet, and expands the size of the system that society can afford to have. Advertising is subject to a degree of public regulation, through for example restrictions on when and how advertisers can communicate with the traffic. While it is easy for the public and policy makers to see the benefits of restriction on advertising, it is harder to see the costs in the absence of a study such as this one. The study will therefore estimate the value of the ecosystem that relies on the Internet, expressed as a proportion of the United States' gross domestic product, and then estimate the fraction of that value that is funded by advertising.

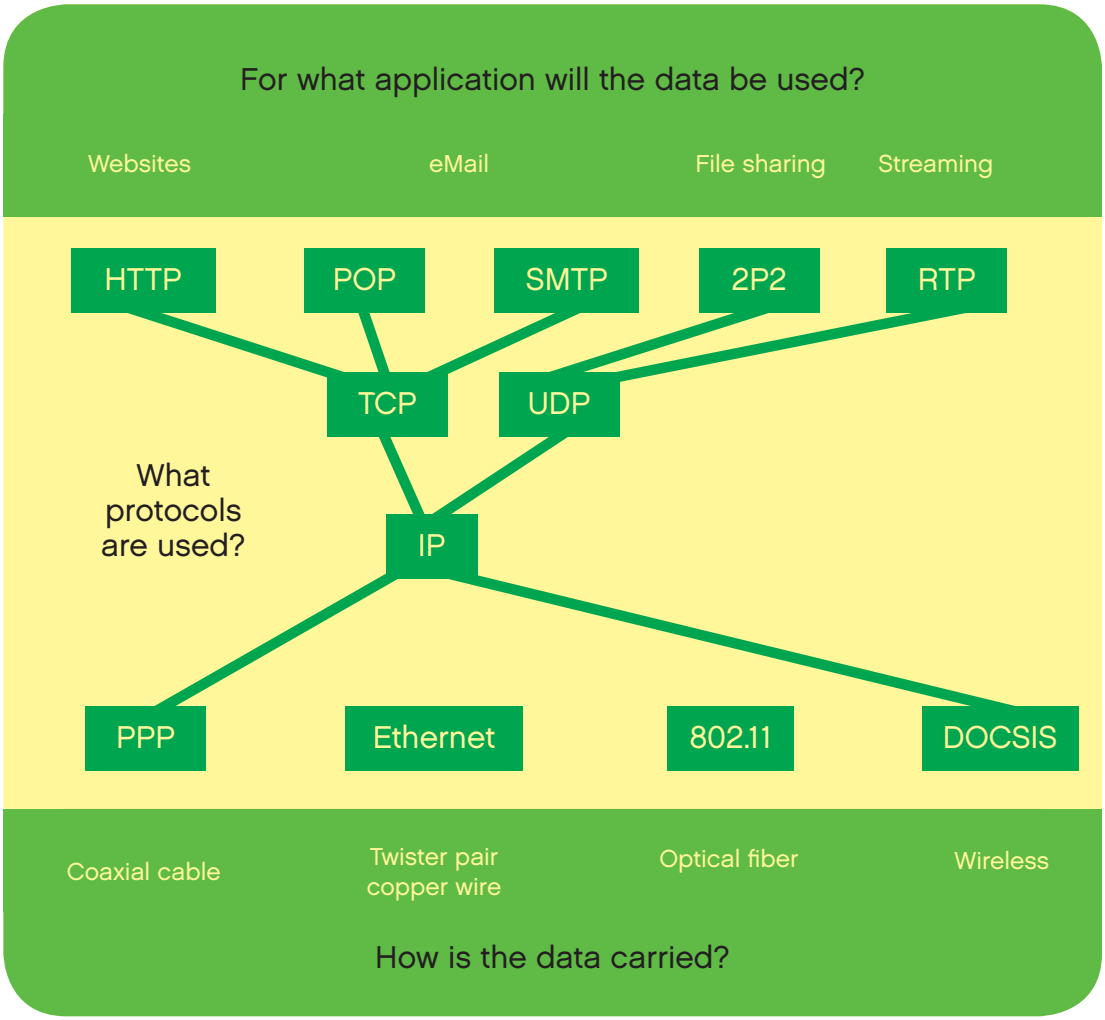
What is the Internet ecosystem? What marks the boundary between it and the rest of the economy? At the time of the 2007 study, answering this question was more straightforward than today. So we will devote some space to definitions. First we will define the Internet, and then the Internet ecosystem.

A common way to define the Internet is as a network of computer data networks managed by a software convention known as the Internet Protocol (IP.) As Figure 1.1 illustrates, the IP is just one layer in a stack of protocols adopted to transmit data from various physical networks to various applications. As of 2012 the stack has an hourglass shape with a very distinct neck, so that the Internet is conveniently defined as data that passes through the IP layer of the stack. The IP enables packet switching, and is distinct from and independent of voice networks that rely on circuit switching[1]. Thus the IP links networks carrying digital information, and is easily distinguished from networks carrying analog information, including voice transmissions. As long as traffic makes discrete choices to travel end-to-end on one network or the other, little attention needs to be given to definition, just as discrete end-to-end transportation choices make it simple to distinguish a nation's freeway network from its railroad network. In the case of the Internet there have long been exceptions: some data travels over circuit-switched networks, using public switched telephone networks to establish a dialed connection to an Internet service provider via telephone lines, and some voice travels on data networks (such as Skype), but if the quantities are negligible then Internet activity is for all practical purposes the sum of data network activity.

The 2007 study defined the Internet as all data network activity that employed the IP protocol. By 2011 this definition no longer serves our purpose. Packet switching networks have expanded to transmit voice communication over most long distance routes and many short distances, because their carrying capacity is vastly larger and, once built, their incremental cost per unit of data is much lower. So a technological definition of the Internet no longer works: we must pay attention to user applications to resolve ambiguities.

[1] See for example Kahn and Cerff, 'What is the Internet?' http://www.cnri.reston.va.us/what_is_Internet.html

## Figure 1-1: Internet Architecture




In this study we therefore apply a common sense distinction that harks back to the distinction between the uses of the telephone and the uses of text, email, blogs, online discussion groups and websites, which is the distinction between applications that need synchronous, phatic dialogue and those that do not. We do not want our definition to expand to include voice transmission because to do so would exaggerate the growth of the ecosystem. In the analysis that follows we will show, whenever there is ambiguity, how we have drawn the line between data services that belong in the Internet ecosystem and those that employ the IP protocol but are not integral to the ecosystem. We will, for example, define the mobile Internet by what is done on the data plans of mobile contracts, and exclude what is done on voice plans. Undoubtedly the Internet, whether defined technologically or by application, has expanded between this study and the earlier one. By the technological definition it has expanded enormously. But not all traffic that once moved on analog systems and now travels on the IP systems is the Internet for our purposes. By the application-based definition, it has expanded substantially, but not quite as much. The growth has come from two sources in particular: new traffic has been attracted to the Internet by new

platforms (including, as we shall see, mobile platforms) and new applications (including, as we shall see, social media applications.)

Because the mobile platform was a significant factor in the growth of the Internet ecosystem in the last four years we considered examining it as a separate system. However a high proportion of mobile-related employment is in the infrastructure layer of the system, concentrated in a small number of large telecommunications firms, and no data exist to disentangle mobile employment from other Internet employment in these firms. Therefore we felt that an attempt to estimate the mobile ecosystem would be unsuccessful.

We believe that our definition of the Internet is appropriate today and these distinctions are straightforward to draw, but they will likely need to be revised in the future, particularly if new protocols are developed to compete with the IP.

We use the term 'Internet ecosystem' to describe an aggregation of businesses that depends on and co-evolves with the Internet infrastructure

As the 2007 study did, we use the term Internet ecosystem as the phrase to describe the object of this study: an aggregation of businesses that depends on and co-evolves with the Internet infrastructure. The term does not have a long pedigree in economics, but it is useful here. It derives by analogy from a unit of analysis in biology, where it refers to an interdependent system of living organisms, from plants and animals to micro-organisms, taken together with the inert elements of their environment such as water and soil. Although the term has been used in business and economics since at least the 1970s[2], it has become popular in more recent years in the information technology industry, where the interdependence of businesses relying on a common set of technologies is a central fact. Moore (1996) wrote of a business ecosystem as a ". . . community [of firms that] co-evolve their capabilities and roles, and tend to align themselves with the directions set by one or more central companies. Those companies holding leadership roles may change over time, but the function of ecosystem leader is valued by the community because it enables members to move toward shared visions to align their investments, and to find mutually supportive roles.[3]"

The structure of a business or organizational ecosystem has been investigated by Mars, Bronstein and Lusch.[4] They find that players interact in patterns that are sometimes mutually advantageous, sometimes competitive. They argue (as do Iansiti and Levien[5]) that some players act as keystones, in the sense that they occupy hubs in the exchange network whose health assures the health of the system. The ecosystem, they find, is a nested structure in which functions and

[2] Boulding, Kenneth E. Ecodynamics: A New Theory of Societal Evolution. Beverly Hills, Calif.: Sage, 1978.

[3] Moore, James F. (1996). The Death of Competition: Leadership & Strategy in the Age of Business Ecosystems. New York: HarperBusiness

[4] Mars, Matthew, Judith Bronstein and Robert Lusch (forthcoming), "The value of a metaphor: Organizations and ecosystems," Organizational Dynamics.

[5] Iansiti, Marco and Roy Levien (2004), The Keystone Advantage: What the new Dynamics of Business Ecosystems Mean for Strategy, Innovation and Sustainability. Harvard Business School Press.

priorities often overlap. These redundancies create resilience, and conversely their absence puts the system at risk of collapse. They argue that organizational ecosystems, unlike most biological ecosystems, have foresight and can anticipate conditions that might lead to system collapse. The more complex the system, and the more turbulent its evolutionary path, however, the more difficult it is to understand the interdependencies that put the system at risk. Finally, they emphasize the emergent nature of business ecosystems. While strategy and deliberate design are never irrelevant, they are not the determinants. An ecosystem cannot be designed into existence, although enablers such as a legal regime, a regulatory regime, education, and access to capital, can be identified.

One question the study seeks to explore is the extent of the ecosystem's reliance on advertising to support it. Advertising tends to refer to payments by advertisers to third-party online media, following the precedent established in the pre-Internet world. In that world 'advertising' did not cover advertising on so-called 'owned' media such as displays on the sides of a firm's trucks and buildings, nor did it cover direct mail, catalog retailing, or telemarketing. However in the digital economy, this distinction underplays one of the important economic consequences of the internet. The marketing effects of the Internet ecosystem, particularly those of owned and earned media, are very substantial. Payments to third-party media do not measure all that the internet does for the economy.

The Internet, in sum, serves many commercial purposes besides advertising. Websites can serve as storefronts, point-of-purchase stimuli, as tools for conducting research online for offline purchase, and to transact online based on research offline. Websites can aggregate consumer reviews. Consumers can see products promoted and buy them in a single visit. They can download digital products and consume them online. They can share news about their purchases and opinions and review products and services on social media.

Reflecting back to the policy goal of the study, we explore the Internet's many business benefits besides advertising. In addition, we explore the Internet's non-business benefits. Restrictions on advertising or use of individual-user data affect such elements of the Internet as the ad-supported search engines and many content sites that provide information, entertainment, news, and social networking.

## 1.2 Structure of the Internet

Our conceptualizing of the structure of the Internet is informed by several prior studies. In 1998, Cisco Systems commissioned what appears to have been the first comprehensive study to measure the Internet's significance. The study was conducted at the Center for Research in Electronic Commerce

(CREC) at the University of Texas at Austin. It estimated that the Internet was responsible for some 1.2 million jobs in the U.S. and $301 billion in annual revenues.

The CREC study conceived of a structure of four layers to the Internet: an infrastructure layer, an applications layer, an intermediary (market maker and aggregator) layer, and a commerce layer. The structure is reproduced in Figure 1-2 (on the next page). Unfortunately there was no breakdown of revenue or employment by firms listed in the exhibit, owing to an agreement with the companies they interviewed to use revenue figures only in aggregate.

CREC summed firm revenues and firm employment at each layer to compute the total revenue and employment attributable to the Internet. There are two reasons why this step generates a much larger total than the method we employ. First, although they made a ten percent reduction in subtotals in anticipation of double-counting, this adjustment was likely far too small. By summing revenues, not value added, the summing over layers resulted in large-scale double counting. Second, the CREC analysis took into account the full value of software and hardware industries on which Internet firms rely, not the incremental value attributable to the Internet. These qualifications duly noted, they produced the totals for Internet revenues and jobs in Table 1-1.

## Table 1-1: Jobs & Revenues attributed to Internet Ecosystem according to 1998 CREC analysis

| Internet Layer | 1998 Internet Revenues (billions) | 1998 Internet Jobs |
|---|---|---|
| Infrastructure Layer | $115.0 | 372,462 |
| Applications Layer | $56.3 | 230,629 |
| Intermediary Layer | $58.2 | 252,473 |
| Commerce Layer | $102.0 | 481,990 |
| Total | $301.4 | 1,203,799 |

In a second study released in early 2001, also sponsored by Cisco, the same University of Texas group estimated the Internet had grown over 50 percent from 1999 to 2000, to $830 billion and 3.1 million employees. Though supporting data are not available, the $830 billion likely includes B2B e-commerce and is therefore likely to have counted revenues more than once in reaching a total size for the Internet economy.

In 2007, four years after the original CREC work, a third study of the economic value of the Internet was conducted.  Shawn O'Donnell, of the MIT

## Figure 1-2: The 1998 CREC Model of the Internet Ecosystem

**Layer One: The Internet Infrastructure Layer**

This layer comprised companies with products and services that together created an IP network infrastructure. The categories in this infrastructure layer included:

- Internet backbone providers (e.g., Qwest, MCI, WorldCom)
- Internet service providers (e.g., Mindspring, AOL, Earthlink)
- Networking hardware and software companies (e.g., Cisco, Lucent, 3Com)
- PC and server manufacturers (e.g., Dell, Compaq, HP)
- Security vendors (e.g., Axent, Checkpoint, Network Associates)
- Fiber optics makers (e.g., Corning)
- Line acceleration hardware manufacturers (e.g., Ciena, Tellabs, Pairgain)

**Layer Two: The Internet Applications Layer**

This layer comprised products and services built on the IP network infrastructure to make it technologically feasible to perform business activities online. The categories in this applications layer included:

- Internet consultants (e.g., U.S.Web/CKS, Scient, etc.)
- Internet commerce applications (e.g., Netscape, Microsoft, Sun, IBM)
- Multimedia applications (e.g., RealNetworks, Macromedia)
- Web development software (e.g., Adobe, NetObjects, Allaire,Vignette)
- Search engine software (e.g., Inktomi, Verity)
- Online training (e.g., Sylvan Prometric, Assymetrix)
- Web-enabled databases (e.g., Oracle, IBM DB2, Microsoft SQL Server, etc., only Internet/intranet related revenues are counted)

**Layer Three: The Internet Intermediary Layer**

This layer comprised Internet intermediaries whose task was to increase the efficiency of electronic markets by facilitating the meeting and interaction of buyers and sellers over the Internet. They acted as catalysts in the process through which investments in the infrastructure and applications layers were transformed into business transactions. The categories in this intermediary layer included:

- Market makers in vertical industries (e.g., VerticalNet, PCOrder)
- Online travel agents (e.g., TravelWeb.com, 1Travel.com)s
- Online brokerages (e.g., E*Trade, Schwab.com, DLJDirect)
- Content aggregators (e.g., CNet, ZDnet, Broadcast.com)
- Portals/content providers (e.g., Yahoo, Excite, Geocities)
- Internet ad brokers (e.g., Doubleclick, 24/7 Media)
- Online advertising (e.g., Yahoo, ESPNSportszone)

**Layer Four: The Internet Commerce Layer**

This layer comprised Internet commerce: the sale of products and services to consumers or businesses over the Internet. The categories in this Internet commerce layer included:

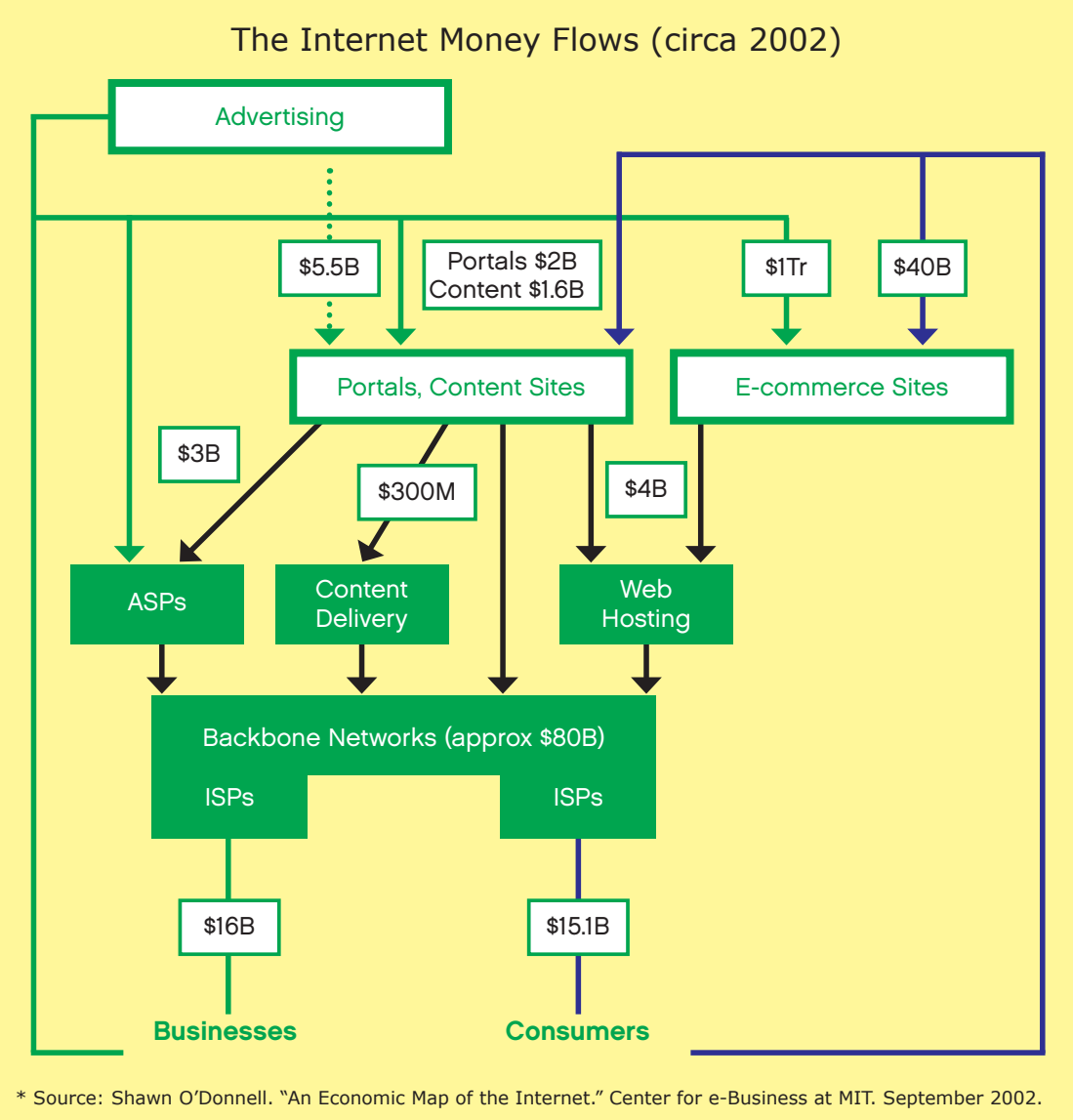
- E-tailers (e.g., Amazon.com, eToys.com)
- Manufacturers selling on-line (e.g., Cisco, Dell, IBM)
- Fee/subscription-based companies (e.g., thestreet.com, WSJ.com)
- Airlines selling online tickets
- Online entertainment and professional services

(Massachusetts Institute of Technology) Program on Internet and Telecoms Convergence, attempted to portray some of the money flows between elements or segments of the Internet. However, he pointed out that "it is relatively easy to gather information on the size of individual Internet industry segments… [but hard to] determine the disposition of revenues in any [one of them]."

O'Donnell explained that his numbers for the size of the Internet were much smaller than CREC's because he omitted hardware and software supporting the Internet, and looked only at dollar flows dedicated to the Internet. His figures for B2C eCommerce and B2B eCommerce are quite low relative to comparable figures today. His figures for the combination of ISPs and backbone networks, equivalent to today's ISP provisioning by telecom and cable companies, is actually somewhat larger, reflecting the cost reduction effect of new technology.

O'Donnell's model of the Internet and its money flows is reproduced in Figure 1-3.

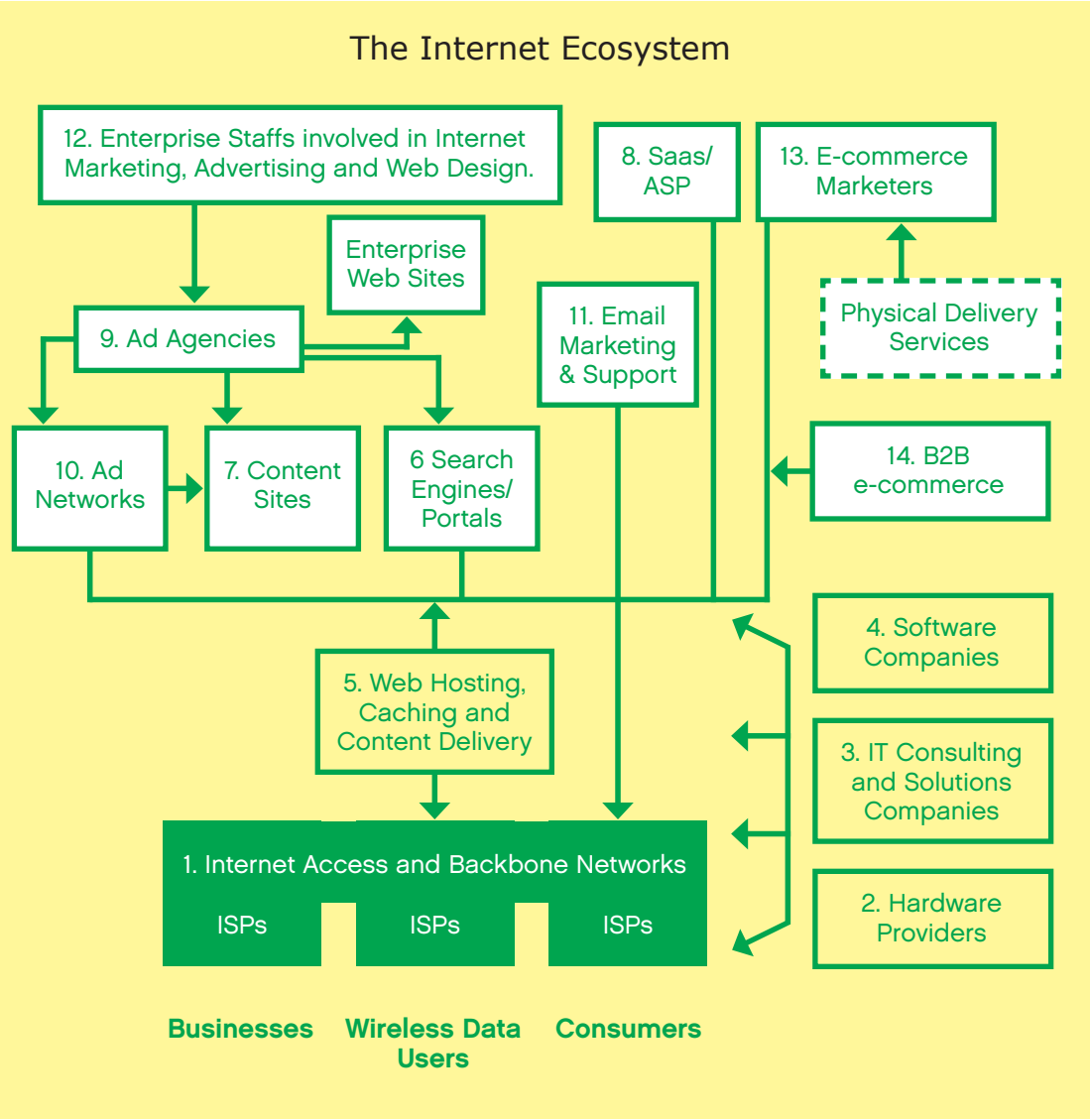
## Figure 1-3: Structure of the Internet in O'Donnell's (2002) Model




* Source: Shawn O'Donnell. "An Economic Map of the Internet." Center for e-Business at MIT. September 2002.

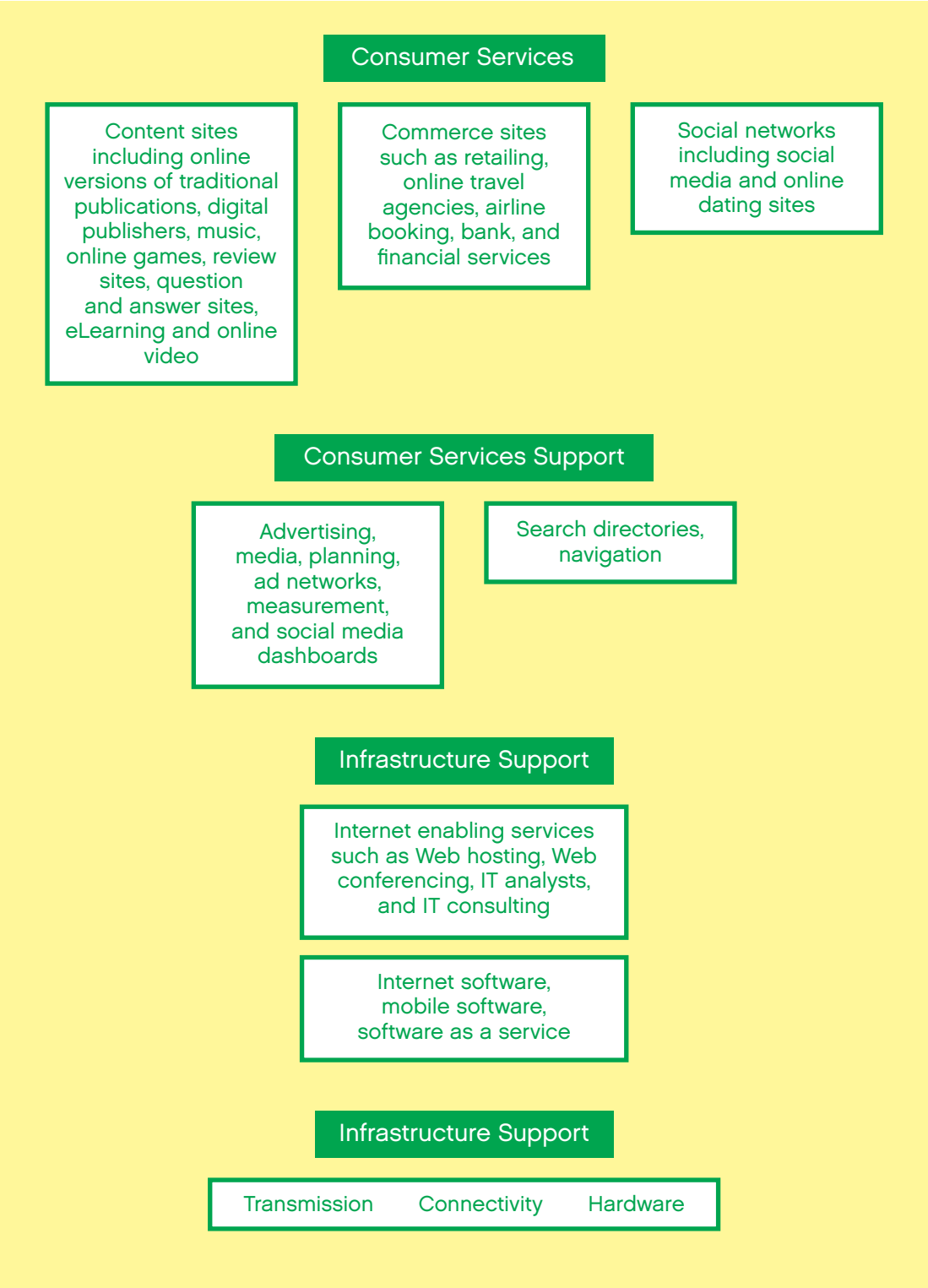
The 2007 model of the structure of the Internet (Figure 1-4) built most directly on the O'Donnell model. It was modified to reflect the segments to be observed at that time and contemporary money flows. It eliminated the "backbone network" segment, because there were by then so many alternative paths for sending data, and the networks so interwoven, that the original structure of a few long-haul networks connecting local networks did not apply.

## Figure 1-4: Map of the Internet 2007




The model used in this 2011 study (seen in Figure 1-5) is visually quite different, but structurally follows the evolving logic of its predecessors. We have adopted the metaphor of a tree, with roots in infrastructure, a trunk of infrastructure services, branches supporting consumer services, and leaves corresponding to the services that consumers buy or receive in exchange for advertising services. The tree metaphor conveys the logic of revenue flows and the relative stability of the roots and trunk relative to the richness of the foliage.

## Figure 1-5: Structure of the Internet 2011




In the next chapter we present the methodology employed in the study. In Chapters 3 to 6 we develop the results for employment in each of the four layers of the Internet. Chapter 7 shows the distribution of the ecology's employment across the United States. Chapter 8 reviews the broader socio-economic significance of the Internet ecology. Chapter 9 presents the integrated results of the study.

# Chapter 2: Methodology

Our objective is to provide data that, together with reasonable assumptions, can be used to estimate the U.S. domestic economic activity attributable to the advertising-supported Internet ecosystem. This report uses three methods to converge on an answer:

1. Employment-Based Approach: We compute the number of jobs that depend on the existence of the Internet and estimate the salaries and wages paid to these jobs.

2. What the Internet Exports to the Rest of the Economy: We compute payments to firms for Internet services, viewing the Internet as if it were an island exporting to the rest of the economy.

3. Time Spent on the Internet: We value the time that users spend on the Internet at its marginal value.

## 2.1 Employment-Based Approach

A nation's gross domestic product (GDP) is the aggregate of incomes received by residents, both individual and corporate, as direct payment for current services to production, plus capital appreciation. It is equal to the sum of the values added at each stage of production by the industries and productive enterprises located in, and making up, the country's domestic economy. The national GDP can be decomposed into sector GDPs, which, in the same spirit, measure the economic activity of each sector.

For each layer of the Internet we identify the largest employers, their total revenue and employment, and the proportion of revenue and employment that we attribute to the Internet-related activities of the firm in the United States. The firm-by-firm assumptions that underlie these attributions can be obtained by requesting a spreadsheet from the IAB. In this report we review the assumptions behind the larger and most material of the estimates.

We make allowances for smaller employers by comparing our firm-by-firm enumerations to the number of employees counted in U.S. Bureau of Census reports, and where necessary we create 'all other' categories. For industrial activity that is too new to have been counted in the most recent business census, such as mobile phone application development, we make special adjustments described in the body of the report.

For each person directly employed in a particular sector of the Internet ecosystem, other people work in sectors that supply the sector or that benefit from retail and service sector spending by these workers. The focal sector also helps to support taxation-dependent areas of the economy, such as government and public sector workers who are employed in federal, state, and municipal services, education, and the military. Thus, this indirect employment, computed by applying employment multipliers to the sector's employment, arises from supplier effects, re-spending effects, and government employment effects. The U. S. Bureau of Labor Statistics publishes statistics on industry employment requirements, which enable calculation of the labor inputs into a sector. Sectors differ in the size of their multipliers. Bivens[6] computes indirect employment that ranges from 372 indirect jobs for every 100 jobs in durables manufacturing to 163 indirect jobs for every 100 jobs in business services. These estimates are inclusive of capital service usage. We assume that the Internet sector will generate 180 indirect jobs for every 100 jobs directly created.

We then apply a fully burdened labor cost, comprising wages and salaries, the cost of benefits, on-boarding, management overhead, vacation time, and facilities costs, to these employees.

## 2.2 Value of Internet Exports to the Rest of the Economy

The direct economic value of the services that the Internet provides to the rest of the U. S. economy is the revenue paid for the services "exported" beyond the borders of the Internet's economy to the rest of the U.S. economy, net of what is "imported." The major categories of export comprise advertising services, retail transactions (net of cost of goods) conducted on the Internet, and direct payments to Internet service providers. In addition, the Internet

[6] Bivens, Josh (2003) Updated Employment Multipliers for the U.S. Economy, EPI Working Paper 268. Economic Policy Institute.

generates an indirect economic value of activity that takes place elsewhere in the economy due to the Internet sector. The same multiplier is used as was used for employment.

## 2.3 Time Spent on the Internet

The third method is based on the time that people give to the Internet. We rely on a number of studies of Internet use, some of which were surveys of recalled behavior and others that were based on observation of actual behavior.

We estimate the value of an hour spent at work for a representative U.S. worker at $19.07 per hour, derived from the average wage of non-management, non-agricultural workers in data published by the Bureau of Labor Statistics. There is no market price for an hour spent in recreation or leisure, although there is an opportunity cost. If work time is discretionary, then it has been argued (Bockstael et al., 1987[7]) that the wage rate measures the opportunity cost of leisure time. If not, and in particular for people in school or under-employed, the wage rate over-estimates the value of a leisure hour. As an approximation, we use 10 percent of the wage rate for leisure time.

[7] Bockstael, N., Strand, I. and Hanemann, W. (1987), "Time and the Recreational Demand Model," American Journal of Agricultural Economics. 69 (2) 293-302.

# Chapter 3: The Infrastructure Layer

## 3.1 Transmission

The first network to apply the Internet Protocol (IP) to packet-switched data transmission, and therefore the original backbone of the Internet, was ARPANET, built to provide routing among networks of university and research laboratories and first used in 1969. It was replaced in 1989 with the government-sponsored NSFNet backbone. When the backbone was opened to private and for-profit traffic, a group of large telecommunication vendors began to supplement NSFNet with their own IP networks. In time they grew to replace NSFNet. Because they did not pay settlements for transit on each other's networks they became known as the tier 1 transit-free networks, and this concept has now supplanted the concept of an Internet backbone.

Other significant IP networks negotiate with the tier 1 networks and pay settlement fees based on anticipated usage. In turn they recover these fees from large scale users of the Internet and Internet Service Provider (ISPs) retailers who perform what we classify below as connectivity.

The transmission element of the Internet infrastructure contains firms with the largest concentrations of Internet-reliant employment (for example AT&T and Verizon,) and some of the smallest (for example Inteliquent.) This heterogeneity is a product of the slow build-out of the networks, and the tension between historical network monopolies and the inhibitory forces of regulation.

We attributed $46.1 billion of AT&T's $126.7 billion revenue to U.S. Internet-related activity. According to the firm's 10-K filing to the SEC, wireless services contributed $57 billion of revenue and wire line data services $29.1 billion. We took 30% of wireless revenue to be Internet-related based on an IDC report (Hopkins et al[8]) that gives AT&T's data ARPU[9] at $19.30 or 30% of total ARPU of $63.76. We took 100% of wire line data to be Internet-related. An additional 3% of revenue appears in the "Online Ad Networks & Exchanges" sector of the report. The balance we attributed to AT&T's telephony business. Employment in the U.S. was computed by prorating 85% of global employment between Internet-related and telephony in proportion to revenues, and deducting 1,300, the workforce of AT&T Advertising Solutions.

A similar procedure was applied to Verizon Communications, relying on the firm's 10-K filing to allocate total revenues to segments, and to determine which segments were Internet-related.

## Table 3-1: Transmission Providers

| Tier 1 transit-free networks | 2011 US Internet Revenue ($B) | 2011 US Internet Employees |
|---|---|---|
| AT&T | $46.100 | 77,991 |
| CenturyLink, Inc. | $5.500 | 17,557 |
| Level 3 Communications | $0.292 | 730 |
| Inteliquent | $0.268 | 176 |
| Verizon Communications Inc. | $39.880 | 66,181 |
| Sprint Nextel Corporation | $11.390 | 12,851 |
| Tiers 2 and 3 Internet Providers | | |
| XO Holdings Inc. | $0.448 | 1,069 |
| Equinix | $1.030 | 1,371 |
| SunGard Capital Corp | $0.960 | 1,248 |
| Cogent Communications | $0.303 | 561 |
| Abovenet | $0.410 | 570 |

[8] Hopkins, Suzanne, Carrie MacGillivray and John Weber (2011), "IDC's INSIGHT U.S. 4Q11 and 2011 Mobile Operator Roundup", IDC, Framingham MA.

[9] ARPU is Average Revenue per User.

## 3.2 Connectivity

Where once connectivity was envisioned as an opportunity to become a portal with proprietary content, it is currently viewed as a near-commodity

Connectivity firms provide some transmission, and transmission firms offer connectivity, so there is a degree of arbitrariness in the distinction we are making between the two, but our general rule is that firms listed here retail connectivity to much smaller clients than do the transmission firms, particularly households, and often sell it as a complement to more profitable services delivered on their pipes, such as cable television and wireless telephony, or to Internet services such as email and spam protection. Where once connectivity was envisioned as an opportunity to become a portal with proprietary content, it is currently viewed as a near-commodity.

### Table 3-2: Connectivity Providers

| Internet Access | 2011 US Internet Revenue ($B) | 2011 US Internet Employees |
|---|---|---|
| Clearwire Corporation | $1.063 | 777 |
| Earthlink | $1.310 | 3,241 |
| Hughes Communications | $0.743 | 1,606 |
| tw telecom Inc. | $1.370 | 3,051 |
| Windstream Communications | $4.160 | 14,194 |
| VeriSign Inc. | $0.772 | 1,009 |
| Cable Providers | | |
| Cablevision Systems Corp. | $1.322 | 3,516 |
| Charter Communications | $1.500 | 3,500 |
| Comcast Corporation | $7.749 | 17,466 |
| Cox Communications | $1.050 | 2,538 |
| DISH Network | $4.844 | 11,722 |
| Mediacom Communications Corp. | $0.373 | 1,024 |
| Time Warner Cable | $4.844 | 11,926 |
| Mobile Internet Access Providers | | |
| Leap Wireless (Cricket) | $1.140 | 1,633 |
| MetroPCS | $1.860 | 1,493 |
| T-Mobile U.S.A, Inc. | $5.400 | 9,041 |
| TracFone Wireless | $1.584 | 1,538 |
| U.S. Cellular | $1.574 | 1,263 |
| Virgin Mobile | $0.013 | 420 |

## 3.3 Hardware

Hardware on which the Internet relies comprises servers and other storage devices, routers, desktop and laptop personal computers, wireless access devices, fiber optic cable, and broadband wireless equipment, among other components. Over the years there has been consolidation among hardware suppliers in many areas. Cisco, for example, purchased 73 companies between 1993 and 2000. Acer, the Taiwanese manufacturer of PCs, bought Gateway and Packard Bell in 2007. Hardware is one of the most concentrated of the Internet segments: many of the leading suppliers of routers, switches, storage devices, computers, and fiber are large companies.

With low-cost labor in Asia, two trends have emerged in the hardware business in this decade. One is new competition from Asian brands of equipment, such as Huawei and Lenovo. Another is the manufacture in Asia of branded equipment designed by U.S. firms. Some companies use contract manufacture to do this, while others have their own plants located outside the U.S. Thus, more of the U.S. employment in this sector is engaged in product design, software, marketing, sales and service than manufacturing. We list below the major hardware providers and some of the smaller ones. It is difficult to break out the number of employees in these companies related to the Internet, since none of the companies states it publicly. Our estimates are sensitive to the revenues of their lines of business, and in some cases we received guidance from people in the companies or industries. Our estimates are conservative.

We list co-location service providers in this section because they are hardware-intensive and the invitation to rent cloud data services amounts to a form of pricing of the server hardware.

## Table 3-3: Hardware & Co-Location

| Manufacturers of equipment & tools | 2011 US Internet Revenue ($B) | 2011 US Internet Employees |
|---|---|---|
| Alcatel Lucent U.S.A Inc. | $0.975 | 8,787 |
| Avaya | $1.415 | 4,740 |
| Barracuda Networks, Inc. | $0.017 | 190 |
| Blue Coat Systems, Inc. | $0.487 | 1,333 |
| Brocade Communications Systems | $0.108 | 227 |
| Cisco Systems, Inc. | $19.450 | 32,321 |
| Corning Incorporated | $0.185 | 675 |
| Dell Inc. (see also Retailers) | $2.235 | 3,940 |
| EMC Corporation | $6.350 | 18,276 |
| F5 Networks, Inc. | $0.086 | 187 |
| Fortinet | $0.273 | 997 |
| Hewlett Packard (see also IT Consulting) | $10.539 | 23,165 |
| IBM (see also IT Consulting) | $8.965 | 36,336 |
| Infoblox | $0.084 | 308 |
| Juniper Networks, Inc. | $2.225 | 4,565 |
| Microsoft (manufacturing only) | $1.000 | 2,000 |
| Motorola Solutions (exc. Motorola Mobility) | $0.250 | 50 |
| NetApp | $3.584 | 1,120 |
| Netgear, Inc. | $0.472 | 316 |
| Nokia Navteq | $0.448 | 1,500 |
| Nokia Siemens Networks | $0.149 | 500 |
| Riverbed | $0.291 | 644 |
| Data Co-Location Providers | | |
| Savvis | $0.280 | 586 |
| Rackspace | $0.927 | 2,909 |
| SunGard Availability Services LP | $1.323 | 2,070 |

# Chapter 4: The Infrastructure Support Layer

In distinguishing Infrastructure from Infrastructure Support we follow the distinction drawn in prior studies. Infrastructure refers to the IP network and its hardware, and Infrastructure Support refers to products and services built on the IP network infrastructure to make it technologically feasible to perform business activities online.

## 4.1 Internet Enabling Services

Digital delivery systems and networks manage the storage and movement of content between websites and the users who call for the content. These firms help to eliminate capacity bottlenecks on transport networks. One noteworthy service provided to many companies by Akamai and several of its competitors is widespread, geographically distributed infrastructures of data servers that connect to many of the data networks that comprise the Internet. These firms cache content at locations close to where their analysis suggests it will be demanded.

Independent web hosting companies store the web pages of content and e-commerce sites on their servers in data centers, and make them accessible to site visitors. Large enterprises may do their own web hosting, and many ISPs offer web hosting services, at least for simple one-page web sites put up by individuals. Backup hosting is important for data security and disaster recovery. Uptime performance is an extremely important aspect of web hosting, because all owners of websites fear their sites going down and being inaccessible to customers and website visitors.

We list dedicated information technology consulting services such as Accenture, IBM's consulting practice, and the Hewlett Packard consulting service, in this sector, as well as portions of large strategy consultants such as Bain and Deloitte, and we list focused analysts such as Forrester and Gartner in this layer because they provide recommendations on IP equipment purchases, although their services are also used by buyers in the consumer services layer.

The largest firm in this sector is IBM. Its Americas revenues are 43% of global revenues, and U.S. is 75% of Americas. Working from sector reporting in its 10-k filing, we assume that the sum of Global Business Services, Hardware, and Financing (totaling 38% of global revenues) are not directly related to the Internet. Thus 75% of 43% of 52% of revenues are Internet-related. Half is recorded here, the other half in manufacturing. Hewlett Packard's consulting division, known as HP Enterprise Services, has its roots in its acquisition of EDS Inc. in 2008. Of the lines of business identified in the 10-k report to the Securities and Exchange Commission, we make the following assumptions to determine U.S. Internet-related revenues: Of Imaging and printing we take 10% of $25.783 billion (Internet Retailer[10] reports $1.58 billion in U.S. retail revenues, most from this line of business and the personal systems group.) From the Personal Systems Group, we attribute 10% of $39.574B. From the Enterprise Servers, Storage and Networking, we attribute 30% of $22.241 B. Only 40% of Hewlett Packard's resulting revenues appear here: the balance is listed under manufacturing. Beyond the time frame of this study (August 2012) Hewlett-Packard announced a write-down of $8 billion in its Enterprise Services business, reflecting weakness in the outsourced enterprise model inherited from EDS, possibly as a consequence of growth in cloud computing[11].

[10] Internet Retailer (2011) "Top 500 Guide: Profiles and Statistics of America's 500 Largest Retail Web Sites Ranked by Annual Sales", Internetretailer.com

[11] Kanarcus, Chris, "HP Takes $8 Billion Writedown on Services Arm", http://www.pcworld.com/businesscenter/article/260594/hp_takes_8_billion_writedown_on_services_arm.html, August 8, 2012

## Table 4-1: Internet Enabling Services

| Digital Delivery Systems & Networks | 2011 US Internet Revenue ($B) | 2011 US Internet Employees |
|---|---|---|
| Akamai | $1.044 | 2,142 |
| GlobalSCAPE, Inc | $0.021 | 96 |
| Internap Network Services Corp. | $0.245 | 500 |
| Limelight Networks | $0.154 | 434 |
| RealNetworks | $0.286 | 1,040 |
| Zayo | $0.287 | 396 |
| **Web Hosting Services and Software** | | |
| 1and1 | $0.003 | 38 |
| Bridgeline Digital | $0.026 | 148 |
| DataPipe | $0.027 | 230 |
| eNom (subsidiary of Demand Media) | $0.100 | 391 |
| Go Daddy | $0.741 | 2,900 |
| Hostway Corporation | $0.014 | 278 |
| Network Solutions, LLC (acquired by Web.com in 2011) | $0.062 | 900 |
| Register.com (acquired by Web.com in 2010) | $0.025 | 489 |
| Verio | $0.017 | 206 |
| All other | $0.604 | 2,365 |
| **Web Conferencing** | | |
| Cisco WebEx | $0.108 | 2,411 |
| West Corporation | $0.216 | 3,154 |
| **IT Consulting & Solutions Providers** | | |
| Accenture Inc. | $2.048 | 17,700 |
| Affiliated Computer Services, Inc. (part of Xerox since Feb. 2010) | $9.485 | 5,709 |
| Bain | $0.154 | 424 |
| Bearingpoint Inc | $0.026 | 456 |
| Capgemini North America, Inc. | $0.012 | 161 |
| CGI Group | $0.126 | 930 |
| CIBER, Inc. | $0.029 | 195 |
| Cognizant Technology Solutions | $0.195 | 4,382 |
| Computer Sciences Corp. | $0.334 | 1,892 |
| Deloitte Touche Tohmatsu | $0.215 | 1,359 |
| Digital River, Inc. | $0.393 | 1,419 |
| Dimension Data Holdings | $0.290 | 679 |
| Hewlett Packard | $9.205 | 5,058 |

| | | |
|---|---|---|
| IBM | $8.965 | 36,336 |
| Insight Enterprises | $0.794 | 808 |
| SAIC | $0.530 | 2,055 |
| Unisys | $0.193 | 1,135 |
| IT & Internet Analysts / Research Firms | | |
| Forrester Research Inc. | $0.084 | 359 |
| Gartner | $0.088 | 299 |
| IDC Research, Inc – new | $0.021 | 102 |
| Yankee Group | $0.003 | 17 |

## 4.2 Software Manufacturing

The largest software firm in this study is Microsoft, which also appears as a hardware manufacturer and provider of advertising services. In the software sector, Microsoft employs an estimated 14,680 people working on Internet-related software in the United States. Of its $69.9B global revenues, we attribute 20% of the Windows and Windows Live segment revenue of $19B to the Internet. We take 75% of the $17B revenue of the servers and tools division, 100% of online services revenue of $2.5B, 10% of business division software and productivity $22B, and 50% of entertainment and devices revenue of $8.9B. Thus we take 37% of total revenue to be Internet related. Following the 2011 10-k we take 60% of global employment to be U.S.-based and we allocate this employment to Internet-related sectors in proportion to revenue. Microsoft products and services are then allocated to three of our identified sectors. The majority of employees (14,680) is in the software sector, 3,334 are in the Search Engines and Portals sector, and 2,000 in the Hardware sector to account for the estimated 50% of entertainment and devices business (mainly Xbox). Beyond the time frame of this study Microsoft wrote down much of the investment in advertising services, $6.2B[12].

The second largest producer of software that enable business activities on the IP network is Symantec Corporation, focusing on software and services that protect, manage and control information risks related to security, data protection, storage, compliance and systems management. Its software is used both for consumer PC security as well as for business and network IT security. Other significant software companies include Adobe, Intuit, Verisign, Secure Computing, and Websense, each with fewer than 5,000 Internet employees. The Internet software industry has become relatively concentrated due to acquisitions in recent years, but there remain smaller U.S. and foreign companies not specifically enumerated here, such as Corel, Bitdefender, and Panda. We

[12] Bass, Dina, "Microsoft Writing Down $6.2 Billion Over AQuantive Deal", http://www.businessweek.com/news/2012-07-02/microsoft-will-write-down-6-dot-2-billion-related-to-aquantive-deal, July 3, 2012

therefore conservatively estimate another 10% of revenue and employees to round out the sector.

We do not include here software companies selling special-purpose software for personal computers over the Internet, as we believe they are covered in e-commerce.

App development for smartphone platforms has emerged as a large factor in the software sector

App development for smartphone platforms has emerged as a large factor in the software sector. A forecast was made in 2012 of the number of jobs directly attributable to the app industry in the United States in 2011 (before allowing for multiplier job effects) and its estimate was 311,000[13]. This number is calculated by counting online want ads for app writers, and assuming 3.5 jobs per want ad. The 3.5 ratio is taken from the ratio of want ads to jobs in a more mature job category, the 'computer and mathematical occupations' category of the Bureau of Labor Statistics database. We believe in an emerging sector like apps the number of jobs per want ad will be much lower than 3.5, so we use a multiplier of 1.75, and reach the more conservative conclusion that the number of employees in the app industry is 155,500. This employment combines full-time and part-time workers. We recognize that many of the full-time employees will be working for large firms such as Electronic Arts and Zynga, and will therefore be counted elsewhere in this report. A report by Evans Data Corp[14] claims that 26% of the 155,500 people building apps for sale on app stores, that is 40,430, are employed full-time, and we assume therefore that they are counted elsewhere in this report. The remainder, 100,070, are moonlighting or under-employed, and not counted elsewhere. We take the full time equivalent of these 115,070 app software writers not employed elsewhere to be 45,000.

However a study of Facebook app developers using a different methodology[15] estimates that there are 53,434 people designing apps for the Facebook platform. Applying the finding that 26% of all app developers are full-time employed, and assuming that likely at least half are counted elsewhere, we take 5,000 of the Facebook app developers to be full-time employed and not counted elsewhere, and the full time equivalent of the 29,220 part-time workers to be 5,000. These 10,000 people are tabulated under the Facebook entry in the spreadsheet referenced in Section 2.1 of the Methodology chapter, and subtracted from the total here, yielding a total for non-Facebook app developers of 35,000.

While the software field appears fairly concentrated due to acquisitions there a few small U.S. and foreign companies that have revenues dependent on the

[13] Mandel, Michael (2012) "Where the Jobs Are: The App Economy," TechNet, South Mountain Economics LLC, http://www.technet.org/wp-content/uploads/2012/02/TechNet-App-Economy-Jobs-Study.pdf

[14] Hanley, Ben (2011), Application Distribution Channels Survey 2011, Vol. II, Evans Data Corporation.

[15] Hann, Il-Horn, Viswanathan, Siva, and Koh, Byungwan (2011), "The Facebook App Economy", Center for Digital innovation, Technology and Strategy, Robert H. Smith School of Business, University of Maryland.

Internet — Corel, Bitdefender, Panda and others. We therefore conservatively estimate another 10% of revenue and employees beyond those of the larger companies listed in this table.

Largest of the Software as a Service firms is Salesforce.com, but the sector is significantly less concentrated than the software for sale sector. When we subtract our estimates of enumerated firms from a Gartner report[16] we conclude that our list of suppliers excludes a significant number of firms who offer software as a service. We therefore adjust by means of a residual estimate of 36,000 employees.

## Table 4-2: Software Manufacturing

| Internet Software including Mobile Operating Systems | 2011 US Internet Revenue ($B) | 2011 US Internet Employees |
|---|---|---|
| Adobe Systems | $1.266 | 2,978 |
| Apple (see also Retailing sector) | $1.000 | 2,500 |
| Avocent – subsidiary of Emerson Electric Co. as of 2009 | $0.009 | 99 |
| BMC Software | $0.109 | 310 |
| CA Technologies | $1.443 | 4,020 |
| Citrix Systems, Inc. | $0.884 | 2,774 |
| CommVault | $0.033 | 115 |
| Deltek, Inc. | $0.017 | 80 |
| Epicor Software Corporation | $0.042 | 200 |
| Infor Global Solutions, Inc. | $0.090 | 400 |
| Informatica | $0.235 | 766 |
| Intuit | $1.848 | 3,840 |
| iPass Inc. | $0.141 | 366 |
| Lawson Software | $0.037 | 195 |
| McAfee (Intel is parent co.) | $0.412 | 1,260 |
| Microsoft | $13.010 | 14,680 |
| NetScout | $0.031 | 89 |
| NeuStar | $0.620 | 1,488 |
| Novell, Inc (acquired by Attachmate) | $0.041 | 170 |
| Nuance | $0.132 | 730 |
| Oracle | $7.124 | 2,160 |
| Red Hat, Inc. | $0.113 | 450 |
| Riverbed | $0.436 | 966 |

[16] "Gartner Says Worldwide Software-as-a-Service Revenue to Reach $14.5 Billion in 2012", Gartner Newsroom, http://www.gartner.com/it/page.jsp?id=1963815.

| | | |
|---|---|---|
| Saba Software | $0.094 | 588 |
| Sage Software, Inc. | $0.348 | 1,600 |
| SAP America, Inc. | $0.185 | 260 |
| SAS Institute Inc. | $0.055 | 254 |
| SonicWall (acquired by Dell in 2012) | $0.071 | 574 |
| Sybase, Inc. (subsidiary of SAP) | $0.234 | 764 |
| Symantec | $2.165 | 6,506 |
| Teradata Corporation | $0.307 | 1,118 |
| TIBCO Software Inc. | $0.046 | 148 |
| Websense | $0.364 | 1,502 |
| All other | $3.294 | 5,395 |
| Mobile Software & Apps | | |
| App developers for mobile devices | | 35,000 |
| Software as a Service (SaaS) | | |
| Concur Technologies | $0.349 | 1,600 |
| Convio | $0.080 | 367 |
| DealerTrack Holdings | $0.353 | 1,900 |
| DemandTec (acquired by IBM in 2011) | $0.082 | 340 |
| Hubspot | $0.029 | 300 |
| inContact | $0.089 | 412 |
| IntraLinks | $0.214 | 601 |
| Kenexa Corporation | $0.283 | 2,744 |
| LivePerson, Inc. | $0.133 | 524 |
| LogMeIn | $0.119 | 482 |
| NetSuite | $0.236 | 1,265 |
| RealPage | $0.258 | 2,273 |
| RightNow Technologies (Oracle since 2012) | $0.186 | 920 |
| Salesforce.com | $2.270 | 7,785 |
| Taleo | $0.309 | 1,414 |
| Vocus | $0.115 | 808 |
| Miscellaneous SaaS vendors | $7.800 | 36,164 |

# Chapter 5: Consumer Services Support Layer

The distinction between Infrastructure Support and Consumer Services Support is not crisp, but follows the distinction between second and third layers that goes back to the first studies reviewed in Chapter 1. The distinction we apply is whether the firms primarily serve firms in the IP layer or firms that support the consumer-facing layer. In Customer Services Support we identify Marketing Support and Navigation. We add to the Consumer Support Services layer those employees that do marketing work in large enterprises omitted elsewhere in this report because the firms are not significant Internet businesses.

## 5.1 Marketing Support

Commerce, entertainment, and social media have flourished on the Internet in the years since our previous study, and so, inevitably, has the industry that supports them: advertising agencies, measurement and analytics companies, advertising exchanges and other advertising infrastructure firms.

To assess the Internet-related employment of the top ten full-service advertising agencies, we consulted the primary industry source, the Redbook[17], and summed the employment of all U.S. branches that listed digital marketing among their main services. Agencies below the top ten tend not to be full-service, and were less likely to have significant digital capability unless they classified themselves as digital agencies, in which case they were captured in the next section. We therefore accounted for the missed online employment among full service agencies by a conservative 20% adjustment.

[17] The Advertising Redbooks Standard Directory of Advertising Agencies, 2012 Edition

Specialized digital agencies include Digitas, Epsilon, Ogilvy One, Razorfish and Sapient Nitro. The allocation between U.S. and international employment was based on the global distribution of offices. All employment identified in the Redbook was taken to be digital, except that for firms with a significant customer relationship management practice a small exclusion was made for lettershop services.

There is a very long tail to the distribution of firms that supply digital agency services. In 2011 U.S. digital services revenue was 30.3% of all U.S. advertising agency revenue of $33.3 billion,[18] giving the digital sector a total revenue of $10.06 billion. The firms that we list by name total $3.48 billion. However we adjust by only $1.0 billion because some of the discrepancy is, we believe, captured in other sectors such as the self-employed web designers discussed in the next paragraph.

We allow for a substantial number of self-employed web designers, freelance writers and freelance computer programmers. The U.S. Bureau of Labor Statistics gives the number of graphic designers in the U.S. in 2010 as 279,200. We assume that 20% are Web designers, and that 35% of U.S. web developers are self-employed and 14% work part-time[19]. We treat the part-time component as contributing a negligible full-time equivalent, and obtain an estimate of 17,000 self-employed web graphic designers. The U.S. Bureau of Labor Statistics gives the number of web developers in 2010 as 302,300. We estimate that 35% of U.S. web developers are self-employed and 14% are part-time[20] to obtain an estimate of 90,000 self-employed web developers. Thus the total of self-employed web developers and graphic designers is 107,000. This number, while large, compares to 100,000 identified in the 2007 study.

Much written content on websites is outsourced to freelance contract writers. The U.S. Bureau of Labor Statistics identifies the number of people giving their occupation as writer or editor in 2010 as 263,200. We assume 20% write for the web, and that 62% are self-employed and 22% are part-time[21]. Assuming the full-time equivalent of the part –time work is negligible, we conclude that there are 25,000 self-employed web content creators. But this study lists 10,000 writers in the writer stables of Demand Media, Federated Media, Technorati and Netshelter, so we list only the incremental 15,000 people here.

The U.S. Bureau of Labor Statistics reports that in 2010, 363,000 people gave their job as software developer. We have no basis for saying what proportion work on Internet software development, or are self-employed, but we anchor

[18] AdAge: The Agency Issue, April 30, 2012

[19] The following site describes a comprehensive survey, but without attribution: http://www.studentscholarships.org/salary_ca/102/web_designers_and_developers.php

[20] *op cit*

[21] *op cit*

our estimate on the web developer number since freelance development requires programming, and deflate by 50% to allow for duplication of skills. Thus we estimate that there are 45,000 self-employed web software writers.

Online ad networks have grown with the increase in display advertising since 2007. Google's Doubleclick is the largest employer, followed by Yahoo, AT&T's Advertising Solutions and Tribal Fusion. Similarly, online advertising audience measurement has grown, and employment at Omniture and comScore is in the low thousands. The mobile ad network industry is immature at this time. A small industry has begun to develop around social media, made up of firms that are described by terms such as listening platforms and social media dashboards.

## Table 5-1: Marketing Support

| Advertising Agencies (Full Service) | 2011 US Internet Revenue ($B) | 2011 US Internet Employees |
|---|---|---|
| BBDO Worldwide | $0.023 | 35 |
| DDB Worldwide | $0.026 | 146 |
| DraftFCB | $0.019 | 131 |
| Grey | $0.008 | 35 |
| JWT | $0.018 | 23 |
| Leo Burnett Worldwide | $0.013 | 54 |
| McCann Worldgroup | $0.021 | 93 |
| Saatchi and Saatchi (North America, Inc.) | $0.010 | 60 |
| TBWA Worldwide | $0.020 | 164 |
| Young & Rubicam, Inc. | $0.019 | 63 |
| Other advertising agencies | | 965 |
| Digital and CRM Advertising Agencies | | |
| Agency.com (merged with Designory) | $0.028 | 360 |
| AKQA (to be acquired by WPP in 2012) | $0.027 | 360 |
| Acxiom | $0.013 | 200 |
| ClickSquared | $0.011 | 75 |
| Constant Contact | $0.214 | 926 |
| Digitas | $0.200 | 1,218 |
| eDialog | $0.017 | 118 |
| Eloqua | $0.035 | 163 |
| Epsilon | $0.565 | 1,500 |
| ExactTarget | $0.078 | 425 |
| Experian Information Solutions | $0.096 | 900 |

| | | |
|---|---|---|
| iCrossing | $0.038 | 675 |
| Merkle Group Inc. | $0.242 | 718 |
| Ogilvy One Worldwide (WPP) | $0.132 | 1,000 |
| Organic (Omnicom) | $0.028 | 200 |
| R/GA Media Group, Inc. (Interpublic) | $0.068 | 795 |
| Rapp Worldwide (Omnicom) | $0.219 | 313 |
| R2C Group | $0.147 | 94 |
| Razorfish (acquired by Publicis in 2009) | $0.337 | 2,000 |
| Responsys | $0.101 | 520 |
| Rosetta | $0.367 | 267 |
| Sapient Nitro | $0.353 | 3,317 |
| Silverpop Systems | $0.016 | 200 |
| VML | $0.019 | 185 |
| Wunderman (WPP) | $0.331 | 315 |
| All other digital marketing providers | $1.000 | 10,449 |
| Self-employed Web Designers, Writers and Programmers | | |
| Web developers and graphic designers | | 107,000 |
| Web content creators (writers) | | 15,000 |
| Web computer programmers | | 45,000 |
| Advertising Media Planning & Buying | | |
| Carat | $0.032 | 266 |
| Horizon Media | $0.018 | 140 |
| Initiative Media | $0.004 | 178 |
| MEC | $0.012 | 8 |
| Mediacom | $0.041 | 53 |
| Mediavest U.S.A | $0.026 | 11 |
| Mindshare Worldwide | $0.010 | 72 |
| Optimum Media Direction (Omnicom) | $0.010 | 20 |
| Starcom U.S.A | $0.016 | 290 |
| ZenithOptimedia | $0.014 | 13 |
| Online Ad Networks & Exchanges | | |
| AT&T AdWorks | $0.510 | 300 |
| AT&T Advertising Solutions | $1.000 | 1,000 |
| 24/7 Real Media | $0.021 | 390 |
| AdBrite | $0.014 | 116 |
| AOL Advertising.com (formerly Platform-A) | $0.032 | 270 |
| BrightRoll | $0.008 | 19 |

| | | |
|---|---|---|
| BrightRoll | $0.008 | 19 |
| Burst Media | $0.008 | 75 |
| DoubleClick (Google) | $0.092 | 850 |
| Google Ad Network | $4.784 | 4,098 |
| Gorilla Nation Media | $0.023 | 158 |
| Kontera | $0.004 | |
| PubMatic | $0.021 | 125 |
| Specific Media | $0.009 | 108 |
| Traffiq | $0.006 | 65 |
| Tribal Fusion | $0.600 | 1,200 |
| Undertone Networks | $0.260 | 131 |
| ValueClick | $0.390 | 990 |
| Vibrant Media | $0.017 | 220 |
| Yahoo Media Network (see also Search Engine sector) | $1.850 | 3,269 |
| **Data Measurement/Mining/Management/Research** | | |
| Adchemy, Inc. | $0.012 | 100 |
| Alexa | $0.003 | 25 |
| Blue Kai | $0.003 | 24 |
| Compete, Inc. | $0.013 | 100 |
| comScore | $0.139 | 607 |
| Coremetrics, Inc. (acquired by IBM June 2010) | | |
| DataLogix, Inc. | $0.014 | 120 |
| DynamicLogic | $0.008 | 60 |
| eRewards | $0.300 | 952 |
| Google Analytics | $0.500 | 500 |
| Harris Interactive | $0.099 | 440 |
| Hitwise (a division of Experian) | $0.003 | 29 |
| Lotame Solutions, Inc. | $0.004 | 51 |
| Marchex, Inc. | $0.147 | 350 |
| MediaMind Technologies, Inc. | $0.041 | 190 |
| Nielsen Online | $0.140 | 700 |
| Nielsen NetRatings | | |
| Omniture, LLC (acquired by Adobe Oct. 2009) | $0.076 | 1,886 |
| Quantcast | $0.095 | 133 |
| Unica (acquired by IBM August 2010) | $0.067 | 519 |
| Webtrends | $0.040 | 309 |

| Mobile Ad Networks, Exchanges, Measurement & Analytics, Tech Platforms | | |
|---|---|---|
| AdMob (see also Google in Search Engines) | $0.400 | 500 |
| Amobee | $0.010 | 100 |
| AppNexus | $0.002 | 15 |
| Cellfire | $0.002 | 25 |
| Dataxu | $0.003 | 31 |
| Flurry | $0.007 | 70 |
| Jumptap | $0.004 | 30 |
| Loopt | $0.001 | 19 |
| Millennium Media, Inc. | $0.104 | 222 |
| Mojiva | $0.005 | 30 |
| Obopay | $0.009 | 80 |
| Paydiant | $0.001 | 17 |
| Placecast | $0.002 | 18 |
| Pontiflex | $0.005 | 60 |
| Tapjoy | $0.009 | 54 |
| Velti | $0.076 | 414 |
| Waze | $0.006 | 72 |
| Listening Platforms | | |
| Alterian (acquired by SDL – in translation section below – in Jan. 2012) | $0.047 | 326 |
| Collective Intelligence | $0.003 | 35 |
| Converseon | $0.008 | 67 |
| Cymfony (acquired by Visible Technologies April 2012) | $0.015 | 80 |
| evolve24 | $0.008 | 60 |
| Nielsen BuzzMetrics | $0.018 | 200 |
| Visible Technologies | $0.018 | 108 |
| Attensity | Small | Small |
| Bluefin | Small | Small |
| Crimson Hexagon | Small | Small |
| NM Incite | | |
| Radian 6 (acquired by Salesforce.com in 2011, Canadian) | | |
| Social Media Dashboards | | |
| Hootsuite (located in Canada so N/A) | | |
| Seesmic | $0.001 | 8 |
| SproutSocial | $0.001 | 35 |
| Tweetdeck (acquired by Twitter May 2011) | | |
| Vertical Response | $0.012 | 105 |

## 5.2 Navigation

The widespread commercialization of the Internet began with the launch of search technology, and search remains the foundation of much of commerce and content success. However it is a mature sector, and although Google has more than doubled its revenue since the 2007 study, we credit much of its employment growth to areas adjacent to search technology. According to its latest 10-k report, Google's search site earned $26.1 B of which 46% originated in the U.S. The report does not identify YouTube revenue separately. We have imputed $1.6B to YouTube globally[22], and $0.64 billion in the U.S., and have deducted this amount from the Search Internet revenue total.

## Table 5-2: Navigation

| Search Engines & Portals | 2011 US Internet Revenue ($B) | 2011 US Internet Employees |
|---|---|---|
| AOL | $1.540 | 3,396 |
| InfoSpace, Inc. | $.0229 | 198 |
| Microsoft Online Services (including Bing) | $1.512 | 3,334 |
| Google | $11.366 | 13,507 |
| Yahoo! | $2.160 | 6,111 |
| Specialized Search, Data & Portals | | |
| CareerBuilder | $0.089 | 300 |
| Hoover's | $0.089 | 300 |
| LexisNexis Group | $0.123 | 1,750 |
| Monster | $0.400 | 2,400 |
| WebMD Health Corp | $0.559 | 1,700 |
| Online Business Directories | | |
| Craigslist | $0.115 | 30 |
| Supermedia Information Services LLC | $0.050 | 600 |
| Yahoo listings, transactions, fees | $0.970 | 1,713 |
| Yellowpages.com LLC (owned by AT&T) | $0.015 | 300 |
| Yellowbook Inc. | $0.379 | 3,500 |
| eGovernment | | |
| BLS.gov | n/a | 100 |
| Census.gov | n/a | 50 |

[22] Google does not break out YouTube revenues. We estimate YouTube revenues from this citation among others: Szalai, George, "Analyst: YouTube Channels No Immediate Threat to Entertainment Companies", Hollywood Reporter, November 1, 2011, http://www.hollywoodreporter.com/news/youtube-channels-no-immediate-threat-255841

| | | |
|---|---|---|
| data.gov | n/a | 40 |
| fedstats.gov | n/a | 5 |
| NIC Inc | n/a | 653 |
| recovery.gov | n/a | 5 |
| usa.gov (inc. gobiernousa.gov) | n/a | 300 |
| WhiteHouse.gov | n/a | 100 |
| Other suppliers to federal, state, local gov't websites | n/a | 650 |
| Website Translation Services | | |
| Lionbridge Technologies, Inc. | $0.171 | 1,800 |
| SDL plc | $0.145 | 912 |

## 5.3 General Enterprise

In the 2007 study a number of allowances were made for the possibility of omitted employment. In updating the study we were careful to make similar allowances, so that differences between the 2007 and 2011 employment totals would be attributable to growth in the ecosystem, not differences in the number of entities counted. The largest allowance for omitted employment in 2007 was for 100,000 people to account for the staffs of corporations, non-profit organizations, and government agencies, and their subcontractors, who were responsible for Internet advertising, marketing and web design but which, because they were not individually large firms or were large but were not conspicuous members of the Internet ecology, were not counted elsewhere. There are 27 million firms in the United States, of which 6 million have a payroll and 18,000 have over 500 employees[23], and this study, like its predecessor, selected only the 500 or so most conspicuous members of the Internet ecology for careful enumeration. We followed the precedent of the earlier study, but increased the 2007 adjustment number of 100,000 by the percentage by which the overall employment total had grown, to preserve the relative magnitude of this adjustment.

## Table 5-3: General Enterprise Activity

| | 2011 US Internet Revenue ($B) | 2011 US Internet Employees |
|---|---|---|
| General Enterprise Activity | $25.500 | 170,000 |

[23] U.S. Census Bureau, http://www.census.gov/econ/smallbus.html

# Chapter 6: The Consumer Services Layer

## 6.1 Content Sites

Most content sites today have moved beyond the broadcast model of 1-way, top-down communication

Content and user experience are the key drivers of traffic on the Internet. Online content may take the form of news, entertainment, online courses, online games, shared opinions and discussions on blogs, wikis, and social media sites, shared reviews, shared photos, shared videos, and collaborative problem solving on Q&A types of sites. This content can be published on the Internet as text, graphics, photographs, audio, video, or a combination of these forms.

Most content sites today have moved beyond the broadcast model of one-way, top-down communication, and enable connections between people, identified and anonymous, to personalize information and entertainment streams.

Since the time of the last report the biggest changes to the online content landscape have been the maturing of social media and the growth of mobile as a publishing platform and for Internet access. Though sites such as Facebook and YouTube and Twitter existed at the time of the previous report, they were still very much in their infancy, and the extent of their utility to users hadn't completely manifested itself.

The iPhone was new to the market in July 2007, and the shift from thinking of a mobile device as a phone to mobile device as a multimedia entertainment and communications platform had only just begun. As other hardware manufacturers began creating devices in the style of the iPhone, the handsets became

increasingly affordable and ubiquitous, and made 'wherever you are' participation on these platforms part of everyday life. The arrival of the iPad in 2010 and similar tablet devices shortly thereafter heralded not just a new device but a new set of user behaviors, in particular those related to gaming, shopping, reading online newspapers and magazines and participatory media behavior such as uploading photos, 'pinning' images, accessing user reviews, transacting with mobile coupons or payments, or simply being in constant contact with people, places, and organizations, both synchronously and asynchronously.

Our estimate of the value of the online content sector in the U.S. in 2011 is $17.3 billion, spread across the web, mobile, and app properties of:

- Traditional publishers and broadcasters (e.g. CNN, MSNBC, Disney),
- Digital only publishers (e.g. Huffington Post, Demand Media, Gawker, Technorati)
- Online music sites offering streaming and paid downloads (e.g. Pandora, iTunes, Spotify)
- Online video sites (e.g. Hulu, Vevo, Vimeo, YouTube)
- Online game sites & producers (e.g. Zynga, Sony Online Entertainment, Electronic Arts)
- Q&A sites and User-generated review sites

### 6.1.1 Publishing – Traditional Publishers Online and Pure Play Digital Publishers

Internet employment in the traditional publisher sector is, predictably, concentrated among the online divisions of the largest offline publishers: CBS Interactive, Disney Online, Sony Online, NBC Universal Online, Discovery Digital Media, and the online properties of Gannett, Hearst, NewsCorp, and the New York Times[24]. Less predictable is the growing sector of digital publishing, where new business models, based around aggregation, syndication, and low cost article and video provision have been emerging over the past few years. Building large audiences on digital publishing platforms can be achieved swiftly and relatively inexpensively, and rapid growth is possible if tools such as search engine optimization and social sharing are used strategically.

[24] Andrews, Robert, "PaidContent 50: The World's Most Successful Digital Media Companies", July 31, 2012, http://paidcontent.org/2012/07/31/pc50/

## Table 6-1a: Traditional Publishers Online

| Online Divisions of Conventional Publishers | 2011 US Internet Revenues (billions) | 2011 US Internet-based employment |
|---|---|---|
| Bloomberg | $4.550 | 6,000 |
| CBS Interactive Inc. | $0.109 | 1,894 |
| Cox Enterprises | $1.200 | 2,408 |
| Discovery Digital Media | $0.030 | 75 |
| Disney Online | $0.400 | 800 |
| EMI | $0.400 | 800 |
| Gannett Co. Inc | $1.110 | 2,400 |
| Hearst Corp. | $1.500 | 3,273 |
| IAC | $1.236 | 1,920 |
| Meredith Corporation | $1.000 | 2,000 |
| MSNBC Interactive News, LLC | $0.028 | 706 |
| NBC Universal (Online Properties) | $1.000 | 2,000 |
| NewsCorp/Dow Jones | $1.000 | 700 |
| Pearson | $1.500 | 3,000 |
| Reed Elsevier | $2.970 | 2,500 |
| Sony | $1.000 | 2,000 |
| The New York Times Online Properties | $1.000 | 2,000 |
| Thompson Reuters | $4.710 | 6,000 |
| Time Warner | $0.900 | 800 |
| Turner Broadcasting | $1.050 | 1,900 |
| Universal Music | $0.700 | 700 |
| Viacom | $0.600 | 1,200 |
| Warner Music | $0.380 | 600 |

A significant portion of the growth of online content sites can be attributed to the abundance and quality of user-generated content

A significant portion of the growth of online content sites can be attributed to the abundance and quality of user-generated content. Such content is provided free of charge by individuals to news and opinion sites and also review sites such as Yelp, Angie's List, and Quora, which will be covered in tables later in this chapter.

This participatory content creates value for both the community of users and the company on whose platform it lives. Though people writing reviews of products and services are not paid to do so, this content is monetized at the company level, as the company is able to attract more users when a critical mass of reviews and/or entries is present. The greater the number of users, the higher the fees for advertising or subscriptions a company is able to charge.

The exception here is the enormously popular online crowd-written and edited encyclopedia Wikipedia. There is no remuneration for writing or editing services and no advertising sold on the site, as it is a not for profit foundation that operates from grants. In 2011 Wikipedia was in the Top 10 of the Internet's most visited sites, with over 400 million unique visitors per month.

In the category of pure play digital publishers, the rise of companies such as Buzz Media and Gawker, each of whose families of websites attract about 35 million unique visitors each month[25], is noteworthy for the rapid rate of growth and ever-expanding scope of coverage. When a one-time print industry stalwart, Newsweek Magazine, was looking for a lifeline (after being sold for $1 in November of 2010) its owners decided to merge it not with another print publication, but with the digital news and opinion website The Daily Beast. Digital publishers have in general been more flexible than the online divisions of traditional publishers.

## Table 6-1b: Digital Publishing

| Digital Publishing | 2011 US Internet Revenues (billions) | 2011 US Internet-based employment |
|---|---|---|
| Alloy, Inc. | $0.185 | 542 |
| Buzz Media | $0.180 | 350 |
| Demand Media (excluding eNom) | $0.225 | 400 |
| Demand Media outsourced employment | n/a | 5,000 |
| Everyday Health, Inc. | $0.017 | 370 |
| Federated Media | $0.032 | 233 |
| Federated Media outsourced employment | | 2,913 |
| Gawker | $0.008 | 150 |
| GeekNet (SlashDot + eCommerce & Open Source Software) | $0.119 | 143 |
| Glam Media, Inc. | $0.100 | 240 |
| Huffington Post (acquired by AOL) | $0.046 | 100 |
| NetShelter Technology Media | $0.026 | 1,350 |
| Onion, Inc. | $0.008 | 62 |
| Salon Media Group, Inc. | $0.004 | 45 |
| Technorati Media | $0.020 | 35 |
| Technorati bloggers | $0.040 | 1,000 |
| XO Group Inc. (TheKnot.com, TheNest.com, The Bump.com, etc.) | $0.124 | 631 |
| Wikimedia Foundation (Wikipedia) | $0.025 | 60 |

[25] comScore Media Metrix Ranks Top 50 U.S. Web Properties for August 2012", September 12, 2012, http://www.comscore.com/ita/Press_Events/Press_Releases/2012/9/comScore_Media_Metrix_Ranks_Top_50_U.S._Web_Properties_for_August_2012

Since the time of the last report in 2007, one of the many interesting developments in the economy of the Internet is what could be termed 'micro-monetization' of content. Companies such as Demand Media and Federated Media, mentioned in the table of pure play digital publishers, commission content for their family of websites, with individuals signing up to create articles or videos for posted topics. The content is optimized for search and contributors are paid on a per submission basis. The fee is usually in the vicinity of $25 per article, a fraction of what a professional freelance writer or videographer would charge. Though the model is sometimes derisively referred to as 'content farming', it is attractive to a certain slice of the content creation market as it provides a supplementary revenue stream for those in between jobs, or those seeking part-time work, and provides experience and portfolio building opportunities for those just starting out. Additionally, writers and videographers do not have to spend time and resources pitching for jobs, as the platform mechanizes the process.

Though the bulk of this type of work is not done on a full-time basis, our estimate of the full time equivalent employment of the part-time employment in creation of this content in the U.S. is approximately 10,000 for 2011. The equivalent of approximately 5,000 full-time jobs has been created by Demand Media, 3,000 by Federated Media, 1,500 by NetShelter and 1,000 by Technorati. These 10,000 jobs exceed the number of full-time jobs in the online divisions of Hearst, Gannett, MSNBC, and the New York Times combined.

## Table 6-1c: Contributors to Online Content Networks & Aggregators

| Company | Unique Monthly Visitors | Number of Global Contributors | Popular Blogs |
|---|---|---|---|
| Demand Media | 65,000,000 | 15,000 | eHow, GolfLink, Trails, Type F, Cracked |
| Federated Media | 64,000,000 | 5,000* | Alphamom, Bargainist, BoingBoing, Cult of Mac, Make, VentureBeat |
| Glam Media | 79,000,000 | 4,000 | Glamchic, Glambuzz, Brash |
| NetShelter Technology Media | 37,000,000 | 4,500 | SlashGear, MacRumors, Crackberry, BetaNews, Phandroid |
| Technorati | 34,000,000 | 4,000 | JobsHQ.com, Listenernetwork.com, MarketSense.org, NYdailynews.com, Onetravel.com |

*estimate based on competitors with similar traffic

Source: comScore Media Metrix Top 50 U.S. Web Properties, June 2012

### 6.1.2 Online Music Services

In 2011 digital music sales eclipsed physical music sales for the first time

A category that has undergone a complete transformation in the years between the previous report and this one is online music. When Napster and the practice of peer-to-peer file sharing threatened to destroy the music business with the uploading and exchange of MP3 files of songs, free of charge, the music industry went through a prolonged period of turmoil. As unapproved MP3 uploading was illegal (though widespread) some music labels, copyright holders, and industry associations began to sue individuals known to upload and download the unsanctioned files.

A chaotic atmosphere reigned in the industry for several years, with much ill will around the notion of "suing your customers", despite the fact that downloading was illegal. Notions of ownership and access were changing, and many artists and labels realized that people were going to consume music however they wanted to and wherever they wanted to, so perhaps facilitating, rather than blocking the process was the way to go. Alternate approaches to monetization emerged, such as free music files posted to artist's and label's sites, with some continuing to carry a price, or collections of songs that would have carried a price tag of $14.99 or thereabouts on compact disc were being sold for $1.99 as a paid download package.

Apple's iTunes store, launched in 2003, led the shift of the sale of music by album unit to the sale of music by song unit. And while revenues from physical music sales were in decline annually since 2001, it wasn't until 2011 that digital sales actually eclipsed physical sales. Highlights from the Nielsen/Billboard 2011 Music Industry Report include: 1.27 billion individual tracks sold in 2011, an increase of 100 million, or 8.4%, over 2010, and 228 million units of physical albums, down 5% from 2010, though significantly less than the 20% decline seen between 2009 and 2010.[26]

Many developments were seen in the sector of Internet radio and streaming music services as user experiences developed and new platforms became popular for the consumption of anywhere, any time music. Companies such as Pandora, which allows users to create online 'radio stations' based on song preferences, surpassed 150 million registered users in the U.S. in 2011, with more than 2/3 of these users accessing the service via smartphone or tablet.[27]

Rhapsody, one of the pioneers in this space with a decade of operating history in online music, reported 800,000 users[28] in 2011 and revenues of $90 million. In the fall of 2011 the company acquired Napster, the early online music site that made the shift from pirated music to legitimate online music sales, from audio/video retailer Best Buy, which had purchased it in 2008. And in the midst of this activity European streaming service Spotify launched in the U.S. in the summer of 2011, attracting one million users in just 3 weeks and 250,000 paid users in the U.S. (representing 10% of its 2.5 million subscriber base) by year's end.[29]

Profitability remains a problem in this sector, as most users opt for the free, ad-supported service as opposed to the ad-free, premium service. Also costs for licensing remain high as do costs for streaming. And yet, new entrants into this space abound, with companies such as Slacker, 8tracks,Wimp, Raditaz, Songza and others throwing their musical hats into the ring, all in the search for a viable business model in online music.

[26] Nielsen/Billboard 2011 Music Industry Report: http://narm.com/PDF/NielsenMusic2011YEUpdate.pdf

[27] "Pandora Outlines Mobile Leadership at CTIA 2012", http://www.marketwatch.com/story/pandora-outlines-mobile-leadership-at-ctia-2012-2012-05-08, May 8, 2012

[28] "Spotify now has 250,000 paying U.S. users", http://www.reuters.com/article/2011/10/13/us-spotify-idU.S.TRE79C5N120111013, October 13, 2011

[29] "Spotify reaches 2.5 million paying subscribers", http://www.spotify.com/us/blog/archives/2011/11/23/spotify-reaches-two-and-a-half-million-paying-subscribers/, November 23, 2011

## Table 6-1d: Online Music Services

| Online Music Services | 2011 US Internet Revenues (billions) | 2011 US Internet-based employment |
|---|---|---|
| eMusic.com | $0.011 | 75 |
| Grooveshark | $0.001 | 113 |
| iTunes (included in Apple's revenues in Software/Hardware) | | |
| MOG Inc. (acquired by Beats Electronics July 2012) | $0.007 | 60 |
| Napster, Inc. (acquired by Rhapsody in Fall 2011) | $0.027 | 133 |
| Pandora Media, Inc. | $0.274 | 530 |
| Rdio, Inc. | $0.003 | 42 |
| Rhapsody | $0.090 | 150 |
| Spotify | $0.003 | 50 |

### 6.1.3 Games:

In the Entertainment Software Association Report "Video Games in 21st Century"[30] Siwek estimates that total employment in the computer and video game industry in the U.S., including console, mobile, handheld and online multiplayer games is 32,000. The report attributes 12,000 employees to the large employers and 20,000 to small and startup firms, suggesting that there is a long tail of small game developer firms, whose employment is not captured in the large firms enumerated in this report. While some are recorded in the entry for app-related employment, we assume that 2,500 game industry workers are not counted in the workforces of the large employers identified in Siwek's report.

In the 2007 report, the contribution of the game industry to the U.S. Internet ecosystem was estimated at about $1 billion. In 2011 we estimate it to be $3 billion. What has changed? In 2007 the game industry was dominated by console-based games played on platforms such as Microsoft's Xbox, Sony's PlayStation (PS), and Nintendo's Gamecube, Wii, and DS, and games played online, primarily on desktop computers. Most of these games were based on immersive worlds and/or 3D graphics and offered motion picture quality experience, with titles such as *World of Warcraft*, *Rock Band*, and *Grand Theft Auto* being among the most popular. Videogames, or computer games, as they were also called, were time-intensive experiences, with players often playing for sessions of several hours at a time.

Since then, while high quality, high bandwidth games remain popular, a new market of games aimed at casual gamers is emerging. Casual games are

[30] Siwek, Stephen E., "VideoGames in the 21st Century – the 2010 Report", Entertainment Software Association, http://www.theesa.com/facts/pdfs/VideoGames21stCentury_2010.pdf

generally played online, usually on social networks and on mobile devices, and are often delivered to users in the form of an app or widget. They offer a lighter game play experience and can be played in small bursts, for example on a smartphone while waiting in a line or for a bus, or on a desktop or laptop at the office or home. They can be played alone or with others.

The most prominent developer of online casual games is Zynga, a company founded in 2007 that by 2011 had global revenues in excess of $1 billion. Zynga's top titles include *Farmville*, *Cityville*, and *Words with Friends*. The company rose to prominence as a developer for games living on Facebook's platform, and as such enjoyed the massive scale effects made available by the social networking site and its close to 1 billion users. To provide some context re Zynga's rapid rate of growth, in the summer of 2009, when Zynga launched Farmville, it became the first game on the Facebook platform to reach 10 million daily active users. That figure swelled to 20 million daily active users by the fall. A year later Zynga's *Cityville* reported over 60 million monthly active users and more than 16 million daily active users. The business model is based on the online purchase of characters and property and 'energy' to fuel different aspects of gameplay. Another notable company within this market sector is Big Fish Games, producer of over 2,500 casual games such as *Sudoku* and *Drawn*. The company reported over 1.5 billion downloads by the end of 2011.[31]

The most prominent developer of games of all kinds is Electronic Arts, which reported sales of $4.14 billion for 2011. Once largely a console-based business, Electronic Arts has become increasingly digital, with $1.0 billion attributed directly to online and mobile games for 2011[32]. Looking ahead to the 2012-2013 fiscal period the company estimated in its annual report that the ratio of social, mobile, and play-for-free game platforms to console and PC-based play will be approximately 3:1.[33] The company seems to have executed on its plan. On its Q1 of fiscal year 2013 earnings call it announced that revenue derived from smartphones and tablets was up 86 percent year-over-year.[34]

[31] via Hoover's

[32] EA 2011 Annual Report, http://investor.ea.com/releases.cfm?ReleasesType=Earnings

[33] From EA 10-k Annual Report for fiscal year 2012: "In fiscal year 2013, we plan to offer only 14 titles on video game consoles and PCs (each with additional online features, content and/or services) and we plan to offer more than 40 titles for social, mobile and Play4Free platforms to take advantage of the growth opportunities on those platforms."

[34] EA Q1 2013 Earnings Call, http://www.morningstar.com/earnings/PrintTranscript.aspx?id=41651230

The following table shows the top game developers for 2011.

## Table 6-1e: Online Games

| Games played on Internet | 2011 US Internet Revenues (billions) | 2011 US Internet-based employment |
|---|---|---|
| Big Fish Games, Inc. | $0.026 | 200 |
| Capcom U.S.A, Inc. | $0.004 | 66 |
| Digital Chocolate | $0.007 | 65 |
| Playdom | $0.003 | 38 |
| Electronic Arts | $0.569 | 975 |
| Glu Mobile Inc. | $0.033 | 338 |
| Sony Online Entertainment | $0.067 | 720 |
| Zynga | $0.734 | 2,135 |
| All other | $1.531 | 2,500 |

## 6.1.4 User Review and Q&A sites

One of the primary ways the average person interacts with content online is by way of consumer-posted reviews. While such reviews can be found on the sites of various retailers and e-tailers (e.g. Best Buy for electronics, Amazon for a wide array of goods) and on sites devoted to specific marketplaces (e.g. MakeupAlley for beauty products, Zappo's for shoes, TripAdvisor for hotels), this section deals with dedicated review sites.

The two largest companies in this space that have not been acquired by other content, search, or listings sites are Yelp and Angie's List, both of which went to IPO in 2011. At just under half the size of either of these firms, in terms of revenues, is MerchantCircle, a private company whose focus is on marketing small businesses in local markets with added features such as reviews, coupons, and social networking. Once familiar names in this category, such as Citysearch, have since undergone a series of mergers and acquisitions; For example Citysearch acquired Microsoft's Sidewalk.com and later Insider Pages, and then rebranded itself as CityGrid Media, which also owns the popular dining site UrbanSpoon. CityGrid Media operates under the umbrella of IAC/InterActiveCorp, which can be found in this chapter in the section on traditional and digital publishers. Another early entrant in this space, epinions.com, was first acquired by DealTime (now known as Shopping.com). Shopping.com was in turn acquired by eBay in 2005. Therefore U.S. employment numbers and revenues for epinions.com appear under our entry for eBay in the eCommerce section that follows.

Another kind of site that was an early attractor online was the Q&A, or question and answer site. Today such sites have largely morphed into search-optimized 'how to' web properties (as covered earlier in this chapter in the section on pure play digital publishers) though some dedicated Q&A sites remain. Answers.com and Ask.com, which both hark back to the first wave of online content publishing, in the mid to late 1990s. Both companies remain operational today, with Answers.com currently in negotiations to acquire About.com from the New York Times company.[35] Up and coming companies of interest in this sector include Quora, a different twist on a Q&A site, in which the concept of the traditional Q&A site is combined with some of the characteristics of the expert community site as well as 'up voting' and 'down voting' posts and all activity can be integrated with Facebook and Twitter. In the 1-year period between June 2011 and June 2012 Quora experienced a 300% increase in traffic, with 1.5 million unique visitors recorded for June 2012.[36]

## Table 6-1f: Review and Q&A Sites

| Review sites | 2011 US Internet Revenues (billions) | 2011 US Internet-based employment |
|---|---|---|
| Angie's List | $0.090 | 300 |
| Citysearch is covered under IAC | | |
| epinions.com (acq'd by shopping.com, whch was acq'd by eBay) | | |
| InsiderPages is covered under IAC | | |
| Merchant Circle | $0.034 | 304 |
| Yelp | $0.083 | 918 |
| Q&A Sites | | |
| About.com | $0.022 | 155 |
| Answerbag (owned by Demand Media, covered in Digital Publishers) | | |
| Answers Corporation (Answers.com) | $0.021 | 90 |
| Ask.com | $0.067 | 505 |
| Askville (Amazon) | small | 5 |
| Mahalo | small | 5 |
| Quora | $0.002 | 32 |

[35] Hagey, Keach, "New York Times Co. to sell About.com to Answers.com", Wall Street Journal, http://online.wsj.com/article/SB10000872396390443991704577577110053087138.html

[36] Goodman, Eli, "How search is helping Quora break through to the mass market", comScore blog, http://blog.comscore.com/2012/07/how_search_is_helping_quora_break_through_to_the_mass_market.html, July 26, 2012

### 6.1.5 eLearning/Online Education Sites

We estimate 2011 revenues in this sector to be $3.8 billion, and employment in excess of 16,000 people. eLearning and online education did not appear as its own category in the 2007 report, for two main reasons. First, there was still a sizable market for educational products on CD, CD-ROM and DVD, and second, we included companies creating software and systems used for educational and training purposes in the category of software manufacturing or software as a service. (Docent Software and Saba Software are examples of two such firms.)
The eLearning category in 2011 comprises companies that create software for corporate training, for language learning, for casual learning, for school curricula, and for degree-granting institutions.

Of the $3.8 billion in revenues in our estimate, half are attributed to 2 firms, each with just under $1 billion in revenues for 2011: Apollo Group, which operates University of Phoenix, and Bridgepoint Education. University of Phoenix is probably the better known of the two, owing to its extensive online marketing efforts. It is a degree-granting institution with an enrollment of 400,000, with students in programs ranging from associate and bachelor's degrees to doctoral, while Bridgepoint has an enrollment of 80,000, of which 99% are enrolled exclusively as online students.[37]

An additional $1.4 billion of the $3.8 billion category total is attributed to 3 firms – Blackboard, K12, and Capella, which serve elementary, high school, and high school curricula, as well as some college level programs. The remaining approximately $200 million is divided between Renaissance Learning, Rosetta Stone, and Berlitz. Renaissance creates software for the K-12 market in North America, on CD-ROMs as well as online, and we are assuming that 75% of services are now delivered online. Rosetta Stone's global Internet revenues for the year are estimated to be $72 million and our assumption is that 80%, or $58 million can be attributed to the U.S. market[38]. In the case of Berlitz, which offers in person classes, distance learning, and online learning via its berlitzonline.com division we assume that 20% of revenues are online, of which half is U.S.-based, for a total of $42 million.

Some eLearning providers such as Khan Academy and MIT do not sell their products or accept advertising. Khan Academy operates on a small budget funded by grants and donations. It has been described as 'the Wikipedia of education' for its high quality and free online videos on topics ranging from history to finance to physics. Its inventory of over 3,300 short videos has been viewed over 180 million times. MIT's Open Courseware is funded similarly. Since

[37] via Hoover's

[38] This estimate is based on the breakdown of revenues in the company 10-k filing to 12/31/11 which states that 73% of revenues are from sales of CD-ROMs and 27% come from online subscriptions.

2008 it has used YouTube as its primary platform for videos, and iTunes for video and audio downloads. The MIT channel on YouTube offers more than 240 videos on science- and technology-related topics and has attracted over 40 million views.

## Table 6-1g: Online Learning

| eLearning | 2011 US Internet Revenues (billions) | 2011 US Internet-based employment |
|---|---|---|
| Berlitz | $0.042 | 559 |
| Blackboard.com | $0.447 | 1,780 |
| Bridgepoint Education, Inc. | $0.993 | 3,900 |
| Capella Education Company | $0.430 | 2,883 |
| K12, Inc. | $0.522 | 2,500 |
| Renaissance Learning | $0.098 | 670 |
| Rosetta Stone | $0.058 | 408 |
| University of Phoenix (Apollo Group) | $0.946 | 1,200 |

## 6.1.6 Online Video

Increasingly, television viewing is not restricted to broadcast signal

Increasingly, television viewing is not restricted to broadcast signal. Consumers now have other options, many of them made possible by Internet-related technologies. Companies providing enhanced digital viewing experiences to consumer include Boxee, Sling Media, and Tivo. Firms such as Hulu, Vevo, and Vimeo have been focused on staking out specific territories within the online video marketplace. Hulu is focused on providing on-demand viewing of programs produced by top television networks and production studios. Vevo is the result of a partnership between a group of the major music labels and an outside media companies. It is sometimes thought of as a 'Hulu for the music business', where high quality, unpirated music video can be enjoyed on demand. Vimeo has become a popular site for independent filmmakers and cinema lovers, and was acquired by IAC/InterActiveCorp in 2006. The largest distributor of online video is YouTube, with 800 million unique monthly visitors and 4 billion views streamed daily[39]. Google Inc. does not break out its YouTube revenues, but we estimate them to be $1.6 billion[40] based on an estimate made by a Barclays Capital Analyst in November 2011.

[39] Raby, Mark, "YouTube claims 4 billion daily streams", http://www.tgdaily.com/software-brief/60984-youtube-claims-4-billion-daily-streams, January 24, 2012

[40] Szalai, George, "Analyst: YouTube Channels No Immediate Threat to Entertainment Companies", Hollywood Reporter, November 1, 2011, http://www.hollywoodreporter.com/news/youtube-channels-no-immediate-threat-255841

## Table 6-1h: Online Video

| Online Video (incl. Internet TV) | 2011 US Internet Revenues (billions) | 2011 US Internet-based employment |
|---|---|---|
| Boxee (U.S. office) | | |
| Hulu | $0.002 | 20 |
| Sling Media, Inc. | $0.016 | 200 |
| Vevo | $0.021 | 180 |
| Vimeo (included in IAC/InterActive entry) | $0.150 | 170 |
| TiVo | $0.179 | 473 |
| YouTube partners and contributors (FTE's) | $0.020 | 476 |

We have also calculated revenues and employment for participants in YouTube's Partner Program. In the spring of 2007 YouTube created the program, which allowed people to monetize videos they uploaded as long as they held the copyright and complied with the site's Terms of Service and community guidelines. In 2011 there were over 30,000 YouTube partners, a year-over-year increase of 50%. A few hundred, or roughly 1% of these 30,000 YouTube partners are reported to have earnings in the 6 figure range annually[41], with the top YouTube partners, such as Annoying Orange, Shane Dawson, and Smosh earning substantially more. The following table lists some of the most popular "YouTubers", or people who produce, post, and monetize videos via YouTube's partner program.

## Table 6-1i: Top YouTube Partners

| YouTube Channel | Number of Views | Number of Subscribers | Average Views Per Video[42]* |
|---|---|---|---|
| Ray William Johnson | 1.9 billion | 5.7 million | 6.2 million |
| Smosh | 1.6 billion | 5.2 million | 6.7 million |
| Annoying Orange | 1.3 billion | 2.5 million | 7.9 million |
| Ryan Higa | 1.26 billion | 5.5 milion | 10.3 million |
| Sxephil | 945 million | 2.2 million | 1.03 million |
| Fred Figglehorn | 938 million | 1.9 million | 8.7 million |
| Shane Dawson | 725 million | 2.8 million | 3.5 million |
| The Young Turks | 772 million | 366,000 | 62,342 |
| Freddie W | 682 million | 3.5 million | 4.5 million |
| Jenna Marbles | 667 million | 3.8 million | 6.5 million |
| Natalie Tran | 432 million | 1.1 million | 1.5 million |
| Epic Mealtime | 432 million | 2.7 million | 4.2 million |

[41] Seabrook, John, "Streaming Dreams: YouTube turns pro", The New Yorker, January 16, 2012

[42] YouTube Statistics, from http://www.youtube.com/t/press_statistics/

* via Channelmeter

But such superstar partners tend to be the exceptions, not the rule, on the video-sharing site, where the majority of videos posted receive dozens to hundreds of views, and those videos that net views in the hundreds of thousands and millions are a fraction of the top 1% of all videos posted. Still, with a site that claims 800 million unique visitors each month[43] and 4 billion videos streamed each day, there is ample traffic that can potentially be monetized by individual video producers.

Our estimate for YouTube partner earnings globally in 2011 is $39.05 million, making earnings for the average partner approximately $1300 per annum. We assume this is all income to the partner, because cost of production is generally low. Therefore a partner earns 3.17% of a full time employee in the U.S. Factoring in the geographic origins of YouTube viewers and YouTube production our estimate for the U.S. full time equivalent of the program's 30,000 partners is just under 1000 people.

## 6.2 eCommerce

### 6.2.1 Retailing

eCommerce has evolved from an interesting novelty to a promising but financially troubled sales channel to a significant factor in the U.S. retail sector

Since its inception in the mid-1990s eCommerce has evolved from an interesting novelty to a promising but financially troubled sales channel to a significant factor in the U.S. retail sector. For 2011 we estimate that eCommerce is responsible for $222 billion of gross revenues in the U.S., which is about 5% of all retail, a total that includes automotive and grocery. The 2011 number compares to $160 billion in 2007.

Online retailers range from conventional retailers with substantial physical presences (e.g. Walmart, Sears, Staples, and Best Buy), through pure play digital retailers who transact exclusively online (such as Amazon, Netflix, and Gilt Groupe), to a growing category of sole proprietors and independent merchants selling on platforms such as eBay and Etsy.

By far the largest player in this space is Amazon, with $48 billion in global online sales for 2011, of which we attribute $26.0 billion to the U.S.[44] Amazon was founded in 1995, when crucial support services such as logistics, shipping, and secure online payment systems were underdeveloped. It was not until 2003 that Amazon became profitable, and since then profits have increased every year. In the 2007 report Amazon was the top e-tailer with $15 billion in global online sales and 12,750 U.S. employees. That figure has more than tripled for 2011, as

[44] Our estimate is based on the reported figure of company global employment of 56,200 in 2011 10-k report. U.S. employment and revenues have been taken at 62%, based on the ratio of U.S. office and warehouse space leased to total leased space worldwide.

has the U.S. employee headcount.[45]

The #2 online retailer in both the 2007 and 2011 reports was Apple Inc., with $2.7 billion in online sales in 2007 and $15.8 billion in online sales for 2011. The growth is explained by iTunes sales, digital software sales, and Internet-related equipment sales, such as desktop and laptop Macs computers, iPhones, iPods, and iPads.[46]

Other comparisons between the 2007 report and the 2011 report are:

- Staples rose from #17 to #3 on the list of top Internet retailers, doubling online sales to $10.6 billion and quadrupling U.S. Internet-related employment, from 6,395 to 25,481.
- Walmart made a similar leap in the Internet retailer ranking, from #20 to #5, tripling online sales to $5 billion for 2011 and increasing U.S. Internet-related employment from 1,800 to 12,000.
- QVC.com (Liberty Interactive Corp.) doubled its online revenues to $3.8 billion.
- Netflix tripled its sales to $3.2 billion.

New entrants in the Top 50 Internet Retailers for 2011 include the following:

- Groupon, launched in November 2008, is now the biggest player in the daily deals space. On the Top Internet Retailer list it comes in at #21, with $1.6 billion in sales and 5,736 Internet-based employees in the U.S.
- Etsy, the online marketplace for handmade items and vintage items, crafts, and art supplies, launched in mid 2005, brokered gross sales of $526 million in 2011, of which $328 million were by its U.S. merchants.47
- GiltGroupe, founded in 2007, a flash sale website for luxury and design items, had sales of $500 million in 2011 and employed 900 workers in the U.S.

In the table that follows we enumerate individually the top 20 Internet retailers, which together account for $108.5 million, drawing mainly on the 2012 Internet

[45] Using the same formula as in the previous footnote, we calculate Amazon's U.S. employment at 62% of global employment, based on ratio of leased office space, to arrive at a figure of 34,800 U.S. employees.

[46] Note that the figure for Apple's 2011 online sales via Internet Retailer database was $6.6B, while from the company's 2011 10-k report, page 78, U.S. sales total was$41,812B. Globally Internet-related sales comprise iTunes store sales, apps, iBookstore ($6.3B,) iPhone hardware and licensing ($47.1B), iPad ($20.4B). Assume that of the iPhone revenues 1/3 is data, 2/3 is phone. Thus globally 39% of revenues are Internet dependent. Assuming U.S. sales are similarly distributed (probably conservative) U.S. Internet revenue is $16.3B, much larger than the figure of $6.6B reported for 2011 by Internet Retailer.

[47] For our estimate for Etsy we took total merchandise sales of $526M and divided it by the 800,000 sellers to arrive at sales of $657 per seller, from which we subtracted Etsy's 3.5% sales commission and 3% payment commission to yield net sales per seller of $614 per year. Based on the SSA.gov figure of $41,000 per annum as national U.S. average, an Etsy seller therefore earns 1.5% of a full time worker, so its 800,000 sellers are equivalent to 12,000 full time workers globally. We assume 2/3 to be U.S.-based, yielding8,000 FTE Etsy merchants in the U.S. for 2011.

Retailer report. We then combine the next 80 from that source (a total of $41 million,) and the next 400 (which total $26 million.) We allow for an additional $10 million of revenue from retailers not captured in the top 500. Following the procedure used in the 2007 report, we add employment of 172,000 to allow for people employed to deliver products purchased online. This estimate is anchored on the 100,000 in the 2007 report and adjust by the 72% by which online retailing has grown since 2007.

## Table 6-2: Internet Retailing

| Internet Retailers: Top 20 | 2011 US Internet Revenue (billions) | 2011 US Internet employment |
|---|---|---|
| Amazon.com Inc. | $26.03 | 34,800 |
| Staples Inc. | $10.60 | 25,481 |
| Apple Inc. | $15.30 | 3,221 |
| Walmart | $4.90 | |
| Dell Inc | $4.61 | 7,700 |
| Office Depot Inc. | $4.10 | 9,856 |
| Liberty Interactive (QVC.com) | $3.76 | |
| Sears Holdings Corp. | $3.60 | 8,663 |
| Netflix Inc. | $3.20 | 2,979 |
| CDW Corp | $3.00 | 6,230 |
| Best Buy Co. | $2.95 | 6,382 |
| OfficeMax Inc. | $2.90 | 1,000 |
| Newegg Inc. | $2.70 | 1,289 |
| Macy's Inc. | $2.25 | 5,409 |
| W.W. Grainger Inc. | $2.18 | 5,240 |
| Sony Electronics Inc. | $1.98 | 4,760 |
| Costco Wholesale Corp. | $1.90 | 4,567 |
| LL Bean Inc. | $1.72 | 4,135 |
| Victoria's Secret/Bath & Body Works | | 3,918 |
| JC Penney Co. Inc | $1.59 | 3,822 |
| Internet Retailers - Ranked 21 to 100 | $41.063 | 94,600 |
| Internet Retailers - Ranked 101 to 500 | $26.000 | 87,000 |
| Internet Retailers - All others | $10.000 | 33,333 |
| Shippers delivering online purchases | $6.880 | 172,000 |

Also worth noting in the 2011 eCommerce landscape is the rise of mobile commerce, transacted on smartphones, tablets and eReaders. The commoditization of smartphones in particular, along with the development of mCommerce capabilities, has freed online sales from the constraints of desktop and laptop computers. Now transactions can happen anywhere, at any time; and increasingly they do. In 2011 mobile commerce sales totaled $10.7 billion. $2 billion of mobile commerce was transacted on Amazon.com., and $5 billion was transacted on eBay, where thousands of sellers use its eCommerce platform and the over one dozen apps that plug into its main platform. Close to 2/3 of the U.S.'s top Internet retailers report having a website optimized for mobile devices and screens, or a dedicated app.[48]

Finally we list in the retail sector the revenues and full-time equivalent employment of people who use platforms such as Etsy, Amazon and eBay to run sole proprietor and small business retail enterprises to sell collectibles, overstock, and handcrafted designs. We exclude Craigslist from this list because sellers of second-hand goods on Craigslist are redistributing economic value, not generating it, and service providers who advertise on Craigslist capture only the economic value of the advertising, not the services. We estimate that $36 billion in sales accrued to such individual online sellers in 2011.

### Table 6-2a: Independent/Small Retailers Online

| Internet Retailers – sole proprietors and small businesses | 2011 US Internet Revenue (billions) | 2011 US Internet employment |
|---|---|---|
| Etsy.com sellers | $0.328 | 8,000 |
| Amazon.com Merchants | $7.228 | 33,600 |
| eBay sellers | $28.400 | 138,517 |

## 6.2.2 Travel & Airlines

Of the industries affected by digital technology, travel is one of the most transformed

Of the industries affected by digital technology, travel is one of the most transformed. No longer a full service industry, travelers can now comparison shop online and on mobile devices, read guest reviews of hotels, and build entire travel itineraries. Researching and booking hotels, holiday homes, flights, and cars online has been made as simple as typing a query into a search engine , or starting the process at online travel portals or apps such as Expedia and Trip Advisor, an airline's website, or a meta-search engine such as Kayak.com.

In the last report the leading companies in online travel were Expedia, Priceline, Travelocity, and Orbitz. These firms remain market leaders, but new niche players have emerged -- in the form of companies specializing in such sectors as

[48] InternetRetailer.com

holiday home rentals (HomeAway.com), last minute discount travel (TravelZoo.com), and even rental of private apartments (AirBnB.com.)

We distinguish four sectors of the online travel industry: Pure play digital agencies, online and offline hybrid agencies, airline sites, and technology support services for the travel industry.

## Table 6-2b: Online Travel Industry Sectors

| Pure Play Digital | Hybrid | Airlines | Technology Providers |
|---|---|---|---|
| AirBNB | Carson Wagonlit | Alaska Airlines | Pegasus |
| Expedia | Thomas Cook | American Airlines | TravelPort |
| HomeAway | American Express | United Continental | |
| Kayak | | Delta | |
| Orbitz | | Jet Blue | |
| Priceline | | Mesa Air | |
| Travelocity | | Republic | |
| Travelzoo | | SkyWest | |
| Trip Advisor | | Southwest | |
| | | U.S. Airways | |
| | | Virgin American | |

We estimate that pure play digital and online travel agencies employ about 9,500 people. The hybrid agencies are larger, but we note that most of their travel revenues are from corporate accounts accessed by email and telephone, and they do not support sophisticated self-service Web interfaces as the online travel agencies do, except to the extent that they sell tours and cruises. We estimate that airlines selling their own inventory employ about 1,500 people. Technology providers employ only 1,300.

The following table breaks out the 2011 U.S. Internet-based revenues and U.S. Internet-based employment for the companies we have identified in this sector.

## Table 6-2c: Online Travel

| Online Travel (including technology and corporate travel) | 2011 US Internet Revenue (billions) | 2011 US Internet-based employment |
|---|---|---|
| AirBnB, Inc. | $0.035 | 60 |
| American Express | $4.000 | 800 |
| Carlson Wagonlit | $5.000 | 900 |
| Expedia (also owns Hotels.com, Hotwire) | $2.040 | 5,688 |
| HomeAway, Inc. | $0.090 | 421 |
| Kayak Software Corporation | $0.225 | 162 |
| Orbitz Worldwide Inc. | $0.384 | 665 |
| Pegasus Solutions | $0.063 | 800 |
| Priceline | $0.872 | 1,000 |
| Thomas Cook | $2.800 | 500 |
| Travelocity | $0.035 | 400 |
| Travelport Limited | $0.231 | 550 |
| Travelzoo Inc. | $0.148 | 350 |
| TripAdvisor, Inc. | $0.287 | 740 |
| Airlines | | |
| Alaska Airlines | n/a | 58 |
| American Airlines | n/a | 280 |
| United Continental Airlines | n/a | 346 |
| Delta | n/a | 328 |
| JetBlue | n/a | 50 |
| Mesa Air | n/a | 18 |
| Republic | n/a | 38 |
| SkyWest | n/a | 49 |
| Southwest Airlines | n/a | 209 |
| U.S. Airways | n/a | 173 |
| Virgin America | n/a | 5 |

### 6.2.3 Financial Services: Online Banking and Trading

In 2011 four of the top five top banking activities happened primarily online

Online banking is a rapidly growing segment of the Internet ecosystem. A report by Forrester Research[49] tracked sales of more than 20 financial products across all channels and found that in 2011, consumers in the U.S. who opened financial products reported that they opened 37% of those products online, 2% by mobile, and 36% in a branch, with the online channel up from 32% of sales online in 2010, and most of that increase coming at the expense of branch sales. The same report finds that four of the top five top banking activities happened primarily online. Paying a bill, viewing balances and transaction histories, viewing a statement, and transferring money, were conducted about 60% of the time or more often via the Web. The only non-online-centric servicing activity was depositing a check: 70% of check deposits today occurred at branch. Mobile banking growth increased, with 15% of U.S. online adults are active mobile bankers, up from 5% in 2008.

Internet employment was difficult to relate to online bank revenues, because most banking customers were serviced both on- and offline. Therefore we estimated Internet-related employment as follows. Employment was taken as the sum of people employed in a bank's digital marketing team (online advertising, social media marketing, mobile marketing, and email customer service,) and people employed in online banking customer support and service and the mobile banking app team. The former was taken as 100 employees for the larger commercial banks, based on employment in similarly scaled retailers. The latter averaged 600 based on the Forrester report "Staffing and Hiring for eBusiness 2011."[50] For Capital One, one third ($5B) of revenues were assumed to be related to consumer banking, and the balance to be credit card-related. We treated it as a small bank for purposes of online banking, but a large spender on online marketing. Discussions with a range of banking executives gave some confidence in these estimates.

[49] Forrester Research: The State of North American Digital Banking, July 20, 2012

[50] Johnson, Carrie, "Trends 2011: Staffing and Hiring for eBusiness", January 9, 2012, http://www.forrester.com/Trends+2011+Staffing+And+Hiring+For+eBusiness/fulltext/-/E-RES61082?docid=61082

## Table 6-2d: Online Banking & Trading

| Financial Services – Online Banking & Trading | 2011 US Internet-based employment |
|---|---|
| Bank of America | 700 |
| Capital One | 200 |
| Charles Schwab | 500 |
| Credit Suisse USA | 5 |
| JPMorgan Chase | 700 |
| Citigroup | 680 |
| Deutsche Bank | 200 |
| eTrade | 400 |
| First National | 5 |
| Goldman Sachs | 700 |
| HSBC North America | 400 |
| Huntington Bancshares | 10 |
| ING | 500 |
| Interactive Brokers Group, Inc. - new | 5 |
| Merrill Lynch | 400 |
| Morgan Stanley | 600 |
| TD Ameritrade | 200 |
| TD Bank | 200 |
| UBS | 5 |
| U.S. Bancorp (US Bank) | 100 |
| Wachovia | 5 |
| Wells Fargo | 450 |

## 6.3 Social Networks

At the time of the previous report social media was a niche market, and arguably not even a market as very few companies had identified profit-generating business models despite being able to attract tens and sometimes hundreds of millions of users. The category was largely thought of as a distraction, or a social toy, but in the intervening years this sector has turned into a platform that has led to a reinvention of eCommerce, gaming, online publishing, and a host of other industries that have learned how to benefit from interconnected and highly engaged consumers.

## Table 6-3a: Top Social Networks/Online Sites: 2007 vs. 2011[51]

| | 2007 | 2011 |
|---|---|---|
| Facebook | 30 million users | 845 million users |
| Twitter | 340,000 users | 225 million users |
| YouTube | 6 hours of video uploaded every minute | 72 hours of video uploaded every minute |
| eBay | Net income of $348 million[52] | Net income of $11.65 billion |

The 2007 report included the following companies in the social networking category:

- High school friends sites Classmates.com and Reunion.com
- Dating site Match.com
- Yahoo! 360, launched by the search portal in 2005 and shuttered, some say prematurely, in 2008
- Business networking site LinkedIn
- An up and coming site, Facebook, which had grown from its college dorm origins to 40 million users in the space of 3 years

The leader in the sector was MySpace, with 81% of the market share for social networks in the U.S. in 2007[53]. In addition to the having the lion's share of the social networking market at the time MySpace also had more U.S. users than Google.[54] One year earlier the site had been acquired by NewsCorp for $580 million. From a 2012 point of view this acquisition may seem unwise (as MySpace was sold in 2011 for a mere $35 million) but the dramatic rises and falls speak to the vicissitudes of this sector. What looks like an incumbent one day can quickly become an also-ran. There were defensible reasons to believe MySpace was on its way to becoming both a social media giant and a mainstream media giant. It was the first site that gave users the freedom to freely (and anonymously, if they desired) to post pictures, videos, and opinions and quickly became synonymous with youth culture and its unbridled expression and rebellion. A feature story in BusinessWeek at the time of MySpace's rise dubbed the teenagers of the time "The MySpace Generation".[55]

[51] Source: "Internet 2011 in Numbers", http://royal.pingdom.com/2012/01/17/Internet-2011-in-numbers/, January 17, 2012

[52] Demery, Paul, eBay's 2007 merchandise sales grow 31.1% to $59.3 billion, http://www.Internetretailer.com/2008/01/24/ebay-s-2007-merchandise-sales-grow-13-1-to-59-3-billion, January 24, 2008

[53] "Market Share of U.S. Internet Visits to Top 20 Social Networking Sites, February 2007", Hitwise blog, http://weblogs.hitwise.com/leeann-prescott/2007/03/buzznet_and_imeem_fast_growing.html

[54] Alvarez, Socrates, "What Causes Internet Companies To Fail?", San Francisco Gate, August 14, 2012, http://www.sfgate.com/business/investopedia/article/What-Causes-Internet-Companies-To-Fail-3788875.php#ixzz23fvoKB4T

[55] "The MySpace Generation", BusinessWeek, December 11, 2005, http://www.businessweek.com/stories/2005-12-11/the-myspace-generation

But by mid 2009[56] the tide had turned and Facebook overtook MySpace. Facebook's rate of growth continued to increase, and the site added hundreds of millions users each year, until reaching close to 1 billion users by 2012. eMarketer reported that 141 million Americans accessed the site at least once per month.[57]

Nielsen's 2011 State of the Media Report for 2011[58] showed Facebook to be the dominant online destination for Americans, with 17% of time online spent on the social networking site, vs. 11% spent on Google sites (Google, Gmail, YouTube, etc.), 10% spent on Yahoo! sites, and 6% spent on Microsoft sites. The table below compares these figures for 2007, the time of our last report, and for 2011, the period of this report.

## Table 6-3b: Percentage of time spent online on major sites 2007 vs. 2011

| | End of 2007 | End of 2011 |
|---|---|---|
| Facebook | 2% | 17% |
| Google sites | 4% | 11% |
| Yahoo! sites | 13% | 10% |
| Microsoft sites | 7% | 6% |

As users began to spend more time on social media sites, various features of websites became integrated with social media features, such as the ability to 'like' a product or service on an another website and have it appear in your Facebook newsfeed. Brand pages and social media accounts also became commonplace since the writing of the last report, with some of the largest being Coca-Cola, with 48 million fans, Disney with 38 million, Converse with 33 million, Starbucks with 31 million, RedBull with 29 million, and Oreo with 27 million.[59]

Companies in the social media space are now vying for audience in such niches as artists, moms, runners, recovering addicts, and even couch surfers

Since the time of the 2007 report there has been a proliferation of companies in the social media space, with companies vying for audience in such niches as artists, moms, runners, research scientists, recovering addicts, and even couch surfers. Many have built communities numbering in the tens and hundreds of thousands and even millions, with some achieving user bases over tens of million (e.g. Flixster for film lovers, Last.fm for music, BlackPlanet for African Americans). Even though the sector has matured in terms of user base and user experience business models remain elusive for many, and for 2011 the top U.S. companies in this sector with significant revenues are Facebook and LinkedIn,

[56] Lipsman, Andrew, "The Network Effect: Facebook, LinkedIn, Twitter & Tumblr Reach New Heights in May", comScore blog, June 15, 2011, http://blog.comscore.com/2011/06/facebook_linkedin_twitter_tumblr.html

[57] "Facebook helps get one in five people worldwide socializing on online networks", eMarketer, March 15, 2012, http://www.emarketer.com/Mobile/Article.aspx?R=1008903

[58] Nielsen State of the Media: The Social Media Report Q3 2011, http://blog.nielsen.com/nielsenwire/social/,

[59] Number of Facebook fans on these pages is current to mid August 2012.

with $3.7 billion and $522 million reported for 2011, respectively. Well-known companies with widely used products, such as Tumblr, Twitter, Foursquare, and Pinterest are either pre-revenue, do not report revenue, or have small revenues, usually in the single digit millions, and employ less than 100 people.

## Table 6-3c: Social Networks

| | 2011 US Internet Revenue (billions) | 2011 US Internet-based employment |
|---|---|---|
| Digg – acquired by Betaworks, 2012 | $ 0.002 | 18 |
| Facebook | $3.710 | 3,200 |
| Facebook app developers | | 10,000 |
| Foursquare | $0.000 | 10 |
| Instagram (acquired by Facebook, 2012) | $n/a | 13 |
| LinkedIn | $0.522 | 1,200 |
| Pinterest (Cold Brew Labs, Inc.) | $0.000 | 21 |
| Reddit* | | 26 |
| Stumbleupon, Inc. | $0.006 | 49 |
| Tumblr, Inc. | $0.000 | 107 |
| Twitter | $0.020 | 400 |

*(Sept. 2011 changed ownership from Conde Nast to Advance Publications, parent co. of Conde Nast)

Online dating, which was included in the 2007 in the category of social networks has been broken out separately in this report. There are now over 1,000 online dating sites in the U.S., with the majority being privately held firms. We estimate that this sector's value to the U.S. economy in 2011 is approximately $1.5 billion.[60] There are 3 firms in this market that account for the majority of these revenues: eHarmony, with $250 million, FriendFinder Networks with $331 million, and Match.com, with approximately $500 million.[61] Match.com launched in Dallas in 1995, the nascent days of the consumer Internet and this pioneer in online dating, continues to be the leader in this sector as well as the best known and most trusted name. Since the time of the last report, Match.com launched a sister site, chemistry.com, and acquired OKcupid.com and SinglesNet.com. Match.com is owned by InterActiveCorp (IAC).

Other well-known online dating companies include Los Angeles-based Spark Networks, which operates jdate.com, christianmingle,com, blacksingles.com and

[60] Forrester reported $957 million of revenues for the U.S. online dating industry in 2010, http://blogs.computerworld.com/online_dating_its_bigger_than_porn , while an IbisWorld report from December 2011 estimated the market value to be $2 billion, therefore we take an average and estimate the value of the industry to be $1.5 billion in 2011.

[61] The figure of $500 milion of revenue in 2011 for Match.com is based on company quarterly filings which showed revenues in excess of $100 million per quarter in 2011.

other niche dating sites, and San Francisco-based Zoosk, which was reported to have generated $90 million in revenues in 2011.[62]

## Table 6-3d: Online Dating

| | 2011 US Internet Revenue (billions) | 2011 US Internet-based employment |
|---|---|---|
| eHarmony.com | $0.250 | 275 |
| FriendFinder Networks | $0.199 | 692 |
| Match.com (owned by IAC, covered in Online Content Section, above) | | |
| okcupid.com (owned by IAC, covered in Online Content Section, above) | | |
| plentyoffish.com (Canadian co., therefore N/A) | $0.025 | 20 |
| Spark Networks, Inc. (jdate.com, christianmingle.com, blacksingles.com, etc) | $0.049 | 161 |
| Zoosk | $0.090 | 52 |

[62] Levy, Ari "Zoosk, the web's perpetual love machine", Business Week, February 8, 2012, http://www.businessweek.com/magazine/the-webs-perpetual-love-machine-02082012.html

# Chapter 7: Distributing the Economic Value by Geography

We examined the geographic distribution of the Internet ecosystem in two ways. The employment analysis built up in Chapters 3 to 6, relying as it did mainly on company reports to the Securities and Exchange Commission, treated a firm's entire employment as if it was at its headquarters. These data have something to say about the distribution of head office power around the U.S., but vastly understate the dispersion of economic benefit. To compensate, we used the U.S. Census Bureau's economic census to find the location of establishments whose North American Industry Classification System (NAICS) codes revealed them to be part of the Internet ecosystem.

## 7.1 Company headquarters and their employment by geography

Of the 2 million jobs that our study credits to the Internet ecosystem, our method cannot assign about one million to a geography, because they work in very small firms or are self-employed or are in "all other" categories of some sectors, and it is impractical to trace individual addresses. We assign the other million people to about 500 firms whose headquarters have known street addresses. We find that 37 of the 50 states in the U.S. are home to one of these company headquarters.

New York and California are home to the headquarters of the largest Internet firms, and nine states are the sites of headquarters that account for 72% of the attributed employment:

## Table 7-1: Firms and Employees by State

| State | Number of Firms Headquartered in the State | Number of Employees Whose Firms are Headquartered in the State |
|---|---|---|
| New York | 102 | 239,000 |
| California | 128 | 215,000 |
| Washington | 24 | 64,000 |
| Massachusetts | 29 | 60,000 |
| Illinois | 22 | 38,000 |
| Minnesota | 10 | 29,000 |
| Pennsylvania | 11 | 28,000 |
| Arkansas | 3 | 26,000 |
| Colorado | 8 | 19,000 |

## 7.2 Total Internet employment by geography

As noted, the previous section vastly understates the dispersion of economic benefit of the Internet ecosystem because it deals with headquarters. To get closer to the true dispersion, we made use of the U.S. Census Bureau's economic census to find the location of establishments whose North American Industry Classification System (NAICS) codes classified them as part of the Internet ecosystem.

Note that firms found in this way are not the whole of the Internet ecosystem. These firms are those who classify all their revenue as attributable to the Internet. Many of the firms tracked in our study attribute some revenue to the Internet and some to other sources. If we had relied on the U.S. Census Bureau's data to calculate the size of the Internet ecosystem, we would have missed these mixed revenue firms, and understated the ecosystem's size. However the Census data is better for estimating dispersion of economic activity than our survey because it maps every business entity to a county, while we map ours to the location of its headquarters.

Another limitation of the census data is that the Census Bureau promises anonymity to firms that participate, and therefore does not report information like exact employment at a geographic location that might be used to find the identity of a firm in, for example, a low-density county. Instead it simply counts and reports the number of "establishments" at a location, defined as businesses or industrial units at that location that distribute goods or perform services. It does give national employment per NAICS code.

We relied on five NAICS codes to identify establishments in the ecosystem:

454111: Business to consumer retail sales Internet sites,
517110: ISPs, using own operated wired telecommunications infrastructure (eg cable, DSL),
517919: Dial-up ISPs, using client-supplied telecommunications connections,
519130: Advertising periodical publishers, exclusively on Internet,
541511: Web (i.e. Internet) page design services, custom.

These codes produced 115,000 establishments, a far larger number than the 500 firms identified in our survey, and 1,640,000 employees, somewhat smaller than the 2 million identified in our surveys. These discrepancies are to be expected. We have fewer firms than the U.S. Census has establishments, because our sample is of headquarters. We have more employees, because the selected census NAICS codes cover only pure internet businesses.

## Table 7-2: U.S. Census Bureau Establishments and Employment for Internet-related NAICS Codes

| NAICS Code | Establishments | Employees |
|---|---|---|
| 454111 | 15,910 | 130,032 |
| 517110 | 35,222 | 799,246 |
| 517919 | 3,215 | 31,481 |
| 519130 | 5,392 | 90,892 |
| 541511 | 55,336 | 590,819 |
| TOTAL | 115,075 | 1,642,470 |

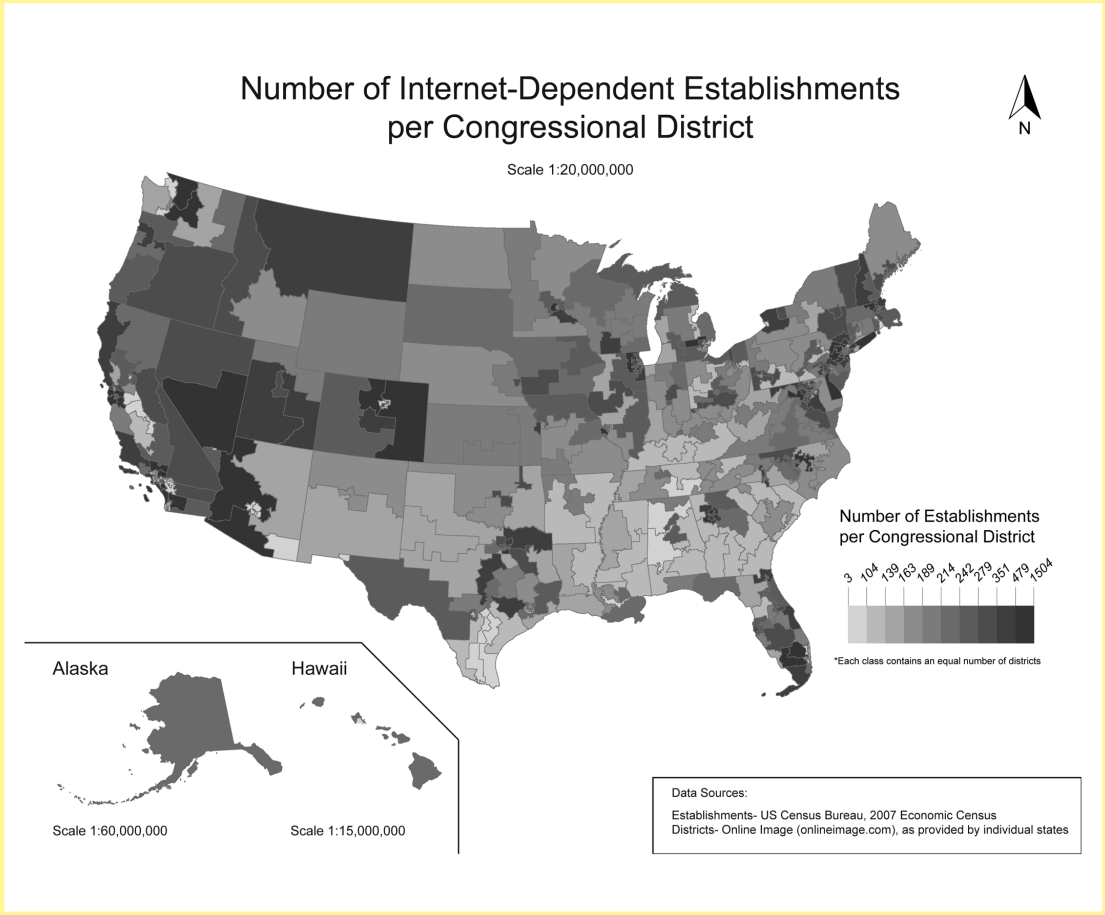
Because each establishment was identified as to its state and county, we were able to translate from the 3,300 counties to the 435 congressional districts using an algorithm supplied by Online Image, Inc. We found that every congressional district contained some establishments. The district with the fewest establishments contained 3, and the district with the most contained 1,504. The mean was 203 establishments per congressional district.

Figure 7.1 plots establishments onto U.S. congressional districts, and Figure 7.2 breaks out the four densest regions of the country. The congressional districts are graded into deciles, from the 10% of districts with fewest establishments to the 10% with the greatest number.

Note that congressional districts with large land masses but small populations are visually prominent in these maps. Thus Montana, with only one congressional district but 411 Internet establishments, is in the ninth decile of the distribution of congressional districts, and its dark black shading makes it appear more

prominent than the state of Washington, which has 3,018 establishments (but 10 congressional districts.) For similar reasons the lightly populated first congressional district in the state of New York, located on the eastern end of Long Island, is visually more prominent than all of Manhattan.

## Figure 7-1: Mapping of the Internet Ecosystem onto Congressional Districts



## Figure 7-2: Details of Four Metropolitan Areas

# Chapter 8: Socio-Economic Benefits of the Advertising-Supported Internet Ecosystem

## 8.1 Overview

The economic benefits of the Internet and its ecosystem to the United States are broad, and have been categorized, at least since Hagel[63] coined the distinction, under the headings content, commerce and community, and these categories formed the structure of our Chapter 6. Thus the Internet gives almost universal, low cost access to all manner of information content, it supports commerce platforms on which we can perform such tasks as shopping, booking travel, banking, and transacting with government, and it supports community platforms that facilitate businesses that bring efficiency to dating, job hunting, and many other social activities.

Yet we shall argue here that the impact of the Internet may be more profound than the economic effects identified in Chapters 3 through 6. Whether it is at the level of the recreational, the educational, or the political spheres, democracy enabled by the Internet has disrupted patterns of social stratification, liberated talent, and engaged injustice. Where access to much of the world's information was once restricted, it is now largely open. Where information was once costly or available only on the scheduled news cycle, it is now on-demand and free. Where there were once socially isolated strata, there is now community.

We begin this chapter with a review of the evidence that social impacts have had direct effects on economic performance. We then review the arguments that

[63] Hagel, John and Arthur G. Armstrong (1997), Net Gain: Expanding Markets Through Virtual Communities. Harvard Business School Press.

there have been indirect, less observable, and perhaps less immediate, effects on economic welfare and, more broadly, on human flourishing. Finally we close the loop by arguing that the indirect effects, too, enhance business practice.

## 8.2 Social Networks Enhance Entrepreneurship

Ecosystem tools have put a generation of entrepreneurs into business by reducing their communication frictions and allowing them to share infrastructure costs. For example:

- Merchant platforms such as Amazon, eBay and Etsy take small business's products to market.
- Brokerage platforms such as Craigslist and Kickstarter link buyers to sellers, and investors to those who need capital.
- Payment facilitators such as Paypal, Wikipay and Square democratize access to credit provision and payment mechanics.
- Logistics platforms link small merchants to a global network of one- and two-person trucking companies.
- Social networks, recommendation engines, and search engines help small sellers, who lack the resources to build broadly recognized brands, to discover customers.
- Cloud computing has enabled small merchants to enjoy hardware and software benefits once limited to firms who could afford their large investments. They can rent, as needed, services such as storage, software, platforms, and test environments.

These tools are helpful for small entrepreneurial businesses on the long tail of the firm-size distribution discussed by Anderson (2006).[64] They are associated with an increase the share of niche products relative to mainstream products as Brynjolfsson, Hu and Simester (2011)[65] demonstrate.

The extreme end of the long tail, made up of individuals and very small teams, has more than trebled in size. Drawing from Chapters 5 and 6 of this report, we compute Table 8.1 and find that a total of 375,000 people are working individually or in very small teams to help build out or transact on the Internet. This number compares to 100,000 in 2007, when the social web had barely taken shape.

Since the time of the 2007 report, the climate for funding digital start-up businesses has improved considerably. In the Q2 2012 report of venture capital (VC) investment, VC levels were shown to be the highest since the Dot Com

[64] Anderson, Chris (2006), The Long Tail: Why the Future of Business is Selling Less of More. Hyperion.

[65] Brynjolfsson, Erik, Jeffrey Yu Hu, and Duncan Simester (2011), "Goodbye Pareto Principle, Hello Long Tail: The Effect of Search Costs on the Concentration of Product Sales," Management Science,

days.[66]. With fixed costs covered by venture investors, and marginal costs almost zero, Internet entrepreneurs of digital goods have been able to build awareness and demand for their products by offering them free to as much as 95% of their customer base, an approach known by the term freemium, which has been defined as: "a business model using two products or services, or a combination of products and services. In such combination, one item is provided at no charge while a complementary item is sold at a positive price to the same general group of customers."[67] The maturation of the freemium model has been one of the enablers of Internet entrepreneurship since the time of the 2007 report. Examples of enterprises that pioneered the method are Skype and LinkedIn, and newer exponents include Dropbox, MailChimp, and Evernote.

### Table 8-1: Independent writers, programmers, designers, and merchants online

| Sector | Number of people |
|---|---|
| Individuals and small teams selling on Amazon, eBay and Etsy | 138,500 |
| Self-employed web designers, writers and programmers | 167,000 |
| Individual App developers | 35,000 |
| People on content networks (e.g. Demand Media) and blog networks (e.g. Technorati) | 32,500 |
| Individual game developers | 2,500 |
| TOTAL | 375,000 |

## 8.3 Social Effects Foster Geographic Dispersion of Economic Activity

The lower communication costs have had implications for where firms locate. Arora and Gambardella (2005)[68] show how advances in communication technology have allowed software to be produced in Brazil, China, Ireland and Israel, far from the location of final demand and despite the importance of close interaction with the lead users who drive final demand.

The so-called 'glocal' hypothesis, that firms can reach a geographically dispersed, even global, customer base from almost any location, is causing some scholars to question whether the historical pattern of business location, which has emphasized the benefits of physical co-location of firms in urban concentrations

[66] CB Insights, July 2012, http://www.cbinsights.com/blog/.-capital/q2-2012-quarterly-report Quarterly Venture Capital Report, Q2 2012.

[67] Puloj, N., "Freemium: Attributes of an Emerging Business Model", December 1, 2010, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1718663

[68] Arora, Ashish and Alfonso Gambardella (2005), From Underdogs to Tigers: The Rise and Growth of the Software Industry in Brazil, China, Ireland, and Israel. Oxford University Press.

such as California's Silicon Valley and New York's Wall Street, is changing. Is the geographic trajectory of capitalism continuing in the direction of spatial clustering or is the rise of the Internet nudging it toward dispersal[69]?

There is evidence that, since the beginning of the deployment at scale of the commercial Internet around 1995, businesses in the United States have become more dispersed, at least those businesses that invest in Internet-based process innovation. A study by Forman, Goldfarb and Greenstein (2005)[70] finds that firms, if they have enough Internet technology staff to be able to absorb new Internet technology, may locate in more isolated regions and still, nonetheless, maintain the pace of innovation needed to remain competitive. They can, in effect, trade off the costs of an urban location against investment in the skills.

Florida[71] argues that the pattern of a generation ago, in which the fastest-growing Internet companies were housed in sprawling suburban office park campuses, is giving way to denser, urban concentrations. He points to downtown San Francisco, Seattle's South Lake Union, Los Angeles' Silicon Beach and London's Shoreditch as evidence of a pattern more appropriate to the needs of startups operating with small teams working on cloud-based applications.

The two patterns – re-urbanization and dispersion – are consistent with the finding in Chapter 7 of this report. Internet employment is so dispersed in the United States that every congressional district relies on the ecosystem for some part of its employment base, while certain cities, San Francisco, New York, Boston, Seattle, Denver and Austin, for example, show concentrated ecosystem employment. And in parts of the country that have been hurt by sector depression, such as Detroit, MI, there is some evidence in our data that Internet employment is beginning to generate compensating employment opportunities. Figure 7.1 in the next chapter shows that the congressional district north of Detroit is one of the more concentrated Internet employment sites.

## 8.4 Social Platforms Produce Social Effects

A number of economic and social theorists attest to the emergence of a new social order in the years since the flowering of the Internet.

Shirky[72] points to what he contends is a vast 'cognitive surplus,' the mental capacity released from the free time that was once frittered away in passive consumptive acts such as watching poorly targeted mass media entertainment,

[69] Sturgeon, Timothy J (2003), "What Really Goes on in Silicon Valley? Spatial Clustering and Dispersal in Modular Production Networks," Journal of Economic Geography.

[70] Forman, Chris, Avi Goldfarb and Shane Greenstein (2005), "Geographic location and the diffusion of Internet technology," Electronic Commerce Research and Applications.

[71] Florida, Richard (2012), The Rise of the Creative Class, Revisited. Basic Books.

[72] Shirky, Clay (2010), Cognitive Surplus: Creativity and Generosity in a Connected Age.

and now available for creative acts enabled by online collaboration tools. He details in a series of books and articles the many products of this reallocated resource, including Wikipedia, socially constructive protests, and charitable movements.

Yochai Benkler[73] has authored a more general analysis of the consequences of social production. In Benkler & Nissenbaum,[74] the term "commons-based peer production" is defined as follows: "(a) socio-economic system of production that is emerging in the digitally networked environment. Facilitated by the technical infrastructure of the Internet…the hallmark of this socio-technical system is collaboration among large groups of individuals, sometimes in the order of tens or even hundreds of thousands who co-operate effectively to provide information, knowledge, or cultural goods without relying on either market pricing or managerial hierarchies to co-ordinate their common enterprise."

Among the examples Benkler alludes to of commons-based peer production is open source software. The advocates who pioneered open source software believed that a program's source code should be available to the community, so that it could be used, studied, and improved, for the good of the community. Such a philosophy was a radical departure from the prior beliefs held by most of the major software manufacturers, for whom source code was valuable intellectual property, and as such had to be kept under copyright protection. Software had to be sold or licensed, not shared or iterated by anyone other than the official development team. The Free Software Foundation, a collective of computer programmers that formed in the mid 1980s to promote an open and ethical approach to software development, defines the free software movement as follows: "The users have the freedom to run, copy, distribute, study, change and improve the software. With these freedoms, the users (both individually and collectively) control the program and what it does for them…When users don't control the program, the program controls the users…Thus, "free software" is a matter of liberty, not price. To understand the concept, you should think of "free" as in "free speech," not as in "free beer".[75] From its origins over 25 years ago, open source software has become a bona fide element of commercial technology, found in applications such as web browsers, video players, content management systems, email programs, and even entire operating systems, of which Linux is the best known and most popular. It is subject to open source licensing and it has been argued that mandatory sharing can increase industry profits and consumer surplus[76].

[73] Benkler, Yochai (2006), The Wealth of Networks: How Social Production Transforms Markets and Freedom.

[74] Benkler, Yochai, and Nissenbuam, Helen, "Commons-based peer production and virtue", The Journal of Political Philosophy, Volume 14, Number 4, 2006, pp. 394-419.

[75] Free Software Foundation Website, http://www.fsf.org/about/what-is-free-software

[76] Kumar, Vineet, Brett Gordon, and Kannan Srinivasan (2011), "Competitive strategy for open source software," Marketing Science.

In a few short years, social technologies have given social interactions the speed and scale of the Internet. Whether discussing consumer products or organizing political movements, people around the world constantly use social-media platforms to seek and share information. [77]

Peer production is facilitated by web-based collaboration tools that enable people in disparate locations to work together for a common goal. Such tools are now used for everything from online political organizing to the administration of micro-loans. The following table provides an overview of popular online collaboration sites and services.

### Table 8-2: Platforms for Social Good

| Political Organizing | Recycling & Sharing of Goods | Crowdfunding of Creative Projects | Charitable Giving | Health Support | Outsourcing of odd jobs |
|---|---|---|---|---|---|
| Moveon.org | Freecycle.org | Kickstarter | JustGive.org | DailyStrength.org | Taskrabbit |
| Change.org | Freesharing.org | IndieGoGo | NetworkForGood.org | Inspire.com | Ziptask |
| | Throwplace.com | Peerbacker | DonorsChoose.org | CureTogether.com | Gigboard |
| | | ChipIn.com | Razoo.com | | Blastboard |

## 8.5 Social Platforms Foster Creativity and Innovation

Digital networks foster new ideas because they put at the disposal of idea generation such resources as speed, agility, decentralization, inexpensive experimentation, and networks of consumer opinion.

Established brands, we argue, are barriers to innovation. Consumers feel cautious when they are invited to try something new, and these adoption risks have traditionally been mitigated by such tools as franchising and extension of established brands. These tools are more likely to be at the disposal of incumbent firms than their smaller rivals. Review forums help the little firm with a good product or service to do the job that brands have traditionally done, at a fraction of the cost. By allowing consumers to share their responses to new products and services, social platforms lower barriers to commercializing innovation. Anderson and Magruder (2011) show that a half-star rating increase on the review site Yelp makes restaurants 19 percentage points more likely to sell out.[78]

More generally, in *Wikinomics*, a book that examines the mechanisms and new behaviors of the participatory Internet, Tapscott and Williams identify four enabling characteristics:

- Openness – Open content, open source software and openness toward external ideas
- Peering – Collaboration replaces hierarchies and conventional business structures

[77] McKinsey Global Institute, "The social economy: Unlocking value and productivity through social technologies", July 2012.
[78] Anderson, Michael and Jeremy Magruder (2011), "Learning from the Crowd: Regression Discontinuity Estimates of the Effects of an Online Review Database," The Economic Journal, 5 October.

- Sharing – A commons-based approach to intellectual property versus a proprietary one
- Acting globally – The boundaries of geography and locale now much less important

Operating within these new frameworks the authors see benefits to business and society in a number of areas. The first is what they term talent utilization, or the ability of organizations to collaborate with people and organizations outside their own walls. The second is demand creation, or the ability to create new markets leveraged on existing markets, particularly in open source communities, and the third major benefit wrought by digital structures is cost reduction, or the ability of large scale, distributed collaboration to lower the costs of production, distribution, and ongoing product improvement.[79]

## 8.6 Mobile and Social Platforms Link the Internet Ecosystem to Society

At the time of the 2007 report, the Internet was quite different from what it is today. Websites resided on desktops or laptops. They did not travel with the user, and sensitivity to the user's location was irrelevant. While the Internet played a large role in marketing, messaging tended to be broadcast, and not to be commented upon, distributed, or mixed with other content. Content producers did not anticipate the value of user-generated content, nor shared online assets, nor the power of crowdsourcing to solve problems.

Apps that live on mobile platforms allow the Internet to permeate social life. At the time of the 2007 report there was no such permeation. To be online, a person needed to be stationary, and therefore usually engaged in some place-bound instrumental task. Computing while on the move was unfamiliar. Smartphone penetration was low, the devices expensive, and monthly carrier costs high. Four years later, more smartphones are sold than personal computers, and people go online when waiting in a line, while walking in the street, and, occasionally, while riding a bicycle. Mobile apps permit the development of Web services that link people to strangers with similar interests, augment reality, and transform chores into multiplayer games.

By 2011, 30 billion mobile apps had been downloaded worldwide, from 10 billion a year before. The Apple App store downloads 46 million apps each day and their capabilities are growing. It is difficult to anticipate how these tools will shape the evolution of social, political, and public life as people find themselves perpetually connected to one another and continuously identifiable to others in time and space. Notions of anonymity, of civility, of security, in fact of citizenship,

[79] Tapscott, D., & Williams, A. D., Wikinomics: How Mass Collaboration Changes Everything, (USA: Penguin Group), 2008

will change at a rapid pace and in unpredictable directions.

### Table 8-3: App Marketplaces

| App Marketplace | Date Launched | Total # of Apps as of Q2 2012 |
|---|---|---|
| App Store for iPhone | July 2008 | 688,000 |
| Google Android Store | October 2008 | 500,000 |
| Blackberry App World | April 2009 | 60,000 |
| Apple Store for iPad | April 2010 | 156,000 |
| Windows Phone Marketplace | Winter 2010 | 100,000 |
| Amazon App Store | March 2011 | 30,000 |

## 8.7 Data from Social Platforms Become a Resource for More Efficient Commerce

The argument of this chapter has been, so far, that the Internet ecosystem's investments for economic benefit spill over accidentally into social benefits, which in turn foster deliberate investments for social benefit. The final leg of this argument is that the ecosystem's social investments in turn produce economic benefits. When individuals express their personal interests by the keywords they enter into search engines, more precise market targeting becomes possible, as analyzed in the work of Ghose.[80] When people become deeply engaged with the mobile and social web, they reveal even more about themselves and their patterns of movement, and allow for even more precise targeting[81]. But the question arises whether the sense of being exposed discourages consumers from responding to targeting. Tucker[82] found that they were more likely to respond to targeted ads when they had control over what personal information was available to advertising, a result with implications for whether privacy should be under a person's control or under a blanket policy.

The mobile web permits another level of data to be gathered. A mobile device continuously communicates its location to the signal carrier on map coordinates. It enables a broad range of location-based services to be offered to marketers and consumers, and new levels of analysis. The term geofencing refers to the ability to locate landmarks and to relate a mobile consumer's location to the landmarks, both to trace where the consumer has been or to identify that he or she has entered or left a location of interest. These data permit detailed analysis of consumer behavior. When geofencing of retail stores is combined with

[80] Dhar, Vasant and Anindya Ghose (2010), "Sponsored Search and Market Efficiency," Information Systems Research, 21(4), 760-772.

[81] Stephen, Andrew and Oliver Toubia (2009), "Deriving value from social commerce networks," Journal of Marketing Research, 2009.

[82] Tucker, Catherine (2011), Social Networks, Personalized Advertising, and Privacy Controls, MIT Sloan Research Paper No. 4851-10.

independently gathered information on transactions in the stores, for example, non-intrusive customer analysis becomes possible. Such analysis requires the consumer to opt into geographic monitoring, and firms such as Foursquare, Loopt, and Scvngr, offer incentives to opt in.

# Chapter 9: Summary of Findings

## 9.1 How the Internet Ecosystem Grew from 2007 to 2011

This analysis finds that the number of jobs that rely directly on the U.S. Internet ecosystem has doubled in four years. Almost a million new jobs were added to the million that were found in the 2007 study. In addition, when a multiplier of 1.54 is applied to capture indirect job creation, total employment due to the Internet ecosystem grew from 2.54 million to 5.1 million. This performance stands in sharp contrast to the overall economy: through the years of the 'Great Recession' and the very slow climb back, the businesses that live on the Internet have been a conspicuous exception to the general pattern of unemployment and business revenue stagnation.

The sources of this large increase in jobs on the ecosystem are mapped to the four layers of the system in the table below.

### Table 9-1: Growth in Internet Ecosystem by layer, 2007 vs. 2011

| Layer | 2007 Employment | 2011 Employment | Percent Growth |
|---|---|---|---|
| Infrastructure | 140,000 | 420,000 | 300% |
| Infrastructure Support | 165,000 | 254,000 | 54% |
| Consumer Support Services | 190,000 | 435,000 | 229% |
| Consumer Services | 520,000 | 885,000 | 70% |
| TOTAL | 1,015,000 | 1,999,000 | 197% |

The most striking finding of this report is that while growth was fast in the consumer-facing layer, among the household names like Facebook, YouTube, and Twitter, or consumer services like online banking and airline booking, it was even faster in the less glamorous layer that supports the high-profile brand names. Jobs grew fastest in digital advertising agencies, ad networks, ad exchanges, customer analytics firms, and listening platforms. The engine of growth was not just firms like Twitter, but also firms that used the data spun off by firms like Twitter.

The support layer was the engine that drove the million new jobs. Consumers could get the benefits of the Internet at lower cost, or even, for services like Yelp, Facebook, Twitter and many others, for free, because entrepreneurs were building out support services to make them leaner and more profitable. It may even be (though our report cannot prove it) that growth in the support layer made it unnecessary to grow employment in consumer-facing services as fast as their revenues grew, if it made these services more efficient.

Certainly there has been a furious pace of innovation, entrepreneurship, and investment, in the consumer-facing layer of the ecosystem in the last four years. This layer contains many more firms, smaller firms, and younger firms, than those lower down the tree. In absolute terms it added more jobs (365,000) than the consumer support services layer (245,000). The consumer-facing layer is where entrepreneurs come face to face with consumer demand or its absence, so it is the layer where all growth originates. But it grew from a larger base so it grew far less (70%) than the consumer support services layer (229%.) In the story of the Internet ecosystem, much of the drama happens offstage. Data drives Internet innovation, and a rich sub-ecology of consumer support services is growing to make sense of that data. In designing the regulatory environment, it is as important to consider impact on the support services as on the rest of the structure.

The infrastructure layer certainly grew. With more traffic came more need for people. But, as we explained in Chapter 3, we were careful to credit this infrastructure growth to the ecosystem only when the ecosystem was truly the cause. We disregarded growth in employment in telecom carriers, cable companies and others to the extent that this growth came merely from substituting packet switching for circuit switching, or digital voice for analog voice transmission.

If employment doubled, did the ecosystem's contribution to U.S. gross domestic product (GDP) also double? We do not make that claim. In the sections that follow we describe the results of applying three methods to assess the contribution. One of these methods pointed to a smaller contribution to GDP, so we offer a conclusion that is more modest. However the employment result is a result with implications in its own right, resting on its own verifiable data collection process, and we believe that from a policy perspective it is the more important result.

## 9.2 The Contribution of the Advertising-Supported Internet Ecosystem to GDP

As described in the Methodology chapter, this report uses three methods to triangulate on an estimate of the economic value of the Internet ecosystem:

- An employment-based approach built up from identified Internet employment
- By viewing the Internet as an island-like system exporting to the rest of the economy
- By valuation of the time that users spend on the Internet.

### 9.2.1 Employment-Based Approach to Valuing the Internet

We have computed the number of people receiving direct salary payments for services to the Internet ecosystem at about 2.0 million.

For each person directly employed in the Internet ecosystem, other people work in sectors that service the needs of this person, such as entertainment, banking, insurance, and retail employees. The person pays taxes that support employment in federal, state, and municipal government services, education, and the military. This indirect employment arises from supplier effects, re-spending effects, and government employment effects. It is standard practice to apply a multiplier to the direct employment to account for the indirect employment that would be lost if the direct employment did not exist. The U.S. Bureau of Labor Statistics publishes statistics on industry employment requirements, which enable calculation of these multipliers. Sectors differ in the size of their multipliers. Bivens[83] has computed indirect employment that ranges from 372 indirect jobs for every 100 jobs in durables manufacturing to 163 indirect jobs for every 100 jobs in business services. These estimates are inclusive of capital service usage. Hann, Viswanathan and Koh[84] used a range of multipliers from 2.4 to 3.4 in their analysis of the Facebook app economy, and Mandel[85] used 0.5 in his report on the app economy, a very conservative assumption. We have chosen a multiplier of 1.54, identical to the ratio that was used in the 2007 report. Thus our projection of employment due to the advertising-supported Internet ecosystem is 2.0 million direct jobs and 3.1 million indirect jobs, for a total employment of 5.1 million people.

The national average wage index published by the U.S. Social Security Administration[86] was $41,673 in the most recent year for which data exists, 2010. It had grown by 2.4% from 2009, but was almost unchanged from 2008.

[83] Bivens, Josh (2003) Updated Employment Multipliers for the U.S. Economy. Economic Policy Institute

[84] *op cit*.

[85] *op cit*.

[86] http://www.socialsecurity.gov/oact/cola/AWI.html

We make a nominal adjustment to $42,000 for 2011 and use that number as the base from which to calculate a fully burdened labor cost, comprising wages and salaries, the cost of benefits, on-boarding, management overhead, vacation time, and facilities costs. The national average wage index for the year of the previous study, 2007, was $40,405, and that report imputed a fully-burdened figure of $100,000 each to these employees. In this report we therefore increase the imputed figure by the proportionate increase in the wage index, and use $104,000. By this method, the advertising-supported Internet ecosystem contributes about $530 billion to the U.S. GDP in 2011.

### 9.2.2 The Internet "Exports" to the Rest of the Economy

The value of the Internet ecosystem as estimated by the export method described in Chapter 2 is $862 billion. The direct economic value of the services that the Internet provides to the rest of the U. S. economy, which is the revenue paid for the services exported to the rest of the U.S. economy beyond the borders of the Internet ecosystem to the rest of the U. S. economy, net of what is imported over the same implicit boundary, had three components.

First, the ecosystem exported advertising. The sum of search, display, classified, mobile, lead generation' and email advertising services in 2011 was $32 billion according to the interactive Advertising Bureau.[87] Second, the ecosystem exported retail services. Retail revenues are estimated in this report at $212 billion, and net of cost of goods they are $106 billion. Third, the ecosystem provided Internet access, for which it charged the rest of the economy, as estimated in this report, $170 billion. Thus total net "exports" were $308 billion. In addition, the Internet generates indirect economic value due to the activity that takes place elsewhere in the economy due to the Internet sector. If the same multiplier is used as was used for employment, 1.8, then by this method the advertising-supported Internet ecosystem creates value of $862 billion.

### 9.2.3 Time Spent on the Internet

The third method is based on the time that people give to the Internet. We relied on a number of studies of Internet use, some of which were surveys of recalled behavior and others that were based on observation of actual behavior.

According to Nielsen Online, which monitors a panel of users of computers linked to the Internet, about 210.6 million U.S. residents over age two visited the Internet at least once per month from home and at work, for leisure and work purposes, in the third quarter of 2011[88], spending 35.5 hours online on desktop,

[87] http://www.iab.net/insights_research/industry_data_and_landscape/adrevenuereport

[88] http://blog.nielsen.com/nielsenwire/online_mobile/august-2011-top-us-web-brands/ visited September 8, 2012.

laptop and mobile devices[89]. The estimate of users by comScore Media Metrix, using a similar methodology but for users aged 15 and older, and including university locations, was 185.9 million for a three-month average between Q4 2010 and Q4 2011, and 38.8 hours per month[90]. We have relied on the Nielsen data for our estimate of total time spent on the Internet.

We have estimated the value of an hour spent at work for a representative U.S. worker at $19.07 per hour, derived from the average wage of non-management, non-agricultural workers in data published by the Bureau of Labor Statistics[91]. There is no market price for an hour spent in recreation or leisure, although there is an opportunity cost. If work time is discretionary, then it has been argued by Bockstael et al[92] that the wage rate measures the opportunity cost of leisure time. If not, the wage rate over-estimates the value of a leisure hour. As an approximation, we use 10 percent of the wage rate for leisure time, and we use the finding from Nielsen that 57% of online time is leisure time. On these assumptions, time spent on the Internet ecosystem values the ecosystem at $760 billion.

## 9.3 Comparison of the Methods

Thus we have three estimates: $530 billion by method 1, $862 billion by method 2, and $833 billion by method 3. The first two methods show similar growth between 2007 and 2011, but the third suggests a significantly slower growth. Since the use of three methods is intended to triangulate on the answer, it seems not unreasonable to average them in pursuit of a single conclusion. An average of the three estimates places our estimate of the contribution of the Internet ecosystem to $14.5 trillion U.S. gross domestic product at $741 billion in 2011. This number compares to the 2007 average of the three estimates of $475 billion. We conclude that the Internet ecosystem sector GDP grew by 56% in a period when gross domestic product, partly as a consequence of the 2008/9 recession, grew only 5%.

[89] The Nielsen Company (2012) State of the Media: The Cross-Platform Report

[90] comScore MediaMetrix (2012) State of US Internet in Q1 2012.

[91] http://www.census.gov/compendia/statab/cats/labor_force_employment_earnings.html accessed August 24, 2012.

[92] Bockstael N, I Strand and W Hanemann (1987), "Time and the Recreational Demand Model," American Journal of Agricultural Economics. 69 (2) 293-302.

## Table 9-2: Three estimates of contribution of the Internet ecosystem to GDP, 2007 vs. 2011

| Method | Value in 2007 ($ BIllions) | Value in 2011 ($ BIllions) | Percent Growth |
|---|---|---|---|
| Employment-based approach | $300 | $530 | 177% |
| Export to the rest of the economy | $444 | $862 | 194% |
| Time spent on the Internet | $680 | $833 | 123% |

## 9.4 Conclusion

The concurrent development of apps, mobile platforms and tablet platforms compels a redefinition of the concept of the Internet. Its core features, connectivity and interactivity, are the same, but their meanings are not. Now that a large part of what was the Internet is now the mobile Internet, the meaning of connectivity is evolving from the notion of a connected desktop at work at or connected laptop at home to the notion of a connected person, in touch with the resources of the Internet ecosystem anywhere, any time. And the meaning of interactivity is evolving from a notion of interaction on commerce and content platforms to one that delivers richly on the idea of interaction with a community. The social media layer makes it easier for people to do things that they like to do with other people, such as rating, sharing, expressing solidarity, and recommending, faster, at lower cost, and over distance.

These changes in the meaning of connectivity and interaction change the role of the Internet ecosystem as a marketplace. They solve many of the problems associated with marketing and distribution in a competitive world. Distribution of products is now itself distributed, and filtering according to 'people like me' becomes an element of the system. Rounding out this picture of innovation in an ecosystem is the fact that a significant number of apps and tools are built on the platforms of other Internet businesses, via open APIs (application programming interfaces) that allow new software components to complement the functionalities of existing ones. On the consumer behavior side we see evidence of multi-screen ownership and multi-screen usage, in which one screen such as a tablet or smartphone augments the experience of another screen. The emergence of social TV will supplement the experience of television with comment streams on platforms such as Twitter and Facebook. Companies such as Bluefin, Trendrr, Social Guide, and GetGlue build enterprise and consumer dashboards that monitor and measure the volume and sentiment of comments and postings, providing valuable new sources of data for advertising agencies, television networks, and the viewing public. New kinds of ratings systems, based on social media chatter now provide additional data points to existing technologies, while watching television, once an experience of isolation, can be enjoyed in the digital company of people around the world. The Internet, once a desktop machine that connected the office or home to the world has

become ubiquitous, and opportunities abound for technological development and new user experiences that build on the features of constant connectivity and participation.

There is general agreement as to the value of the Internet, and its impact on contemporary life. With this report we have tried to assess, qualitatively and quantitatively, the magnitude of that impact at a moment in time. We hope that by deepening the understanding of the Internet economy and its structure, we have provided data and analysis that will further the discussion of policy choices as the Internet economy continues to extend its reach and become a larger and more integrated part of the US economy as a whole.