

Technology and Globalization

Table of Contents

Technology and Globalization	2
Introduction.....	2
The Impact of Information Technology.....	5
Industrial Structure and Jobs.....	5
Workforce	7
Financial Markets.....	7
Benefits	8
Short-Term Capital Concerns	9
Improving Sectors of Society: Health, Education, Journalism, and Government.....	12
Health Care	12
Education	13
Journalism and Media	15
Government.....	18
Technology in Warfare.....	19
WWI & WWII	19
Weapons of Mass Destruction	20
Modern Warfare.....	21
Web 2.0.....	24
Social Networking Sites.....	24
Peer Production: A Mighty Fortress of Collective Creativity	28
Open Source.....	29
Concerns of the Technological Age	32
The International Digital Divide.....	34
Privacy and Security Concerns	36
Conclusion	37
Ellie Walton and Sunju Ahmadu, young filmmakers	38
Glossary Of Terms.....	40
Bibliography	42

Technology and Globalization

Introduction

In nearly every corner of the world, from Mumbai to Madrid, one cannot enter a café or walk down the street without seeing someone talking, texting, or surfing the Internet on their cell phones, laptops or tablet PC. Information Technology (IT) has become ubiquitous and is changing every aspect of how people live their lives.

Recent advances in our ability to communicate and process information in digital form— a series of developments sometimes described as an "IT revolution"— are reshaping the economies and societies of many countries around the world.



Picture Source: <http://www.flickr.com/photos/sydneya/130164091/>

Information Technology

IT is a driving factor in the process of globalization. Improvements in the early 1990s in computer hardware, software, and telecommunications greatly increased people's ability to access information and economic potential. While advancements in Internet-based tools over the past five to ten years, such as social networking websites, twitter, and other Web2.0 applications are changing the way people use and share information for personal, political, and commercial purposes. These developments have facilitated efficiency gains in all sectors of the economy. IT drives the innovative use of resources to promote new products and ideas across nations and cultures, regardless of geographic location. Creating efficient and effective channels to exchange information, IT has been the catalyst for global integration.

Products based upon, or enhanced by, information technology are used in nearly every aspect of life in contemporary industrial societies. The spread of IT and its applications has been extraordinarily rapid. Just 30 years ago, for example, the use of desktop personal computers was still limited to a fairly small number of technologically advanced people. The overwhelming majority of people still produced documents with typewriters, which permitted no manipulation of text and offered no storage.

Twenty years ago, large and bulky mobile telephones were carried only by a small number of users in just a few U.S. cities. According to a 2013 International Telecoms Union (ITU) World Report, there were 6.8 billion cell phone subscriptions worldwide at the end of 2012. Global mobile cellular penetration reached 96 percent in 2012 (ICT Facts and Figures, 2013). In some developing countries, mobile phones are used by more people than the fixed line telephone network.

But perhaps most dramatically, just fifteen years ago, only scientists were using (or had even heard about) the Internet; the World Wide Web was not up and running, and the browsers that help users navigate the Web had not even been invented yet. Today, of course, the Internet and the Web have transformed commerce, creating entirely new ways for retailers and their customers to make transactions, for businesses to manage the flow of production inputs and market products, and for job seekers and job recruiters to find one another. According to ITU World Report 2013, the total amount of users reached more than 2.7 billion (39 percent of the world's population) by 2013.

The news industry was dramatically transformed by the emergence of numerous Internet-enabled news-gathering and dissemination outlets. Websites, blogs, instant messaging systems, e-mail, social networking websites, and other Internet-

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based communication systems have made it much easier for people with common interests to connect, exchange information, and collaborate with each other. Education at all levels is continually transforming thanks to innovations in communication, education, and presentation software. Websites now serve as a primary source of information and analysis for the masses.

Globalization accelerates the change of technology. Every day it seems that a new technological innovation is being created. The pace of change occurs so rapidly many people are always playing catch up, trying to purchase or update their new devices. Technology is now the forefront of the modern world creating new jobs, innovations, and networking sites to allow individuals to connect globally. The timeline below shows the rapid transformation of how technology has accelerated within the last 20 years to 2012.

- **18 years ago:** Internet commercialized
- **17 years ago:** first mobile phone with Internet connectivity
- **15 years ago:** Google named the search engine of choice by PC magazine
- **12 years ago:** Blackberry launched
- **9 years ago:** Facebook launched
- **7 years ago:** Twitter launched
- **6 years ago:** iPhone, the first of the smart phones, introduced
- **5 years ago:** Groupon introduced
- **3 years ago:** 17 million smart tablets sold — estimated that 100 + million by 2014
- **1 year ago:** Google Glass announced
- **Every 60 seconds** (so it seems): new apps, tailored to users' specific needs created

Advances in Information Technology

The IT revolution drives the extraordinarily rapid decline in the cost and rapid increase in the processing power of digital technologies. The digital device whose technological advance has perhaps been most crucial to the IT revolution is the microprocessor, the collections of millions of tiny circuits that serve as the "brains" of personal computers and that are embedded in an ever-expanding number of products, from video games, to cars, to refrigerators. Using a concept known as Moore's law the amount of power in a processor doubles approximately every two years. In 2013 the use of nanowires in microprocessors has allowed this trend to continue (Peckham, 2013).

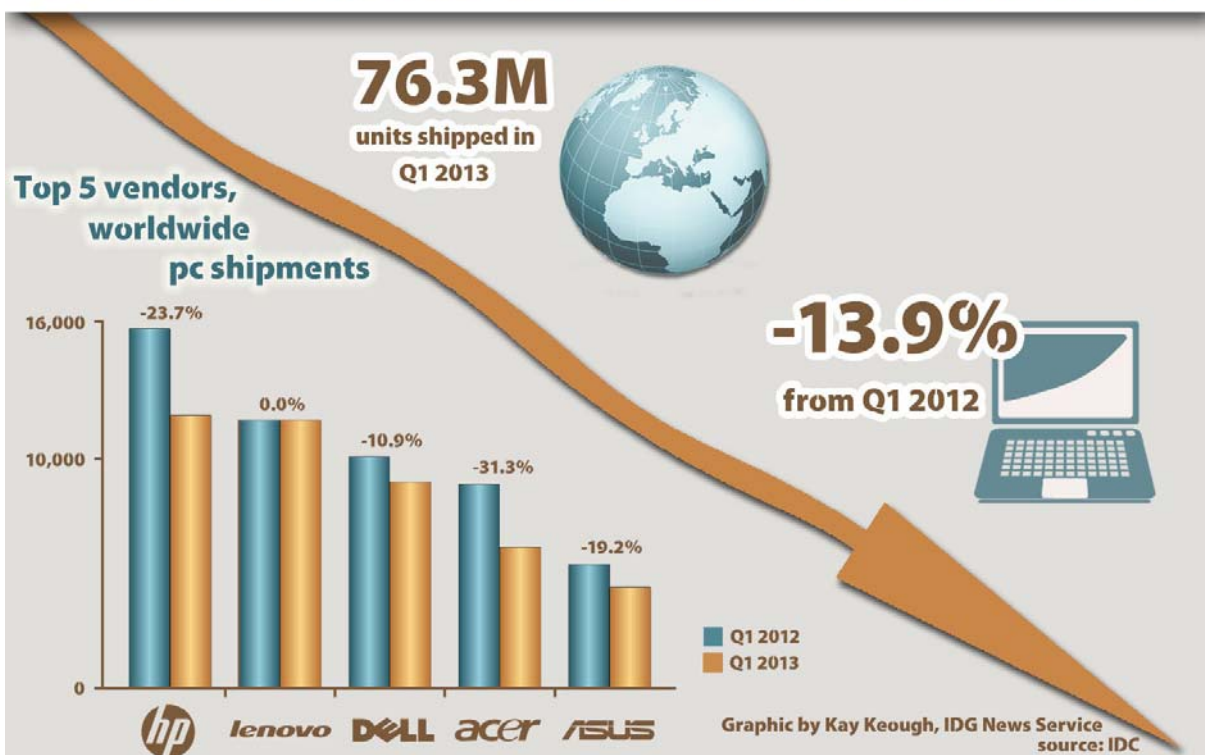
Rapid advancements in fiber optic technologies have also been critical to the IT revolution. Fiber optics technology enables data, including voices captured in digital form, to be converted into tiny pulses of light and then transmitted at high speeds through glass fibers wrapped into large capacity telecommunication cables. Hundreds of thousands of miles of these cables were installed over the past ten years, boosting the speed and capacity of telecommunications networks. A contributing factor to the growing technology sector is human capital. The majority of tech firms worldwide have leveled the baseline production of new technology to the point where they seek new areas of improvement for their products. Human capital, the workforce, drives these advancements and often the reason why one company succeeds, while others do not. Tech firms seek skilled workers with knowledge of technology and problem solving skills, which gives them an edge over the competition. Technology companies in the U.S. are pushing for better immigration policies so they can hire the best and the brightest from around the world.

The transformation of the technology sector in the U.S. market resulted in need for software developers, computer and information systems managers, and computer systems analysts. New jobs such as these are commodities in the globalized world of technology, especially for companies recruiting individuals from technologically advanced countries. The growing market for tech jobs will continue to increase as technologies become even further integrated into society. More and more jobs will become available to individuals that obtained degrees in technology orientated fields. According to Catherine Mann (2003) "Frequently cited projections indicate that millions of jobs will be lost to offshore workers. What these projections ignore is that the globalization of software and IT services, in conjunction with diffusion of IT to new sectors and businesses will yield even stronger job demand in the United States for IT-proficient workers."

Driving Down the Cost of Information Transactions

A key reason why these advances in IT have spread so quickly is that they have progressively reduced the unit cost of computing power or the transmission of a message. For less than \$30, Americans without any advanced technical training can purchase and use a desktop computer whose data processing power far exceeds the room-sized computers that powered the spacecraft that carried astronauts to the moon and back in the late 1960s and early 1970s. The smallest of which, recently popularized Raspberry Pi, allows amateurs to experiment and run their own programs on a processor. Companies such as Microsoft have even sold \$100 computers to consumers in emerging countries as a way of helping developing countries use more advanced technological resources.

Deepest drop yet for worldwide PC shipments



(Shah, 2013)

While throughout 2013 the use of traditional PCs are expected continue to decline as smaller devices such as tablets and phones become more advanced, vendors are expected to ship 315 million units in the year (Gartner, 2013). The decline in sales is contrary to the rise in the amount of Internet users. In 2013, 77 percent of the developed world was connected to the Internet, while 31 percent in the developing world was connected to it (ITU, 2013) However, as global PC sales in the developed world continue to fall, it is expected that those in the developing world will decline as well.

The last two years have seen a decline in the amount of PC shipments both in the developed and the developing world. In 2012 there was a -1.4 percent growth in PC sales and in 2013 this only improved to 0.6 percent. However, it is expected in 2017 that there will be a 4.3 percent growth in PC shipment sales. The reasons for this are a weak global economy, and a preference among consumers for higher mobility devices such as phones or tablets. The growth in this market is expected to be modest as the technology of mobile devices improves and allows them to compete with traditional computers (IDC, 2013).

The spread of digital technologies has also been spurred by several unique attributes of information, which serves as the principal input and product of many IT industries. In contrast to more tangible products, like consumer goods, one person's "consumption" of a piece of information does not necessarily reduce or eliminate the possibility that another person might benefit from the same piece of information.

Furthermore, networks built upon the exchange of information, like the Internet, tend to become more valuable to existing participants as new participants link up with them. Finally, the cost of using digital technologies, such as Internet service providers, decreases as the number of users increases. All of these factors have worked together to promote rapid growth in the demand for, and supply of, IT products and services. During the second half of the 1990s, as more people bought computers and went online, the average cost of the equipment and services necessary to access the Internet declined. Today, individuals go beyond the conventional desktop computer to stay connected: laptops, smart phones and tablet PCs utilize Wi-Fi networks to make the Internet an integral—and necessary—part of everyday life.

The Impact of Information Technology

The next three sections of this Technology and Globalization Issue in Depth will examine the impact of the IT revolution in several critical areas:

- Industrial structure and jobs
- Workforce
- Financial markets

In each of these areas, we will identify ways in which the application of new information technologies promotes prosperity and enhances lives. But developments in IT are also causing some problems and raising some concerns in both areas, and the sections that follow will also look at some of those problems and concerns.

Industrial Structure and Jobs

Developments in computing and telecommunications technology are changing America's industrial landscape and its workforce. The application of new digital technologies to management, manufacturing, distribution, and services has produced significant and lasting increases in productivity. The new technologies have also created new industries (e.g., Internet access providers) and entirely new kinds of work (e.g., website designers) and boosted other industries. But the new technologies have also shrunk or even eliminated other industries and the jobs associated with them (e.g., electric typewriters).

IT is fundamentally restructuring business practices. IT innovations have increased the efficiency of business operations. New IT-based inventory systems allow businesses to cut costs by delivering or receiving parts for "just-in-time" assembly. By reducing delivery times and inventories, "just-in-time" assembly allows businesses to meet consumer demand more quickly and cheaply.

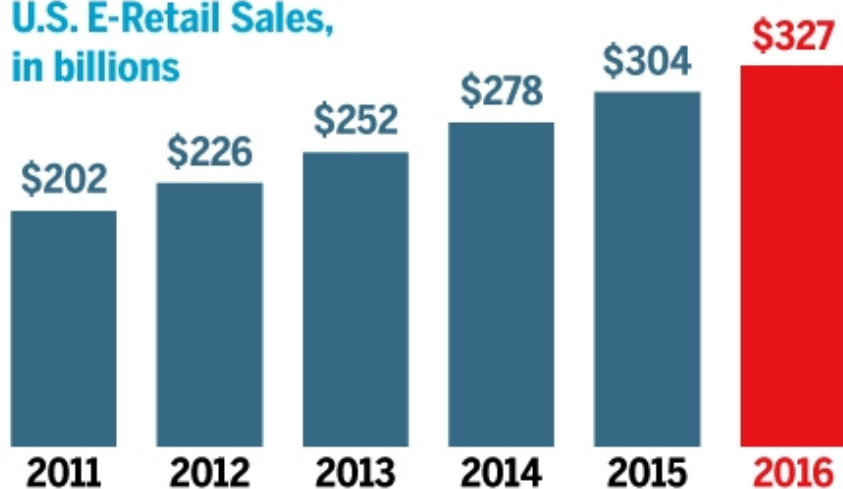
IT and the use of the Internet have also dramatically transformed exchanges between buyers and sellers. Some Web-based businesses, such as Amazon.com, are using the Internet to sell and arrange for the delivery of large quantities of goods without buyers themselves having to access a network of wholesalers and retail stores. "Business-to-business" ("B2B") commerce over the Internet helps many companies streamline their sourcing of production inputs and allows them to sell products or services to other companies. Similarly, companies are using the Internet to find other businesses that might want to buy their products or services or sell them products or services. The value of B2B e-commerce exceeds the value of e-commerce between Internet retailers and individual consumers.

There has also been a trend of "reverse outsourcing." In the past globalization shifted the center of cheap job markets eastward in countries such as India and China. Recently, however, the creation of new jobs that allow for a virtual

workplace, sees the return of badly needed jobs in the West. In short, the off shoring of the past may be replaced with a "redistribution" of labor. This is also in part due to the growth of online retail replacing brick-and-mortar stores (Icreon 2013).

Global e-commerce is growing steadily; past growth shows a gradual upward trend. (See figure below (Owen, 2012). While the absolute numbers declined in 2009 as a result of the recession, they bounced back in 2010 and continued to grow in 2011. The US accounted for 33.5 percent of online sales in 2012 and is expected to account for 31.5 percent in 2013 as China's share grows (Dusto, 2013). Because of the growth of e-commerce, other sectors of the job market have shrunk and will continue to do so. For example, employment for stock clerks and order fillers are expected to drop by 171,000 from 2006 to 2016 ("The 30 Occupations with the Largest Employment Declines. 2008-18.). Nonetheless, physical stores still account for 95 percent of all retail sales, though this percent may drop to 80 percent in the next ten years (Groenfeldt, 2012). This expected decrease is due to growth of e-commerce. By the end of 2012, global e-commerce reached \$1 trillion. The most prolific online retailer was Amazon, which has pushed into the digital television market recently.

U.S. E-Retail Sales, in billions



U.S. E-commerce Sales: 2011-2016

Online consumers will increase their spending 62% by 2016, according to Forrester Inc.

Source: Forrester Inc.

Applications of new IT have boosted U.S. labor productivity. From 1974 to 1990, labor productivity grew by 1.4 percent per year. Between 1991 and 1995, annual productivity growth increased slightly, to 1.5 percent per year. From 1996 to 2005, however, as companies invested heavily in IT equipment, software, and services, annual productivity growth, measured by non-farm output per hour, soared from 1.0 percent in 2000 to 5.5 percent in 2008 (Productivity and Costs, First Quarter 2011, Revised.). Since 2008, non-farm businesses have witnessed declines and increases depending on the quarter. In the first quarter of 2013, there was a 0.7 percent increase (Productivity and Costs, First Quarter 2013, Preliminary).

Most economists attribute the increase in annual productivity growth to the pairing of labor with new kinds of IT across a broad swath of the U.S. economy. Many economists believe the recent productivity gains will endure for the foreseeable future.

Extraordinary labor productivity growth, coupled with a rapid increase in Internet usage by businesses and individual, has prompted some economists and other analysts to argue that the United States now has a "new economy." According to this view, permanently higher productivity, more versatile and flexible corporations, and a likely reduction in the periodic ups and downs of economic activity, known as the business cycle, characterize the new economy.

One significant implication of the new economy theory, if it is correct, is that the United States will be able to grow at a faster rate than has been the historical norm, without generating price inflation. Among other things, higher, non-inflationary growth would enable further reductions in our unemployment rate.

Workforce

As noted by QFinance “Information technology (IT) is both a huge industry in itself and the source of dramatic changes in business practices in all other sectors. The term IT covers a number of related disciplines and areas, from semiconductor design and production through hardware manufacture (mainframes, servers, PCs, and mobile devices), to software, data storage, backup and retrieval, networking, and, of course, the internet.”

The incorporation of new digital technologies into all sectors of the U.S. has created substantial new demand for expertise in software development, the management of computer and information systems, technical support services, and the manufacturing of high-tech gear. As of 2011, there were approximately five million jobs in the core IT industry in the U.S. IT firms provide telecom services, IT hardware, IT services, and software. As a result of the slow growth of the global economy in 2013 the IT industry is expected to grow by only three percent. The global IT industry market reached \$3.6 trillion in 2012, with the U.S. representing more than \$950 billion. The IT industry also employs approximately five million workers in technical and non-technical positions and 4.16 million in business IT departments (CompTIA, 2013).

In 2014 it is estimated that there will be over 100 million knowledge workers in the U.S. (Infotrends, 2011). Knowledge workers are also called "symbolic workers," as they use very little physical or mechanical labor. Unlike their industrial counterparts, knowledge workers spend their time at work manipulating information rather than machines. An increase in knowledge workers has led to a decline in other sectors of the economy, such as service and labor-intensive jobs.

The flip side of increased demand for high-tech workers is the decreased demand for workers in industries where computers and other high-tech devices have replaced tasks that used to be performed by people. Workers have also lost jobs in industries or firms that have been unable to adopt new information technologies as effectively as industries or other firms that offer comparable products or services.

Many of the workers who lose jobs in declining firms or industries lack the education or training to take up jobs in the high-tech sector. A person who spent 30 years in a steel plant that is shutting down may not be equipped to work for many of the industries that are adding jobs as our economy transforms itself. State governments and the federal government offer programs designed to help workers acquire the training and education needed to make the transition from declining to growing sectors of our economy, but the record of these programs has been mixed.

Unfortunately, many firms in the industries that are succeeding also have a bias in their hiring practices toward younger workers. They may believe that younger workers are more flexible and more easily trained than older workers, and they may undervalue the importance of experience and maturity.

The IT-driven cycle of job creation and job destruction can be seen in almost every sector of the new, knowledge-based economy. The automation of assembly lines has reduced jobs in manufacturing, for example, but it has created new jobs in robotics technology and computer engineering. The introduction of computers has reduced the need for many kinds of clerical work in offices, but it has also created a new demand for computer designers, software writers, computer system managers, service personnel, and data entry workers.

Financial Markets

A second area in which the impact of information technology has been profound is in financial markets. Financial markets encompass a wide variety of institutions and practices through which lenders and borrowers are able to

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interact. Lenders include banks and other financial institutions that make loans to individuals (e.g., for house or car purchases) and to institutions (e.g., for expansion or acquisitions).

These lenders are typically compensated through interest payments or, in some cases, an ownership stake in an enterprise. Individual investors who buy corporate stocks and bonds or government bonds are also lenders, and the companies and governments that sell the investors the stock or bonds are borrowers.



The borrowers hope to use the money raised through these transactions for new equipment, new lines of business, or other productive purposes. The investor-lenders receive compensation for their investments through interest earnings, dividends, or an increase in the value of their stock or bond holdings.

Stock markets are perhaps the most familiar institutions in the financial marketplace, but a wide variety of other institutions and investment vehicles, or "instruments" are available to those hoping to earn or raise money. These include bond markets, foreign exchange markets and futures markets, among others. Each of these markets for financial markets has been impacted by the efficiency improvements from IT.

A combination of policy reforms and IT innovations has transformed financial markets over the past two decades. Governments around the world have modified, or eliminated, regulations that limited innovation and competition in their financial markets. They have also reduced barriers to foreign participation in their markets.

New IT developments have spurred innovation and international expansion in financial markets in three ways:

1. By permitting complex domestic and international transactions to be conducted rapidly and securely.
2. By enhancing data storage, analysis, and other data—dependent tasks associated with the management of financial institutions.
3. By giving market actors of all sizes access to a wide array of information on investment and borrowing opportunities, the performance of companies and financial institutions, economic trends, and policy developments.

Building upon policy reforms and technological developments, private financial firms have over the past two decades created numerous new vehicles, or "instruments," through which people and institutions can lend, invest, or raise money. Reforms and technology have also helped multiply cross-border linkages among national financial markets.

As recently as the 1970s, individual investors, firms, and governments were generally able to invest or raise capital only within their own self-contained, national financial systems. Access to foreign bank loans, stocks, and other financial instruments was available only to the most sophisticated investors.

Closed markets like these are hard to imagine today. Cross-border financial arrangements have become commonplace. A global financial market has emerged, and the volume and value of the transactions it supports is staggering. The total daily value of foreign exchange transactions (exchanges of one national currency for another) increased from \$18.3 billion in 1977 to \$4.0 trillion in April 2010 (Spears, 2011).

Benefits

The global financial market offers an extraordinary range of opportunities to invest and borrow money, benefiting investors, firms, and economies. On the borrowing side, if a U.S. entrepreneur is not satisfied with her American options

Technology and Globalization
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for raising funds for a new business, she can seek funds in Europe or Japan. The wider range of options available to borrowers increases competition among lenders, helping to keep the cost of borrowing down. This makes it easier for firms to finance business expansion plans and acquisitions, generating jobs and economic growth.

Likewise, on the investing side, a European stock investor hoping to earn a higher return than he can earn in his home stock market can now explore alternative investments in the United States. Access to a wider range of international opportunities helps successful investors increase their earnings and minimize risk through diversification of their investment portfolios.

The global financial market often increases the growth potential of individual countries. By opening up their financial sectors to international flows of capital, countries have been able to acquire the funds they need to support all sorts of private and public sector development initiatives. These funds can spur higher levels of growth.

Short-Term Capital Concerns

The same technologies that helped create a nearly seamlessly international financial market also increased both the probability and the potential cost of market volatility. The chief problem is that the openness of national financial systems and the technologies that facilitate transactions not only make it easier for investors to find places around the world to put their money—they also make it possible for investors to pull their money out of particular investments or countries very quickly. The quick withdrawal of investments can potentially have devastating consequences for the countries concerned.

The funds that investors are able to withdraw on short notice from foreign markets are often called short-term capital. International flows of short-term capital have increased at an astonishing rate over the past decade, thanks largely to new communication and IT. The buying and selling of currencies has generated perhaps the largest and fastest-growing flows of short-term capital in recent years, with an average daily trading volume of four trillion dollars in the foreign exchange market (Forex)(Macini et. al, 2012).

When an American visiting the United Kingdom changes some of her dollars for pounds, the British currency, she "buys" pounds and "sells" dollars, and the person or institution with which she makes the exchange "buys" dollars and "sells" pounds. The amount of dollars she will need to buy one pound is the exchange rate of the pound in terms of dollars.

Professional money traders do the same thing as an American tourist in London, though on a much larger scale and for very different purposes. Money traders who work for companies or financial institutions often buy and sell currencies to support international trade and investment transactions. Using sophisticated trading technologies, money traders are able to move large sums of currency around the world every day.

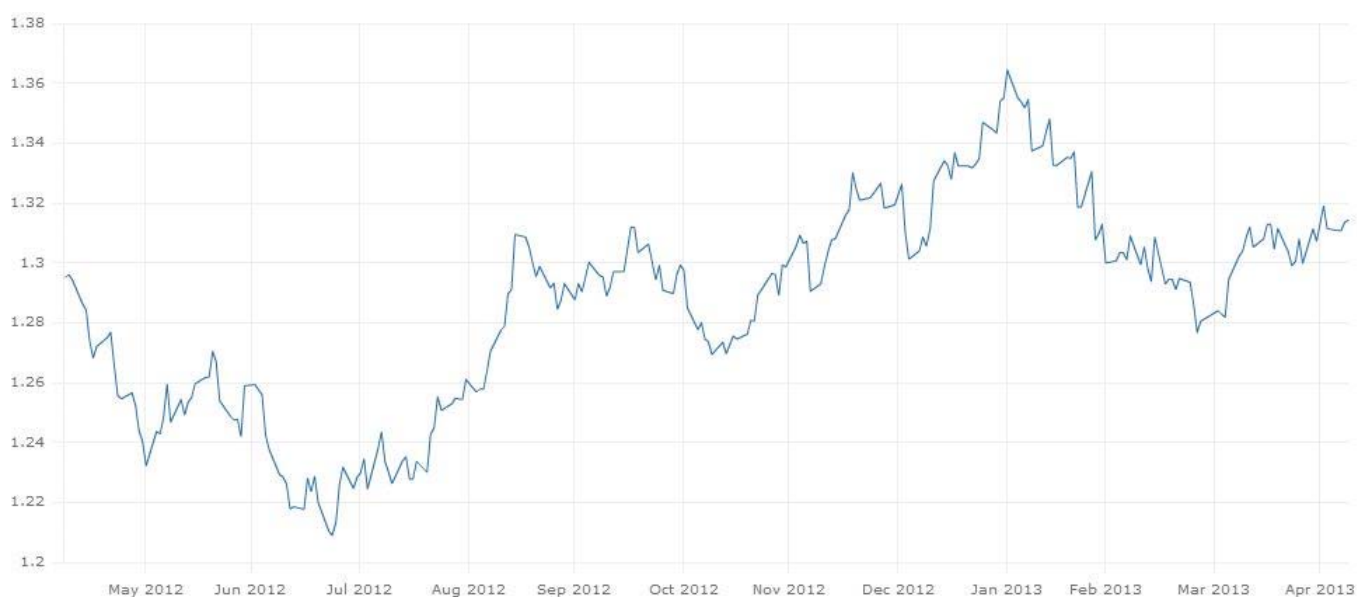
A U.S. company that needs to buy production inputs from an Italian firm, for example, needs to use some of its dollars to buy the Italian currency, or euro, that the Italian firm wants to receive in payment for its product. Other money traders, called speculators, buy and sell currencies in an effort to make money. Speculators make money by anticipating changes in the value of one currency relative to another, or by taking advantage of small differences in the values of a currency being traded at the same time in different countries.

Currency speculation can cause rapid swings in the value of a country's currency. These currency swings can make it difficult for a country's businesses or its trading partners to make trade and investment plans. Large volumes of short-term capital also flow around the world in response to changing assessments of the health of national economies. If an investor fears that the exchange value of the currency of an ailing economy is likely to drop by a significant amount, he may decide he wants to get rid of stocks or bonds he owns in that country. His hope is that he can sell those foreign stocks or bonds before the relevant currency drops too much, after which the amount of other dollars or other currencies he will be able to receive in exchange for the sale of the foreign investments will be much lower.

But if many investors share the same concern about the country's economy and decide to sell investments there at about the same time, the exchange rate of the currency will, indeed, depreciate by a large amount, and perhaps even collapse. When the value of a country's currency collapses, the currency loses its purchasing power relative to foreign currencies. What this means is that imported products become much more expensive. As imports rise in price, the prices for other domestic goods also typically rise. Basic necessities can end up beyond the reach of average citizens. To prevent crushing price inflation and reverse a currency's decline, countries typically must cut government spending and increase interest rates, which can cause more pain in the short run.

The figure below shows the U.S. Dollar to Euro exchange rate over the course of a year. While the dollar is stronger than the Euro, it is still relatively weak.

Figure 4: The Euro Versus The Dollar Exchange Rate, 2012-2013 (1 EU=Y USD)



(European Central Bank, 2013)

The United States is currently suffering from a weak dollar, partially due to the unprecedented [subprime mortgage crisis](#). High housing prices during the early-to-mid 2000s drove many mortgage companies to offer loans to “subprime” borrowers, high-risk individuals who had lesser credit and lower incomes than “prime” borrowers. However, it was a dangerous maneuver because companies were banking on the fact that the subprime lenders could repay them through future refinancing of their homes.

When the housing bubble burst, subprime borrowers had difficulty refinancing and were unable to pay back their loans. During 2007, nearly 1.3 million properties were subject to foreclosure, up 79 percent from 2006 (U.S. Foreclosure Activity Increases 75 percent in 2007, 2008). The debt impacted mortgage lenders initially, but eventually hit banks, security firms and even foreign stock markets. The subprime fiasco yet again highlights the risk and dire consequences of economic wagers and how global these outcomes can be. The housing market is starting to return, though it has not returned to pre-crisis levels in most areas of the country.

A former U.S. Treasury Secretary recently compared the emergence of the modern international financial system to the development of jet aircraft. Jet planes are significantly more powerful and efficient means of transportation than the ships

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and propeller-driven planes they replaced. Analogously, the modern international financial system can generate much more wealth and support much more business than the system that preceded it. But just as the power and speed of jet planes can make for spectacularly destructive crashes when something goes wrong, the massive volume of transactions and rapid pace of modern financial markets can produce extraordinarily costly crises.

In an effort to minimize those costs, governments have tried to find new ways to reduce financial volatility and avert financial crises before they start. A couple of developing countries have experimented with restrictions on the outflow of capital. Most countries have been reluctant to impose new regulations on wealth—generating capital flows. They have tried instead to use new data disclosure and monitoring tools to identify signs of financial or economic weaknesses before they are able to touch off a crisis. Not surprisingly, some of these new tools rely heavily upon IT. Moreover, nations with stronger economies are now searching for new ways to further regulate their markets and economic activity to protect against the devastating effects of global recessions.

Improving Sectors of Society: Health, Education, Journalism, and Government

The information revolution is creating opportunities in many other sectors of society, including health care, education, journalism, and government. Over the past decade, new applications of information and communication technology have improved services, transparency, and public access in each of these areas.

By improving access to health care, education, and government services to these sectors, new IT has the potential to help people around the world overcome geographic or income barriers which currently degraded the quality of their lives. By dramatically increasing access information, the advances can enhance knowledge, break down barriers to participation, and improve the accountability of public and private institutions to its people. These developments will prove especially beneficial to individuals in poor and underserved communities around the world.

In this section we look at some of the ways that IT is enhancing knowledge in health care, education, journalism, and government. In the next section we look at gaps in access to IT, sometimes known as the "digital divide."

Health Care

IT is dramatically improving health care in the following ways:

- prevention and control of emerging infectious diseases,
- patient to health care provider interaction,
- rapid dissemination of information,
- improved responses to outbreak situations.

Efforts to contain outbreaks of dangerous infectious diseases require the rapid collection and transmission of detailed patient data to medical labs or public health centers. Health professionals need tools to communicate important scientific or epidemiological findings to other parts of the health care community. IT is enhancing capacity in each of these areas.



Source: <http://www.flickr.com/photos/23065375@N05/2234741663/>

Many health problems in developing countries are being addressed using IT. Digital records and images utilizing digital cameras have made it possible for doctors around the world to share information or offer advice on treatments for complicated ailments. For example, using Internet connections, doctors working in remote regions of northern Uganda during an outbreak of the deadly Ebola virus would be able rapidly to transmit their findings to experts at the World Health Organization in Geneva and the U.S. Centers for Disease Control in Atlanta.

IT systems have had a profound effect on the healthcare system in the U.S. as well as other systems around the world wherein new technologies are utilized in an effort to efficiently providing healthcare to a large audience. New initiatives are being undertaken by governments in a multilateral effort to provide for patients that are not within accessible reach of a hospital. For example, John's Hopkins University is providing individuals with mobile technology to seek advice or treatment from a doctor that is unattainable due to a lack of resources. Dr. Larry Chang, a Johns Hopkins researcher who studied H.I.V./AIDS and the use of technology in Uganda, said that "over the past decade of working in Africa you really started seeing this amazing growth in the use of mobile phones and it seemed obvious to use it for global health" (Novak, 2012).

Information Technology Applications in Health and Medicine

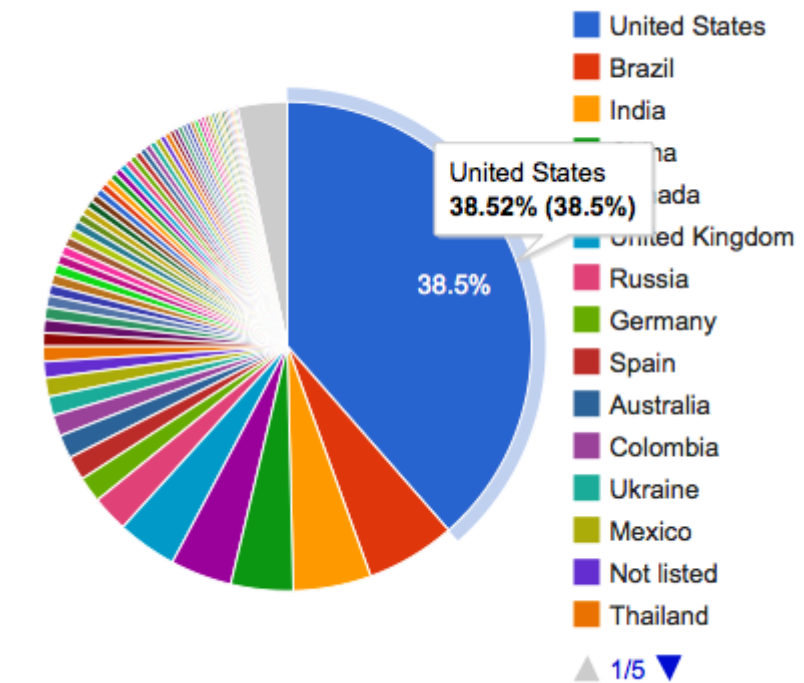
- Patients will have access to their medical records from any location via secured Internet sites. Readily available medical records will help ensure that individuals receive appropriate care when traveling or changing medical institutions.
- New devices are able to determine the chemical content of blood when placed on top of the skin.
- A simple digital watch can be incorporated into a pill bottle-cap to record the time and date when the bottle was opened. This will allow medical personnel to monitor the use of medication by patients.

Education

IT improves educational opportunities by enabling educators and students to overcome barriers of distance and by enhancing the content of instructional materials.

The use of IT to deliver lessons or training from instructors in one location to students in another is frequently called "distance learning." Distance learning has been around for a long time. For many years people have listened to recordings of classroom lectures or other educational presentations, and millions of people have watched educational programming on public television channels.

Most colleges and universities across the United States offer some online course offerings. In 2012, the latest development is the rise of Coursera, which offers free online courses from elite universities, such as MIT and Harvard, reaching more than one million registered students in 2012. The figure below highlights the popularity of Coursera courses around the world. In its first thirteen months Coursera registered 2.8 million users, however completion rates of programs are found to typically be low, with a 27 percent completion for high school level, eight percent for undergraduate, and five percent for graduate (Mackay, 2013).



(Young, 2012)

Both the emergence of the Internet and new developments in educational software vastly enhanced distance education over the past decade. The geographic reach of distance education has been extended. There has been a substantial increase in the quantity and diversity of educational material available over the Internet or through the use of satellite video and audio linkups.

Over the past decade, computers and Internet connections have been widely deployed in classrooms, from pre-K through the university level. Lessons delivered through computers can be interactive, which gives students real-time feedback on their work and enables them to work at their own pace. Kids often enjoy working with computers, so when they are intelligently integrated into classrooms, computers can create excitement about learning among students.

The Internet provides an extraordinary opportunity for students to extend the reach of their learning. Before the Internet, the resources available to students were largely those that could be found in their classrooms, in their outdated textbooks or in public libraries. The Internet enables students to reach well beyond the physical confines of their classrooms and gain access to virtually unlimited quantities of information on the topics or events they are discussing in their classrooms. The use of the Internet for school assignments also encourages students to give free rein to their curiosity and strengthens their research and investigative skills.

IT offers especially valuable educational opportunities for poor people in developing countries. Students and other residents of poor countries are increasingly using the Internet—often in community Internet centers—to gain access to information and communicate via e-mail. Doctors, scientists, and other professionals, for example, can achieve cheap or free access to journals and other professional publications that are too expensive to afford in hard-copy versions.

Government aid agencies, foundations, and private firms sponsor numerous distance education programs designed to teach skills to a wide variety of developing country professionals, government officials, engineers, scientists, and businesspeople. Internet or satellite connections enable students from developing countries to take courses offered in foreign institutions. In these and other ways, technology-enabled educational programs can help strengthen the people who will be called upon to provide leadership in developing countries in a wide variety of social welfare, economic, and political fields.

Technology has a positive impact on education, enabling students to learn at their own pace as opposed to following traditional teaching methods. “Education technology has been found to have positive effects on student attitudes toward learning and on student self-concept. Students felt more successful in school, were more motivated to learn and have increased self-confidence and self-esteem when using computer-based instruction. This was particularly true when the technology allowed learners to control their own learning” (Technology’s Impact on Learning, 2012).

Technology use can lead to increased levels of self-esteem and confidence among students, which in turn promotes higher levels of learning. As technology continues to change over time so will the classroom environment, as both students and teachers learn to adapt to new formats of education. There have also been signs that “Introducing technology into the learning environment has been shown to make learning more student-centered, to encourage cooperative learning, and to stimulate increased teacher/student interaction” (Technology’s Impact on Learning, 2012). As time passes, with a greater influx of technology in education, the evolutionary process will grow into school systems rather than revolutionizing the current educational format.

There are countries that implemented standards for incorporating technology into the classroom to enhance students learning capabilities as well as educating them for the 21st century and beyond. Countries are using ICT skills to teach their students real world application. Countries such as Norway and New Zealand have implemented classroom programs into their classrooms that help students become proficient in ‘digital literacy’ and ‘media literacy’ in the globalized world. “Norway offers an example of detailed standards...that state a 10 year old for instance, will use 3-D imaging software to design simple houses in art class” or “New Zealand standards for digital literacy stand out from the other countries because they require the demonstration of higher-level technical skills, describing outcomes for programming and the manipulation of image and audio files as part of digital literacy” (Bakia, 2011).

A study by John Kosakowski lists the other benefits of technology use in the classroom and their yields vis-a-vie student behavior in the classroom. The results indicate that technology does more than just provide an alternative to the traditional method of teaching. Here are some of the benefits he found through his research of technology in the classroom:

- Explored and represented information dynamically and in many forms

- Became socially aware and more confident
- Communicated effectively about complex processes
- Became independent learners and self-starters
- Worked well collaboratively
- Knew their areas of expertise and shared expertise spontaneously
- Better understanding and broader view of math
- Ability to teach others, and
- Greater problem solving and critical thinking skills (Kosakowski, 1998).

To learn more, please visit our Education Issue in Depth: <http://www.globalization101.org/category/issues-in-depth/education/>.

Journalism and Media

The technological revolutions of the Internet have ushered in a new age of journalism that cannot be confined to one medium or one platform of exchange. It has made publishing and accessing news easier and cheaper than ever before with more sources and varied voices. The Internet offers unlimited space to whoever chooses to partake, unlike television programs and news articles that are confined by word count limitations and air time restrictions. The relative ease with which information spreads creates an interactive playground for users that will only grow with time.

The Shift to the Digital

In the late 1980s, Cable News Network (CNN) began offering 24-hour news coverage that affected political discourse and public opinion, producing what is now known as the “CNN Effect.” Around-the-clock reporting took news to the next level beyond the daily newspapers and weekly or monthly magazines. Yet, the CNN effect seems limited compared to the possibilities of the Internet: Not only is national and international news available within minutes of the events happening, but there are also more news sources to choose from than just CNN. The perspective of both American and international reporters, of journalists and citizens, are open to the public.

Wider and Broader News Conglomeration

Greater dependence on the web has sparked various trends relating to the collection of news stories. First, newspapers are turning more readily to news agencies for efficient news coverage. This can be seen with the growth of news agencies such as The Associated Press (AP), which creates and distributes content to registered members and subscribers in 121 countries. With 1,400 newspapers reprinting their stories and images daily, while their mobile app has been downloaded over 9 million times since 2008, it is no surprise that more than half of the world’s population sees AP news on any given day, according to their website.

The second trend is the emergence of news conglomeration websites that bring together stories from a variety of sources including AP and other nationally-based papers. Even larger news-gatherers are online search engines themselves, such as Google and Yahoo! Search. Not only do the searches include news stories, keywords also pull out the most searched-for commentaries, surveys, and blogs. Meanwhile, user-driven sites such as Wikipedia provide even more stories than most of these news conglomerates combined.

Where People Get Their News

Many studies have shown that the Internet is becoming increasingly popular as a news source. During the 2008 presidential elections, the range and use of the internet reached unprecedented levels. The Obama campaign, utilized the internet as a communication, information and outreach platform in an unparalleled fashion. In 2012, voters used their cellphones, particularly their smart phones, to get information about the elections or to keep up to date about political issues (Smith and Duggan, 2012).

Furthermore, Pew's Internet Project found that 66 percent of social media users (39 percent of the American adults) engaged in political activities online. In the 2012 elections, 30 percent of registered voters were encouraged to vote for either Obama or Romney by friends and family through Twitter or Facebook and 22 percent publicized which candidate they voted for on these social media sites. Twenty-seven percent of registered voters used their cellphone to keep up-to-date on new stories during the election period and nineteen percent sent election-related text messages. Thirteen percent of adults used their phones, the Internet, or email to make online political donations for the 2012 elections. Finally, 66 percent of registered voters who use the Internet and 55 percent of all registered voters watched videos online that were related to the elections (Duggan, 2012)

Digital News Surpasses Newspapers, Radio

Where did you get news yesterday?



(Thompson, 2012)

Multimedia and Interactive Dialogue

Words alone do not account for how individuals comprehend and share news—photos and videos are fervently uploaded to add perspective and visual aids. Forums and blogs (discussed below) allow for continual exchange of the multimedia dialogue, and the Web is able to combine both print and television for a comprehensive media package.

Americans are adapting to these high-tech advances and speaking out on various topics. Video-sharing websites such as YouTube have even been incorporated into the political process. During the 2007 U.S. Presidential Debates, CNN teamed up with the video-sharing hub and asked citizens to upload videos questions for the candidates. Four years later in the 2012 U.S. Presidential Election, the debates were live-streamed using Youtube, giving greater access to the events as it allowed voters to watch it on phones and other devices. The use of the Internet as a medium became more important in the recent election as it allowed the nominees to connect with young adults who would otherwise not watch cable news.

New forms of Media

Information is dispersed in many different forms because of the overlapping of technology, print, and film. We highlight three significant applications of the Web revolution to journalism and discuss how each is changing the way media is conceived and perceived by public.

Blogs

Blogs, or web logs, gained popularity right before the new millennium with the releases of LiveJournal, OpenDiary and Blogger in 1999. As of October 2012, there were an estimated 77 million Tumblr and 56.6 million WordPress blogs, the most popular services today (Bullas, 2012). The purpose of a blog ranges from personal use, functioning like an online diary, to political commentary and trend analyses. Web blogs are increasing in popularity due to the ease with which one can be publish material online. One of the main features of blogging is the integration of folksonomy (tagging). Users are able to tag blog posts to make the content available through keyword searches. By grouping similar content, searching for and indexing the information is an easier task, making an age of “information overload” more convenient and adaptive.

A 2011 survey conducted by Universal McCann found that 64.5 percent of people in the US maintain an Internet profile. The survey found that China leads in blogging penetration with 71.5 percent highly vocalized bloggers. This is a result of the view that blogging is a form of self expression and for sharing experiences. This makes China the global leader in bloggers, a trend which has existed since the survey began (UM, 2012).

Besides the traditional forms of text blogging, video, audio, and photo blogs are taking form within the online community. Many of the users on YouTube, a website featuring user-generated videos, are bloggers of a wide range of interests, from comedy to commentary. In recent years, photo sharing sites have become more popular as the amount of people using smart phones has increased, the most popular of which are Instagram and Pinterest which are both used mostly by women between the ages of 18-29 (Bennett, 2013).

Twitter may even be replacing blogs as it becomes a major source of news stories for millions of followers worldwide. In 2011, people sent 140 million tweets per day. While in 2012, people sent 340 million tweets per day (Weber, 2012).

Issues and Controversy

Although access to up-to-date information is more widespread and accessible, the public availability of data is a double-edge sword. Because content is permanently available over the World Wide Web, accusations against inappropriate facts posted can result in unseen consequences. The case of a high school in Steubenville Ohio grabbed national attention when members of the football team posted pictures and tweets that suggested a rape had taken place at a large party. The pictures posted on both Twitter and Instagram quickly resulted in rape charges being filed for some of the teens, without which the information may never have come to light.

On an even more serious level, some governments are tightening Internet restrictions further as blogging becomes more and more popular. For example, users who mention topics such as corruption, prostitution, or apostasy can possibly face a death sentence in countries such as Iran. Iran was also amongst the first countries to ban YouTube from the Iranian Internet providers (Cheng, n.d.).

<http://www.youtube.com/watch?v=kYRu9CGJJal>

The media revolution is consequently hurting print media, such as newspapers and magazines. Newspapers and magazine rely heavily on ad revenue to fund their companies, but competition with online mediums is hurting sales. In the past six years, print ad revenue has fallen more than 50 percent from the 2005 peak of \$49.4 billion to \$23.9 billion in 2011 (Edmonds, Guskin, Rosenstiel, Mitchell, 2012). In 2012 the revenue from print ads only totaled \$18.9 billion (NAA, 2012). It is predicted that Internet ad revenue will surpass print within the year (Beaujon, 2012). However, less consumption of print also equates to less environmental damage. The Pulp and Paper Products Council (PPPC) found newspaper companies consumed 13.5 percent less paper from May 2007 to May 2008—that is equivalent to 800 million pounds of paper not used (Mutter, 2011).

Print media has tried to adapt by integrating new content on websites to draw readers to both the web and paper, but with the expansion of web syndication and the popularity of interactive user forums, the future of media remains unclear.

Government

IT can enhance interactions between citizens and their governments in several ways. The use of IT in government, sometimes called "e-government," can enhance the efficiency and effectiveness of government services. E-government can also help achieve other important goals of good governance, such as accountability and transparency.

In democratic societies, information on government activities should be readily available for review by the public. Prior to the emergence of computer databases, the Internet, and other IT innovations, large quantities of government documents were not easily accessible to most citizens. Using these technologies, governments today can provide citizens with fast and free access to a wide variety of documents and records.

Access to official information is critical to ensuring that governments are accountable to citizens—that they are responsive to citizens and that they are doing what they are obligated to do under law. The capacity to track government budget expenditures, for example, enables taxpayers to ensure that governments are trustworthy stewards of the funds entrusted to them.

IT can also provide mechanisms through which governments can interact with citizens. Government websites can provide quick access to information on building regulations, motor vehicle licenses, or immunizations, for example. Information technology can also improve the performance and efficiency of government bureaucracies, and enhance interagency cooperation. In these ways, technology can strengthen the delivery of government services. For example, in India, an [e-governance initiative](#) is being implemented to improve citizen access to public services and increase the transparency of government transactions.

<http://www.youtube.com/watch?v=vBKa1TihqXU>

Technology in Warfare

Up until now we have discussed the uses and advancement of technology in the financial markets, media, and workforce. This section will begin to cover how technology has altered the face of war, and how developments in such technology have changed the means by which wars are waged over the course of the 20th and 21st centuries.

There have been numerous advancements that were seen on the battlefield in the form of arms, transportation, and air power. In this section we will trace the origins of technological inventions that have direct impacts not only on the battlefield, but for those who may be operating on a remote computer thousands of miles away from a combat arena. These technologies are increasingly impersonal, as countries are waging war via proxies and remote controlled weaponry.

This section will help bring to light the technological advancements made during eras of heightened global conflict such as the timeframe spanning the two World Wars (1900-1950), as well as modern warfare crises (1960-Present). The strategic and technical uses of these inventions will be examined concurrently with the moral and ethical hazards that are faced in the ever changing field of warfare technology.

WWI & WWII

Technological innovations during the first half of the 20th century were numerous, helping to shape the methods by which the two largest wars in history were waged. We began to see brilliance in the creations of highly sophisticated technology such as radars and jammers, as well as experimentation with nuclear energy that offered myriad of possibilities for positive use in the civilian world. In addition, these advancements coincided with applications in the world of warfare that could be used for great harm and casualties. We will ascertain the importance of these technologies below.

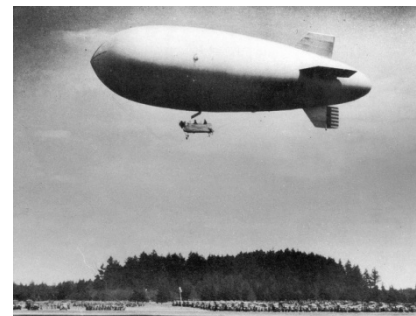
Communications & Intelligence Gathering Technology

Observation Balloons- The observation balloon was initially used during the French Revolutionary War, and rose to mainstream military prominence with continual use throughout World War I. The use of this technological advancement was varied, however, the balloons were primarily employed for intelligence gathering, artillery spotting, and locating enemy submarines.

This technology was composed of rather simplistically, filling up fabric envelopes with hydrogen gas, which were then tied to steel cables before being sent up for observation. Observation balloons were often targeted by enemies, and the operators often had to parachute to safety to avoid the potentially lethal consequences of the highly flammable hydrogen gas (History of Flight).

As one of the first major technological breakthroughs in 20th century warfare, the observation balloon was a major element for change in combat operations. The ability to fly a balloon overhead and view the advancement of the opposition's forces brought about a new method in which global warfare strategies are enacted, and the observation balloon is still used in present day military operations in both Iraq and Afghanistan (Pincus, 2009).

Radar- Early experiments with electromagnetic waves can be dated back to the late 1800's to German physicist Heinrich Hertz, who helped to discover the fact that radio waves could be reflected by solid objects. In 1917, Croatian Engineer Nikola Tesla outlined the premise for a modern radar unit, declaring that from any standing location, electromagnetic waves should be able to locate the location of any standing or moving object.





The use of radar technology did not reach prominence until the 1930's when nations began to realize that they needed the ability to remotely locate enemy crafts and ships. The term RADAR was initially created by the United States Navy in the year 1940, as an acronym for **Radio Detection and Ranging**.

Radar equipments' use in warfare was immense, allowing for the jamming of enemy signals to deny communications, as well as intercepting intelligence transmissions of the opposition forces. Such functions described are often referred to as "electronic warfare."

Electronic warfare significantly impacts combat since war is no longer being waged with just guns, rockets, and tanks. The use of such technology now allows devices such as 'radar jammers' to detect, combat, and change the strategy of their opposition, drastically changing the methods by which wars are waged, and enemies interact with one another.

Weapons of Mass Destruction

Atomic Bomb- Commonly referred to as *weapons of mass destruction* (WMDs), nuclear weapons have been at the forefront of international relations policy debates for many decades, with many questioning the morality of using such technology to cause indiscriminate harm.

Only two nuclear weapons have been used throughout the history of warfare, both by the United States near the end of World War II. In 1942, the United States began the 'Manhattan Project', to create the first atomic bomb. With the help of theoretical physicist J. Robert Oppenheimer, known as the 'father of the atomic bomb', the United States crafted two bombs, "Little Boy" and "Fat Man", which would be used to decimate the Japanese cities of Hiroshima and Nagasaki in August 1945.

- **"Little Boy"**- Dropped on Hiroshima on August 6, 1945, this weapon obtains its explosive power through the nuclear fission of uranium-235. Designed as a 'gun type' fission weapon, when the 'bullet' hit the target an immense amount of energy and heat radiation is released, decimating its immediate surroundings. The temperature of the center of the fireball at the moment of detonation is more than one million degrees Celsius. It is estimated that approximately 140,000 people died by the end of December 1945, due to the use of this weapon (Damage From the Atomic Bombing).
- **"Fat Man"**- Dropped on Nagasaki August 9, 1945, this weapon functioned as an 'implosion-type' weapon, with plutonium-239 as its base core. Thirty-two detonators were placed inside of a hollow sphere of explosives to cause a powerful inward pressure, resulting in initiation. It is estimated that approximately 80,000 people died by the end of December 1945, due to the use of this weapon (Hiroshima and Nagasaki Death Toll, 2007).

On August 15, 1945, less than one week after the bombing of Nagasaki, the Emperor Hirohito of Japan issued a radio address to the nation, declaring the surrender of Japan. There is often much debate as to whether the use of such weapons of destruction was truly necessary to compel the Japanese to surrender. The moral dilemma of using a weapon of such indiscriminate brutality is thought to have weighed heavily on then President Harry S. Truman's mind, however, when he reflected upon later in life still came to the same decision, stating "I knew what I was doing when I stopped the war ... I have no regrets and, under the same circumstances, I would do it again" (Truman, 1963).

With these instances being the only times nuclear weapons have ever been used in the history of warfare, it is categorically necessary to include them in the section depicting warfare technology of World War II, however, the threat of use of nuclear weapons still remains today, and is a continual discussion in the realm of International politics.

Nuclear non-proliferation remains a pillar within the global community to this day, with no country wanting to see such gratuitous violence ever rear its head on the face of this earth again. There are currently 189 signatory member states to the UN's "Nuclear Non Proliferation Treaty", which aims to halt the spread of nuclear weapons to non-nuclear states, disarm and liquidate nuclear weapons, and maintain a peaceful use for nuclear power in today's world.

President Harry Truman's use of the Atomic Bomb on Japanese soil remains highly debated to this day. Do you think it was necessary for such technology to be used in order to garner surrender on the battlefield? With the development of weapons of mass destruction, how has the global atmosphere changed in terms of unilateral cooperation, deterrence, and ability to trust those who possess weapons of such destructive power?

To learn more about the UN's non-proliferation treaty, you can visit the UN webpage [here](#) (THE TREATY ON THE NON-PROLIFERATION, 2005).

Modern Warfare

After the conclusion of World War II, the military industrial complex truly began to produce some simply amazing technological breakthroughs. As countries around the globe were engaged in a competition to produce the best technologies the fastest we began to see the inventions of man-portable missiles, spy satellites, and a plethora of other gadgets that are still used in today's combat operations.

Critically examining the inventions and uses of these technologies helps to gauge the level of technological advancement in modern warfare. These often impersonal devices can bring about changed feelings towards war on the global stage. The issues of sovereignty and civilian casualties are at the forefront of such discussions, and should be considered when examining the following technologies.

Rocket Propelled Grenade (RPG)- Coming to prominence shortly after World War II, the RPG is a shoulder-fired anti-tank weapon, firing rockets equipped with an explosive warhead. While the accuracy will only remain intact within a few hundred feet of firing, it is easily portable while still maintaining the same explosive force as a stick of dynamite upon impact (Speck, 2012).

The RPG is largely popular in asymmetrical guerilla warfare spanning many countries, from Ireland to Chechnya. It is still a weapon of choice for many combatants in the 21st century. While industrialized countries such as the United States continue to wage war with cutting edge 21st century technology, the RPG remains highly useful for small contingencies of opposition forces. Ease of access coupled with simplicity of usage makes this weapon a preferred item to have in ones weapons cache on the battlefield.



Improvised Explosive Devices (IEDs)- The terminology of this weapon was first used in the 1970's, when British forces were dealing with the Irish Republic Army insurgency, and their use of fertilizer and semtex to create improvised yet highly effective surprise traps for their foes. The use of IED's in modern warfare shows the truly indiscriminate nature of battlefield technology in the 21st century. These devices can and do harm not only to military personnel, but to innocent civilians who make the fatal flaw of walking or driving over such devices.

There has been an indisputable growth of anonymity added to modern warfare due to technological advancements in the preceding decades. Does the use of UAVs promote a feeling of being 'removed from the battlefield' that allows an individual to consider 'pulling the trigger' without wholly considering the consequences? Does this mainstreaming of remote controls and 'video game-like' technology create any hazards in modern warfare, or is it a positive step forward that helps save lives that could otherwise be lost when engaging in traditional forms of combat?

Man-Portable air-defense systems (MANPADs)-

Development of the original surface-to-air-missiles (SAMs) began in the 1940's. Rapid advancement began though roughly two decades later in the 1960's. Modern usage of such technology can be seen with devices known as 'stingers', which are infrared-homing SAMs, developed by the United States. Stingers were used in combat in the early 1980's during the Cold War combat operations between the Soviet Union and Afghanistan. With the ability to hit an aircraft from nearly 16,000 feet, this weapon once again introduced a level of long-distance warfare where the enemy was simply seen as a target to strike from a distance, rather than a human being that was being destroyed by the hands of another human being (Baglolle).



Reconnaissance Satellite- With early development dating back to the 1950's, the United States and Russia initially began trying to garner this technology in their great 'space race'. This technological competition was exemplified by the quest for global hegemony.

In modern warfare, this technology provides never before access to high resolution photographs (IMINT), communications eavesdropping (SIGINT), as well as the ability to detect the launch of any missiles. This technology is popularly referred to as "spy satellites."

The topic of civil rights and the usefulness of SIGINT remains an issue of high contention around the globe, with ardent proponents citing the need to eavesdrop on others to prevent potential terrorist plots, as well as those who believe this is a flagrant violation of individual rights that has taken "the desire to protect" a step too far.

Globalization 101

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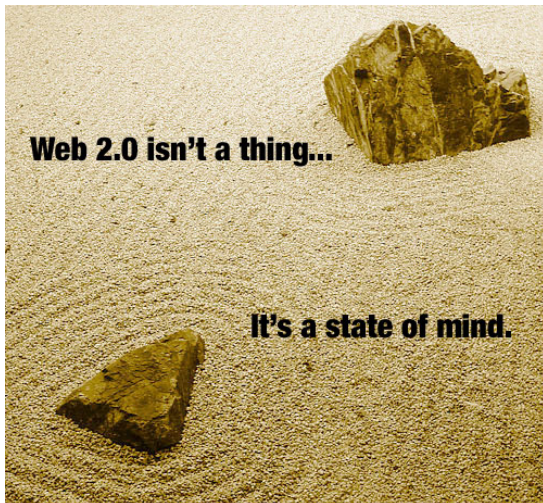
To learn more about the role of electronic warfare in 21st century “War on Terror”, you can visit this *New York Times* [article](#).

Unmanned Aerial Vehicles (UAVs)- Functioned by a remote controlled navigator often far away from the battle field, UAV’s saw their official indoctrination to the United states military in the early 1970’s. Highly useful in a hazardous territory, a UAV can be used by its controllers to conduct reconnaissance, to provide logistical support, to target enemies, and much more. While many UAV’s are simply used as an “eye in the sky”, there are other uses as well used specifically for combat, detailed below:

- **Armed Drones**- Coming to prominence only within the past two decades are missile-laden UAV’s with such ominous names as “Reaper” and “Predator” drones, used to target and kill enemy targets of high value. Largely used by the United States in modern warfare scenarios, these armed drones can be used to attack targets that are deemed too dangerous or inhospitable for soldiers to enter, taking 21st century combat to a new level of anonymity in the battlefield.

To watch “Robot Wars: Worrying New World Technology for 21st Century Modern Warfare”, a documentary on the increasingly complex technologies used in modern warfare and its implications for the “changing face of war”, visit this link <http://www.youtube.com/watch?v=0jt43pwBtxc>.

Web 2.0



Source: <http://www.flickr.com/photos/pigatto/332193181/>

One thing seems to hold true for modern Internet enterprises: nothing stays constant forever. The number of users is growing, page views are exponential rising, and online content is frequently updated, from every couple days to every five minutes. Many experts believe Web 2.0, a term made popular by O'Reilly Media in 2004, is the cause of the boom. According to President and founder Tim O'Reilly, the advanced Internet has become "the business revolution in the computer industry caused by the move to the Internet as platform."

As a platform, the Web evolution comes with integrative enhancements thanks to cheaper production of technological infrastructure. A core aspect of Web 2.0 is harnessing collective intelligence through open source project, mass collaboration, user engagement on social networks, and rethinking the traditional business model.

In the next section, we will discuss Web 2.0 and its social, economical, and ethical implications. This Issue in Depth will provide background into popular trends brought about by Web 2.0 and why they hold significance in the global age.

Social Networking Sites

Social networking sites (SNS) have gained much momentum since the dot-com boom at the start of the new millennium. Approximately 62 percent of people who are connected online use social media to communicate (Reaney, 2012). What was once an uncommon activity, SNSs include millions upon millions of users, most of which whom engage in networking for a variety of reasons.

Characteristics of Social Networking Sites

Networking websites embody many characteristics of Web 2.0, including an interactive, user-based platform built around the notion of a personalized profile page that reflects how you want to be perceived. Along with a profile, another important aspect of social networking is being able to link to the circle of friends that your acquaintances have built, creating a world that is truly connected by a few clicks of a mouse.

SNSs not only allow for users to stay connected more frequently, but they also provide a more personal user experience in a generation founded upon technology. Like other web-based services, there is a mass conglomeration of social networking websites springing up on the Internet. According to its website, Facebook boasts more than 800 million active

users, while Twitter, which is growing even faster, claims more than 500 million active users. Social media accounts for the majority of time spent online.

Social networking sites have gotten much attention recently as privacy has become an increasingly important issue as younger children begin to use these sites. Further, a recent study by USC revealed that the younger generation is less likely to hesitate to give out personal information on sites like Facebook. The generation known as "millennials" has become ever more engaged with social media sites, ranging from "liking" a product on Facebook, or sharing their location, and tweeting private information. The number of 18-34 year olds who were willing to share their personal information was 56 percent compared with 42 percent for those 35 and older.

Various Uses of SNSs

Although it would be easy to categorize SNSs as a tool used to keep individuals connected, that would be an oversimplification. Different sites serve diverse roles that fit into the various niches to improve Internet accessibility. Below, we highlight three important uses of social networking sites that are shaping the way people are engaging themselves within the Internet:

Personal networking: For example, Facebook and Twitter have been categorized as "lifestyle" social networking tools, where users actively upload photos, update their interests, and comment on other user's activities. Similarly, sites such as LinkedIn aim toward working professionals and make searching for jobs and networking with colleagues more convenient.

Corporate and Market Research: Because social networks have such a large pool of users, they have also become a new form of market outreach. Although the largest demographic among SNS users is the college population, companies and other individuals are beginning to submerge themselves in this platform to target. More than 45 percent of the current users on Facebook are 45 years or old or older, and everyone from musical artists, clothing lines, and television shows have accounts (Skelton, 2012).

Companies are eager to expand their reach turn to SNSs to gather demographic information and improve marketing tactics. One way that corporations reach out to users is through ad sales. Social media ad spending will reach \$11 billion by 2017, according to reports (Stambor, 2013). Ads seen on sites such as Facebook and Twitter, the two sites that dominate more than 70 percent of SNS ad sales, are customized to user preferences.

For examples, if a person has stated liking a particular musical artist on their page, ads that appear in the banners will be related to that artist or other musicians similar to the group. We are heading away from a mass-marketing approach to a niche strategy that utilizes the advances technologies of the Web.

Besides boosting ad sales, SNSs are becoming a platform for business-exchange. Recently, Visa was the first company to launch an *application* directed towards small businesses on Facebook. The credit card company has teamed up with Google, *The Wall Street Journal*, *Entrepreneur*, Forbes.com, and Microsoft to provide tools, such as expert and Q&As with business professionals, within this network so emerging companies can better target their consumers.

Social Networking and Law Enforcement

The use of social networking has begun playing a prominent role in combating terrorism and seen by the recent Boston Bombings event. In this case, thousands of witnesses flooded the Internet and authorities with evidence in the form of pictures and video, taken mostly from cell phones. While police were initially overwhelmed by the large amount of evidence at their disposal they also had to take into account the investigation that was taking place parallel to their own. This occurred when users of online social networking sites like Facebook and Reddit, began examining evidence that was made available by other users and started making conclusions based on it. This resulted in innocent bystanders being accused of setting off the devices.

Theories that began on these sites were sent spinning out into the Web and some news sources began to pick them up and use them, as the falsely accused rushed to defend themselves online. These amateur investigations began to hurt the

official one, forcing authorities to stay one step ahead of the Internet vigilantes. The events of the Boston Bombings highlight both the benefit and the drawback of an interconnected world, with untold amounts of recording devices being used on a daily basis (Montgomery, 2013). The use of social media will continue to be instrumental in law enforcement in the coming years, however, it also showcases its limits and how police should deal with similar events in the future.

Activism at home and abroad

Social networking sites also facilitate the mobilization of grass-root movements, especially among the younger generation. One such example is the Darfur cause. The Genocide Intervention Network (GI-Net), a non-profit aiming to promote awareness, advocacy and fundraising for civilians, started out as an on-campus organization that now includes over 300 colleges and 200 high schools in less than two years. GI-Net utilizes platforms such as MySpace, LiveJournal and Facebook to spread information about the organization. In many cases, students themselves were “self-organizing” within these sites, rallying friends on the site to learn more about the cause.

On a more serious level, social networking activity in the Middle East is stirring great controversy within political infrastructure. Nir Boms, Vice President of the Center for Freedom in the Middle East, states *“the internet has provided Arab activist groups with a new medium of expression: it quickly has become the preferred domain for many opposition groups that have little or no access to traditional forms of media”* (Boms, 2008).

For example, SNSs played a significant role in the spread of the Arab Spring and revolts of early 2011. In Algeria, Tunisia and Egypt, civil unrest was spread through social media sites and protestors were given a place to organize. Due to restrictions placed on conventional media, the Internet provided a perfect platform for dissenters to voice their opinions and spread their ideals (Abbas, 2011).

In the 2009 Iranian Presidential Election, the SNS Twitter, played an vital role in the organization and information dissemination efforts of the Mousavi supporters. The reformist camps used Twitter to circumvent strict governmental political oversight and rally support.

The effect of social networks in the Middle East since the Arab Spring can still be widely felt even after two years. The governments of some of these countries now use Twitter and Facebook to communicate with citizens. Most famously this could be seen when President Morsi of Egypt issued his policy announcements via Facebook. In other countries such as Iran, political candidate Hooshang Amirahmadi has taken to Reddit, answering questions from all over the world. Unfortunately, the use of social networks has also proven to be a detriment to the Arab Spring, leading to a high level of political polarization as debates take place online rather than in moderated forums. This type of infighting has lead to the loss of interest in the West for many of the movements (Goldman, 2013).

<http://www.youtube.com/watch?v=2SPuxiHYXmc>.

Support Groups

In contrast to general SNSs like Facebook, niche-specific sites have been growing in popularity because people are searching for a more private, community-based network that larger sites can no longer provide. It is an “inevitable reaction” to “leave for a smaller, more personal experience,” says senior analyst Deborah Williamson of eMarketer (Holahan, 2007). Of these sites, online support groups are highly sought after.

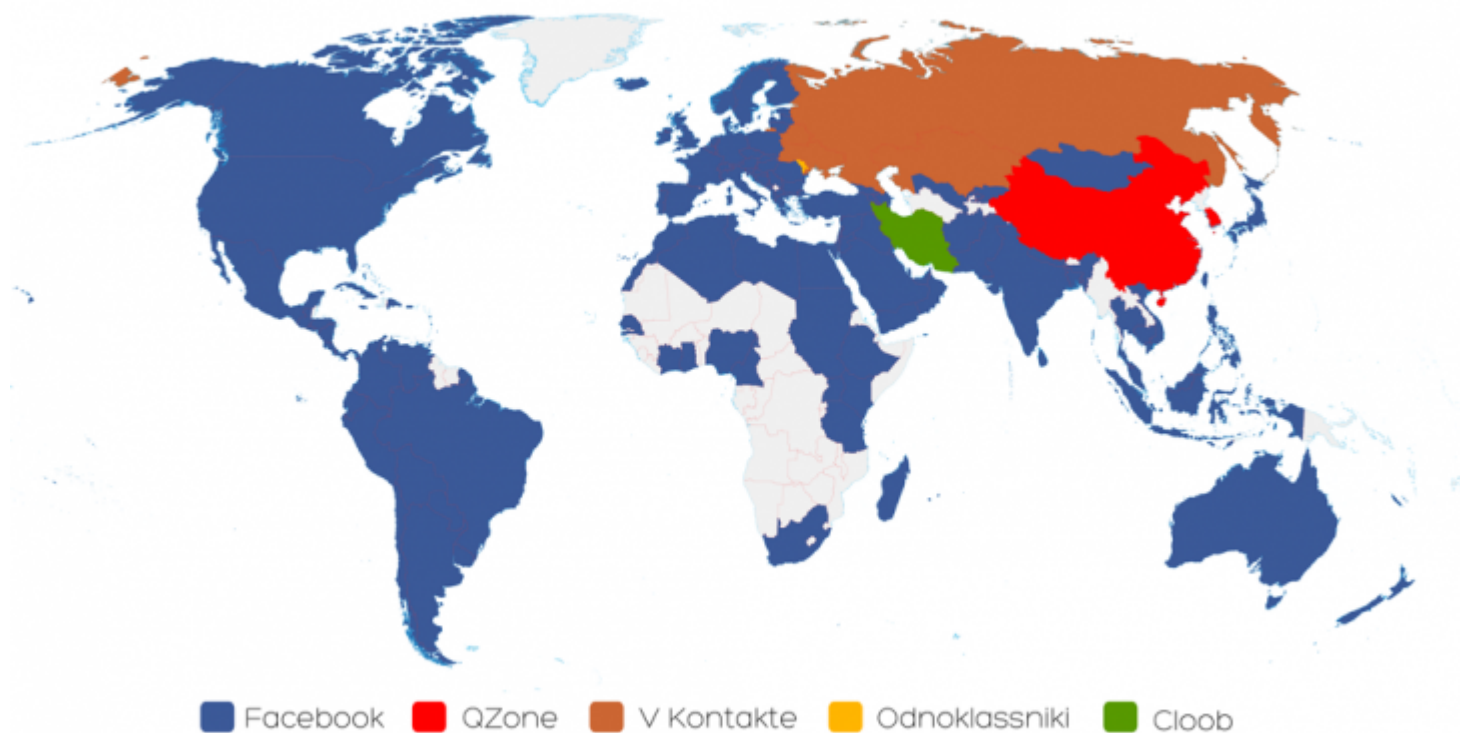
For example, Patients Like Me is a recently emerging SNS that acts as an online therapy group in which people can search for others with similar experiences or share their own stories to help others cope. Individuals who suffer from HIV/AIDS, depression, and Parkinson’s disease now have a common space to seek advice and learn about new treatment without distance barriers. SoberCircle is another example of an online support group, specifically for those overcoming addictions.

Global Reach of Networking

Looking at the figure below, we see that social networking sites have a global reach. For instance, V Kontakte is most popular in Eastern Europe and Russia, while Facebook is heavily concentrated in North America, Europe and Africa. The growth of Facebook throughout the world has begun to foster the global connections that these sites sought out to develop.

WORLD MAP OF SOCIAL NETWORKS

December 2012



credits: Vincenzo Cosenza vincos.it

license: CC-BY-NC

sources: Alexa

Source: <http://thenextweb.com/facebook/2013/01/02/world-map-of-top-social-networks-shows-just-five-left-facebook-dominates-127-out-of-137-countries/>

Because social network sites span across nations and cultures, many networks are beginning to adapt to these changes. One example is XIHA, a Finland-based start up, which bridges language barriers by offering the first multilingual SNS. According to Jani Penttinen, the Co-Founder and CTO at XIHA, the website was created out of the necessity to provide an online community that wasn't based around one language. "Users can simultaneously select as many languages as they know or want to learn. Our technology platform recognizes and filters the languages, so that the user generated content is displayed based on the language preferences." (Multilingual Social Network XIHA Life Creates Cross-Cultural Connections, 2008) As time continues on, the website hopes to provide over 100 languages for users to choose from. XIHA is changing the way people perceive communication across borders.

Peer Production: A Mighty Fortress of Collective Creativity

Peer production (PP) has gone from a technical term only used within the software industry to becoming a landmark revolution that is transforming how business is conducted within firms and across borders. Also referred to as mass collaboration, peer production is any coordinated, (chiefly) Internet-based effort whereby volunteers contribute project components, and there exists some process to unify them to produce an integrated intellectual work. PP covers many different types of intellectual output, from software to libraries of quantitative data to human-readable documents (manuals, books, encyclopedias, reviews, blogs, periodicals, and more).

Peer production has its roots within the technology sector, but large corporations, including Procter & Gamble, Google, and Amazon, are beginning to utilize its powerful potential. Capitalizing on an infinite amount of collective energy facilitated through the Internet, projects ranging from user reviewed databases to constantly-edited open source (OS) software projects are tapping into a new market that relies on the knowledge of the common people (The Power of Us., 2011).

Changing Firms and Markets

Peer production is changing the way people perceive production, especially within the business sector. One of the key elements of peer production is the widespread availability of information. Projects are open to anyone who feels the desire to contribute. Open resource initiatives are counterintuitive to the fundamental notion of for-profit firms, which safe-guard company-owned research to produce revenue.

Ronald Coase wrote in 1937 that firms exist within markets because they greatly lower contract costs by specializing in a specific area and dealing with co-operations all in one place. Firms exist as long as their production levels are less expensive than the market price of producing the same result. For example, Microsoft, a multinational technology corporation, excels in their specific industry by contracting and hiring workers to design, research, and develop new software for them. Having the resources “in house,” Microsoft is able to put out products into the market more inexpensively than had the individuals desired to design, develop, and market the software themselves.

Procter & Gamble (P&G), a \$78 billion enterprise, recently strayed from the typical research and development (R&D) model to a “connect and develop (C&D) structure of production. C&D turns to “external sources for innovation” to help sustain “high levels of top-line growth.” Currently, more than 35 percent of PG’s new products in market have elements that originated from outside PG, and innovation success rate has more than doubled, while the cost of innovation has diminished.

However, the emergence of peer production eliminates transaction costs all together because the existing hierarchy of upper, middle, and lower managements is no longer in place—the fluidity and organic formulations of PP renders this modeling system for firms obsolete.

To highlight an example of this phenomenon, we can take one of the most successful open source projects: Firefox. It is a web browser managed by Mozilla whose aim is to “promote openness, innovation and opportunity on the web” (Get to Know Mozilla).” There is no hierarchy that dictates the method of production; ordinary Internet users are encouraged to give feedback and partake in the Firefox venture. Currently, 19 percent of Internet clients use Firefox, making it the second most popular web browser (Protalinski, 2012). The eight million downloads for Firefox 3.0 on its first day of launching in June 2008 made a Guinness World Record for most downloaded software in a 24-hour period (Paul Ryan). Firefox is now up to version 17. Firefox remains popular as an open source project but faces competition from Google Chrome, which has approximately 40 percent of Internet users as of April 2013 (Statcounter, 2013).

In addition to firms’ diminishing value in the face of peer production, the open market also has to compete with peer-production. Yochai Benkler, the Harvard Law Professor who coined the term peer production, believes that PP projects are helping to form the ideal market that is shifting away from the rigid, asymmetrical pyramid of the privileged few dictating the actions of managers and workers.

“What we are seeing now is the emergence of more effective collective action practices that are decentralized but do not

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rely on either the price system or a managerial structure for coordination.”

Decentralization allows for more efficient platforms of information exchange that depend on strong interdependence and networking. More people can harness their knowledge to create better products in a shorter amount of time. Yochai believes that people who partake in peer production do so not because of monetary gains, but rather *"for a wide range of intrinsic and self-interested reasons [...] people who participate in peer production communities love it. They feel passionate about their particular area of expertise and revel in creating something new or better."* This outlook may hold true for contributors of projects such as Wikipedia, the free online encyclopedia that is written, managed, and edited by the masses. Yet, because open source is becoming a viable approach to tackling the diverse market competition, companies are eager to incorporate this model into their strategic infrastructure remodeling.

Open Source

Open source software projects reach the market much quicker than traditional software programs. Because open-sourced products are constantly being improved and updated, there is little reason to purchase software that only comes out once a year. For instance, OpenOffice, an OS software aiming to compete with Microsoft Office, is updated as often as every two months. On the other hand, Microsoft Office software comes out once a year. Not to mention, OS projects are free-to-use and free-to-update. The 2010 Microsoft Office products range from \$150 to \$500.

Open Source and Global Betterment

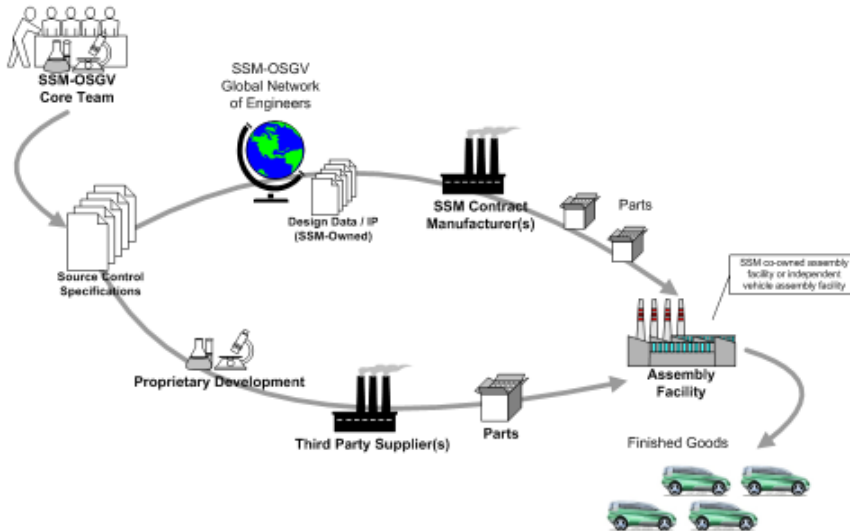
Open source software saves organizations millions of dollars in information technology. One of the most popular uses of open source software today is in education, which allows schools that are hurt by budget cuts to move from paying for closed source tools to free open source options, such as switching to Linux, a free open source operating system. One school reported saving over \$4,000 in resourcing costs alone by switching to open source software. The benefits of this software will be seen in the future as more schools continue to adopt it as an alternative (Morrison, 2013).

Open source projects are not limited to IT, though. SHPEGS, an Open Renewable Energy Project of the Buckminster Fuller Institute, utilizes the same methodology as OS software projects, which is usually referred to as open design, but aims to create sustainable energy through solar collection that will be *"economical, environmentally friendly, scalable, reliable, efficient and location independent manner using common construction materials"* (SHPEGS Open Energy Project, 2009).

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Society for Sustainable Mobility Engineering Development and Production Plan Illustration



Source: Society for Sustainable Mobility

Similarly, the Society for Sustainable Mobility (SSM) of the International Humanities Center is a nonprofit automotive engineering group working on an open design project to create next-generation electric cars. The above figure shows the open design model for the creation of the car from planning to execution.

Another noteworthy open design project is the Hexayurt, a hexagon-shaped house made of simple materials such as cardboard and plastic. The collaborative product resulted in a cheap, \$200 shelter that can be set up in less than 20 minutes. The Hexayurt has been featured in *The New York Times* and *BusinessWeek*, and it was also recently presented at the Red Cross Innovative Shelter Convention as possible emergency homes for disaster-stricken areas (Gupta).



Picture Source: <http://www.hexayurt.com/>

Government Sponsorship

Governments are starting to look into the benefits of open source codes and are trying to find ways that federal agencies can implement similar programs. In 2004, the U.S. formed the Government Open Code Collaborative (GOCC), a partnership amongst public sector and non-profit institutions to encourage the free sharing of computer code developed

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for and by government entities. However, no new material has been added since 2006, signifying only a partial embrace of this new open source culture by the US government.

In 2012, the Obama Administration released the “We The People” online petition application to help U.S. citizens start petitions or register their point of view. The Administration wants to support more open source initiatives and hopes this is the first of many new programs and apps (Darrow, 2012). Recently, open source software has been developed for the express purpose of allowing the free flow of information from governments to people who request it. The extent to which Obama’s adoption of open source software and government transparency will interact remains to be seen.

Smartphone Usage

The use of “smart phones” such as Apple’s Iphone or Android devices has increased and according to reports will continue to rise throughout 2013. The sale of these smart phone devices are expected to top 900 million units by the end of 2013. As the technology has developed it has become cheaper and more readily available to younger markets. Further, smart phones are able to do more than ever before. Their use can range from browsing the web, to capturing video and sharing it online.

Satellite phones have also allowed rural areas and places without internet to become interconnected. According to statistics, 97 percent of 18-29 year olds in the US currently use smart phones to send text messages. The most common activity of smart phone users includes texting and using the phone as a portable GPS. This has enormous implications within the spheres of business as people can be available to work through their phones even when they are nowhere near an office. With the rise in the use of higher tech devices, such as smart phones and tablets, along with the use of cloud services, virtual offices are becoming more common, especially as companies look to drive down costs of operation (Alexander, 2013).

Smartphones have become popular outside of the US as well with the highest percentage of smartphone market penetration in Singapore at 54 percent, Canada at 39 percent, and Hong Kong with 35 percent (Go-Gulf, 2012). Globally, smartphones are used mostly in the home to send text messages or browse the web. Asian countries have the most smartphone users of any other region with the top countries in the region being Japan, South Korea, and China (SiliconIndia, 2013).

Cloud Computing

Cloud services have become increasingly popular in the business world in recent years. The basis of cloud computing is that data is not stored on a person’s physical machine but hosted in third party pools known as the cloud. This allows for businesses to store more information without having to worry about failure of their own computers and risk losing vital information. This type of storage has already been adopted by Amazon, Google, and Microsoft. It is estimated that 74 percent of enterprises now use cloud computing. There has been a 19% increase in usage of the service since 2009 (Lynn, 2011).

These services also allow virtual collaboration on projects that can also be worked on simultaneously, making meetings and traditional office work obsolete. One of the key benefits to cloud storage is the ability to recover from a disaster, since the data is stored in a third party location any problems can easily be mitigated. However, there have been concerns about the security of data that is stored in the cloud and whether this information could be sabotaged easily. Cloud storage is also used by individuals who enjoy the convenience of having their data readily accessible from any machine. The cloud service market is projected to reach \$131 billion in 2013 compared to \$111 billion in 2012 The highest growth rate regions are Asia and Latin America (Presti, 2013).

Concerns of the Technological Age

The preceding sections have highlighted ways in which new information technologies are improving the quality of people's lives. This section will look at two of the leading sets of concerns that have been raised with respect to the growth of IT.

IT is rapidly creating a knowledge economy, in which productivity and prosperity will increasingly come to depend on access to information and on the ability to make productive use of it. But the great promise of these technologies to improve the quality of lives carries with it an implicit risk: gaps in technological access will reinforce and perhaps even widen existing disparities in living standards. Access to new IT—and therefore to knowledge—varies widely within countries and between countries. The promises that information technology provides require access to and knowledge of the new technology itself—without one or the other, the IT will not be used to its maximum potential.

The broad variations in IT accessibility could lead to the exclusion of large numbers of people from the benefits of the knowledge economy. As knowledge critical to enhancing social welfare and economic opportunity increasingly comes to depend on IT, these gaps in access to technology, frequently called "digital divides," will reinforce national and international gaps in living standards.

Digital Divide in the United States

The digital divide in the US has made improvements in recent years; however, certain indicators such as race and income levels still show large disparities in access to IT.

According to the Pew Internet Project, there is still a difference in the U.S. among different demographic groups for access to high-speed broadband at home. One in five Americans do not use the Internet; groups with low Internet usage include senior citizens, interviewees who preferred Spanish, adults that had less than a high school education, and households earning less than \$30,000 per year. The main reason these groups did not use the Internet is that they did not think it was relevant to them. Twenty-seven percent of adults with a disability were less inclined to use the Internet (Zickur, Smith, 2012).

The rise of mobile telephony and smart phones are changing the dynamics and are giving more adults access to the Internet. Forty-five percent of all Americans own a smart phone. As of April 2012, 55 percent of adult cell phone owners accessed the Internet from their phones (Brenner, 2012).

Broadband access has become cheaper in recent years as the technology advances and access expands throughout the U.S. In 2010 a report found that on average users paid \$40.68 per month for broadband access. In 2013 the average price of a broadband connection per month in the U.S. was \$20. Globally, the average price of broadband was 115 percent of GNI per capita, three years ago, it is now only 40 percent. Still, in 2012 the U.S. lagged behind other developed countries with 119 million people without access to the service. The slowing growth of broadband and the fact that providers are moving away from a wireline infrastructure with a preference for wireless initiatives will hurt the access of broadband to rural and less developed parts of the U.S (Molla, 2012).

The current adoption rates of broadband in the U.S. at 196.7 million or 62 percent have ranked it 15th globally in terms of adoption rate per capita. However, the adoption of Google Fiber recently which boasts speeds of 1 gigabit per second, has promised to help deliver access of high speed internet to rural areas cheaply, using fiber optic cables over traditional delivery methods, this has pushed existing providers to improve or face competition from Google.

The use of IT has increased among all American population groups, regardless of income, education, race or ethnicity, geographic location, age, or gender. Groups that have traditionally fallen behind as new information and communication technologies have spread (rural populations, African Americans, women, and Hispanics) have been making dramatic gains in narrowing the digital gap. Women have closed the Internet usage gap with men, and the disparity between these

two groups is now negligible.

Some Quick Facts About Internet Use by Americans

- E-mail is the most popular Internet application: 92 percent of adult Internet users reporting using e-mail services. (Purcell, 2011)
- The fastest growing Internet applications are social networking applications.
- Lower-income Internet users reported looking for jobs most frequently on the Internet, signaling growing Internet usage in that income group.
- Large numbers of Americans access the Internet through public access points in schools, libraries, community centers, and for-profit ventures.

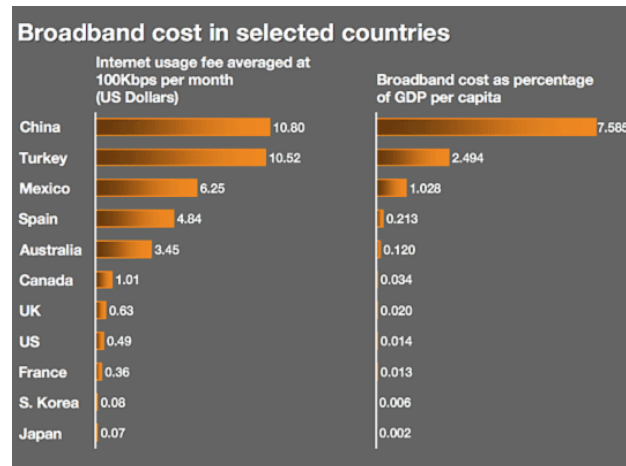
The International Digital Divide

Access to IT is not equitably distributed around the globe. There are an estimated 2.7 billion people online globally, yet there are 7.09 billion people in the world. Thus only approximately 38 percent of the world's population is online. As the figure below indicates, access to and usage of the Internet is extremely unequal around the world.

WORLD INTERNET USAGE AND POPULATION STATISTICS June 30, 2012						
World Regions	Population (2012 Est.)	Internet Users Dec. 31, 2000	Internet Users Latest Data	Penetration (% Population)	Growth 2000-2012	Users % of Table
<u>Africa</u>	1,073,380,925	4,514,400	167,335,676	15.6 %	3,606.7%	7%
<u>Asia</u>	3,922,066,987	114,304,000	1,076,681,059	27.5 %	841.9 %	44.8%
<u>Europe</u>	820,918,446	105,096,093	518,512,109	63.2 %	393.4 %	21.5 %
<u>Middle East</u>	223,608,203	3,284,800	90,000,455	40.2 %	2,639.9 %	3.7 %
<u>North America</u>	348,280,154	108,096,800	273,785,413	78.6 %	153.3 %	11.4 %
<u>Latin America/Caribbean</u>	593,688,638	18,068,919	254,915,745	42.9 %	1,310.8 %	10.6 %
<u>Oceania / Australia</u>	35,903,569	7,620,480	24,287,919	67.6 %	218.7 %	1.0 %
WORLD TOTAL	7,017,846,922	360,985,492	2,405,518,376	34.3 %	566.4 %	100.0 %

Source: World Internet Usage Stats.

The Internet access gap is partially explained by income levels. In most developing countries, the cost of Internet access, broadband as the new standard for connectivity, constitutes a much larger proportion of income than in the developed world, as the figure below indicates.

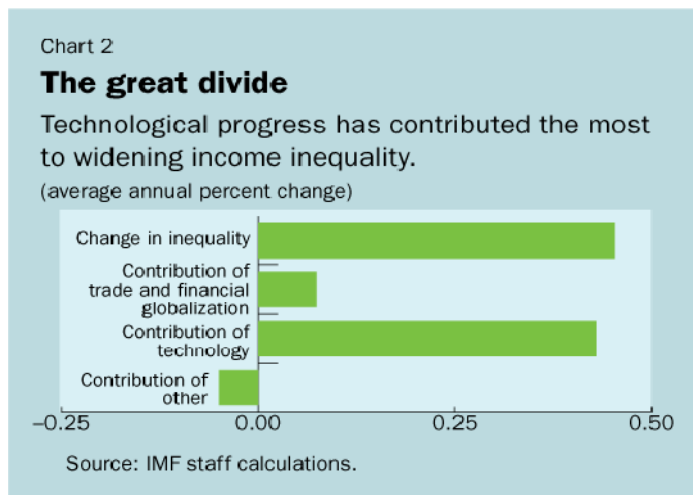


Source: The World Bank; International Monetary Fund

For China and Turkey, monthly broadband costs are more than \$10, which is much higher than the \$0.50 average that Americans pay. Furthermore, since broadband adoption is nearly eight percent of China’s and Turkey’s GDPs—it is no surprise that many developing countries have been lagging in adopting the cyberspace. The cost of paying for a couple hours of Internet usage could amount to a day’s worth of work. Keep in mind that the figure only depicts broadband internet costs—most families in developing countries do not own their own computers, which makes the Internet practically obsolete.

Although many individuals think globalization has led to an increase in global inequality the truth is technology has widened the gap between the rich and the poor in the world. Technology continues to adapt and grow at such an accelerated rate that most countries cannot afford the new technology innovations. The lack of resources hampers country progressions in economics, education, healthcare, and so on.

The chart below shows the changes in the global inequality rate due to the rise of technological progress. The rate at which technology has occurred represents the divide between the rich and poor countries instead of a decrease in the widening gap in the globalized market. Contrary to common belief, economic globalization has helped reduce inequality rather than increase it, especially among the developing countries. The chart also shows how little change globalization has had on the effects of trade and finance in the modern world.



(Jamotte, 2007)

Privacy and Security Concerns

The stunning growth of Internet usage in some countries is also raising concerns about privacy. The qualities that make computer networks such powerful tools for improving efficiency and living standards also give them extraordinary power to collect, store, or distribute medical data, financial data, and other personal or biographical information. Many individuals and consumer groups are calling for new privacy safeguards for the Internet and other computer networks.

Personal information that may be of interest to businesses or people with malevolent aims is generated whenever people surf the Internet. Companies, for example, are able to learn a great deal about web surfers who visit their websites. Using tracking devices known as "cookies," companies are able to track purchases and gather personal data. They can use this information to target their marketing efforts at individual consumers or groups of consumers.

While some may welcome increased attention to their consumer needs, others may consider it an invasion of their privacy. There is also growing concern about what online and conventional stores do with the purchasing or personal data they collect during transactions. Under pressure from consumers, some stores have recently begun to develop privacy policies, but consumer groups say many of these policies fall short.

Finally, patients and consumer advocates want to set rules for the sharing of personal medical data. In each of these areas, it will be difficult to strike a balance between protecting privacy and ensuring a flow of information and data that can enhance quality of life.

The same Internet-based tools that can improve education, health, and governance can also cause considerable damage when used for purposes of theft or fraud. Companies and individual computer users are being increasingly affected by computer viruses and schemes to steal data or computer identities. Companies are spending enormous amounts of time and money to protect their networks and their data. Recent polls suggest that two thirds of American companies have experienced some form of "cyber-disruption."

Resources that could be directed toward improving Internet capacity are being used to thwart cyber criminals. According to an article published in the Financial Times, the average annual cost per company of these disruptions exceeds two million dollars. The Federal Bureau of Investigation (FBI) has estimated annual losses to industry in the \$10-15 billion range. Recent data forecasts that worldwide spending on security will hit \$86 billion in 2016 as a result of increased concern over cyber crime from China, which has been made a priority by the Obama administration (Infosecurity, 2012). Internet or computer service disruptions have become a major problem not only for companies, but for governments, associations, international institutions, and private citizens around the world.

Conclusion

Advances in technology are producing many changes in our society at speeds that are hard to measure and quantify. The shifts within the job market, the rise of open source material, and the rethinking of firms will bring about new trends in business. More efficient ways to handle health care and education material will provide more access, flexibility, and coverage to all parties. Web 2.0 and the Internet Revolution will continue to lead the way so social networking, peer production projects and comprehensive news coverage will be streamlined to become an integral part of the expansion of communication across cultures.

However, the rapid expansion of information and computer technology also bears certain costs. Workers in sectors such as agriculture and manufacturing are losing their jobs as innovations in IT create a greater demand for high-tech workers and introduce efficiencies that make manual labor obsolete. Furthermore, governmental programs do not provide the assistance needed to help these workers transition to the technological age, further wedging the gap between rural and urban America. This disparity is also magnified within the stratification of international systems: The digital divide that exists among developed and developing countries is obvious and the high cost of bringing broadband and technology to third-world countries is an issue that needs to be solved.

As individuals become more engaged with the possibilities that Web 2.0 brings, censorship and the imprisonment of journalists in autocratic nations will become a larger and larger issue that should be addressed by the international community. Although information technology and increased knowledge can empower everyone on an individual level, the limitations of the existing structures within the job market, socioeconomics, and governmental sovereignty are hard to cast away; an underlying irony has yet to be eliminated.

If the new technologies are to fulfill their promise, it is necessary to direct attention towards the costs and concerns that come with the globalization of technology. Experience with previous technologies suggests that prudent policies can help us effectively manage the risks associated with new technologies without harm to their benefits. History also advises that the measures taken must be developed through close consultation between governments, private sector experts, and stakeholders and citizens. We can partake in the ongoing debate by staying informed on current events, and technology facilitates the process in a vital way.

Ellie Walton and Sunju Ahmadu, young filmmakers

Ellie Walton and Sunju Ahmadu are young filmmakers seeking to tell the story of how radio helps get youth involved in peace-building in war-torn Sierra Leone. Sunju, who grew up in Sierra Leone, describes her home and goals for the project: *"My country of origin is Sierra Leone. It is a beautiful country with a vibrant population, situated on the coast of West Africa. However, in 1992 we were plague by what became a decade long civil war where Sierra Leonean rebels committed some of the most brutal atrocities against innocent civilians. Judging from the reaction of people when I tell them I am originally from Sierra Leone, I believe the international media coverage of the war has led to a widespread view that we are a violent, corrupt people from a hopeless land. I am thus dedicated to presenting stories of those who survived the war and are making positive contributions to promote social change within the country. The development of community radios in particular has played a significant role in promoting peace and reconciliation by encouraging Sierra Leoneans, young and old, to voice their concerns and to come up with resolutions."*

Ellie notes that the film will *"focus on stories of a former child soldier who is now hosting her own show about children's rights, as well as a group of young people who are just learning radio skills. Through the documentary they hope to illustrate how Sierra Leoneans are actively working for change, through the brilliance of educational music and soap operas played on the radio. The film seeks to rejuvenate a sense of pride and hope in the country, while also seeking to dispel the image of Africa portrayed in the main stream media as a barren, dangerous and hungry land."*

One particular community radio station gained their interest and will be featured in the film. Sunju describes the station: *"Radio Tombo is situated in a small fishing community separated from Freetown (the capital of Sierra Leone) by the peninsular mountains. Originally one of the reasons it was set up was to with the geographical distance; the community felt that it was important for them to be connected to the rest of the country and to get the latest national news on the peace process. Radio Tombo received sponsorship from World Vision and Talking Drum Studio, a US-AID sponsored NGO that offers technical training to FM stations. It started out as a project that was managed by Tombo youth; however it has now been adopted by the larger community and has the support of community leaders. The station concentrates on catering to community needs discussing on air themes which include health, HIV/Aids prevention, proper waist disposal and literacy, in addition to programs geared toward women and youth. Ellie and I had the opportunity to interview several young people involved in radio from Tombo who discussed with us their desire to have access to more equipment and to expand their practical skills in radio journalism. She and I discussed with them the possibility of providing such equipment and training in exchange for their contribution to our film."*

Both Sunju and Ellie have been involved in social activism for many years. Ellie describes her first experience using the radio as a tool to change public opinion. *"When I was ten years old I vividly remember watching a documentary about the destruction of the rainforest in and feeling completely overwhelmed and frightened by its apocalyptic prediction. Nonetheless, I went to my local community radio station and spoke out against deforestation. Although the rainforest may not have been saved by that broadcast, it was an empowering experience. This made me realize that through globalization, images like burning trees can be spread around the world instantaneously, which can sometimes lead to powerlessness and frustration."*

During college, Ellie continued her activism. *"During college, I discovered on the internet that a community radio station in Guatemala was looking for volunteers. I jumped at the opportunity to work in a radio station which was set up to promote peace building. For 3 months I helped train young people in radio skills and supported the production of a radio soap opera which encouraged women to vote in the upcoming elections. However, the former dictator Rios Mont, accused of acts of genocide during the 36 year civil war, was also running for president, and many feared political suppression. Upon return to Washington DC, I created a link between the community radio station in Guatemala to my own neighborhood station. On election day, the radio reports from the streets of were broadcast to Washington DC, extending the support network to guard against suppression. Not only did Rios Mont lose in the first round, but record numbers of Guatemalans went to the polls, including the largest percentage of women ever."*

Currently Sunju and Ellie are in film school together in London. They hope to return to Sierra Leone soon to make the documentary.

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Hoping to change the world, both offered strong advice to young people everywhere. Sunju recommends: "*Travel far and wide. The media i.e. print, television, radio, film and the internet, are only some of the ways to inform you about the world which we live in. They are not the only means of obtaining knowledge and are certainly not always the most reliable sources of information. If given the opportunity, try to meet and get to know people from all walks of life. Always try to keep an open mind and question that which you think you know about a people or a place, especially if you have never been.*"

Ellie's message: "*My message for young people is thus always seek out new things, as life is about learning, and learning is about exploring different perspectives, opening your mind to new conversations. Globalization has enabled this exchange. Although it is too easy to be overwhelmed by the injustices of the world, to be swept away by the divisions made between north and south, east and west, it is crucial to participate and cross over those boundaries. Travel, and share stories: it makes you realize that amidst all these differences, there is everything to share. This exchange, I believe strongly can foster positive change, starting at the personal/local level.*"

Glossary Of Terms

Blog: The abridged term for “web log,” it is maintained by an individual or group with regular entries of commentary or description of topic of interest with added graphics or videos. Can also be used as a verb to describe the action of adding content to blogs.

E-commerce: Electronic commerce is the ability to reach a global market, access real-time market information, improve internal efficiencies, reduce costs, and complete business transactions electronically. E-commerce benefits economic growth in the developing world by providing a further channel to export goods and services. This is particularly true for business-to-business trading.

E-government: Online provision of public services and information to the citizen, as well as the participation of civil society in governance through IT. E-government initiatives focus on bringing government services online and strategically set out to demonstrate the economic advantages and beneficial use of IT. These include the internal information efficiencies assisting policy decision-makers; improving delivery of government services; and the empowering civil society to access, and respond to, government information.

Firms: A business organization that owns or operates one or more establishments.

Foreign bonds: Bonds denominated in domestic currency, but are issued and sold by a foreign company. An example of a foreign bond would be a French firm selling bonds in the United States. Some foreign bonds are nicknamed: foreign bonds sold in the UK are often called "Bulldogs," while foreign bonds sold in Japan are called 'Samurai.'

Foreign exchange market: The market in which foreign exchange is traded, foreign exchange management is implemented and foreign exchange rates are set.

Futures markets: The market where contracts are traded to buy or sell an amount of a commodity for a specific price at a specific point in the future.

Health care and IT: The application of technology to health-care is a key to improving quality of life. Health programs draw on the benefits of access, used to capture and disseminate information, for example in the monitoring of diseases and their treatment, and the dissemination of disease prevention information. IT in health-care brings medical knowledge to remote and poor areas.

International bond market: a source of medium and long-term funds for borrowers, which include corporations (multinational and domestic), sovereign governments, intergovernmental organizations and financial institutions. International Bond Market consists of Eurobonds and Foreign Bonds.

International market for Equity is a market that consists of shares in foreign equity.

Just-in-time inventory: A management philosophy that strives to eliminate sources of manufacturing waste by producing the right part in the right place at the right time. Just-in-time inventory is the minimum inventory necessary to keep a system running. Technology plays an important role in helping facilitate Just in Time Inventory by facilitating the transfer of information.

New economy: Extraordinary gains in performance, including rapid productivity growth, rising incomes, low unemployment, and moderate inflation that have resulted from a combination of mutually reinforcing advances in technologies, business practices, and economic policies.

Open design: The application of open source to methods of creating physical materials.

Open source (OS): A development methodology offering practical accessibility to a product's source of goods and knowledge. The concept is generally applied to the development of source code for software that is made available for public collaboration, and it is later released as open-source software free to the public.

Options: A call option is a contract in which a seller gives a buyer the right, but not the obligation, to buy the optioned shares of a company at a set price (the strike price) for a certain period of time. If the stock fails to exceed the strike price before the expiration date, the option expires worthless. A put option is a contract that gives the buyer the right, but not the obligation, to sell the stock underlying the contract at a predetermined price (the strike price). The seller (or writer) of the put option is obligated to buy the stock at the strike price.

Peer Production (PP): Any coordinated, (chiefly) internet-based effort whereby volunteers contribute project components, and there exists some process to combine them to produce a unified intellectual work. PP covers many different types of intellectual output, from software to libraries of quantitative data to human-readable documents (manuals, books, encyclopedias, reviews, blogs, periodicals, and more)

Protectionism: A series of economic regulatory measures by which the government attempts to protect domestic industry from foreign competition. One of the most common methods used to measure the degree of protectionism in the economy is to look at the country's average tariff rate. Tariffs act as barriers and serve to reduce imports of foreign products thereby protecting domestic industry that would otherwise have to compete with imported goods. Tariffs used to be the most common trade policy tool, but with the expansion of liberalization (which implies the lowering of tariff barriers); many countries began to use non-tariffs barriers.

Research & Development (R&D): Creative work undertaken on a systematic basis in order to increase the stock of knowledge to devise new applications.

RSS: Stands for "Really Simple Syndication" and allows for users to subscribe to a news feed and receive automatic e-mail updates or notifications on content aggregators such as Google reader and Netvibes.

Stock market: Markets where ownerships of shares in corporations are bought and sold. Each share of stock is a proportional stake in the corporation's assets and profits, and purchasing a stock should be thought of as owning a proportional share of the successes and failures of that business.

Tag: keyword or term associated with a piece of information (i.e. blogs, websites, news articles). They serve as "internet bookmarks" and multiple articles under the same tag are grouped together by the keyword. The verb referring to the act of attaching tags is "tagging."

Web syndication feed: Commonly known as "web feeds" or "RSS feeds," Internet feeds are a data format used for providing users with frequently updated content. Websites syndicate content, users subscribe to websites (or feeds) that they are interested in, and the updates are collected on a web aggregate (such as Google reader, Blogline, Netvibes)

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