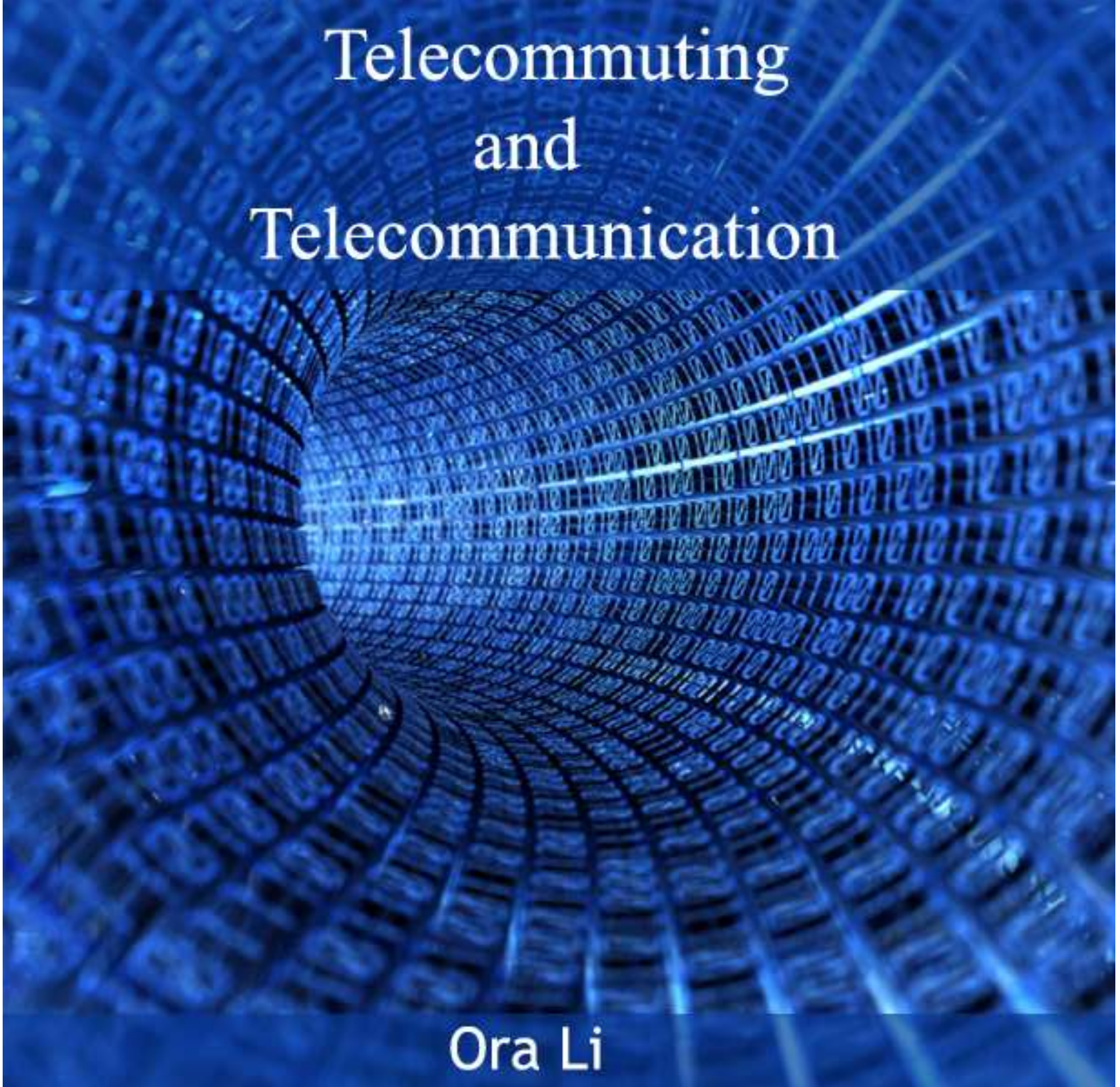
Telecommuting and Telecommunication



Ora Li

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Chapter- 1

Telecommuting

Telecommuting or **telework** is a work arrangement in which employees enjoy flexibility in working location and hours. In other words, the daily commute to a central place of work is replaced by telecommunication links. Many work from home, while others, occasionally also referred to as **nomad workers** or **web commuters** utilize mobile telecommunications technology to work from coffee shops or other locations. **Telework** is a broader term, referring to substituting telecommunications for any form of work-related travel, thereby eliminating the distance restrictions of telecommuting. All telecommuters are teleworkers but not all teleworkers are telecommuters. A frequently repeated motto is that "work is something you do, not something you travel to".

A successful telecommuting program requires a management style which is based on results and not on close scrutiny of individual employees. This is referred to as management by objectives as opposed to management by observation. The terms *telecommuting* and *telework* were coined by Jack Nilles in 1973.

Tellecommuting statistics

Estimates suggest that over fifty million U.S. workers (about 40% of the working population) could work from home at least part of the time, yet in 2008, only 2.5 million employees (not including the self-employed) considered their home their primary place of business.

Occasional telecommuters— those who work remotely (though not necessarily at home) —totaled 17.2 million in 2008.

Very few companies employ large numbers of home-based full-time staff. The call center industry is one notable exception to this; several U.S.-based call centers employ thousands of home-based workers. For most employees, the option to work from home is granted as an employee benefit; most do so only part of the time.

In 2009 the Office of Personnel Management reported that approximately 102,000 Federal employees telework.

In the next three years, public and private sector IT decision makers expect telework to increase by sixty five percent and thirty three percent, respectively.

Technology

The roots of telecommuting lay in early 1970s technology, linking satellite offices to downtown mainframes by dumb terminals using telephone lines as a network bridge. The massive ongoing decrease in cost and increase in performance and usability of personal computers forged the way to decentralize even further, moving the office to the home. By the early 1980s, these branch offices and home workers were able to connect to the company mainframe using personal computers and terminal emulation.

Long distance telework is facilitated by such tools as groupware, virtual private networks, conference calling, videoconferencing, and Voice over IP (VOIP). It can be efficient and useful for companies as it allows staff and workers to communicate over a large distance, saving significant amounts of travel time and cost. As broadband Internet connections become more commonplace, more and more workers have enough bandwidth at home to use these tools to link their home office to their corporate intranet and internal phone networks.

The adoption of local area networks promoted sharing of resources, and client–server computing allowed for even greater decentralization. Today, telecommuters can carry laptop PCs around which they can use both at the office and at home (and almost anywhere else). The rise of cloud computing technology and Wi-Fi availability has enabled access to remote servers via a combination of portable hardware and software.

Potential Benefits

Telecommuting offers benefits to communities, employers, and employees.

For communities, telecommuting can offer fuller employment (by increasing the employ-ability of proximal or circumstantially marginalized groups, such as Work at home parents and caregivers, the disabled, retirees, and people living in remote areas), reduces traffic congestion and traffic accidents, relieves the strain on transportation infrastructures, reduces greenhouse gases, saves fuel, reduces energy use, improves disaster preparedness, and reduces terrorism targets.

For companies, telecommuting expands the talent pool, reduces the spread of illness, reduces costs, increases productivity, reduces their carbon footprint and energy usage, offers an inexpensive method of complying with the Americans with Disabilities Act of 1990 (ADA), reduces turnover and absenteeism, improves employee morale, offers a continuity of operations strategy, improves their ability to handle business across multiple timezones, and hastens their cultural adaptability. Full-time telework can save companies approximately $20,000 per employee.

For individuals, telecommuting, or more specifically, work from home arrangements, improves work-life balance, reduces their carbon footprint and fuel usage, frees up the equivalent of 15 to 25 workdays a year—time they would have otherwise spent

commuting, and saves between $4,000 and $21,000 per year in travel and work-related costs (not including daycare). When gas prices average $3.00 per gallon, the average full-time employee who commutes 5 days per week spends $138.80 per month on gasoline. If 53% of white-collar employees could telework 2 days a week, they could collectively save 9.7 billion gallons of gas and $38.2 billion a year.

Half-time telecommuting by those with compatible jobs (40%) and a desire to do so (79%) would save companies, communities, and employees over $650 billion a year—the result of increased productivity, reduced office expense, lower absenteeism and turnover, reduced travel, less road repairs, less gas consumption, and other savings.

Environmental Benefits

Telecommuting gained more ground in the United States in 1996 after "the Clean Air Act amendments were adopted with the expectation of reducing carbon dioxide and ground-level ozone levels by 25 percent." The act required companies with over 100 employees to encourage car pools, public transportation, shortened workweeks, and telecommuting. In 2004, an appropriations bill was enacted by Congress to encourage telecommuting for certain Federal agencies. The bill threatened to withhold money from agencies that failed to provide telecommuting options to all eligible employees.

If the 40% of the U.S. population that holds telework-compatible jobs and wants to work from home did so half of the time,

- The nation would save 280 million barrels of oil (37% of Gulf oil imports)
- The environment would be saved the equivalent of taking 9 million cars permanently off the road.
- The energy potential from the gas savings would total more than twice what the U.S. currently produces from all renewable energy sources combined.

Employee Satisfaction

Telework flexibility is a desirable perquisite for employees. A 2008 Robert Half International Financial Hiring Index, a survey of 1,400 CFOs by recruitment firm Robert Half International, indicated that 13% consider telework the best recruiting incentive today for accounting professionals. In earlier surveys, 33% considered telework the best recruiting incentive, and half considered it second best.

Current Trends

U.S. Federal Government

If all Federal employees who are eligible to telework full time were to do so, Feds could realize $13.9 billion savings in commuting costs annually and eliminate 21.5 billion pounds of pollutants from the environment each year.

Recent events have pushed telework to the forefront as a critical measurement for the U.S. federal government. Telework relates to continuity of operations (COOP) and national pandemic preparedness planning, reducing dependence on foreign oil and the burden of rising gas prices, the Defense Base Closure and Realignment Commission (BRAC), and a focus on recruitment and retention.

During a keynote address at the September 12, 2007 Telework Exchange Town Hall Meeting, Lurita Doan, at that time the Administrator for the General Services Administration, announced an aggressive commitment goal to increase agency telework participation. Her challenge will enable 50 percent of eligible agency employees to telework one or more days per week by 2010. Currently 10 percent of eligible GSA employees telework, compared to 4.2 percent for the overall Federal workforce. Her goal is to increase participation to 20 percent by the end of 2008, 40 percent by the end of 2009, and finally 50 percent by 2010.

A 2007 study of National Science Foundation employees indicated that approximately one-third participated in telework regularly, characterized staff satisfaction with the program, and noted savings in employee time and greenhouse-gas emissions as a result of telework.

Rep. Sarbanes (D-MD) introduced the Telework Improvements Act of 2009 in March 2009. Co-sponsors of the bill included Reps. Connolly (D-VA), Wolf (R-VA), and Capito (R-WV). The bill requires each executive agency to establish a policy under which employees may be authorized to telework to the maximum extent possible without diminishing employee performance or agency operations. At the same time in the U.S. Senate, Sen. Akaka (D-HI) introduced the companion bill, along with Sens. Landrieu (D-LA) and Voinovich (R-OH).

On May 24, 2010 the Senate passed the Telework Enhancement Act (S. 707) sponsored by Sens. Daniel Akaka (D-Hawaii) and George Voinovich (R-Ohio). The bill grants Federal employees elegibility to telework and requires Federal agencies to establish telework policies and identify telework managers.

On July 14, 2010 the House passed the Telework Improvements Act of 2010 (H.R. 1722) with a vote of 290-131.

Telework Centers

Telework centers are offices that are generally set up close to a majority of people who might otherwise drive or take public transit. They usually feature the full complement of office equipment and a high-speed Internet connection for maximum productivity. Some feature support staff such as receptionists. For example, a number of telework centers have been set up around the Washington Metropolitan Area: 7 in Maryland, 8 in Virginia, 3 in Washington, D.C. and 1 in West Virginia.

Telework centers allow people to reduce their commute yet still work in a traditional office setting. Some Telework Centers are set up by individual companies while others are established by independent organizations for use by many organizations. Telework centers are attractive to people who do not have the space or inclination to work from home. They offer employers the ability to maintain a more formal structure for their workforce.

These work arrangements are likely to become more popular with current trends towards greater customization of services and virtual organizing. Distributed work offers great potential for firms to reduce costs, enhance competitive advantage and agility, access a greater variety of scarce talents, and improve employee flexibility, effectiveness and productivity. It has gained in popularity in the West, particularly in Europe. While increasing in importance, distributed work has not yet gained widespread acceptance in Asia.

Remote Office Centers

Remote Office Centers are office space leasing centers which lease individual offices to employees from multiple companies in a single office location or center. The purpose of Remote Office Centers is to provide professional office space in locations that are near where people live, so they can cut down on the commute, but still work out of a real office with professional grade internet, phone service and security.

Office Center Locations

Remote Office Centers are usually located in close proximity to where people live; they are generally distributed throughout suburban and near-suburban locations. The idea behind a Remote Office Center is that you lease an office near where you live, in a building shared with other remote office users and you telecommute from a professional, secure, and reliable office work environment.

Services Provided by Remote Office Centers

- Professional grade internet access for use with company VPN. (Personal firewalls, for each office, are configured in order to ensure security within the center).
- Professional work space environment (desks, chairs, lighting, file cabinets, etc).
- Professional grade phone system
- Mail Stop
- Security system (complete with system logs that can be provided to employers in order to guarantee work attendance).
- Flexible office space leasing that can grow or shrink as a company grows or shrinks, which is no longer constrained by location, or limited floor space in existing facilities.

Leasing

- Remote Office Centers allow for flexible leasing, so that companies are not stuck in long term leases in case an employee quits or leaves employment for any reason.
- Remote Office Centers may offer additional services such as optional equipment or hands-on technical support for additional fees.

Advantages Over Traditional Telecommuting

- Professional work space with professional internet/network access.
- Freedom from distractions inherit in home work environments (TV, family, chores, etc).
- Secure facilities with attendance logging so that employers can be assured of employee work hours.
- Separation of home and work. This is a key to mental health. For many people, it is hard to separate work from home, if you never leave home. Most people need a work place to go to and more importantly come home from. An ROC provides the office, and the social contact that comes from working in an office with other workers (even if they work for a different company).

Limited Acceptance of Traditional Telecommuting

- Dice Holdings recently ran a survey and found that 30 percent of technology workers who were surveyed would accept a 10 percent pay cut if they were allowed to telecommute. However, the same study showed that only 7 percent of technology workers actually did telecommute, and they were mostly consultants. There is obviously a large discrepancy between those who want to telecommute and those who are able to telecommute through traditional telecommuting implementations.
- A government study showed that only 20 percent of government workers telecommuted at all. The same study showed that 96 percent could telecommute part time and 79 percent could telecommute full time. The same study showed that $19.9 billion dollars of commuting cost and $21.5 billion in pollution costs could be saved if government workers and management were to fully embrace telecommuting either from home or remote centers.

Government Initiatives

- On June 3, 2008, the House passed H.R. 4106. H.R. 4106 would require agencies to develop a program allowing employees to telework at least 20 percent of every two-week work period.
- GSA currently (June 20, 2008) provides 14 Remote Offices in the D.C. area that can be used by Federal Employees.

- The Oregon Telecommunity Center Project produced a replicable model for planning and developing a telecommunity center to reduce travel demand while increasing access to jobs. The project assessed the needs of specific Oregon rural communities that can be served by technology and network services through a telecommunity center.

Related Terms / Concepts

Office Hoteling

Some companies, particularly those where employees spend a great deal of time on the road and at remote locations, offer a hotdesking or office hoteling arrangement where employees can reserve the use of a traditional office, at the company headquarters, a Remote Office Center, or other shared office facility.

Coworking

Citizen Space in San Francisco, CA

Coworking is a style of work which involves a shared working environment, sometimes an office, yet independent activity. Unlike in a typical office environment, those coworking are usually not employed by the same organization. Typically it is attractive to work-at-home professionals, independent contractors, or people who travel frequently who end up working in relative isolation. Coworking is the social gathering of a group of

people, who are still working independently, but who share values, and who are interested in the synergy that can happen from working with talented people in the same space.

Some coworking spaces were developed by nomadic internet entrepreneurs seeking an alternative to working in coffeeshops and cafes, or to isolation in independent or home offices. A 2007 survey showed that many employees worry about feeling isolated and losing human interaction if they were to telecommute. Roughly a third of both private and public-sector workers also reported that they didn't want to stay at home during work. Coworking offers a solution to the problem of isolation that many freelancers experience while working at home, while at the same time letting them escape the distractions of home.

Business accelerators, business incubators and executive suites do not seem to fit into the coworking model, because they often miss the social, collaborative, and informal aspects of the process, with management practices closer to that of a Cooperative, including a focus on community rather than profit. Many of the coworking participants are also participants in BarCamp and other related open source technology activities.

Coworking is not only about the physical space but initially and mostly about establishing the Coworking community first. The benefits of Coworking can already be experienced outside of Coworking spaces and it is recommended to start with building a Coworking community first before considering opening a Coworking space. However, some Coworking Spaces don't build a community, they just get a part of an existing one by combining their opening with an event which attracts their target group.

A lot of Coworking communities are formed by organizing Casual Coworking events (e.g. Jellies) that can take place in people's living room or in public places such as suitable cafes, galleries or multi-functional spaces. During these events Coworkers can experience the benefits of Coworking and get to know each other which lowers the barriers to join a Coworking space later.

History

The term "coworking" was coined by Bernie DeKoven in 1999, and in 2005 used by Brad Neuberg to describe a physical space which he firstly called '9 to 5 group'.

Neuberg organized a coworking site called the "Hat Factory" in San Francisco, which is a live-work loft that is home to three technology workers, and is open to others during the day. Coworking spaces now exist in Argentina, Australia, the United Kingdom, Canada and Germany, although most of the sites are in the U.S. Hub Culture Pavilions are leading the development of coworking on a global basis, with a network of locations that merge online tools with physical coworking environments.

The San Francisco-based consulting firm *Citizen Agency* has actively promoted coworking, starting a space called *Citizen Space* which rents desks but also allows free

drop-ins in the public spaces. Coworking has also spread into many other metropolitan areas, with cities such as Portland, Oregon now offering several thriving coworking venues.

Distributed Work

Distributed work entails the conduct of organizational tasks in places that extend beyond the confines of traditional offices. It can refer to organizational arrangements that permit or require workers to perform work more effectively at any appropriate location, such as their homes and customers' sites - through the application of information and communication technology. An example is financial planners who meet clients during lunchtime with access to various financial planning tools and offerings on their mobile computers, or publishing executives who recommend and place orders for the latest book offerings to libraries and university professors, among others. If this type of distributed work replaces the workers commute, it would be considered telecommuting. If it did not, it would be considered telework.

Jellies

Some telecommuters and teleworkers form local groups that gather at coffee shops and other locations to socialize, collaborate, or just reduce the isolation of working on their own.

Potential Drawbacks / Concerns

- Employers largest concerns about telecommuting are: fear of loss of control; 75% of managers say they trust their employees, but a third say they'd like to be able to see them, just to be sure.
- Barriers to continued growth of telecommuting include distrust from employers and personal disconnectedness for employees.
- Telecommuting has come to be viewed by some as more a "complement rather than a substitute for work in the workplace".
- Security must be addressed for teleworkers and non-teleworkers as well. In 2006, a United States Department of Veterans Affairs employee's stolen laptop represented what was described as "potentially the largest loss of Social Security numbers to date.". While he was not a telecommuter, this incident brought attention to the risks inherent in working off-site. Ninety percent of executives charged with security in large organizations feel that telework is not a security concern. They are more concerned with the occasional work that's taken out of the office by non-teleworkers because they lack the training, tools, and technologies that teleworkers receive.
- Managers may view the teleworker as experiencing a drop in productivity during the first few months. This drop occurs as "the employee, his peers, and the manager adjust to the new work regimen". The drop could also be accountable to inadequate office setup. Managers need to be patient and let the teleworker adapt. It can be claimed that as much as "70 minutes of each day in a regular office are

wasted by interruptions, yakking around the photocopier, and other distractions". Eventually, productivity of the teleworker will climb. Over two-thirds of employers report increased productivity among telecommuters. CompTIA survey of 212 diverse employers (October 2008).

- Traditional line managers are accustomed to managing by observation and not necessarily by results. This causes a serious obstacle in organizations attempting to adopt telecommuting. Liability and workers' compensation can become serious issues as well. Companies considering telecommuting should be sure to check on local legal issues, union issues, and zoning laws. Telecommuting should incorporate training and development that includes evaluation, simulation programs, team meetings, written materials, and forums. Information sharing should be considered synchronous in a virtual office and building processes to handle conflicts should be developed. Operational and administrative support should be redesigned to support the virtual office environment. Facilities need to be coordinated properly in order to support the virtual office and technical support should be coordinated properly. The conclusion for managers working within telecommuting organizations is that new approaches to "evaluating, educating, organizing, and informing workers" should be adopted.
- Teleworking can negatively affect a person's career. A recent survey of 1,300 executives from 71 countries indicated that respondents believe that people who telework were less likely to get promoted. Companies rarely promote people into leadership roles who haven't been consistently seen and measured.

Telecommuting and Work At Home Scams

An ad for a work-at-home scheme posted on a pole

A **Work-at-Home scheme** is a get-rich-quick scheme in which a victim is lured by an offer to be employed at home, very often doing some simple task in a minimal amount of time with a large amount of income that far exceeds the market rate for the type of work. The true purpose of such an offer is for the perpetrator to extort money from the victim.

Work-at-home schemes have been around for decades. Originally found as ads in newspapers or magazines, they have expanded to more high-tech media, such as television and radio ads, and on the Internet. In some countries, law enforcement agencies work to fight work-at-home schemes. In 2006, the United States Federal Trade Commission established Project False Hopes, a federal and state law enforcement sweep that targets bogus business opportunity and work at home scams. The crackdown involved more than 100 law enforcement actions by the FTC, the Department of Justice, the United States Postal Inspection Service, and law enforcement agencies in eleven states.

Legitimate work-at-home opportunities do exist, and many people do their jobs in the comfort of their own homes. But anyone seeking such an employment opportunity must be wary of accepting a home employment offer, as only about one in 42 such ads have been determined to be legitimate. Most legitimate jobs at home require some form of post-high-school education, such as a college degree or certificate, or trade school, and some experience in the field in an office or other supervised setting. Additionally, many legitimate at-home jobs are not like those in schemes are portrayed to be, as they are often performed at least some of the time in the company's office, require more self discipline than a traditional job, and have a higher risk of firing.

Types of work

Common types of work found in work-at-home schemes include:

- Stuffing envelopes
- Assembly of items of some type, such as crafts, jewellery or medical equipment
- Data entry
- Processing medical claims
- Making phone calls
- Phone sex
- Online surveys
- Sales of a product or service that is difficult or impossible to sell. This is often done in the form of a pyramid scheme.
- Legitimate Network Marketing Systems that fall under the Code of Ethics within the Direct Selling Industry (DSA)
- Some ads claim to offer a device that makes passive sales calls, and the "employee" will be paid a commission of the sales.

Some ads offer legitimate forms of work that really do exist, but exaggerate the salary and minimize the effort that will have to be put into the job, or the exaggerate amount of

work that will be available. Many such ads do not even specify the type of work that will be performed.

Some similar schemes do not advertise work that would be performed at home, but may instead offer occasional, sporadic work away from home for large payments, paired with a lot of free time. Some common offers fitting this description are:

- **Acting -** seeking extras to perform in movies and television commercials.
- **Mystery shopping -** Getting paid to shop and dine. While mystery shopping actually does exist, it requires hard work, is paid close to minimum wage, and most importantly, does not require an up-front fee to join.

Victims

The typical victim of a work-at-home scheme may be:

- A burned out employee of a legitimate job seeking an exit to his/her stressful lifestyle
- An unemployed person seeking high-paying easy work
- An uneducated person with few or no skills looking for a job with a good salary
- An employed person wanting to make extra money to supplement his/her regular income.
- Senior citizens, disabled persons, stay-at-home parents, and others who cannot easily leave home in order to make a living.
- Those with busy schedules full of unpaid activities who wish to earn money in their spare time.
- Those with long or tiresome commutes looking to remain at home and eliminate their travel to work.
- Someone who doesn't take the time to carefully investigate the industry, job and company.

Signs of a scam

Signs of a work-at-home scam versus a legitimate job may include:

- Payment of fee is required prior to starting employment. In the United States, the Federal Trade Commission states that under no circumstances should anyone be forced to pay a fee in order to obtain a job. In many countries, no legitimate employer will require a fee be paid as a condition of starting work (except perhaps a small amount for a criminal background check).
- Pay is too good to be true. Though there may be legitimate jobs in existence in which employees are paid to perform the particular task in question, even from home, in reality, they would be paid a wage that is fair for that type of work and level of education, not the $40 per hour or $3000 per week that is typically offered in a work-at-home scheme.

- Employer will seemingly hire anyone, with no experience necessary and no qualifications. Legitimate work-at-home employers will only be interested in those who have the proper experience, skills, certification, and other qualifying factors, and will give at least some scrutiny to an applicant seeking employment. But the perpetrator of a work-at-home scheme is only interested in the payment required to join.
- Company is little known, and does not seemingly have a customer base bringing them revenue from which they can pay employees.
- Company does not appear to have a permanent location. Its address, phone number, and website appear to be centered around recruitment of employees, not customers.

Consequences

The consequences of falling for a work-at-home scheme may be as follows:

- **Loss of money**: It may be only the initial fee to join, which may be a large or small amount. Some scammers will run after receiving just this fee. Others will continue to ask for more in order for the promise of high pay to be fulfilled. Some will act on a two-way street, actually issuing paychecks, all the while receiving payments of greater value in return, which in some cases have exceeded tens of thousands of US dollars. In other cases, the employer may obtain the victim's personal information for purposes of identity theft.
- **Loss of legitimate job**: Those with a real job may quit in hopes of a better one, only to find they cannot get their original job back after they discover their dream job was only a hoax.
- **Damaged Reputation**: Those who engage in sales of a faulty or otherwise controversial product may be tarnishing their own name as the salesperson of such a worthless item.
- **Trouble with law**: Some victims may actually receive money. But at the same time, they may be unknowingly breaking the law, on behalf of the perpetrator of the scheme, but will be fully legally responsible. Such violations may be criminal or civil in nature. In other cases, they will not be committing any criminal acts, but they will end up framed in an investigation for the crimes of the perpetrator.
- **Wasted time**: Victims will often invest huge amounts of time with no pay in return. This is time that can be spent earning money at a legitimate job.

Chapter- 2

Virtual Volunteering and Virtual Teams

Virtual Volunteering

Virtual volunteering is a term describing a volunteer who completes tasks, in whole or in part, offsite from the organization being assisted, using the Internet and a home, school, telecenter or work computer or other Internet-connected device. Virtual volunteering is also known as online volunteering, cyber service, telementoring, and teletutoring, and various other names. Virtual volunteering is similar to telecommuting, except that, instead of online employees who are paid, these are online volunteers who are not paid, and they are working to benefit a nonprofit organization, school, government program or other not-for-profit entity, as opposed to a for-profit business.

In practice

People engaged in virtual volunteering undertake a variety of activities from locations remote to the organization or people they are assisting, via a computer or other Internet-connected device, such as:

- translating documents
- researching subjects
- creating web pages
- editing or writing proposals, press releases, newsletter articles, etc.
- developing material for a curriculum
- designing a database
- designing graphics
- providing legal, business, medical, agricultural or any other expertise
- counseling people
- tutoring or mentoring students
- moderating online discussion groups
- writing songs
- creating a podcast
- editing a video
- monitoring the news
- answering questions
- tagging photos and files

- managing other online volunteers

Early history of the practice

The practice of virtual volunteering to benefit nonprofit initiatives dates back to at least the early 1970s, when Project Gutenberg began involving online volunteers to provide electronic versions of works in the public domain.

In 1995, a new nonprofit organization called Impact Online (now called VolunteerMatch), based in Palo Alto, California, began promoting the idea of "virtual volunteers". In 1996, Impact Online received a grant from the James Irvine Foundation to launch an initiative to research the practice of virtual volunteering and to promote the practice to nonprofit organizations in the USA. This new initiative was dubbed the Virtual Volunteering Project, and the web site was launched in early 1997. After one year of operations, the Virtual Volunteering Project moved to the Charles A. Dana Center at The University of Texas at Austin. In 2002, the Virtual Volunteering Project moved within the university to the Lyndon B. Johnson School of Public Affairs.

The first two years of the Virtual Volunteer Project were spent reviewing and adapting telecommuting manuals and existing volunteer management guidelines with regarding to virtual volunteering, as well as identifying organizations that were involving online volunteers. By April 1999, almost 100 organizations had been identified by the Virtual Volunteering Project as involving online volunteers and were listed on the web site.

Due to the growing numbers of nonprofit organizations, schools, government programs and other not-for-profit entities involving online volunteers, the Virtual Volunteering Project stopped listing every such organization involving online volunteers on its web site in 2000, and focused its efforts on promoting the practice, profiling organizations with large or unique online volunteering programs, and creating guidelines for the involvement of online volunteers.

Until January 2001, the Virtual Volunteering Project listed all telementoring and teletutoring programs in the USA (programs where online volunteers mentor or tutor others, through a nonprofit organization or school). At that time, 40 were identified.

Current state of the practice

Virtual volunteering has been adopted by at least a few thousand nonprofit thousand organizations and initiatives. There is no organization currently tracking best practices in online volunteering in the USA or worldwide, how many people are engaged in online volunteering, or how many organizations are involving online volunteers, and studies regarding volunteering, such as reports on volunteering trends in the USA, rarely include information about online volunteering (for instance, a search of the term *virtual volunteering* on the Corporation for National Service's "Volunteering in America" yields no results.)

The United Nations runs an online volunteering service, formerly a part of NetAid, that allows organizations working in or for the developing world to recruit online volunteers, and does have statistics available regarding numbers of online volunteers and organizations involving such through its service. Several other matching services, such as VolunteerMatch and Idealist, also offer virtual volunteering positions with nonprofit organizations in addition to traditional, onsite volunteering opportunities. VolunteerMatch currently reports that around 5 percent of its active volunteer listings are virtual in nature. As of June 2010, its directory included more than 2,770 such listings including roles in interactive marketing, fundraising, accounting, social media, and business mentoring. The percentage of virtual listings has dropped since 2006, when it peaked at close to 8 percent of overall volunteer opportunities in the VolunteerMatch system.

Micro-volunteering is also an example of virtual volunteering and crowd-sourcing, where volunteers undertake assignments via their PDAs or smartphones. These volunteers aren't required to undergo any screening or training by the nonprofit for such tasks, and do not have to make any other commitment once a micro-task is completed. Micro-volunteering was invented by a San Francisco-based social enterprise called The Extraordinaries in 2008.

Virtual Team

A **virtual team** — also known as a **geographically dispersed team** (GDT) — is a group of individuals who work across time, space, and organizational boundaries with links strengthened by webs of communication technology. Members of virtual teams communicate electronically, so they may never meet face to face. Virtual teams are made possible by a proliferation of fiber optic technology that has significantly increased the scope of off-site communication. Virtual teams allow companies to procure the best talent without geographical restrictions. According to Hambley, O'Neil, & Kline (2007) "virtual teams require new ways of working across boundaries through systems, processes, technology, and people (Duarte & Snyder, 1999), which requires effective leadership...despite the widespread increase in virtual teamwork, there has been relatively little focus on the role of virtual team leaders" (p 41).

Types of virtual teams

Offshore ISD outsourcing teams are teams in which a company subcontracts portions of work to an offshore independent service provider to be worked in conjunction with an onshore team. Offshore ISD is commonly used for software development as well as international R&D projects.

Chapter- 3

Telecentre

Telecentre building in Senegal

A **telecentre** is a public place where people can access computers, the Internet, and other digital technologies that enable them to gather information, create, learn, and communicate with others while they develop essential digital skills. While each telecentre is different, their common focus is on the use of digital technologies to support community, economic, educational, and social development—reducing isolation, bridging the digital divide, promoting health issues, creating economic opportunities, and reaching out to youth for example,.

Telecentres exist in almost every country, although they sometimes go by a different name: public internet access center (PIAP), village knowledge center, infocenter, community technology center (CTC), community multimedia center (CMC), multipurpose community telecentre (MCT), Common/Citizen Service Centre (CSC), school-based telecentre, etc.

Evolution of the telecentre movement

African children in a telecentre in Zambia

The telecentre movement's origins can be traced to Europe's telecottage and Electronic Village Halls (originally in Denmark) and Community Technology Centers (CTCs) in the

United States, both of which emerged in the 1980s as a result of advances in computing. At a time when computers were available but not yet a common household good, public access to computers emerged as a solution. Today, in spite of the fact that home ownership of computers is widespread in the United States and other industrialized countries, there remains a need for public (free) access to computing, whether it is in CTCs, telecottages or public libraries to ensure that everyone has access to technologies that have become essential. In the 1990s, the telecentres spread to Africa, Asia and Latin America.

Types

Beyond the differences in names, public ICT access centers are diverse, varying in the clientele they serve, the services they provide, as well as their business or organizational model. Around the world, some telecentres include NGO-sponsored, local government, commercial, school-based, and university-related. In the United States and other countries, public access to the Internet in libraries may also be considered within the "telecentre concept", especially when the range of services offered is not limited to pure access but also includes training end-users. Each type has advantages and disadvantages when considering attempts to link communities with ICTs and to bridge the digital divide.

- NGO-sponsored telecentres are hosted by an NGO, which manages the center and integrates it, to one degree or another, into the organization's core business;
- Local government telecentres seek to further local development; they often aim to disseminate information, decentralize services, and encourage civic participation, in addition to providing public ICT access.
- Commercial telecentres, launched by entrepreneurs for profit, range from the purely commercial cybercafé to the social enterprise, where profit and social good objectives are combined.
- School-based telecentres can be structured to involve community members during off-school hours, but costs need to be shared by the school system and the community.
- University-related telecentres can offer social outreach to disadvantaged and community groups, provide training, develop locally relevant content, and establish and facilitate virtual networks.
- Internet access in public libraries.

Telecentres and international development institutions

In the 1990s, international development institutions such as Canada's International Development Research Centre (IDRC) and UNESCO, sponsored the deployment of many telecentres in developing countries. Both IDRC and UNESCO are still very involved in the telecentre movement. IDRC's telecentre.org is supporting networks of telecentres around the world and UNESCO continues to support the growth of

community multimedia centers (CMCs), which, unlike most other telecentres, have a local community radio, television or other media component.

Sustainability problems

In light of the rapidly evolving technologies that support telecentres and in light of the increased penetration of mobile technologies (i.e., cell phones), the telecentre model needs to continuously evolve in order to remain relevant and to continue to address the changing needs of the communities they serve. As mobile communication technologies become more pervasive around the world, including in rural areas, the telecentres may no longer need to provide phone services, yet they may still be very relevant in terms of access to web-enabled e-government services, e-Learning, and basic Internet communication needs (email and web browsing).

Evolving models — since the local demand for information and communication services is evolving, the telecentre models need to evolve as well. Franchises and other approaches to linking and networking telecentres are proving to be popular.

Evolving technologies — wireless connectivity technologies, beyond VSAT (known to be expensive) are being explored in many communities around the world. These technologies provide new opportunities for connecting communities through telecentres and eventually at the individual household level.

Evolving services — the types of services that telecentres can and should provide is also rapidly evolving. As the fields of eGovernment, eHealth, e-Learning, eCommerce are evolving and maturing in many countries, telecentres need to take advantage of opportunities to extend the benefits to the community at large, through their public access. Some governments are pursuing the deployment of telecentres precisely as a means of ensuring that larger segments of the population are able to access government services and information through electronic channels.

Community stakeholders - identifying leaders among the community who champion the concept of shared services through telecentre mode, play a crucial role as a bridge between the telecentre operator and hesitant villagers. Indeed, There is a maturing period during which community leaders have to invest constant efforts to drive changes of behaviour in the adoption of innovations.

Community involvement is required however, at the initial phase of the telecentre set up, starting with the site selection and creating a sort of empathy and feeling of empowerment. Furthermore, the telecentre should be well rooted in the socio-cultural context of the community.

Networks

The telecentres of today and of the future are networked telecentres, or telecentres of the 2.0 generation. Increasingly, telecentres are not operating as independent, isolated entities but as members of a network. At times, the network takes the form of a franchise. In other circumstances, the network is much more informal.

One such regional network targeted towards Asia-Pacific is, the Asia-Pacific Telecentre Network.

Chapter- 4

Hotelling (office) and Virtual Office

Hotelling

Hoteling (or hotelling) is a method of supporting unassigned seating in an office environment. It is similar to hot desking, and is sometimes confused with it, since both methods support unassigned seating. Hotelling is *reservation-based* unassigned seating, whereas, hot desking is *reservation-less* unassigned seating.

Background

Offices generally support three kinds of seating assignment:

- Shift/Workshop - People take a seat for a given time-shift. The seat is then released to another person on the next time-shift.
- Assigned - One and only one person is assigned to one or more workstations. Likewise, the workstations are assigned to be used exclusively by one person.
- Unassigned - A person is not assigned to any particular workstation. Likewise, the workstation is not assigned to any particular person.

"Recent studies of knowledge workers, particularly salespeople, customer representatives, and consultants, indicate they spend only 30% of their time in the office. Teleworking also contributes to less frequent presence in the office. So why have a workstation?" Companies are also finding that people may need different kinds of workstations at different times for different tasks (e.g. an enclosed office one day and open space the next and a war room the next - all within the same office.) This means that nomadism is not only inter-office (travellers and teleworkers), but intra-office.

Many companie are beginning to rethink whether assigned seating makes the most sense. With the increasing price of commercial real-estate the modern corporation is always looking for ways to maximize office space of an ever growing business. Corporations attempt to divide up their resources in an efficient and effective manner. A new system that companies have begun using is called hotelling. Hotelling is a fairly recent idea which has begun to pop-up in many large corporations with travelling employees. The

idea stems from that of a hotel where employees must reserve their spot for a specified period of time.

How it works

Hotelling systems can vary from basic to high tech. The system generally works better when they are merged with the overall technology of the firm. Basically, the company uses a piece of software which keeps track of all of its resources. When employees arrive at work in the morning (or log in from home via the company intranet), they access the hotelling reservation software and log in using their unique user ID and password. They can then either reserve spaces by their name/number or, in some systems, by looking at a blueprint of the office and visually selecting a workspace. Once the reservation process is complete, a number of functions may be performed by the system including the routing of phone service to the workspace, the notification of an office "concierge" who prepares the workspace, etc. With many systems, workers are required to "check in" through a terminal connected to the reservations database when they arrive at the office.

Who uses it

Hotelling started and continues to predominantly appear in customer representative and consultant-based companies. This is because most of these companies' employees spend the majority of their time away from the office; thus, reducing the amount of office resources they need to occupy on a regular basis. This allows large firms to utilize the concept of hotelling.

Although hotelling started in consulting companies this does not mean that it is limited to these companies. According to experts, any company that has nomad workers is suited for hotelling. Any service-based business can also benefit from hotelling, and more than 50% of the U.S. economy today is service-based.

Virtual Office

Office types:

- Class A office space
- Back office
- Middle office
- Front office
- Mobile office
- Paperless office
- Serviced office
- Small office/home office

- **Virtual office**

A **virtual office** is a combination of off-site live communication and address services that allow users to reduce traditional office costs while maintaining business professionalism. Frequently the term is confused with “office business centers” or “executive suites” which demand a conventional lease whereas a true virtual office does not require that expense.

History

The virtual office idea came from the convergence of technological innovation and the Information Age. The concept has roots in the Industrial Revolution, where parallels to current work styles, specifically working from home, have been drawn. The term was first used in a 1983 airline in-flight magazine article about portable computing. The virtual office concept is an evolution of the executive suites industry. However, the inflexibility of an executive suite lease doesn’t work for many business models and helped spur the virtual office concept. The first commercial application of a virtual office occurred in 1994, when Ralph Gregory founded “The Virtual Office, Inc" now known as Intelligent Office, in Boulder, Colorado.

Services

The term “virtual office” implies space utilization, but a full application includes professional live communications.

1. **Communications Services**
    1. **Remote Receptionist** A team of workers in an office environment working remotely, using high-tech Computer Telephone Integration software, to replace a traditional receptionist.
    2. **Virtual Assistant** A virtual assistant is often a “lone eagle” working from home, who rarely meets their clients face-to-face. A virtual assistant typically has no access to CTI Software. Rates run $15 an hour and up.
    3. **Answering services/call centers** operate from a centralized location for the purpose of receiving and transmitting a large volume of requests by telephone. Users lament problems of security, impersonal staff with high turnover, language barriers, translation errors and a less-than-professional image.
    4. **Voicemail** is a low-cost technology that stores voice messages electronically. In customer service applications, voicemail has limitations. Used for customer service, voicemail has become synonymous with frustration. The complaints are legion and have inspired spoofs on the voicemail experience.
2. **Space Services**
    1. **Professional Address –** A prestigious building to be used as the business address. A professional address alleviates the privacy and personal

security concerns of running a home-based business. A user can expand into new markets by utilizing a provider with multiple locations to establish a professional presence in the desired growth markets.

2. **Mailing address –** The professional address can be used for accepting, sending & forwarding mail without the connotations of a PO Box. Under US law, a PO Box is to be clearly indicated and so not condusive for most corporate entities in this regard. Some VO providers offer 24/7 access to individually assigned and locked mailboxes. This allows the staff of a VO user to have a centralized location as a convenient vehicle for the secure transfer of paper documents 24/7. A mail-only provider may be subject to USPS CMRA regulations.
3. **Reception Courtesies –** Receptionists at the business address can receive and sign for incoming overnights, deliveries, packages and provide document drop-off/pick-up services. On-site witnesses and notaries may be available, depending on the provider.
4. **Business Meeting Space –** The on-demand use (hourly, daily or weekly) of conference rooms and offices for meetings.
5. **Casual Workspace –** As an alternative to the distractions of co-working or the interruptions of a home office, office space is available on an occasional or "drop-in" basis, either hourly, daily or monthly.
6. **Executive Suite –** A small percentage of VO users lease space full-time time.
7. **On-Site Amenities –** A full-service virtual office will provide broadband internet, fax-copier-printer, advanced phone features, conference calling, video conferencing, kitchenette and a business-worthy lobby/waiting area.

Users

A virtual office blends home and work to gain efficiencies in both. Office expenses are low, while the user's professionalism retains the image of a traditional, high-cost office. A virtual office user can reduce their environmental impact, as well as the personal negatives of a daily commute. Virtual office clientele have the flexibility to match expenses with revenue fluctuations immediately, as the costs are usually variable. A virtual office can allow for low-cost expansion with no long-term commitments. Users taking advantage of virtual office receptionists eliminate the traditional burden of health care, records, payroll, insurance & rent. Also, traditional time-off (sick days, vacations, personal leaves, etc…) does not apply to a virtual staff.

Common Virtual Office Users:

1. Home-based entrepreneurs
2. Accountants
3. Attorneys
4. Law Firms
5. Mobile salespeople

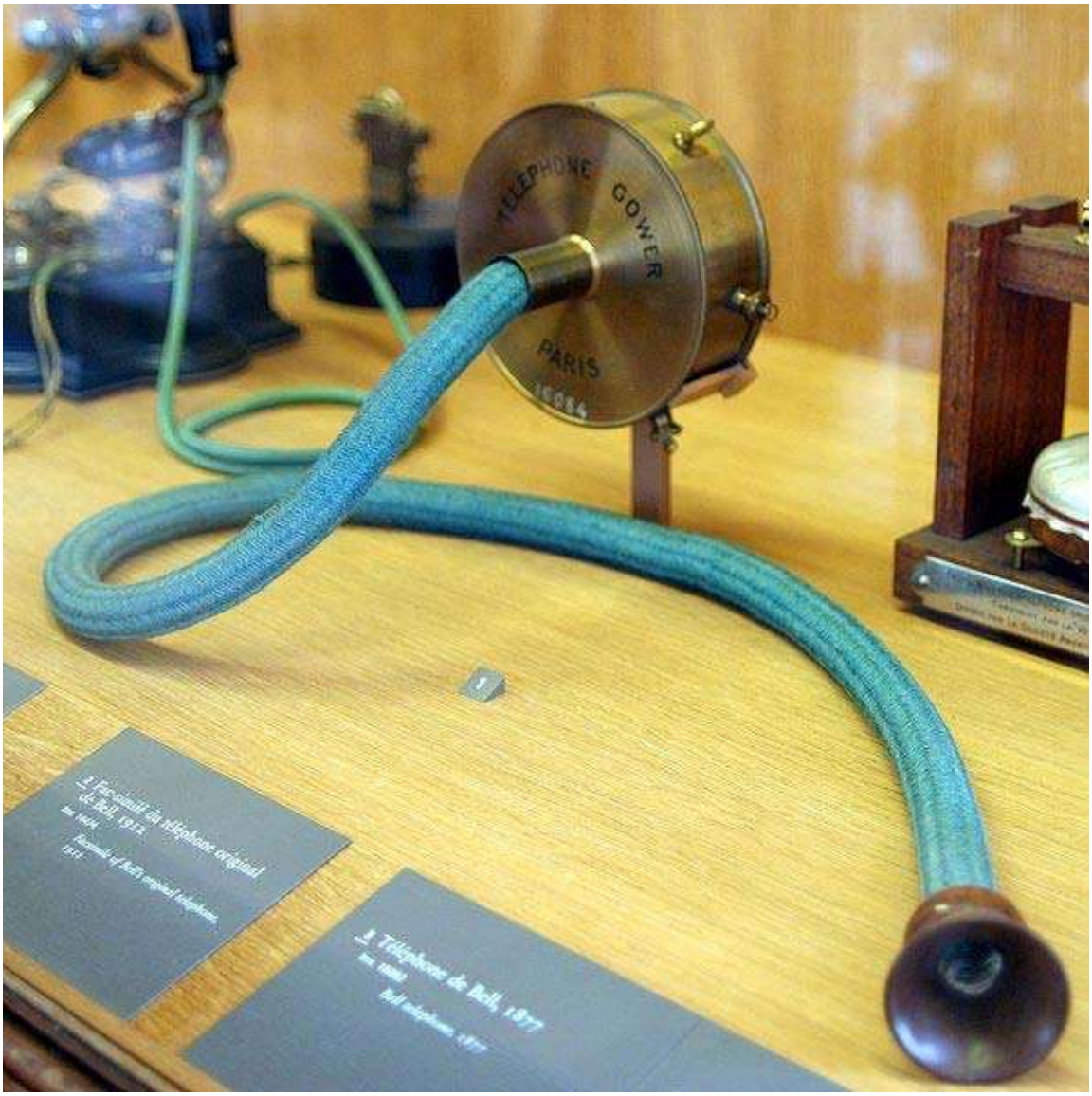
6. Trades (Home service industry: roofers, electrical, plumb, landscape, construction, repair/remodel, etc)
7. Doctors/Dentists
8. Therapists
9. Business consultants
10. Mediators/conflict resolution
11. Frequent travelers/foreign companies
12. Chambers of Commerce
13. Senior management
14. Real estate
15. mortgage companies
16. Stock brokers/financial planners
17. Collections agencies
18. Networking groups
19. Trainers/instructors
20. Incubators

Economy

Virtual offices are experiencing growth even in a recessionary economy, and not just in the United States. As businesses look to trim expenses, virtual office services help reduce overhead while keeping professionalism high. For example, by paying for space and communication infrastructure on an as-needed basis, businesses can keep office expenses to a minimum. The portability of today's technology also allows for a more flexible work environment. As businesses trend to a more "online" workplace, the notion of paying for space full-time becomes anachronistic. Traditional receptionists making $12-14/hour can be replaced with remote receptionist services at a fraction of the traditional cost.

Chapter- 5

Telecommunication



A Gower telephone, at the *Musée des Arts et Métiers* in Paris

Telecommunication is the transmission of messages, over significant distances, for the purpose of communication. In earlier times, telecommunications involved the use of visual signals, such as beacons, smoke, semaphore telegraphs, signal flags, and optical heliographs, or audio messages via coded drumbeats, lung-blown horns, or sent by loud whistles, for example. In the modern age of electricity and electronics, telecommunications now also includes the use of electrical devices such as telegraphs, telephones, and teletypes, the use of radio and microwave communications, as well as fiber optics and their associated electronics, plus the use of the orbiting satellites and the Internet.

The first breakthrough into modern electrical telecommunications came with the push to fully develop the telegraph starting in the 1830s. The use of these electrical means of communications exploded into use on all of the continents of the world during the 19th century, and these also connected the continents via cables on the floors of the ocean. The use of the first three popular systems of electrical telecommunications, the telegraph, telephone and teletype, all required the use of conducting metal wires.

A revolution in wireless telecommunications began in the first decade of the 20th century, with Guglielmo Marconi winning the Nobel Prize in Physics in 1909 for his pioneering developments in wireless radio communications. Other highly notable pioneering inventors and developers in the field of electrical and electronic telecommunications include Charles Wheatstone and Samuel Morse (telegraph), Alexander Graham Bell (telephone), Nikola Tesla, Edwin Armstrong, and Lee de Forest (radio), as well as John Logie Baird and Philo Farnsworth (television).

Telecommunications play an important role in the world economy and the worldwide telecommunication industry's revenue was estimated to be $3.85 trillion in 2008. The service revenue of the global telecommunications industry was estimated to be $1.7 trillion in 2008, and is expected to touch $2.7 trillion by 2013.

History

Early telecommunications

A replica of one of Chappe's semaphore towers in Nalbach

During the Middle Ages, chains of beacons were commonly used on hilltops as a means of relaying a signal. Beacon chains suffered the drawback that they could only pass a single bit of information, so the meaning of the message such as "the enemy has been sighted" had to be agreed upon in advance. One notable instance of their use was during the Spanish Armada, when a beacon chain relayed a signal from Plymouth to London that signaled the arrival of the Spanish warships.

In 1792, Claude Chappe, a French engineer, built the first fixed visual telegraphy system (or semaphore line) between Lille and Paris. However semaphore systems suffered from the need for skilled operators and the expensive towers at intervals of ten to thirty kilometers (six to twenty miles). As a result of competition from the electrical telegraph, the last commercial semaphore line was abandoned in 1880.

The telegraph and the telephone

The first commercial electrical telegraph was constructed by Sir Charles Wheatstone and Sir William Fothergill Cooke, and its use began on April 9, 1839. Both Wheatstone and Cooke viewed their device as "an improvement to the [already-existing, so-called] electromagnetic telegraph" not as a new device.

The businessman Samuel F.B. Morse and the physicist Joseph Henry of the United States developed their own, simpler version of the electrical telegraph, independently. Morse successfully demonstrated this system on September 2, 1837. Morse's most important technical contribution to this telegraph was the rather simple and highly efficient Morse Code, which was an important advance over complicated Wheatstone's telegraph system. The communications efficiency of the Morse Code anticipated that of the Huffman code in digital communications by over 100 years, but Morse had developed his code purely empirically, unlike Huffman, who gave a detailed theoretical explanation of how his method worked.

The first permanent transatlantic telegraph cable was successfully completed on 27 July 1866, allowing transatlantic electrical communication for the first time. An earlier transatlantic cable had operated for a few months in 1859, and among other things, it carried messages of greeting back and forth between President James Buchanan of the United States and Queen Victoria of the United Kingdom.

However, that transatlantic cable failed soon, and the project to lay a replacement line was delayed for five years by the American Civil War. Also, these transatlantic cables would have been completely incapable of carrying telephone calls even had the telephone already been invented. The first transatlantic telephone cable (which incorporated hundreds of electronic amplifiers) was not operational until 1956.

The conventional telephone now in use worldwide was first patented by Alexander Graham Bell in March 1876. That first patent by Bell was the *master patent* of the telephone, from which all other patents for electric telephone devices and features flowed. Credit for the invention of the electric telephone has been frequently disputed, and new controversies over the issue have arisen from time-to-time. As with other great inventions such as radio, television, the light bulb, and the digital computer, there were several inventors who did pioneering experimental work on *voice transmission over a wire*, and then they improved on each other's ideas. However, the key innovators were Alexander Graham Bell and Gardiner Greene Hubbard, who created the first telephone company, the Bell Telephone Company of the United States, which later evolved into American Telephone & Telegraph (AT&T).

The first commercial telephone services were set up in 1878 and 1879 on both sides of the Atlantic in the cities of New Haven, Connecticut, and London, England.

Radio and television

In 1832, James Lindsay gave a classroom demonstration of wireless telegraphy via conductive water to his students. By 1854, he was able to demonstrate a transmission across the Firth of Tay from Dundee, Scotland, to Woodhaven, a distance of about two miles (3 km), again using water as the transmission medium. In December 1901, Guglielmo Marconi established wireless communication between St. John's, Newfoundland and Poldhu, Cornwall (England), earning him the Nobel Prize in Physics for 1909, one which he shared with Karl Braun. However *small-scale* radio communication had already been demonstrated in 1893 by Nikola Tesla in a presentation before the National Electric Light Association.

On March 25, 1925, John Logie Baird of England was able to demonstrate the transmission of moving pictures at the Selfridge's department store in London, England. Baird's system relied upon the fast-rotating Nipkow disk, and thus it became known as the mechanical television. It formed the basis of experimental broadcasts done by the British Broadcasting Corporation beginning September 30, 1929. However, for most of the 20th century, television systems were designed around the cathode ray tube, invented by Karl Braun. The first version of such an electronic television to show promise was produced by Philo Farnsworth of the United States, and it was demonstrated to his family in Idaho on September 7, 1927.

Computer networks and the Internet

On 11 September 1940, George Stibitz was able to transmit problems using teletype to his Complex Number Calculator in New York and receive the computed results back at Dartmouth College in New Hampshire. This configuration of a centralized computer or mainframe computer with remote "dumb terminals" remained popular throughout the 1950s and into the 60's. However, it was not until the 1960s that researchers started to investigate packet switching — a technology that allows chunks of data to be sent between different computers without first passing through a centralized mainframe. A four-node network emerged on December 5, 1969. This network soon became the ARPANET, which by 1981 would consist of 213 nodes.

ARPANET's development centred around the Request for Comment process and on 7 April 1969, RFC 1 was published. This process is important because ARPANET would eventually merge with other networks to form the Internet, and many of the communication protocols that the Internet relies upon today were specified through the Request for Comment process. In September 1981, RFC 791 introduced the Internet Protocol version 4 (IPv4) and RFC 793 introduced the Transmission Control Protocol (TCP) — thus creating the TCP/IP protocol that much of the Internet relies upon today.

However, not all important developments were made through the Request for Comment process. Two popular link protocols for local area networks (LANs) also appeared in the 1970s. A patent for the token ring protocol was filed by Olof Soderblom on October 29, 1974, and a paper on the Ethernet protocol was published by Robert Metcalfe and David Boggs in the July 1976 issue of *Communications of the ACM*. The Ethernet protocol had been inspired by the ALOHAnet protocol which had been developed by electrical engineering researchers at the University of Hawaii.

Key concepts

A number of key concepts reoccur throughout the literature on modern telecommunication systems. Some of these concepts are discussed below.

Basic elements

A basic telecommunication system consists of three primary units that are always present in some form:

- A transmitter that takes information and converts it to a signal.
- A transmission medium, also called the "physical channel" that carries the signal. An example of this is the "free space channel".
- A receiver that takes the signal from the channel and converts it back into usable information.

For example, in a radio broadcasting station the station's large power amplifier is the transmitter; and the broadcasting antenna is the interface between the power amplifier and the "free space channel". The free space channel is the transmission medium; and the receiver's antenna is the interface between the free space channel and the receiver. Next, the radio receiver is the destination of the radio signal, and this is where it is converted from electricity to sound for people to listen to.

Sometimes, telecommunication systems are "duplex" (two-way systems) with a single box of electronics working as both a transmitter and a receiver, or a *transceiver*. For example, a cellular telephone is a transceiver. The transmission electronics and the receiver electronics in a transceiver are actually quite independent of each other. This can be readily explained by the fact that radio transmitters contain power amplifiers that operate with electrical powers measured in the watts or kilowatts, but radio receivers deal with radio powers that are measured in the microwatts or nanowatts. Hence, transceivers have to be carefully designed and built to isolate their high-power circuitry and their low-power circuitry from each other.

Telecommunication over telephone lines is called point-to-point communication because it is between one transmitter and one receiver. Telecommunication through radio broadcasts is called broadcast communication because it is between one powerful transmitter and numerous low-power but sensitive radio receivers.

Telecommunications in which multiple transmitters and multiple receivers have been designed to cooperate and to share the same physical channel are called multiplex systems.

Analog or digital communications?

Communications signals can be either by analog signals or digital signals. There are analog communication systems and digital communication systems. For an analog signal, the signal is varied continuously with respect to the information. In a digital signal, the information is encoded as a set of discrete values (for example, a set of ones and zeros). During the propagation and reception, the information contained in analog signals will inevitably be degraded by undesirable physical noise. (The output of a transmitter is noise-free for all practical purposes.) Commonly, the noise in a communication system can be expressed as adding or subtracting from the desirable signal in a completely random way. This form of noise is called ***"additive noise"***, with the understanding that the noise can be negative or positive at different instants of time. Noise that is not additive noise is a much more difficult situation to describe or analyze, and these other kinds of noise will be omitted here.

On the other hand, unless the *additive noise* disturbance exceeds a certain threshold, the information contained in digital signals will remain intact. Their resistance to noise represents a key advantage of digital signals over analog signals.

Communications networks

A communications network is a collection of transmitters, receivers, and communications channels that send messages to one another. Some digital communications networks contain one or more routers that work together to transmit information to the correct user. An analog communications network consists of one or more switches that establish a connection between two or more users. For both types of network, repeaters may be necessary to amplify or recreate the signal when it is being transmitted over long distances. This is to combat attenuation that can render the signal indistinguishable from the noise.

Communication channels

The term "channel" has two different meanings. In one meaning, a channel is the physical medium that carries a signal between the transmitter and the receiver. Examples of this include the atmosphere for sound communications, glass optical fibers for some kinds of optical communications, coaxial cables for communications by way of the voltages and electric currents in them, and free space for communications using visible light, infrared waves, ultraviolet light, and radio waves. This last channel is called the "free space channel". The sending of radio waves from one place to another has nothing to do with the presence or absence of an atmosphere between the two. Radio waves travel through a perfect vacuum just as easily as they travel through air, fog, clouds, or any other kind of gas besides air.

The other meaning of the term "channel" in telecommunications is seen in the phrase communications channel, which is a subdivision of a transmission medium so that it can be used to send multiple streams of information simultaneously. For example, one radio station can broadcast radio waves into free space at frequencies in the neighborhood of 94.5 MHz (megahertz) while another radio station can simultaneously broadcast radio waves at frequencies in the neighborhood of 96.1 MHz. Each radio station would transmit radio waves over a frequency bandwidth of about 180 kHz (kilohertz), centered at frequencies such as the above, which are called the "carrier frequencies". Each station in this example is separated from its adjacent stations by 200 kHz, and the difference between 200 kHz and 180 kHz (20 kHz) is an engineering allowance for the imperfections in the communication system.

In the example above, the "free space channel" has been divided into communications channels according to frequencies, and each channel is assigned a separate frequency bandwidth in which to broadcast radio waves. This system of dividing the medium into channels according to frequency is called "frequency-division multiplexing" (**FDM**).

Another way of dividing a communications medium into channels is to allocate each sender a recurring segment of time (a "time slot", for example, 20 milliseconds out of each second), and to allow each sender to send messages only within its own time slot. This method of dividing the medium into communication channels is called "time-division multiplexing" (**TDM**), and is used in optical fiber communication. Some radio communication systems use TDM within an allocated FDM channel. Hence, these systems use a hybrid of TDM and FDM.

Modulation

The shaping of a signal to convey information is known as modulation. Modulation can be used to represent a digital message as an analog waveform. This is commonly called "keying" - a term derived from the older use of Morse Code in telecommunications - and several keying techniques exist (these include phase-shift keying, frequency-shift keying, and amplitude-shift keying). The "Bluetooth" system, for example, uses phase-shift keying to exchange information between various devices. In addition, there are combinations of phase-shift keying and amplitude-shift keying which is called (in the jargon of the field) "quadrature amplitude modulation" (QAM) that are used in high-capacity digital radio communication systems.

Modulation can also be used to transmit the information of low-frequency analog signals at higher frequencies. This is helpful because low-frequency analog signals cannot be effectively transmitted over free space. Hence the information from a low-frequency analog signal must be impressed into a higher-frequency signal (known as the "carrier wave") before transmission. There are several different modulation schemes available to achieve this [two of the most basic being amplitude modulation (AM) and frequency modulation (FM)]. An example of this process is a disc jockey's voice being impressed into a 96 MHz carrier wave using frequency modulation (the voice would then be

received on a radio as the channel "96 FM"). In addition, modulation has the advantage of being about to use frequency division multiplexing (FDM).

Society and telecommunication

Telecommunication has a significant social, cultural. and economic impact on modern society. In 2008, estimates placed the telecommunication industry's revenue at $3.85 trillion (USD) or just under 3.0 percent of the gross world product (official exchange rate). The following sections discuss the impact of telecommunication on society.

Economic impact

Microeconomics

On the microeconomic scale, companies have used telecommunications to help build global business empires. This is self-evident in the case of online retailer Amazon.com but, according to academic Edward Lenert, even the conventional retailer Wal-Mart has benefited from better telecommunication infrastructure compared to its competitors. In cities throughout the world, home owners use their telephones to organize many home services ranging from pizza deliveries to electricians. Even relatively-poor communities have been noted to use telecommunication to their advantage. In Bangladesh's Narshingdi district, isolated villagers use cellular phones to speak directly to wholesalers and arrange a better price for their goods. In Côte d'Ivoire, coffee growers share mobile phones to follow hourly variations in coffee prices and sell at the best price.

Macroeconomics

On the macroeconomic scale, Lars-Hendrik Röller and Leonard Waverman suggested a causal link between good telecommunication infrastructure and economic growth. Few dispute the existence of a correlation although some argue it is wrong to view the relationship as causal.

Because of the economic benefits of good telecommunication infrastructure, there is increasing worry about the inequitable access to telecommunication services amongst various countries of the world—this is known as the digital divide. A 2003 survey by the International Telecommunication Union (ITU) revealed that roughly one-third of countries have fewer than one mobile subscription for every 20 people and one-third of countries have fewer than one land-line telephone subscription for every 20 people. In terms of Internet access, roughly half of all countries have fewer than one out of 20 people with Internet access. From this information, as well as educational data, the ITU was able to compile an index that measures the overall ability of citizens to access and use information and communication technologies. Using this measure, Sweden, Denmark and Iceland received the highest ranking while the African countries Nigeria, Burkina Faso and Mali received the lowest.

Social impact

Telecommunication has played a significant role in social relationships. Nevertheless' devices like the telephone system were originally advertised with an emphasis on the practical dimensions of the device (such as the ability to conduct business or order home services) as opposed to the social dimensions. It was not until the late 1920s and 1930s that the social dimensions of the device became a prominent theme in telephone advertisements. New promotions started appealing to consumers' emotions, stressing the importance of social conversations and staying connected to family and friends.

Since then the role that telecommunications has played in social relations has become increasingly important. In recent years, the popularity of social networking sites has increased dramatically. These sites allow users to communicate with each other as well as post photographs, events and profiles for others to see. The profiles can list a person's age, interests, sexuality and relationship status. In this way, these sites can play important role in everything from organising social engagements to courtship.

Prior to social networking sites, technologies like SMS and the telephone also had a significant impact on social interactions. In 2000, market research group Ipsos MORI reported that 81% of 15 to 24 year-old SMS users in the United Kingdom had used the service to coordinate social arrangements and 42% to flirt.

Other impacts

In cultural terms, telecommunication has increased the public's ability to access to music and film. With television, people can watch films they have not seen before in their own home without having to travel to the video store or cinema. With radio and the Internet, people can listen to music they have not heard before without having to travel to the music store.

Telecommunication has also transformed the way people receive their news. A survey by the non-profit Pew Internet and American Life Project found that when just over 3,000 people living in the United States were asked where they got their news "yesterday", more people said television or radio than newspapers. The results are summarised in the following table (the percentages add up to more than 100% because people were able to specify more than one source).

Local TV	National TV	Radio	Local paper	Internet	National paper
59%	47%	44%	38%	23%	12%

Telecommunication has had an equally significant impact on advertising. TNS Media Intelligence reported that in 2007, 58% of advertising expenditure in the United States was spent on mediums that depend upon telecommunication. The results are summarised in the following table.

	Internet	Radio	Cable TV	Syndi-cated TV	Spot TV	Net-work TV	News-paper	Maga-zine	Out-door	Total
Percent	7.6%	7.2%	12.1%	2.8%	11.3%	17.1%	18.9%	20.4%	2.7%	100%
Dollars	$11.31 billion	$10.69 billion	$18.02 billion	$4.17 billion	$16.82 billion	$25.42 billion	$28.22 billion	$30.33 billion	$4.02 billion	$149 billion

Telecommunication and government

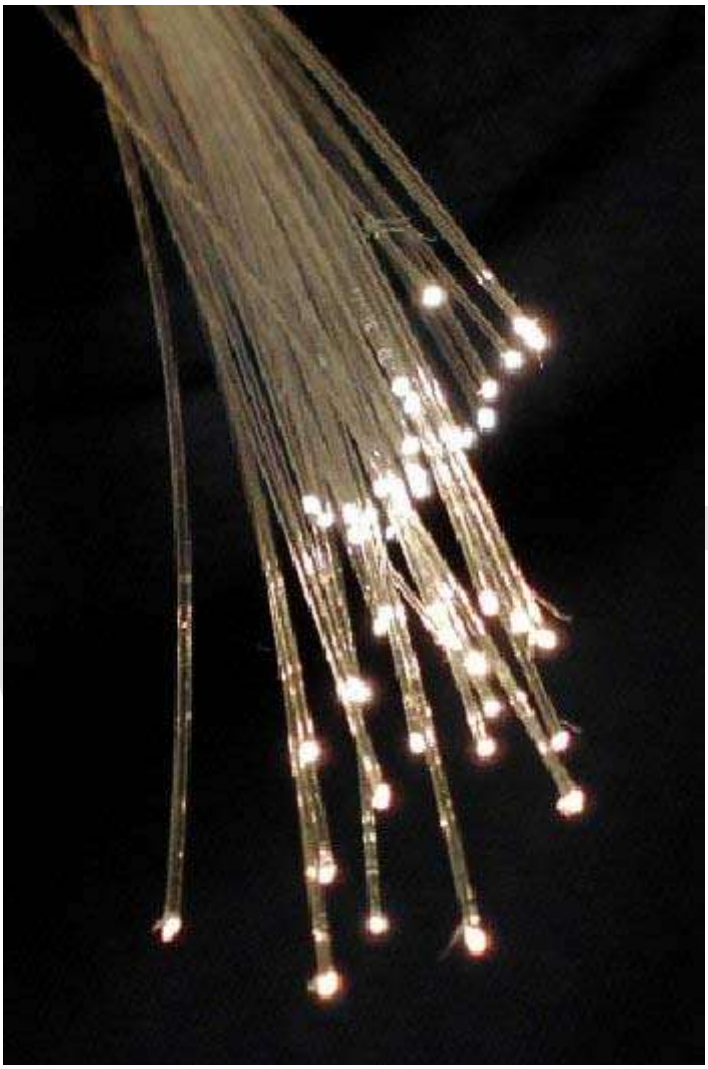
Many countries have enacted legislation which conform to the *International Telecommunication Regulations* establish by the International Telecommunication Union (ITU), which is the "leading United Nations agency for information and communication technology issues." In 1947, at the Atlantic City Conference, the ITU decided to "afford international protection to all frequencies registered in a new international frequency list and used in conformity with the Radio Regulation." According to the ITU's *Radio Regulations* adopted in Atlantic City, all frequencies referenced in the *International Frequency Registration Board*, examined by the board and registered on the *International Frequency List* "shall have the right to international protection from harmful interference."

From a global perspective, there have been political debates and legislation regarding the management of telecommunication and broadcasting. The history of broadcasting discusses some of debates in relation to balancing conventional communication such as printing and telecommunication such as radio broadcasting. The onset of World War II brought on the first explosion of international broadcasting propaganda. Countries, their governments, insurgents, terrorists, and militiamen have all used telecommunication and broadcasting techniques to promote propaganda. Patriotic propaganda for political movements and colonization started the mid 1930s. In 1936, the BBC did broadcast propaganda to the Arab World to partly counter similar broadcasts from Italy, which also had colonial interests in North Africa.

Modern insurgents, such as those in the latest Iraq war, often use intimidating telephone calls, SMSs and the distribution of sophisticated videos of an attack on coalition troops within hours of the operation. "The Sunni insurgents even have their own television station, Al-Zawraa, which while banned by the Iraqi government, still broadcasts from Erbil, Iraqi Kurdistan, even as coalition pressure has forced it to switch satellite hosts several times."

Modern operation

Telephone



Optical fiber provides cheaper bandwidth for long distance communication

In an analog telephone network, the caller is connected to the person he wants to talk to by switches at various telephone exchanges. The switches form an electrical connection between the two users and the setting of these switches is determined electronically when the caller dials the number. Once the connection is made, the caller's voice is transformed to an electrical signal using a small microphone in the caller's handset. This electrical signal is then sent through the network to the user at the other end where it is transformed back into sound by a small speaker in that person's handset. There is a separate electrical connection that works in reverse, allowing the users to converse.

The fixed-line telephones in most residential homes are analog — that is, the speaker's voice directly determines the signal's voltage. Although short-distance calls may be

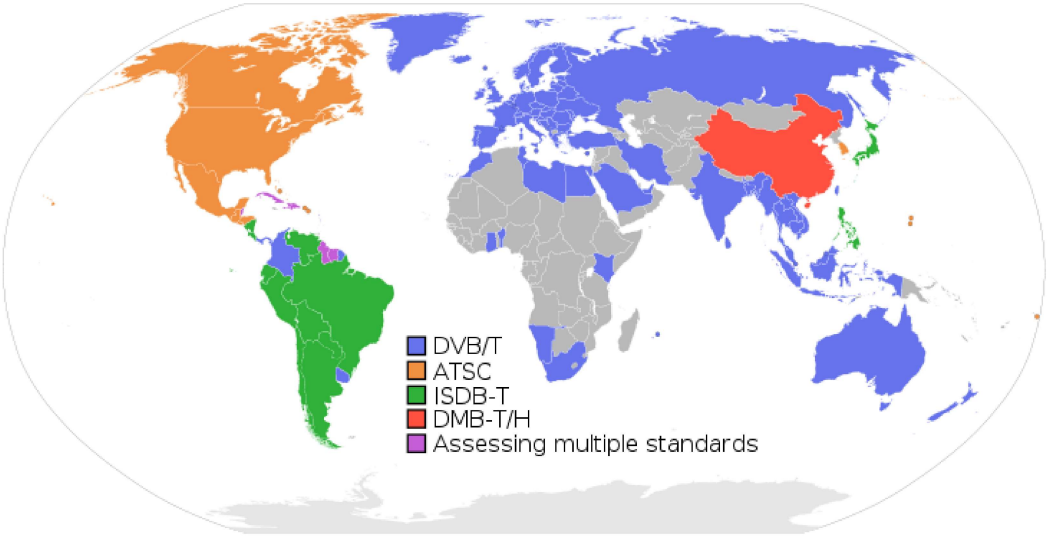
handled from end-to-end as analog signals, increasingly telephone service providers are transparently converting the signals to digital for transmission before converting them back to analog for reception. The advantage of this is that digitized voice data can travel side-by-side with data from the Internet and can be perfectly reproduced in long distance communication (as opposed to analog signals that are inevitably impacted by noise).

Mobile phones have had a significant impact on telephone networks. Mobile phone subscriptions now outnumber fixed-line subscriptions in many markets. Sales of mobile phones in 2005 totalled 816.6 million with that figure being almost equally shared amongst the markets of Asia/Pacific (204 m), Western Europe (164 m), CEMEA (Central Europe, the Middle East and Africa) (153.5 m), North America (148 m) and Latin America (102 m). In terms of new subscriptions over the five years from 1999, Africa has outpaced other markets with 58.2% growth. Increasingly these phones are being serviced by systems where the voice content is transmitted digitally such as GSM or W-CDMA with many markets choosing to depreciate analog systems such as AMPS.

There have also been dramatic changes in telephone communication behind the scenes. Starting with the operation of TAT-8 in 1988, the 1990s saw the widespread adoption of systems based on optic fibres. The benefit of communicating with optic fibers is that they offer a drastic increase in data capacity. TAT-8 itself was able to carry 10 times as many telephone calls as the last copper cable laid at that time and today's optic fibre cables are able to carry 25 times as many telephone calls as TAT-8. This increase in data capacity is due to several factors: First, optic fibres are physically much smaller than competing technologies. Second, they do not suffer from crosstalk which means several hundred of them can be easily bundled together in a single cable. Lastly, improvements in multiplexing have led to an exponential growth in the data capacity of a single fibre.

Assisting communication across many modern optic fibre networks is a protocol known as Asynchronous Transfer Mode (ATM). The ATM protocol allows for the side-by-side data transmission mentioned in the second paragraph. It is suitable for public telephone networks because it establishes a pathway for data through the network and associates a traffic contract with that pathway. The traffic contract is essentially an agreement between the client and the network about how the network is to handle the data; if the network cannot meet the conditions of the traffic contract it does not accept the connection. This is important because telephone calls can negotiate a contract so as to guarantee themselves a constant bit rate, something that will ensure a caller's voice is not delayed in parts or cut-off completely. There are competitors to ATM, such as Multiprotocol Label Switching (MPLS), that perform a similar task and are expected to supplant ATM in the future.

Radio and television



Digital television standards and their adoption worldwide

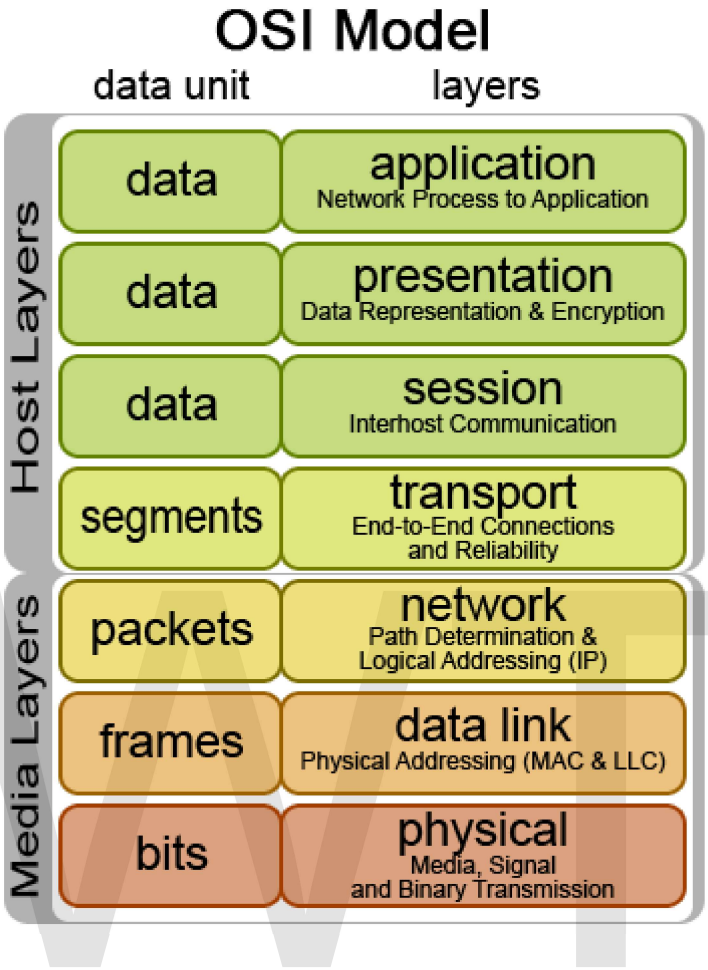
In a broadcast system, the central high-powered broadcast tower transmits a high-frequency electromagnetic wave to numerous low-powered receivers. The high-frequency wave sent by the tower is modulated with a signal containing visual or audio information. The receiver is then tuned so as to pick up the high-frequency wave and a demodulator is used to retrieve the signal containing the visual or audio information. The broadcast signal can be either analog (signal is varied continuously with respect to the information) or digital (information is encoded as a set of discrete values).

The broadcast media industry is at a critical turning point in its development, with many countries moving from analog to digital broadcasts. This move is made possible by the production of cheaper, faster and more capable integrated circuits. The chief advantage of digital broadcasts is that they prevent a number of complaints with traditional analog broadcasts. For television, this includes the elimination of problems such as snowy pictures, ghosting and other distortion. These occur because of the nature of analog transmission, which means that perturbations due to noise will be evident in the final output. Digital transmission overcomes this problem because digital signals are reduced to discrete values upon reception and hence small perturbations do not affect the final output. In a simplified example, if a binary message 1011 was transmitted with signal amplitudes [1.0 0.0 1.0 1.0] and received with signal amplitudes [0.9 0.2 1.1 0.9] it would still decode to the binary message 1011 — a perfect reproduction of what was sent. From this example, a problem with digital transmissions can also be seen in that if the noise is great enough it can significantly alter the decoded message. Using forward error correction a receiver can correct a handful of bit errors in the resulting message but too much noise will lead to incomprehensible output and hence a breakdown of the transmission.

In digital television broadcasting, there are three competing standards that are likely to be adopted worldwide. These are the ATSC, DVB and ISDB standards; the adoption of these standards thus far is presented in the captioned map. All three standards use MPEG-2 for video compression. ATSC uses Dolby Digital AC-3 for audio compression, ISDB uses Advanced Audio Coding (MPEG-2 Part 7) and DVB has no standard for audio compression but typically uses MPEG-1 Part 3 Layer 2. The choice of modulation also varies between the schemes. In digital audio broadcasting, standards are much more unified with practically all countries choosing to adopt the Digital Audio Broadcasting standard (also known as the Eureka 147 standard). The exception being the United States which has chosen to adopt HD Radio. HD Radio, unlike Eureka 147, is based upon a transmission method known as in-band on-channel transmission that allows digital information to "piggyback" on normal AM or FM analog transmissions.

However, despite the pending switch to digital, analog television remains being transmitted in most countries. An exception is the United States that ended analog television transmission (by all but the very low-power TV stations) on 12 June 2009 after twice delaying the switchover deadline. For analog television, there are three standards in use for broadcasting color TV. These are known as PAL (British designed), NTSC (North American designed), and SECAM (French designed). (It is important to understand that these are the ways from sending color TV, and they do not have anything to do with the standards for black & white TV, which also vary from country to country.) For analog radio, the switch to digital radio is made more difficult by the fact that analog receivers are sold at a small fraction of the price of digital receivers. The choice of modulation for analog radio is typically between amplitude modulation (**AM**) or frequency modulation (**FM**). To achieve stereo playback, an amplitude modulated subcarrier is used for stereo FM.

The Internet



The OSI reference model

The Internet is a worldwide network of computers and computer networks that can communicate with each other using the Internet Protocol. Any computer on the Internet has a unique IP address that can be used by other computers to route information to it. Hence, any computer on the Internet can send a message to any other computer using its IP address. These messages carry with them the originating computer's IP address allowing for two-way communication. The Internet is thus an exchange of messages between computers.

As of 2008, an estimated 21.9% of the world population has access to the Internet with the highest access rates (measured as a percentage of the population) in North America (73.6%), Oceania/Australia (59.5%) and Europe (48.1%). In terms of broadband access, Iceland (26.7%), South Korea (25.4%) and the Netherlands (25.3%) led the world.

The Internet works in part because of protocols that govern how the computers and routers communicate with each other. The nature of computer network communication lends itself to a layered approach where individual protocols in the protocol stack run more-or-less independently of other protocols. This allows lower-level protocols to be

customized for the network situation while not changing the way higher-level protocols operate. A practical example of why this is important is because it allows an Internet browser to run the same code regardless of whether the computer it is running on is connected to the Internet through an Ethernet or Wi-Fi connection. Protocols are often talked about in terms of their place in the OSI reference model (pictured on the right), which emerged in 1983 as the first step in an unsuccessful attempt to build a universally adopted networking protocol suite.

For the Internet, the physical medium and data link protocol can vary several times as packets traverse the globe. This is because the Internet places no constraints on what physical medium or data link protocol is used. This leads to the adoption of media and protocols that best suit the local network situation. In practice, most intercontinental communication will use the Asynchronous Transfer Mode (ATM) protocol (or a modern equivalent) on top of optic fibre. This is because for most intercontinental communication the Internet shares the same infrastructure as the public switched telephone network.

At the network layer, things become standardized with the Internet Protocol (IP) being adopted for logical addressing. For the World Wide Web, these "IP addresses" are derived from the human readable form using the Domain Name System. At the moment, the most widely used version of the Internet Protocol is version four but a move to version six is imminent.

At the transport layer, most communication adopts either the Transmission Control Protocol (TCP) or the User Datagram Protocol (UDP). TCP is used when it is essential every message sent is received by the other computer where as UDP is used when it is merely desirable. With TCP, packets are retransmitted if they are lost and placed in order before they are presented to higher layers. With UDP, packets are not ordered or retransmitted if lost. Both TCP and UDP packets carry port numbers with them to specify what application or process the packet should be handled by. Because certain application-level protocols use certain ports, network administrators can manipulate traffic to suit particular requirements. Examples are to restrict Internet access by blocking the traffic destined for a particular port or to affect the performance of certain applications by assigning priority.

Above the transport layer, there are certain protocols that are sometimes used and loosely fit in the session and presentation layers, most notably the Secure Sockets Layer (SSL) and Transport Layer Security (TLS) protocols. These protocols ensure that the data transferred between two parties remains completely confidential and one or the other is in use when a padlock appears in the address bar of your web browser. Finally, at the application layer, are many of the protocols Internet users would be familiar with such as HTTP (web browsing), POP3 (e-mail), FTP (file transfer), IRC (Internet chat), BitTorrent (file sharing) and OSCAR (instant messaging).

Local Area Networks and Wide Area Networks

Despite the growth of the Internet, the characteristics of local area networks ("LANs" - computer networks that do not extend beyond a few kilometers in size) remain distinct. This is because networks on this scale do not require all the features associated with larger networks and are often more cost-effective and efficient without them. When they are not connected with the Internet, they also have the advantages of privacy and security. However, purposefully lacking a direct connection to the Internet will not provide 100% protection of the LAN from hackers, military forces, or economic powers. These threats exist if there are any methods for connecting remotely to the LAN.

There are also independent wide area networks ("WANs" - private computer networks that can and do extend for thousands of kilometers.) Once again, some of their advantages include their privacy, security, and complete ignoring of any potential hackers - who cannot "touch" them. Of course, prime users of private LANs and WANs include armed forces and intelligence agencies that *must* keep their information completely secure and secret.

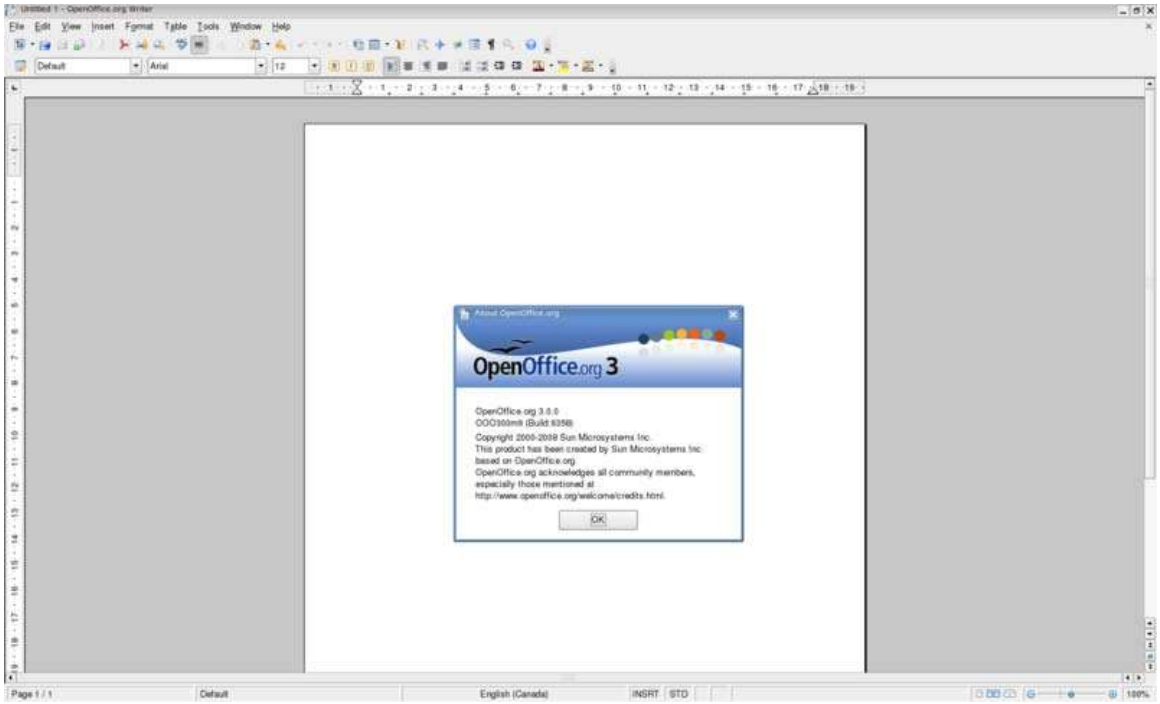
In the mid-1980s, several sets of communication protocols emerged to fill the gaps between the data-link layer and the application layer of the OSI reference model. These included Appletalk, IPX, and NetBIOS with the dominant protocol set during the early 1990s being IPX due to its popularity with MS-DOS users. TCP/IP existed at this point, but it was typically only used by large government and research facilities.

As the Internet grew in popularity and a larger percentage of traffic became Internet-related, LANs and WANs gradually moved towards the TCP/IP protocols, and today networks mostly dedicated to TCP/IP traffic are common. The move to TCP/IP was helped by technologies such as DHCP that allowed TCP/IP clients to discover their own network address — a function that came standard with the AppleTalk/ IPX/ NetBIOS protocol sets.

It is at the data-link layer, though, that most modern LANs diverge from the Internet. Whereas Asynchronous Transfer Mode (ATM) or Multiprotocol Label Switching (MPLS) are typical data-link protocols for larger networks such as WANs; Ethernet and Token Ring are typical data-link protocols for LANs. These protocols differ from the former protocols in that they are simpler (e.g. they omit features such as Quality of Service guarantees) and offer collision prevention. Both of these differences allow for more economical systems. Despite the modest popularity of IBM token ring in the 1980s and 90's, virtually all LANs now use either wired or wireless Ethernets. At the physical layer, most wired Ethernet implementations use copper twisted-pair cables (including the common 10BASE-T networks). However, some early implementations used heavier coaxial cables and some recent implementations (especially high-speed ones) use optical fibers. When optic fibers are used, the distinction must be made between multimode fibers and single-mode fiberes. Multimode fibers can be thought of as thicker optical fibers that are cheaper to manufacture devices for but that suffers from less usable bandwidth and worse attenuation - implying poorer long-distance performance.

Chapter- 6

Office Suite



OpenOffice.org Writer is an example of a word processor

In computing, an **office suite**, sometimes called an **office software suite** or **productivity suite** is a collection of programs intended to be used by knowledge workers. The components are generally distributed together, have a consistent user interface and usually can interact with each other, sometimes in ways that the operating system would not normally allow.

Typical office suite components

- Word processor
- Spreadsheet
- Presentation program
- Notetaking
- Graphics suite
- Formula editor
- Database
- Communication
- Project management software
- Desktop publishing
- Personal information manager
- HTML editor
- Groupware

program

software
- Portable Document Format export
- Email client

- Web log analysis software

Multi-platform office suites

Freeware suites

- IBM Lotus Symphony — based upon an older version of OpenOffice.org. Its components include Documents, Spreadsheets, and Presentations. For Microsoft Windows, Linux and Mac OS X.

Open source suites

- Go-oo - OpenOffice.org variant with a number of enhancements similar to the Novell Edition but freely available. It has better support for Office Open XML (MS Office 2007) file formats than the official OpenOffice.org releases produced by Oracle, and other enhancements that have not yet been accepted into the upstream Oracle version.
- KOffice — free and open-source office suite.
- OpenOffice.org — an open-source software project upon which Sun's StarOffice is based. The initial code was provided by Sun Microsystems, based on the Star Office package by German company, Star Division, which it had previously acquired. Sun has provided much of the labour for its development since. Its components include Writer, Impress, Math, Draw, Calc, and Base. Releases are available for Microsoft Windows, GNU/Linux, Mac OS X and Solaris. As Sun was purchased by Oracle, OpenOffice.org is now under Oracle's ownership.
- OpenOffice.org Novell Edition — features the Office Open XML translator add-on. Based upon OpenOffice.org. Its components include Writer, Impress, Math, Draw, Calc, and Base.
- Gnome Office - Consists of AbiWord, Gnumeric and other software. Some of the applications are cross-platform, others are currently Linux only.
- Siag Office - A lightweight office suite. Has not been updated recently, and is Unix-like only.

Proprietary suites

- Kingsoft Office (Chinese version known as *WPS Office*) — a native Chinese-language office suite. English and Japanese versions are currently available also. For Microsoft Windows and some versions are available also for Linux.

- SoftMaker Office 2010 — a word processor, spreadsheet and presentation graphics program, provided by a German company. For Microsoft Windows, Linux, Windows Mobile, and Windows CE. Softmaker 2006 is a free download for Windows.
- StarOffice — an office suite from Sun Microsystems. Originally developed by the German firm Star Division, which Sun acquired. Early versions shared code with OpenOffice.org project, which Sun funded and continues to support, but there has been separate development of the two packages. For Windows, Linux, Mac OS X, Solaris.

Office suites for Microsoft Windows

Freeware suites

- IBM Lotus Symphony — Freeware word, spreadsheet and presentation suite.
- SoftMaker Office 2006
- WPS Office — The Chinese version is available for free if used non-commercially

Open source suites

- GNOME Office
- KOffice — free and open-source, native for Windows since version 2.0
- OpenOffice.org
    - OpenOffice.org Novell Edition

Proprietary suites

- Ability Office
- Breadbox Office — DOS software, but has been successfully tested with Win3.x, Win95/98/98SE/ME, WinNT4.0, Win2000 and the 32bit-versions of WinXP, WinVista and Win7.0.
- Celframe Office — supports Microsoft Office and other popular file formats, with a user interface styled on Microsoft Office 2003.
- EasyOffice
- EIOffice (Evermore Integrated Office) — a Chinese / English / Japanese / French language integrated office suite. Available for Windows / Linux operating systems
- Framework — historical but also still supported for Windows by the present developer, Selection & Functions Inc.
- Gobe Productive — Originally written for BeOS by developers of the original ClarisWorks, GoBe Productive is a lightweight integrated Works-like office suite with a generous "Hassle-Free License."
- Joffice Office suite fully implemented in Java
- Ichitaro JUST Suite 2008 — a full Japanese-language suite from JustSystems, the most direct competitor to Microsoft Office in Japan. For Windows only.

- Kingsoft Office (Chinese version known as *WPS Office*) — a native Chinese-language office suite. English and Japanese versions are currently available also.
- IBM Lotus SmartSuite — For Windows 2000 and XP only
- Microsoft Office
- Microsoft Works
- SoftMaker Office 2010
- StarOffice
- WordPerfect Office

Office suites for DOS

Proprietary suites

- Breadbox Office — A word processor, spreadsheet, address book and drawing program. It is part of a broader software package called Breadbox Ensemble which also includes programs such as email, web-browser and html editor. Breadbox Ensemble runs under the GEOS (16-bit operating system) and effectively requires a version of DOS to be installed on the host system.

Office suites for Mac OS X

Freeware suites

- IBM Lotus Symphony 1.2.1 — freeware word, spreadsheet and presentation suite.

Open source suites

- KOffice — free and open-source, native support since version 2.0
- NeoOffice — NeoOffice is a Mac-specific free/open-source software development project dedicated to integrating OpenOffice.org with native features of Mac OS X as well as other enhancements that give the suite a more "Mac-like" look and feel.
- OpenOffice.org runs on Mac natively in an Aqua version.

Proprietary suites

- iWork — Apple Inc.'s Mac-only office suite. Includes Pages, for word-processing, Numbers for spreadsheets, and Keynote, for presentations. iWork replaces the now-discontinued AppleWorks suite.
- MarinerPak — MarinerPak includes Mariner Write, a fully-featured word processor, and Mariner Calc, a fully-featured Spreadsheet application.
- Microsoft Office for Mac — Microsoft's office suite for Mac operating systems. The current version is a universal binary that supports both PowerPC- and Intel-based Macs. Prior editions ran on PowerPC systems and Intel based systems using Rosetta.

- Microsoft Works — 4.0 is the last version for Mac.
- StarOffice — Sun's supported version of OpenOffice.org added support for Intel-based Mac OS X systems with StarOffice 9.

Office suites for Unix/Unix-like operating systems

Free software suites

- AUIS — an office suite developed by Carnegie Mellon University and named after Andrew Carnegie.
- GNOME Office — includes AbiWord, Gnumeric and GNOME-DB data access components. It is a part of the GNOME environment for the X Window System (on Linux, the BSDs, and other Unix-like operating systems).
- Jambo OpenOffice — a Swahili version of OpenOffice.org.
- KOffice — free, open-source and cross-platform, integrated office suite for KDE.
- MagyarOffice and EuroOffice — Hungarian and European multilingual commercial office suites based on OpenOffice.org
- Siag Office — a free office suite for Unix systems. Primarily written by programmer Ulric Erikkson, with contributions from other authors. Includes a word processor, a spreadsheet, and an animation program.

Proprietary suites

- IBM Lotus Symphony — freeware word, spreadsheet and presentation suite.

Online office suites

Freeware suites

- Google Docs — an AJAX-based online office suite from Google, Inc. The suite includes a word processor, a spreadsheet program, and a presentation editor. Available free and as an enterprise service.

Open source suites

- Feng Office (formerly OpenGoo) — an open source, fully featured online office suite. The application can be downloaded and installed on a server.

Proprietary suites

- ContactOffice
- ShareOffice — a Web-based office suite from ShareMethods. This suite utilizes separate word processing, spreadsheet, and presentation applications from other vendors. It is distributed through Salesforce.com's AppExchange program.

- Simdesk — an online office suite from Simdesk Technologies, Inc. This suite offers partial compatibility with the Microsoft Office file formats (Word, Excel, and Powerpoint). With a monthly subscription to Simdesk Services (costing $3.50 – $20 per month), one is allowed to install the application anywhere.
- ThinkFree Office — an office suite written in Java, from ThinkFree, Inc. It includes a word processor (Write), a spreadsheet (Calc), and a presentation program (Show). For Microsoft Windows, Linux, and Mac OS X.
- Zoho Office Suite — a free online office suite from AdventNet, Inc. Includes a word processor, spreadsheet, presentations, and collaboration groupware.

Comparison of general and technical information

The following tables compare general and technical information for a number of office suites. Please see the individual products' articles for further information. The table only includes systems that are widely used and currently available.

Operating system support

The operating systems the office suites were designed to run on without emulation; for the given office suite/OS combination, there are five possibilities:

- *No* indicates that it does not exist or was never released.
- *Partial* indicates that while the office suite works, it lacks important functionality compared to versions for other OSs; it is still being developed however.
- *Beta* indicates that while a version of the office suite is fully functional and has been released, it is still in development (e.g. for stability).
- *Yes* indicates that the office suite has been officially released in a fully functional, stable version.
- *Dropped* indicates that while the office suite works, new versions are no longer being released for the indicated OS; the number in parentheses is the last known stable version which was officially released for that OS.

Please note that the list is not exhaustive, but rather reflects the most common operating systems today.

Office suite	Windows	Mac OS X	Linux	BSD	Unix
Ability Office	Yes	No	No	No	No
Celframe Office	Yes	with plugins	Some (with Wine)	No	No
Feng Office Community Edition	Fully online	Fully online	Fully online	Fully online	Fully online
GNOME Office	yes	yes	Yes	Yes	Yes
Gobe Productive	Yes	No	No	No	No
Google Apps	Fully online	Fully online	Fully online	Fully online	Fully online
Breadbox Office	DOS,	No	No	No	No

	Windows				
IBM Lotus Symphony	Yes	Yes	Yes	*?*	*?*
iWork	No	Yes	No	No	No
Kingsoft Office (WPS Office)	Yes	No	some versions	No	No
KOffice	Yes	Yes	Yes	Yes	Yes
Lotus SmartSuite	Yes	No	No	No	No
MarinerPak	No	Yes	No	No	No
Microsoft Office	Yes	Yes (no support for VBA in Excel)	Some (with Wine)	No	No
Microsoft Works	Yes	Dropped (4.0; Classic only)	No	No	No
NeoOffice	No	Mac OS X v10.3 or above	No	No	No
OpenOffice.org	Yes	Yes	Yes	Yes	Yes
ShareOffice	Fully online	Fully online	Fully online	Fully online	Fully online
SoftMaker Office	Yes	No	Yes	Dropped (2006)	No
StarOffice	Yes	Yes (Intel only)	Yes	Yes	Yes
ThinkFree Office	Fully online	Fully online	Fully online	Fully online	Fully online
WordPerfect Office	Yes	No	Some (Ver. 2000)	No	No
ZCubes	Fully online	Fully online	Fully online	Fully online	Fully online
Zoho	Fully online	Fully online	Fully online	Fully online	Fully online
Office suite	**Windows**	**Mac OS X**	**Linux**	**BSD**	**Unix**

Main components

Online capabilities

	E-mail client	HTML editor	Collaborative software	Online editing
Ability Office	No	No	No	No
Celframe Office	Celframe Mail	Celframe Publishing, Celframe Write Inbuilt	Google Docs, plugin in all apps	Celframe Office Online - 2011
Feng Office Community Edition	beta	No	Yes	Yes
GNOME Office	Evolution	No	No	No
GobeProductive	No	Yes	No	No
Google Apps	Gmail	Google Sites	Yes	fully online
Breadbox Office	Yes	Yes	No	No
IBM Lotus Symphony	No	No	No	No

iWork	No	No	iWork.com in beta	iWork.com
Kingsoft Office (WPS Office)	No	No	No	Yes
KOffice	Kontact	Quanta+	No	No
Lotus SmartSuite	No	Lotus FastSite	Yes	No
MarinerPak	No	No	No	No
Microsoft Office	Microsoft Outlook, Microsoft Entourage	Microsoft SharePoint Designer	Microsoft Groove	Microsoft Office Live
Microsoft Works	No	No	No	Microsoft Office Live
NeoOffice	No	NeoOffice Writer	No	No
OpenOffice.org	No	OpenOffice.org Writer	No	With free plugins
ShareOffice	No	No	Yes	Fully online
SoftMaker Office	No	No	No	No
StarOffice	No	StarWriter	No	With free plugins
ThinkFree Office	No	Note	No	ThinkFree.com
WordPerfect Office	WordPerfect MAIL	No	No	Yes
ZCubes	No	Yes	Yes	Yes
Zoho Office Suite	Zoho Mail	Zoho Writer	Yes	Yes
	E-mail client	**HTML editor**	**Collaborative software**	**Online editing**

Unicode support

Not all office suites support Unicode; some have restricted Unicode support or, like Corel WordPerfect Office, use their own encoding standard.

Historical

- AppleWorks (previously known as "ClarisWorks") — an early Mac Office suite. It has morphed and branched into AppleWorks and GoBe Productive. When the original developers split up, ClarisWorks continued as AppleWorks after being bought by Apple, and GoBeProductive was redeveloped from the ground up using ideas from the original. Apple discontinued this suite after the release of iWork '08 in August 2007.
- IBM Works — was an office suite for the IBM OS/2 operating system. It included word processing, spreadsheet, database and PIM applications.
- Island Office was available in the 1990s on many Unix platforms. This included Island Write, Draw, Paint, Presents, Calc, Chart, Table and Equation. Island Draw was, at the time, an extremely powerful PostScript editor. The company that created this software was/is called Island Software.

- Lotus Symphony — Following the popularity of office suites made by competitors, the makers of the wildly popular Lotus 123, tried their hand at a suite for DOS. (Name resurrected by IBM in September 2007 as IBM Lotus Symphony)
- Lotus Jazz — Mac sister product to Lotus Symphony.
- LotusWorks — DOS and Windows suite containing a word processor, spreadsheet, database, graphing tools and telecommunications (modem terminal) module.
- Open Access — Integrated software by Software Products International (SPI).
- Q&A (software) — Featured a database management system, "intelligent assistant", and integrated word processor.
- WindowWorks — Successor to LotusWorks above.
- Xoom Office — Historical but still available on eBay and elsewhere. Produced by the former makers of WordStar.

Chapter- 7

Outsourcing

Outsourcing or **sub-servicing** often refers to the process of contracting to a third-party. While outsourcing may be viewed as a component to the growing division of labor encompassing all societies, the term did not enter the English-speaking lexicon until the 1980s. Since the 1980s, transnational corporations have increased subcontracting across national boundaries. In the United States, outsourcing is a popular political issue.

Overview

A precise definition of outsourcing has yet to be agreed upon. Thus, the term is used inconsistently. However, outsourcing is often viewed as involving the contracting out of a business function - commonly one previously performed in-house - to an external provider. In this sense, two organizations may enter a contractual agreement involving an exchange of services and payments. Of recent concern is the ability of businesses to outsource to suppliers outside the nation, sometimes referred to as offshoring or offshore outsourcing (which are odd terms because doing business with another country does not mean you have to go offshore) In addition, several related terms have emerged to grasp various aspects of the complex relationship between economic organizations or networks, such as nearshoring, multisourcing and strategic outsourcing. Almost any conceivable business practice can be outsourced for any number of stated reasons. The implications of outsourcing objectively and subjectively vary across time and space.

Reasons

Organizations that outsource are seeking to realize benefits or address the following issues:

- Cost savings — The lowering of the overall cost of the service to the business. This will involve reducing the scope, defining quality levels, re-pricing, re-negotiation, cost re-structuring. Access to lower cost economies through offshoring called "labor arbitrage" generated by the wage gap between industrialized and developing nations.
- Focus on Core Business — Resources (for example investment, people, infrastructure) are focused on developing the core business. For example often organizations outsource their IT support to specialised IT services companies.

- Cost restructuring — Operating leverage is a measure that compares fixed costs to variable costs. Outsourcing changes the balance of this ratio by offering a move from fixed to variable cost and also by making variable costs more predictable.
- Improve quality — Achieve a steep change in quality through contracting out the service with a new service level agreement.
- Knowledge — Access to intellectual property and wider experience and knowledge.
- Contract — Services will be provided to a legally binding contract with financial penalties and legal redress. This is not the case with internal services.
- Operational expertise — Access to operational best practice that would be too difficult or time consuming to develop in-house.
- Access to talent — Access to a larger talent pool and a sustainable source of skills, in particular in science and engineering.
- Capacity management — An improved method of capacity management of services and technology where the risk in providing the excess capacity is borne by the supplier.
- Catalyst for change — An organization can use an outsourcing agreement as a catalyst for major step change that cannot be achieved alone. The outsourcer becomes a Change agent in the process.
- Enhance capacity for innovation — Companies increasingly use external knowledge service providers to supplement limited in-house capacity for product innovation.
- Reduce time to market — The acceleration of the development or production of a product through the additional capability brought by the supplier.
- Commodification — The trend of standardizing business processes, IT Services, and application services which enable to buy at the right price, allows businesses access to services which were only available to large corporations.
- Risk management — An approach to risk management for some types of risks is to partner with an outsourcer who is better able to provide the mitigation.
- Venture Capital — Some countries match government funds venture capital with private venture capital for start-ups that start businesses in their country.
- Tax Benefit — Countries offer tax incentives to move manufacturing operations to counter high corporate taxes within another country.
- Scalability — The outsourced company will usually be prepared to manage a temporary or permanent increase or decrease in production.
- Creating leisure time — Individuals may wish to outsource their work in order to optimise their work-leisure balance.

Specific examples of corporate outsourcing

There are situations when a firm may consider outsourcing some of its R&D work to a contract research organizations or universities. In this context, the two most populous countries in the world, China and India, provide huge pools from which to find talent. Both countries produce over 200,000 engineers and science graduates each year. Moreover both countries are low cost sourcing countries.

Outsourcing in the information technology field has two meanings. One is to commission the development of an application to another organization, usually a company that specializes in the development of this type of application. The other is to hire the services of another company to manage all or parts of the services that otherwise would be rendered by an IT unit of the organization. The latter concept might not include development of new applications.

Implications

Management, the corporation and consumers

Quality risk

Quality risk is the propensity for a product or service to be defective, due to operations-related issues. Quality risk in outsourcing is driven by a list of factors. One such factor is opportunism by suppliers due to misaligned incentives between buyer and supplier, information asymmetry, high asset specificity, or high supplier switching costs. Other factors contributing to quality risk in outsourcing are poor buyer-supplier communication, lack of supplier capabilities/resources/capacity, or buyer-supplier contract enforceability. Two main concepts must be considered when considering observability as it related to quality risks in outsourcing: the concepts of testability and criticality.

Quality fade is the deliberate and secretive reduction in the quality of labor in order to widen profit margins. The downward changes in human capital are subtle but progressive, and usually unnoticeable by the out sourcer/customer. The initial interview meets requirements, however, with subsequent support, more and more of the support team are replaced with novice or less experienced workers. Some IT shops will continue to reduce the quality of human capital, under the pressure of drying up labor supply and upward trend of salary, pushing the quality limits. Such practices are hard to detect, as customers may just simply give up seeking help from the help desk. However, the overall customer satisfaction will be reduced greatly over time. Unless the company constantly conducts customer satisfaction surveys, they may eventually be caught in a surprise of customer churn, and when they find out the root cause, it could be too late. In such cases, it can be hard to dispute the legal contract with the outsourcing company, as their staff are now trained in the process and the original staff made redundant. In the end, the company that outsources may find that it is worse off than before it outsourced its workforce.

Quality of service

Quality of service is measured through a service level agreement (SLA) in the outsourcing contract. In poorly defined contracts there is no measure of quality or SLA defined. Even when an SLA exists it may not be to the same level as previously enjoyed. This may be due to the process of implementing proper objective measurement and

reporting which is being done for the first time. It may also be lower quality through design to match the lower price.

There are a number of stakeholders who are affected and there is no single view of quality. The CEO may view the lower quality acceptable to meet the business needs at the right price. The retained management team may view quality as slipping compared to what they previously achieved. The end consumer of the service may also receive a change in service that is within agreed SLAs but is still perceived as inadequate. The supplier may view quality in purely meeting the defined SLAs regardless of perception or ability to do better.

Quality in terms of end-user-experience is best measured through customer satisfaction questionnaires which are professionally designed to capture an unbiased view of quality. Surveys can be one of research. This allows quality to be tracked over time and also for corrective action to be identified and taken.

Productivity

Offshore outsourcing for the purpose of saving cost can often have a negative influence on the real productivity of a company. Rather than investing in technology to improve productivity, companies gain non-real productivity by hiring fewer people locally and outsourcing work to less productive facilities offshore that appear to be more productive simply because the workers are paid less. Sometimes, this can lead to strange contradictions where workers in a developing country using hand tools can appear to be more productive than a U.S. worker using advanced computer controlled machine tools, simply because their salary appears to be less in terms of U.S. dollars.

In contrast, increases in real productivity are the result of more productive tools or methods of operating that make it possible for a worker to do more work. Non-real productivity gains are the result of shifting work to lower paid workers, often without regards to real productivity. The net result of choosing non-real over real productivity gain is that the company falls behind and obsoletes itself overtime rather than making investments in real productivity.

Staff turnover

The staff turnover of employee who originally transferred to the outsourcer is a concern for many companies. Turnover is higher under an outsourcer and key company skills may be lost with retention outside of the control of the company. In outsourcing offshore there is an issue of staff turnover in the outsourcer companies call centers. It is quite normal for such companies to replace its entire workforce each year in a call center. This inhibits the build-up of employee knowledge and keeps quality at a low level.

Language skills

In the area of call centers end-user-experience is deemed to be of lower quality when a service is outsourced. This is exacerbated when outsourcing is combined with off-shoring to regions where the first language and culture are different. The questionable quality is particularly evident when call centers that service the public are outsourced and offshored.

The public generally find linguistic features such as accents, word use and phraseology different which may make call center agents difficult to understand. The visual clues that are present in face-to-face encounters are missing from the call center interactions and this also may lead to misunderstandings and difficulties. In addition to language and accent differences, a lack of local social and geographic knowledge is often present, leading to misunderstandings or mis-communications.

Failure to deliver business transformation

Business transformation promised by outsourcing suppliers often fails to materialize. In a commoditised market where many service providers can offer savings of time and money, smart vendors have promised a second wave of benefits that will improve the client's business outcomes. According to Vinay Couto of Booz & Company "Clients always use the service provider's ability to achieve transformation as a key selection criterion. It's always in the top three and sometimes number one." While failure is sometimes attributed to vendors overstating their capabilities, Couto points out that clients are sometimes unwilling to invest in transformation once an outsourcing contract is in place.

Security

Before outsourcing an organization is responsible for the actions of all their staff and liable for their actions. When these same people are transferred to an outsourcer they may not change desk but their legal status has changed. They no-longer are directly employed or responsible to the organization. This causes legal, security and compliance issues that need to be addressed through the contract between the client and the suppliers. This is one of the most complex areas of outsourcing and requires a specialist third party adviser.

Fraud is a specific security issue that is criminal activity whether it is by employees or the supplier staff. However, it can be disputed that the fraud is more likely when outsourcers are involved, for example credit card theft when there is scope for fraud by credit card cloning. In April 2005, a high-profile case involving the theft of $350,000 from four Citibank customers occurred when call center workers acquired the passwords to customer accounts and transferred the money to their own accounts opened under fictitious names. Citibank did not find out about the problem until the American customers noticed discrepancies with their accounts and notified the bank.

Qualifications of outsourcers

The outsourcer may replace staff with less qualified people or with people with different non-equivalent qualifications.

In the engineering discipline there has been a debate about the number of engineers being produced by the major economies of the United States, India and China. The argument centers around the definition of an engineering graduate and also disputed numbers. The closest comparable numbers of annual graduates of four-year degrees are United States (137,437) India (112,000) and China (351,537).

Company knowledge

Outsourcing could lead to communication problems with transferred employees. For example, before a transfer the staff has access to broadcast company e-mail that informs them of new products, procedures etc. An outsourcing organization may not have the same e-mail access available to them. To reduce costs, outsourced employees may have new information delivered to them in team meetings.

Public opinion

There is a strong public opinion in the United States against outsourcing (especially when combined with offshoring) because it leads to job displacement. It is difficult to dispute that outsourcing has a detrimental effect on individuals who face job disruption and employment insecurity. However, outsourcing supporters draw on mainstream economics to argue that outsourcing should bring down prices, providing greater economic benefit to all. There are legal protections in the European Union regulations called the Transfer of Undertakings (Protection of Employment). Labor laws in the United States are not as protective as those in the European Union. On June 26, 2009, Jeff Immelt, the CEO of General Electric, called for the United States to increase its manufacturing base employment to 20% of the workforce commenting that the U.S. has outsourced too much and can no longer rely on consumer spending to drive demand.

Standpoint of labor

From the standpoint of labor outsourcing may represent a new threat, contributing to rampant worker insecurity, and reflective of the general process of globalization. While the "outsourcing" process may provide benefits in some form and to some degree it may undermine the ability of labor to resist unwanted changes in the workplace. For example, a corporation may outsource a division of the company to a service provider, that may retain the workforce on worse conditions or discharge them in the short term.

By country

United States

'Outsourcing' became a popular political issue in the United States during the 2004 U.S. presidential election. The political debate centered on outsourcing's consequences for the domestic U.S. workforce. Democratic U.S. presidential candidate John Kerry criticized U.S. firms that outsource jobs abroad or that incorporate overseas in tax havens to avoid paying their "fair share" of U.S. taxes during his 2004 campaign, calling such firms "Benedict Arnold corporations".

Criticism of outsourcing, from the perspective of U.S. citizens, by-and-large, revolves around the costs associated with transferring control of the labor process to an external entity in another country. A Zogby International poll conducted in August 2004 found that 71% of American voters believed that “outsourcing jobs overseas” hurt the economy while another 62% believed that the U.S. government should impose some legislative action against companies that transfer domestic jobs overseas, possibly in the form of increased taxes on companies that outsource. One given rationale is the extremely high corporate income tax rate in the U.S. relative to other OECD nations, and the practice of taxing revenues earned outside of U.S. jurisdiction, a very uncommon practice. However, outsourcing is not solely a U.S. phenomenon as corporations in various nations with low tax rates outsource as well, which means that high taxation can only partially, if at all, explain US outsourcing. For example, the amount of corporate outsourcing in 1950 would be considerably lower than today, yet the tax rate was actually higher in 1950.

It is argued that lowering the corporate income tax and ending the double-taxation of foreign-derived revenue (taxed once in the nation where the revenue was raised, and once from the U.S.) will alleviate corporate outsourcing and make the U.S. more attractive to foreign companies. However, while the US has a high official tax rate, the actual taxes paid by US corporations may be considerably lower due to the use of tax loopholes, tax havens, and attempts to "game the system". Rather than avoiding taxes, outsourcing may be mostly driven by the desire to lower labor costs. Sarbanes-Oxley has also been cited as a factor for corporate flight from U.S. jurisdiction.