Future Labor Markets - Technology Assessment

INFOSYS224 – Strategic Computing and Communications Technology – Hal Varian
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Introduction and Historical Background

Labor markets result from the relationships between the population, labor force, technology, and the demand for goods and services. Population directly limits the size of the labor force, which in turn constrains how many products and services can be produced. Demand for various goods and services determines employment in the industries providing them. Technology enables increased production of goods and services, but often makes obsolete various methods of producing goods and services. Examining the past and projecting changes in these relationships enables one to make a prediction of the future labor markets.

From the earliest times – humans were in constant search of food, shelter, and basic necessities for survival. Early human societies operated as hunter gatherers, with little material possessions, and little organizational structure or planning for the future. As humans gained generational experience, societies developed tools, efficient hunting methods, and, eventually, agricultural technologies. Agricultural production enabled societies to amass a stable food supply, which in turn spiked population growth and further enabled the development of more sophisticated technologies and organizational structures. The result was a stratification of society based on divisions of labor and economic productivity.

Technology has always played a key role in the development of labor markets. Technological development has made life much easier for society from a production and communications standpoint. The advent of the industrial revolution and mechanized production was a key inflexion point that increased labor market productivity and population growth. Notable inventions such as the printing press, the combustion engine, radio, telephone, and transportation technologies have directly enabled increased industrial productivity and transformed labor markets from goods-producing to service-producing. The long-term shift from goods-producing to service-producing employment is expected to continue.

Globalization is a main driver of how labor markets are being defined. In the 1980s and 1990s, workers from China, India and the former Soviet bloc entered the global labor pool, with their economies suddenly joining the global system of production and consumption. In 2000, China, India, and former USSR countries contributed 1.47 billion workers to the global labor pool – effectively doubling the size of the world's now connected workforce. These new entrants to the global economy brought little capital with them. Having twice as many workers and nearly the same amount of capital places great pressure on labor markets throughout the world. This pressure will affect workers in the developing countries who had traditionally participated in the global economy, as well as workers in developed countries. By 2010, China will graduate more PhDs in science and engineering than the United States. The huge number of highly educated workers in India and China threatens to undo the traditional pattern of trade between developed and less developed countries. Historically, developed countries have innovated

high-tech products that require high-wage educated workers and extensive R&D, whereas developing countries have specialized in old manufacturing products. The reason for this was that the developed countries had a near monopoly on scientists and engineers and other highly educated workers.

Today, most major multinationals have R&D centers in China or India, and hence the locus of technological advance may shift. Certainly, the rate of technological catch-up will grow, reducing the lead of advanced countries over the lower wage developing countries. It is predicted that if the work is digital – which covers perhaps 10% of employment in the United States – it can and eventually will be off-shored to low-wage highly educated workers in developing countries. The entry of China, India and the former Soviet bloc to the global capitalist economy is a turning point in economic history. For the first time, the vast majority of humans will operate under market capitalism, with access to the most modern technology.

Economics - How do the differences and dynamics in economies affect labor?

The majority of workers in most developed economies are engaged in wage and salaried employment. By contrast, the majority in the developing economies of sub-Saharan Africa and Asia continue to work as self-employed workers and contributing family workers. Falling within these two categories is the bulk of workers in the agricultural sector and the informal economy in low-income, developing countries. A country with a sizeable self-employed workforce typically has low growth levels in formal sector employment and widespread poverty.

The number and proportion of full-time employees with contracts of indeterminate duration has decreased constantly in developed countries since the mid-1980s. As labor markets have become more flexible, the forms of work have multiplied. Part-time workers and workers with fixed-term turn into on-call and self-employed workers. Common to almost all OECD countries is that part-timers are mainly women.

There is a stark contrast between the gap in female and male employment-to-population ratios in developed economies (where the gap was 16 percent in 2004) and in less developed regions. For example, in the Middle East, North Africa, and South Asia, the difference in the employment ratios between the sexes has reached 40 percent, whereas in Latin America and the Caribbean, the difference is almost 30 percent.

Demographics - how do constraints on human workers affect labor?

It is important to note trends in the labor force age groups across the world. In Europe, the 18- to 65-year-old age group has stopped growing and is about to decline. The amount of people aged 18 to 65 equaled approximately 463 million in 2000 and this number is expected to fall back to 343 million in 2050, but will not move very much between 2000 and 2015: the expected number of people in that age group is 463 million in 2015. This contrasts with the situation for North America and the Far East, where labor force growth is expected to continue, albeit at a slower pace than these regions have become used to. In North America, the labor force is expected to grow by 65 million

individuals to 260 million between 2000 and 2050. Until 2015, expected growth is 30 million. The Asian labor force is expected to stop growing only around 2050, rising from 2.1 billion in 2000 to approximately 3.2 billion in the steady state.[1]

 In areas where the labor force is expected to contract, such a condition may be kept at bay by structural changes in social security systems. Broad discussions to raise the legal pension age are already underway in the countries for which the demographic situation is acute. Also, in countries with structurally high unemployment or a sizeable part of the potential labor force disabled, the shrinking labor force may provide stronger incentives to do something about it. For example, maintaining disability insurance at current levels will probably be unaffordable. This will likely mean lower benefits, increasing the incentives for people to leave the social security system and get back to work. Nevertheless, the current pace of social security reform is such that it may take a long time before these measures will have an effect on the labor force.

Industry – What are the sector-specific perspectives on labor?

Since different industries follow different business models, their labor needs can vary greatly. In addition, some industries require highly skilled workers with specialized talents while other industries have relatively simpler but repetitive tasks. Labor sourcing trends in industry can be divided into either goods or services. In the goods sector we will examine the following: software, construction and manufacturing. In the service sector: financial institutions, information technology (IT) services, and the hospitality industry will be examined. By examining the various industries, we can gain a better understanding of popular labor sourcing models and how they are being utilized.

Typical construction contractors today do not have a large in-house supply of skilled or unskilled workers. "The growth in the practice of outsourcing labor has allowed large companies to effectively divorce themselves from the physical work of construction and concentrate on service functions: The large enterprises which are responsible for a significant share of construction output are increasingly removed from the construction site and construction workers. The subcontractors and labor contractors who are now the main employers of the construction workforce are small, sometimes very small firms."[2]

As a result of the increase in outsourcing, many unskilled laborers are experiencing rising concerns about job security. Since many unskilled laborers are only employed when a project is available, they are faced with the daily challenge of finding work.

Construction has traditionally been seen as an entry point into the workforce for uneducated or less educated workers. In addition, many skilled tasks such as carpentry or welding have traditionally been family trades. Unfortunately with increasing standards of living and higher rates of education, many of the younger generation are shunning the trades. The lower levels of entrants into this field are not replenishing the loss in the workforce due to aging and retirement.

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[1] World Population Prospeccts: the 2006 Revision, United Nations Department of Economic and Social Affairs, Population Division, 2006, *available at:* http://www.un.org/esa/population/publications/wpp2006/wpp2006.htm (last visited 19 March 2007).
[2] Press release, International Labour Organization, 6 December 2001, *available at:* http://www.ilo.org/public/english/bureau/inf/pr/2001/52.htm (last visited 19 March 2007).

With the increase in globalization and improvements in technology, it is easier for software companies to outsource on a global scale. As a result, the cheaper and equally effective laborers in less developed countries are perfect sources for the burgeoning software market. By allowing processes such as programming and software development to be outsourced to other countries, companies in the U.S. run the risk of losing their core competencies. Many software companies are only now beginning to realize that while allowing engineers in China and India to perform the coding and implementation for their products might be cheaper in the short-run, the long-term effects could be disastrous.

In the manufacturing field, outsourcing and offshoring are still popular forms of labor sourcing. The construction, operations and maintenance costs of a production facility in developing countries can cost half as much as in the U.S. As a result, there is a great desire to open such manufacturing plants in the less developed areas of the world. However, one of the dangers in such a move is that many of the locations where labor is cheap also tend to be politically unstable. Aside from the typical risks that a manufacturing plant could have in the U.S., a plant in China for example would be exposed to legal, political, currency and cultural risks as well.

In the services sector, many financial institutions such as consultancy firms and banks are increasingly outsourcing their back-office type activities to firms that specialize in such services. One such example is Exigen, a business process solutions provider that specializes in working with financial services companies. One of its solutions is a customizable Web-based imaging system to digitize, store, and distribute documents as a managed service. In light of the increasing security concerns and pressures for transparency by the Securities Exchange Commission (SEC), companies are learning that outsourcing their filing systems to companies such as Exigen are a good idea. The idea of business processes outsourcing (BPO) not only allows for lower costs, it also allows for transference of some risks. Most common forms of BPO include: call centers, human resources management, accounting and payroll outsourcing.[3]

Many IT services firm are learning that there is increasing value and viability in using remote programming resources. In many companies, offshore outsourcing is imperative because of the cost and quality benefits. While the benefits of offshoring have been established as mentioned above, the drawbacks are also evident. While the offshore outsourcing trend is still prevalent, there is an emerging trend in crowdsourcing. With crowdsourcing, not only is it cheaper for IT firms to gain innovative ideas, the solutions provided have a greater connection with the consumer.[4] We will discuss crowdsourcing, and its sister crowdcasting, in the second half of this paper.

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[3] Bruce McCracken, Transforming a Financial Services Firm's Back Office, Outsourcing Center, 2004, *available at:* http://www.outsourcing-insurance.com/backoffice.html (last visited 19 March 2007); for some background on Business Process Outsourcing, see the Wikipedia article on the subject: Business process outsourcing,
http://en.wikipedia.org/w/index.php?title=Business_process_outsourcing&oldid=116241767 (last visited March 20, 2007).
[4] Stephanie Moore, IT Trends 2004: Offshore Outsourcing, Giga Research, 17 December 2003, *available at:* http://www.satyam.com/homenews/documents/it2004_giga.pdf (last visited 19 March 2007).

Technology – How does technology change how work is done?

Because of its explosive growth in the last 100 years, technology's impact on labor sourcing and structuring has been more profound than in earlier civilizations. Often whole new markets, and with them new labor models, are created by new technologies, such as aeronautic engineers with the invention of the airplane, computer programmers with the advent of the computer, and, more recently, various online-only businesses with the rise of broadband Internet. The aforementioned technologies also affect other, non-related markets: (1) airplanes allow hiring, interviewing, and transportation of employees, as well as other physical capital, across the world, (2) computers are used to organize and speed up business operations, and (3) the Internet serves as the fast and inexpensive means of communication for digital information and goods. For example, computers were a main contributor to the 30-50% growth of skilled workers between 1970 and 1995 in various industries.[5] But in the last ten years probably no technology had a greater impact on businesses and the labor market than the Internet.

The Internet and its applications, including email, career websites, instant messaging (IM), blogging, voice-over-IP (VOIP), search engines, remote desktop connections, VPN, and others, have had a tremendous impact in the way labor is sourced and structured. For example, careerbuilder.com, which gets 8 million visits from potential employees and employers per month,[6] is a major forum for finding jobs and employees. As for structuring, VPNs (virtual private networks) allow employees to connect to company servers from anywhere in the world, allowing them to work at home, even if they permanently or temporarily reside in another country. Aside from changing the labor models in various industries, the Internet also created millions of jobs, from web analysts to Internet businesses such as amazon.com. Last but not least, it provides a valuable source of information, helping employees and employers find the right match faster and at low costs.

In the last few years, several trends in Internet usage and applications implicate even greater impacts ahead in our future. Internet penetration is now 17% worldwide, doubling in the last 6 years.[7] This rise is expected to continue and may grow from 1.1 billion to 3.6 billion users in the next decade,[8] an over 300% increase. Its spread will be especially remarkable in developing nations such as India and China, whose broadband penetration rates are significantly lower than ones in developed nations. Over half of the world's labor force will be able to utilize the Internet for finding jobs and, for the new computer literate generations, to actually work online. In addition to increased access, the speed and functionality of the Internet will improve as well. Advancing features, like VOIP, secure VPN, and videoconferencing are vital for online businesses and freelancers working on the Internet, but these features require broadband connections. However,

[5] Autor, D.H., Katz, L.F., Krueger, A.B., Computing Inequality: Have Computers Changed the Labor Market?, Princeton University Industrial Relations Section Working Paper #377, March 1997, *available at:* http://www.irs.princeton.edu/pubs/pdfs/377.pdf (last visited 19 March 2007).

[6] Press release, "Social Networking Sites Continue to Attract Record Numbers as Myspace.Com Surpasses 50 Million U.S. Visitors in May", ComScore Networks, 15 June 2006, *available at:* http://www.comscore.com/press/release.asp?press=906 (last visited 19 March 2007).

[7] A compilation of Internet usage statistics is here: http://www.internetworldstats.com/stats.htm (last visited 19 March 2007).

[8] See AMD's 50x15 effort: http://50x15.amd.com/en-us/about.aspx (last visited 19 March 2007).

broadband Internet is still not ubiquitous, with only 180 million subscribers (about 20%) in the countries of the OECD, which includes the most developed countries in the world, such as Germany, USA, and Japan.[9] We can therefore expect the access to broadband, and hence the features enabling a person to work online, to spread to the labor force all over the world in the next decade. This will naturally result in an increased emergence of online businesses, online jobs, and slowly remove the restrictions of location when it comes to finding and utilizing talent.

In addition to these increases in wired broadband deployment and penetration, we also expect wireless broadband to make significant advances. Wireless networking holds many practical advantages compared to wired networks. As mobile phone network providers have learned, wireless networking doesn't require the expensive deployment of equipment and cabling to individual subscribers. Further, scaling up to meet increased usage is usually as easily as adding new wireless network access points. As evidence of this, there are many of municipal wireless network deployments up and running or under development.[10] Much as we've seen "leap frogging" events in developing countries,[11] we also expect developing countries to be able to easily provide service to urban populations through municipal-grade wireless installations and by providing cheap computing resources and low-cost computing solutions.[12]

In addition to these increases in wired and wireless broadband networking, we expect mobile computing platforms to become substantially more capable. Rich mobile computing experiences, much like the wonder that surrounded the introduction of the Apple iPhone,[13] will not only allow more flexible uses of existing mobile phone functions, but will also facilitate uses that are only currently available in multiple network-aware devices. For example, a job that required recording geo-referenced photos (or other data) and uploading this data to an employer's servers used to require a laptop, GPS, mobile networking card and a digital digital camera. With products like the iPhone or more advanced GPS-enabled mobile devices, this can be accomplished with one relatively-cheap device. This rich mobile computing capability will allow real-time package tracking, mobile tele- and videoconferencing and, in general, will lower the costs of these kinds of services to small companies and individuals.

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[9] OECD Broadband Statistics, June 2006, *available at:* http://www.oecd.org/document/9/0,2340,en_2649_34223_37529673_1_1_1_1,00.html (last visited 19 March 2007).

[10] For a map of municipal broadband, including municipal wireless projects, see: CNet News, Municipal broadband nationwide, *available at:* http://news.com.com/Municipal+broadband+and+wireless+projects+map/2009-1034_3-5690287.html (last visited, 18 March 2007).

[11] BBC News, Mobiles to leapfrog into the future, 30 September 2002, *available at:* http://news.bbc.co.uk/2/hi/technology/2287913.stm (last visited, 18 March 2007).

[12] For example, the One Laptop Per Child (OLPC) project aims to provide a $100 laptop to children in developing countries. See: http://www.laptop.org/ (last visited 18 March 2007).

[13] Tom Krazit, Jennifer Guevin and Michelle Meyers, Finally, Apple answers call for iPhone, CNet News, 9 January 2007, *available at:* http://news.com.com/Finally,+Apple+answers+call+for+iPhone/2100-1041_3-6148392.html (last visited 18 March 2007).

Emerging Models in Labor Sourcing and Structure

In the course of our research, we encountered a few emergent models of labor sourcing and structuring. We'll discuss two such models, crowdsourcing and micro-multinationals, and why we feel they will be relevant in 10 years.

Outsourcing

Outsourcing has been a business strategy since the Romans first outsourced tax collection, with the current model having its roots in professional services and facility management services in the financial and operation support areas during the 1960s and 1970s. Recently conducted research examining the outsourcing practices of numerous organizations concluded that Western companies outsource primarily to save on overhead through short-term cost savings.[14]

There is a spectrum of outsourcing arrangements, from the short-term contracts geared more towards an agile, flexible arrangement, to the long-term partnership, sometimes resulting in ownership/partnership relationships. Even looser outsourcing arrangements are alliances, consortia, and shared-service agreements. Strategic alliances are seen by some as an "in vogue" arrangement, because of the capacity to bring together partners who hold differing and possibly conflicting objectives.[15]

Some argue that IT is an activity that can inherently lead a firm toward a dependency on its suppliers and therefore should only be outsourced in parts, while others argue for fully realizing outsourcing benefits.[16]

Crowdsourcing / Crowdcasting

In the vein of outsourcing is crowdsourcing. Writer Jeff Howe coined the term "crowdsourcing" to refer to "everyday people using their spare cycles to create content, solve problems, even do corporate R & D".[17] Similarly, "crowdcasting" is an outgrowth of crowdsourcing and refers to a much more narrow "crowd", typically highly skilled and invite-only.

> "Crowdcasting is a problem-solving and idea-generating tactic in which a corporation disseminates details of a specific problem or situation to a carefully chosen group of people for possible solutions. The process is often conducted as a contest. The results may be used to resolve difficult or complex development and marketing issues."[18]

Crowdcasting is a particularly innovative and viable solution for industries that have traditionally focused on full or temporary employment where outsourcing is not really an option. For example, Hilton hotels in particular has managed to apply the concepts it

[14] Klein, P., 1999, November 15, Outsourcing's third wave. Information Week, pp. 126–127.

[15] Inkpen, A. C., & Beamish, P. W., 1997, Knowledge, bargaining power, and the instability of international joint ventures. Academy of Management Review, 22(1), 177–202.

[16] Carey, R., 1995, Consider the outsourcing. Incentive: Performance Supplement, No. 4, p. 4.

[17] Jeff Howe, The Rise of Crowdsourcing, Wired Magazine, 14.06, June 2006, *available at:* http://www.wired.com/wired/archive/14.06/crowds.html (last visited 18 March 2007)

[18] Crowdcasting, SearchCRM.com definition, 31 December 2006, *available at:* http://searchcrm.techtarget.com/sDefinition/0,290660,sid11_gci1235376,00.html (last visited 19 March 2007).

garnered from the 2004 Innovative Challenge, a contest targeted at about 3000 MBA students, to its business.[19]

Crowdsourcing and its sister crowdcasting have since become a more general labor sourcing phenomenon that involves bits of outsourcing and bits of open source development. That is, where as the theory of the traditional firm involves employing people internally to do business tasks, the growing tendency to source labor skill outside of the firm - outsourcing - has been extended by crowdsourcing/crowdcasting beyond firms that specialize in simply outsourcing. Today, skilled and relatively unskilled workers can find work through crowdsourcing and crowdcasting programs. We expect this tendency to grow and be extended beyond its current focus in the high technology arena.

There are substantial features and limitations to crowdsourcing and crowdcasting. Firms can tune their labor sourcing to target low or high-skilled work, using crowdsourcing to accomplish low skilled tasks or invest in a crowdcasting effort to source tasks in need of highly-skilled talent. In addition, the materials that a person might need to complete a job can vary from virtually nothing in crowdsourcing to quite complex laboratory equipment in crowdcasting contexts. Both crowdsourcing and crowdcasting seem particularly useful when the deliverable is an information good. Tasks that require someone to type text, tag images, write code, develop chemical processes or perfect the design of parts inevitably require the deliverable to be an information good and, in some cases, physical proof that the solution submitted performs to some standard.

In terms of limitations, both require reasonably low overhead. That is, the size of the "crowd" responsive to a certain request will get inevitably smaller with the more resources required to complete a given task. One substantial limitation relates to quality control. That is, in both crowdsourcing and crowdcasting, the firm will need to define the parameters within which it would find responses acceptable and there needs to be a form of reputation or feedback such that individuals who perform poorly will not spoil the utility of the rest of the crowd. Of course, individuals working on crowdsourcing projects have a similar problem: if they deliver a product that is up to specification, but then the specification changes on them, it requires more work than they had initially anticipated and may no longer be worth the effort.

There are many examples of crowdsourcing and crowdcasting projects and platforms today. We'll describe a few in terms of low- to high-skilled employment. At one end of the skill spectrum is InChorus.com (formerly The Mycroft Project) which website owners can install and visitors are asked to engage in very small, even fun, pieces of work – such as tagging images, typing scanned text, etc. While there is no monetary return to individuals, the tasks are often fun or challenging and require very little to no skill whatsoever. Amazon's MTurk (Mechanical Turk) is a platform that supports a wide range of work, from skilled to unskilled with prerequisites required before an individual

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[19] Melanie Haiken, Want fresh ideas? Try 'crowdcasting', Bussines 2.0 Magazine, 21 November 2006, *available at:* http://money.cnn.com/2006/11/20/magazines/business2/crowdcasting_whatworks.biz2/index.htm (last visited 19 March 2007).

can begin work on certain tasks. The amount paid per task varies from a few cents to a few dollars, depending on the skill needed and the effort required to finish the task.

In terms of crowdcasting, Elance has been described as an "eBay for coders" despite sourcing work in a variety of non-coding areas such as illustration, writing and design. For example, requestors with certain programming tasks can either seek out coders with specific skills or post tasks for all to see. Coders can then express interest in a given job and requestors can assign the job to whomever they feel will do it best at the price they've specified in the time they need it. Effort required and prices paid vary considerably from job to job.

Finally, at the high end of crowdcasting is InnoCentive. InnoCentive effectively sources industrial research and development from a set of highly skilled researchers. For example, a firm might request that someone figure out a way to synthesize a certain chemical from certain ingredients within certain parameters. A chemist with the proper equipment and expertise might be able to produce the product. Typically, the chemist would send a detailed description of the synthesis process plus a certain amount of the chemical synthesized using the new process to the requestor. If the chemist's deliverable is acceptable, he completes the job, assigns any intellectual property to the requestor and collects any monetary reward.

We fully expect the crowdsourcing phenomenon to grow. It has proved amazingly successful judging on the success of firms like Elance and InnoCentive. Crowdsourcing will probably move to new industries and applications where information goods are the deliverable; for example, areas such as photography, journalism, video, consulting, etc. One particularly interesting feature of the crowdsourcing labor phenomenon is that there is no "eBay"-like firm or platform in this area. Services like MTurk or Elance get close but neither seem to have the dominating presence of a market leader for matching work to talent. We expect to see one of the existing firms or a new or unknown firm surge ahead to capture much of the business in connecting crowdsourcers to crowdsourcees.

Traditional Labor Structures

Flat organizations have only seen widespread popularization in the last two decades. With the rise of hi-tech companies and their young and anti-establishment culture came the collaborative and transparent idea of a horizontal organization. Part of what has contributed to the success of the flat movement is the critical examination of the factors that allowed successful startups to survive the dot com crash. Organizational structure gurus believe the rise of the flat movement is expected to revolutionize businesses for the next fifty years. Although it was first expected to only be truly feasible for smaller businesses or service organizations in which all the employees report directly to a single boss, many larger organizations such as Exxon-Mobil, Xerox, General Electric and even public entities such as the Occupational Safety and Health Administration (OSHA) have embraced flat concepts.

As recent as the flat movement has been, there is talk that organizational structures might be completely revolutionized with the invention of the home office. With increased global connectivity, many even question the continued existence of the traditional brick and mortar business establishments. With VOIP and broadband at our fingertips, what is

to prevent more people from working from home? While it seems unlikely that the home office will become the norm in the next decade, it is definitely an increasingly popular working model.

Micro-Multinationals

Because of advancements in technology, especially with respect to communication, entrepreneurs are able to go global right away when starting new companies. These startups, called micro-multinationals (mMNCs), have been especially common in the software industry; 40% software startups adopted this structure since 1999.[20] Companies that go global have two main benefits: they can hire labor at a cheaper rate than in the USA and they are able to choose from a larger pool of experienced, "battle-tested" individuals, many of whom worked in the Silicon Valley and returned to their native countries.[21] Furthermore, this model is not limited to software or hi-tech companies, as exemplified with Sundia, a watermelon fruit company which started out as a mMNC startup, and now is the largest watermelon company in the world.[22] Since this business model is relatively new, we will discuss how it impacts labor and entrepreneurship and its internal labor structure.

As mentioned before, the mMNC model enables people with good ideas to start ventures more easily than with more traditional models. For several years, large enterprises like IBM or ExxonMobil benefited from the global markets by offshoring work to other countries with cheaper but good quality labor force. However, such operations were very costly, requiring expensive communication services, costly severs and software platforms, and other overhead costs. With the advent of pervasive broadband Internet and Web 2.0 tools such as Skype or WebEx, technology is, in effect, "level[ing] the business playing field".[23] It blurs the once circumscribing advantages of economies of scale and economies of scope that the giants held, and lowering the barriers of entry to various markets such as software and financial services.[24] For example, WebEx, a meeting and document sharing program, now costs around $50 per month and lets startups, such as ElevateHome, save hundreds of thousands of dollars on travel costs or more expensive enterprise software by companies like Oracle.[25] In addition to lower disadvantages, mMNCs gain several advantages over local startups and global giants. Founders can hire from a poll of millions of talented and experienced workers in other countries for tasks such as programming, customer service, and even executive decision-making. Local

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[20] Jim Hopkins, "The Rise of the Micro-Multinationals", USA Today, http://www.corpwatch.org/article.php?id=11849 (last visited 19 March 2007).

[21] Michael V. Copeland, "The mighty micro-multinational", CNN Money.com, 28 July 2006, http://money.cnn.com/magazines/business2/business2_archive/2006/07/01/8380230/index.htm?postversion=2006072811 (last visited 19 March 2007).

[22] *Id.*

[23] Hal R. Varian, "Economic Scene; Technology Levels the Business Playing Field", New York Times, http://www.nytimes.com/2005/08/25/business/25scene.html (last visited 19 March 2007).

[24] Richard Daniel Ewing, "The new multinational: Lilliputian, not leviathan", Asia Times,5 April 2006, http://www.atimes.com/atimes/Global_Economy/HD05Dj01.html (last visited 19 March 2007).

[25] Julie Sloane, Justin Martin and Alessandra Bianchi, "Small companies that play big", Fortune Small Business Magazine, 23 October 2006, http://money.cnn.com/magazines/fsb/fsb_archive/2006/11/01/8391412/index.htm (last visited 19 March 2007).

small businesses not only have a much smaller selection of talent, but generally need to pay around three to five times more per worker.[26] As for big international enterprises, mMNCs are generally much quicker in adopting new technologies, are not burdened my legacy organization and models, and now have access to raw materials and service providers just as large firms do. Aside from providing opportunities in entrepreneurship in developed nations, mMNCs create millions of jobs, from executives in the USA, engineers in Argentina, to programmers in Serbia. Many of the offshore workers, despite receiving a salary several times less than an American employee of comparable skill, are generally content with having a job and making a reasonable salary compared to the standard in their country. Even economists have stated that the costs of offshoring work are lower than the benefits to businesses for the American economy,[27] while the offshored workers benefit as well.

Now that we have discussed the characteristics and impact of mMNCs, we will now describe how mMNCs are structured internally in terms of labor. Two of the main disadvantages of a global firm are difficulty of organization and dealing with different time zones. To offset costs of miscommunications, which could be tragic to startups, detailed and extensive Wikis are kept on a secure network accessible by all employees.[28] This is especially important in mMNCs because micromanagement is extremely difficult due to the location differences, for example, one cannot check-up on an employee if he lives 10,000 miles away. Even Sundia keeps a 300 page long Wiki on various protocols regarding shipping, customer service, and ect. Another problem is time zones; often employees need to meet over an Internet VOIP call at times outside of normal work hours. For example, Sonoa, a 35 person software company, connects the hardware team at 9pm Pacific Time in Silicon Valley to a software team in India at 9:30am Indian time.[29] Additionally, location is becoming less and less of an issue in the culture of mMNCs. For example, Ivko Maksimovic, CTO of Vast.com, heads a team of Serbian programmers from Dominican Republic's sunny beaches, simply because his boss thinks that "he is the best man for the job".[30]

Ten years ago, big enterprises held a "monopoly" in the global market, but things are changing. With emerging technologies, small firms, even startups, have access to technologies that can provide supervision, communications, and coordination on the global level. And with small businesses already generating 60-80% of jobs,[31] we can expect this business and labor model to have a large impact on the US and global economies.

Conclusion

While it is extremely difficult to make accurate predictions about the exact structure of the labor market ten years from now, our analysis of technological and economical trends and growing and emerging labor sourcing and structuring models allows us to make some

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[26] *Id.* note 21.
[27] *Id.* note 23.
[28] *Id.* note 21.
[29] *Id.*
[30] *Id.*
[31] *Id.* note 23.

basic predictions. We see that globalization, fueled by technological advancement in information and communication will be much more pervasive ten years from now. The boundaries between nations, and in fact between continents, will become less and less significant when it comes to hiring the right employees or working in one's dream career. As we have demonstrated, this trend will not be limited to large enterprises, but will in fact affect small businesses and startups as they begin to use the emergent Internet penetration and inexpensive Web 2.0 technologies to form global businesses. One can expect lower barriers of entry for entrepreneurs, especially in IT related fields, and the creation of jobs in USA and abroad. As for emerging organizational structures, we will see more flatly structured firms and use of Internet technology to communicate, document data, and work cooperatively across the globe. A direct impact of globalization will include more outsourcing and offshoring of work, especially in the form of crowdsourcing for low-skilled employment needs and crowdcasting for highly-skilled groups or individuals. In short, information technology businesses of all sizes and structures will have a myriad of choices to source and structure their labor needs.