

GLOBAL SKILLS REPORT

# 2006

**Talent in the 21st Century**

*Where in the world is it?*



In conjunction with:

Charles A. Handler, Ph.D.  
*Rocket-Hire*

Mark C. Healy, M.A.  
*De Anza College*

## Where on Earth: Assessing skills around the globe

Brainbench's 2006 Global Skills Report represents an ongoing effort to document technical and work skill certification around the world. In analyzing the skill certification of nearly 300,000 people in over 200 countries and autonomous regions, we have gazed into the past, present, and future of professional work and technical leadership around the world.

This is a follow-up to our 2005 Global Skills Report and is the fourth edition of the series begun in 2001. Since Brainbench's inception, our library of assessments has expanded to fit the needs of the web-enabled global workplace. Although known for IT skills, Brainbench tests also cover a wide variety of workplace skills, including clerical, managerial, sales and financial skills. The world moves fast, and the present report documents more change than status quo across the business world.

## What's Inside?

Brainbench's research staff documents the most common information technology and workplace skills by country, state and US region, as well as tracks changes in the demand for particular knowledge areas and skills. We reveal some of the many dramatic changes in these trends from one year ago, and attempt to interpret and lend insight to the trends presented.

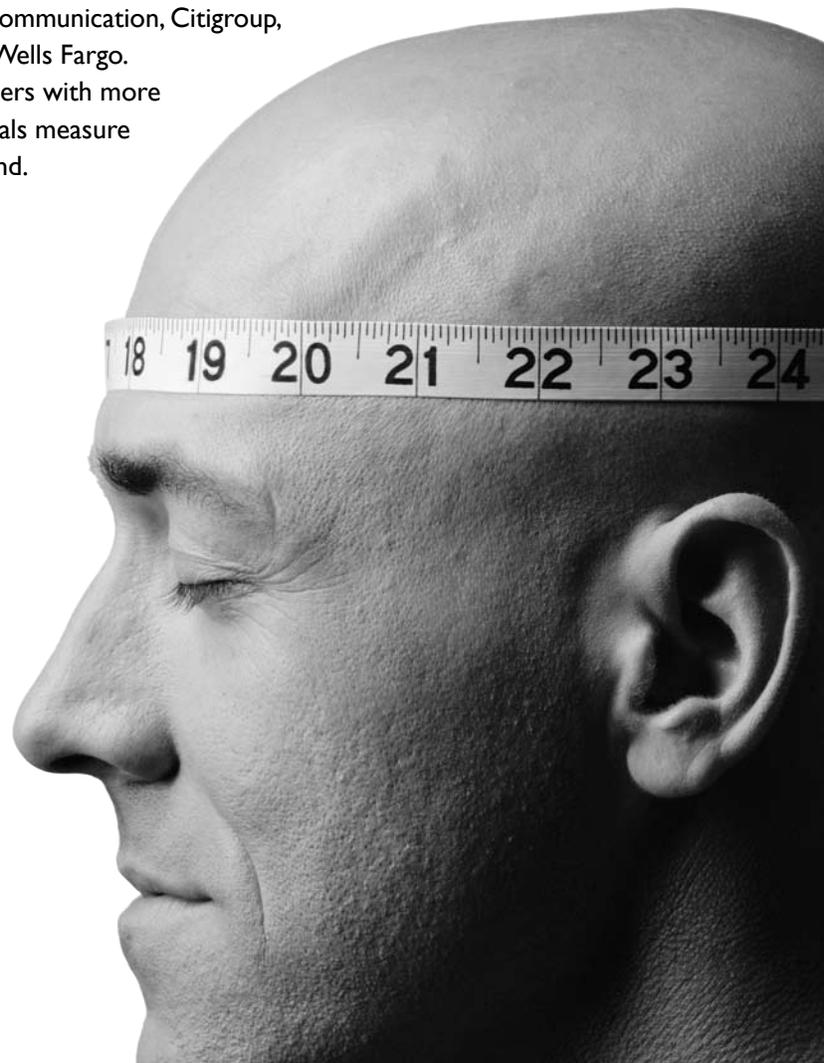
## Who is Brainbench?

Brainbench, a PreVisor Company, helps clients test, track, and improve their employees' vital job characteristics, using the industry's largest ISO 9001-2000 library of tests. Brainbench's online assessment solutions improve hiring, retention, training, customer satisfaction, and profitability for organizations such as Advance Auto Parts, British Telecommunication, Citigroup, IBM, Manpower, OPM, TEKsystems, the U.S. Army and Wells Fargo. Brainbench has served over 6 million consumer members with more than 600 skills test and certifications that help individuals measure and obtain certification for skills that are in high demand.

For more information visit [www.brainbench.com](http://www.brainbench.com).

## Table of Contents

About this Report.....	3
Executive Summary .....	4
Findings from Around the Globe.....	6
Conclusion.....	15
Appendices	
Country Ranking .....	19
Country Skill Ranking.....	20
U.S. States Ranking.....	24
U.S. States Skill Ranking.....	24
References .....	28
About the Authors.....	29



# ABOUT THIS REPORT

---

## A Note about our Methodology

People from around the world attempted certification in one or more skill areas via Brainbench's on-line skills certification site. Certifications completed from July 1, 2005 to June 30, 2006 are included in the present study.

Scoring and certification is standardized across Brainbench's skill library. In order to be certified, an individual must have achieved a score high enough to be officially "certified" for the given skill, which is a score of 2.75 out of a possible score of 5.0. A test result too low for certification (i.e., less than 2.75) does indicate interest or relevance of the skill to local industries and the job market; however, a low score does not indicate competence or employability. This report specifically focuses on actual competence, as opposed to general interest. Therefore, individuals who attempted certification, yet failed, are not included in this report.

Demographic information was contributed by Brainbench members as well. Specifically, individuals must choose a country or state as part of their registration. In addition, a test for a given subject area can only be counted once for a given individual, and an individual can have multiple certifications from different subject areas (See "Terminology" below). Therefore, the report focuses on certifications as the unit of analysis, not individuals.

## The Scope of the Skills

This large-scale assessment of skills around the world began with 887,120 tests completed between July 1, 2005 and June 30, 2006. Of those administrations, 56% achieved passing scores. Of those, 298,495 were unique certifications by an individual who provided state and country information. (Multiple instances of same-test results for a given individual were removed.) Therefore, this report represents 298,495 individual skill certifications.

The individuals representing these skill certifications hail from 217 different nations, territories, and principalities. Nonetheless, the Brainbench assessment library focuses on English. Therefore, most individuals being certified are native speakers of English or speak it fairly fluently. This is no accident: English has become the international language of technology, and many positions require at least enough fluency to allow for successful job performance.

## Skill Categories and Data Trends

As with last year's report, we focus on data and trends for six skill categories:

- Information Technology
- Finance
- Customer Support
- Sales & Marketing
- Management
- Health Care

Though non-technical areas of certification are expanding the Brainbench library, IT still dominates the certification world. Consequently, IT rankings include the following six subsections:

- Database Development and Administration
- Programming and Development
- Systems and Network Administration
- Technical Support
- Telecommunications
- Web Development and Administration

## Terminology

- **Certification** – passing score of  $\geq 2.75$  out of 5 on a Brainbench Assessment
- **Category** – a grouping of subject areas (e.g., Health Care, IT, Finance)
- **Subcategory** – Only within IT, subcategories are detailed in the previous section.
- **Subject area** – A specific certification, such as Project Management or Linux Administration – Sometimes referred to as a "skill" or "skill area."

# EXECUTIVE SUMMARY

---

*(This executive summary was completed by Dr. Charles Handler, an industrial-organizational psychologist known globally as an expert in the development of online screening assessment technology and the application of the same. His opinions and high-level views of the findings are based on information presented in this report.)*

## Statement

This report combines data on the employment skill levels of individuals from over 200 countries along with an analysis of the data to identify trends in the changes and expansion of workplace skills into 2007. As described in the Introduction, nearly 300,000 certifications of key workplace qualifications took place in nearly every corner of the world. Given the dispersed location of participants and the variety of certifications achieved, it is easy to see a continued strong push toward a truly global market of skills, and reveal new areas of workforce development as well as employee talent and sophistication.

## High-level interpretation of findings

In general, the whole world of work is changing due to technology. The days of a company working in isolation in one geographic location are over, replaced by an ever-increasing web of relationships that will end up coming together to create businesses. The success of these ventures will be reliant upon two key drivers: Access to technology and access to skilled labor.

As access to technology increases, businesses of all kinds will begin to see an increase in connectivity, which will provide an increasing numbers of persons from all over with access to more information, learning and skill development. Development of skills will provide the second key driver needed for global business expansion: Workers who have what it takes to do the work required to drive value.

Within the set called “employment skills”, it is important to note that there are two key types. The first are usually called “hard skills,” which are

measured in greater number in this report because they were the first type to be converted and accepted in an online assessment model. However, the future differentiator for businesses will lie in the addition and enhancement of “soft skills” - the qualifications needed to do business today, including the techniques and communication styles necessary to facilitate interactions with others in the workplace and around the world. The countries that are best able to successfully cultivate these important skills - along with specific job-related skills - will be the ones who drive the success of global outsourcing.

With a worldwide movement toward competence in IT and related skills as a background, these more specific findings could be extracted from the data:

- U.S. and western European companies will continue to see technical work and business processes migrate to other countries. However, the specific location and extent of the work performed varies greatly by industry and sector. The leading outsourcing destinations of the world are themselves expanding into emerging areas, and competing with operations in both their home countries and abroad.
- Both established industrial giants and emerging nations are gaining in technical sophistication, perhaps due to continued greater access to technological infrastructure. As internet access spreads, the ability to connect with the rest of the world will drive knowledge and career opportunities.
- In both narrow technical and broad industry sectors, the quality and level of skills required now exist outside a direct connection to local economies or whole countries. While some areas of the world have become known for their ability to provide specific employee skill sets (e.g., India for software testing and database management), the skills are also transferable. Unlike older models of businesses based on local resources like oil, or an auto plant investment, technical expertise is based on education and experience, which can

be developed anywhere. New regions are providing skilled workers and competing for business in response to demand that can't be entirely met by today's business process outsourcing (BPO) leaders. In the future, this will become a major issue to deal with for soft skills outsourcing (e.g., customer service), and will create an economy specifically dedicated to training to a standard of usable competence.

- Taking advantage of worldwide talent pools will require a greater ability to analyze short- and long-term costs, the economic situation of a particular region, growth and stability of the population of potential employees, and trends in the growth of particular kinds of outsourcing partners.
- Education will remain a key driver of the success of both emerging and established nations in the global skills marketplace. Specific and applicable business skills are more important than a general and theoretical background. Moreover, language education and the interpersonal side of work will continue to be drivers as the world grows smaller and remote locations need to interact more closely to make business happen.

## The Future of Global Skills Development

As discussed in the conclusion to this report, the world is moving fast towards a model of an integrated skill and talent market, one in which the trends are short-term and the impacts are difficult to reverse. In the next few years, the following factors will affect the direction of global talent growth:

- **Sophistication of BPO grows.** Organizations worldwide are gaining knowledge as to how to put the global skill market to work for them. As competition among BPO companies grows, demonstrable soft skills will be the new differentiator in choosing individuals or collectively in choosing locations. Language skills will be a key decision point as well.
- **The need for employee assessment becomes more critical.** Assessment of employee knowledge, skills, abilities, and competencies will expand, partly as a corollary in the search for

improved interpersonal and collaborative skills and how these enhance doing business across cultures. The future is about adding skills assessments across cultures to facilitate outsourcing but keeping standards of quality and productivity at high levels. The biggest change will come when companies begin to create their own assessments of their employee and partner strengths across cultures instead of just in one culture. We have a long way to go to learn about the stability of personality, social and cognitive traits across applicant populations of the world, and the development of cross-border standards for employee behavior is leading this trend.

- **New knowledge raises the bar.** Both the initial and ongoing development of valuable talent will help increase expectations for education and training in nearly every country in the world; this will be a significant covariant with the level of technology, and access to that technology, of a particular location. As local organizations get more connected beyond their borders, skills will be more in demand and the local economy will grow if demand can be met.
- **Concentrations of knowledge lead to regional, local, and national growth.** Sometimes, it's hard to halt the success of one company specialized in changing and enhancing a local economy. The future of skill development involves dozens, if not hundreds, of local and regional players developing specific skills, competing with one another but also banding together to sell their capabilities to the world.
- **Companies will clarify the benefits of skill proliferation.** As the outsourcing and offshoring of work becomes more ubiquitous, it will become easier for organizations to analyze the effects of sending work to different companies and countries. The benefit of migrating technical work to more cost-effective locations is fairly easy to judge. Soon, the long-term impact on specific industries, innovation, and technological progress may be more evident. Most importantly, cultures and societies will be able to judge if the impact of the global skills market has enhanced quality of life or degraded it.

# FINDINGS FROM AROUND THE GLOBE

## The Top 10 Across the World

The top 10 countries in terms of overall certifications are listed in the table below, along with their 2005 ranking.

Rank 2006	Rank 2005	% Change
1 U.S.	1	- 18%
2 India	2	+ 47%
3 Russian Federation	3	- 21%
4 Ukraine	5	+ 14%
5 Romania	4	- 18%
6 UK	7	- 7%
7 Canada	6	- 27%
8 Belarus	11	+ 49%
9 Philippines	9	- 4%
10 Bulgaria	8	- 30%

As can be seen above, overall change in the rankings, compared to 2005, was minimal, and the top 10 comprise 86% of global Brainbench certifications. The only significant change from last year was the addition of Belarus,

which knocked Latvia out of the top 10. Latvia only dropped to #13, however, but its total certifications were down by 48%; Belarus increased by 49%. Although rankings of the Global Top 10 did not change by very much, the actual number of certifications in each of the top countries did change in some significant ways. These trends are detailed in the following sections of this report.

The table (left) certainly does not tell the story of the dispersion of skills throughout over 200 political entities around the world. The findings presented in the rest of this report dig deeper into Brainbench's data to find out what it all means.

## FINDING I

### United States drops, but maintains dominance

The U.S.A. remained the leader in total aggregate skill certifications. But for the second year in a row, total U.S. certifications dropped relative to India. In fact, North America took a hit in general: The U.S. and Canada declined by 18% and 27%, respectively.

What contributed to this drop in U.S. certifications? Demand for skilled talent is high, so this might reflect the long-discussed shrinking labor market, particularly those with valued high tech skills. Certainly, employers throughout the country continue to search for a wide variety of professionals and managers in most areas of Information Technology (see for example, recent reports by Robert Half and Monster Intelligence). Trends and shifts in United States skills and the long-term outlook for education and job growth are discussed in the conclusion of this report.

While there has been a decline in certifications overall, the United States still leads India and other high-ranking countries in most technical skill areas. Specifically, the U.S. led in 16 out of 30 IT skill areas, down from 24 of 30 one year before. In some areas, such as MS Windows XP Desktop Administration,

the U.S. has clear dominance, with over 50% of total certifications worldwide. With others, such as LAN/WAN communications, America leads total certifications but is facing stiff competition from attractive outsourcing regions like Romania and the Ukraine, in addition to the long-time big player - India.

The five non-IT skill categories - Customer Support, Finance, Health Care, Management, and Sales & Marketing - were almost entirely dominated by U.S.-based Brainbench users. In fact, last year's Global Skills Report referenced a cutting edge trend towards online skill assessments for more traditionally trained and tested non-IT skills. This development has been confirmed this year in many areas, for example Project Management – a highly sought after position today (The Economist 6/06). The U.S. certifications in this category increased by 160%, but more interestingly, India increased in the same category by 385%, ending up nearly tied with U.S. for 2006.

## FINDING 2

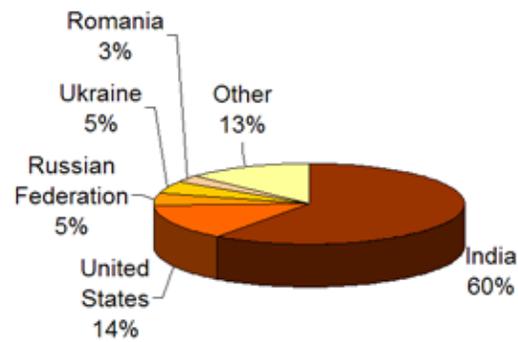
### India continues its remarkable growth

India has significantly closed the gap with the U.S. regarding total certifications, rising 47% in the past year. In fact, the United States led India in total certifications by the smallest margin it has since Brainbench began measuring in 2001.

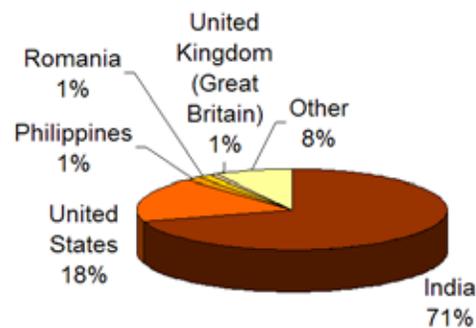
In the IT categories, India continues to gain ground, dominating all Database Development and most Programming language categories (excepting C#), with the U.S. maintaining its own domination of the Systems & Network Administration and Technical Support categories.

Several areas of large Indian market share are displayed in the graphs (right). India dominates some skill areas to such a great extent that it's difficult to imagine them being unseated by smaller players in each of these areas; nonetheless, the tech world moves fast, and it's clearly impossible to predict

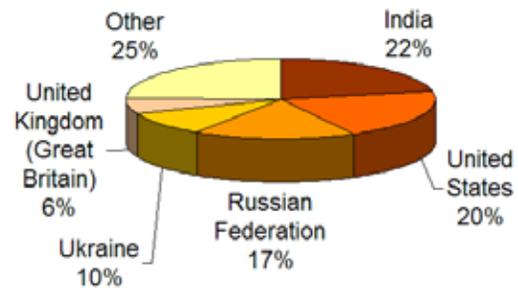
**FIGURE 1a:** Certifications for SQL (ANSI) Fundamentals



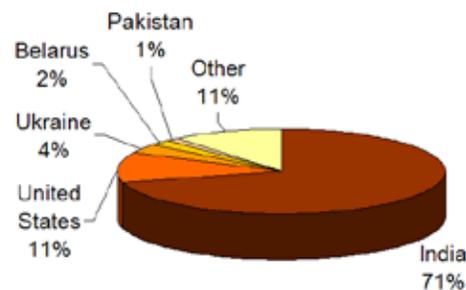
**FIGURE 1b:** Certifications for DB2 Programming



**FIGURE 1c:** Certifications for C++



**FIGURE 1d:** Certifications for Software Testing



where these developments will lead. Nonetheless, when firms like IBM and Accenture suggest that the majority of their employee growth will take place in India – and not North America – it’s hard not to jump to conclusions.

Software application development, and every set of skills that comes with it, has been considered India’s core IT competency foundation. Sun’s Java 2 programming language, as well as the newer .NET framework are both led by India in total certifications across the world. More staff - at lower cost - for application development was the first widespread use of Indian outsourced services by U.S.-based and European companies. But much of this

programming expertise stems from the late 90’s Y2K bug scare,

which spurred the boom in software testing, and in this category, India captured 71% of the world’s total certifications. The growth of now-large Indian owned companies like Tata and Infosys reflects this trend (Economist 6/06).

The Database Development and Programming subcategory is dominated by India as well. DB2 programming remains at 71% of the world’s certifications, and SQL (ANSI) Fundamentals certification in India represents 60% of total for that skill area.

Non-technical skills certification is growing in India, and demand looks to keep rising. For example, Vital Solutions, a large Atlanta-based collections agency, recently inked a large contract with an unnamed Indian firm to perform long-term account recovery. This sort of one-on-one skill set is primarily an interpersonal skill, but one requiring a decidedly aggressive approach. In another surprising example, one of India’s largest IT training firms, NIIT, acquired Element K, a multi-platform, diversified training company based in Rochester, New York.

Neither of those examples supports the stereotype of India as a programming sweatshop. Moreover, the next frontier for India, according to the Economist article, is in true creativity and innovation. This notion is explored more in the concluding section of this report.

---

## FINDING 3

### Latin America increases visibility

---

While the U.S. and India still account for the majority of the certifications – a full 65% combined overall - some new winners emerged in the global competition for skill development, while some of last year’s leaders declined.

Canada declined by 27% from 2005 in total skill certifications. Though placing in the Top 5 in both Unix Administration (Solaris 9) and MS Excel 2003 Fundamentals, these represented fairly small shares of the market. Mostly, this may be explained by Canada’s relatively small population. However, in



terms of non-technical domains, Canada made a reasonable showing. For example, at 33%, they led the Outbound Sales skill area and rank fairly high in most accounting sectors. In general, their share of skill certifications in most areas remains low.

Latin America remains as diverse as ever in terms of burgeoning economic activity, government support, and export capabilities – all of which potentially impact increases and decreases in skills certifications. In its best showing to date, Mexico climbed nearly 73% in its certifications. Some of the reasons for this might include: Mexico's economy is growing this year after a period of slow economic growth; the IMF cites higher oil prices and a relaxed monetary policy. Even India's Mphasis opened a customer contact center in Mexico, a trend reported by A.T. Kearney (2005 Global Services Location Index) – noting that Mexico and Brazil are beginning to attract U.S. back-office and call center work to supply an ever-increasing Spanish-speaking market. Moreover, Mexico is only beginning to reap the benefits of NAFTA as well as commercial agreements with Japan and the European Union. They remain the largest Latin American user of Brainbench assessment technology.

The largest country in Latin America, Brazil's numbers grew by 15%, slowing from more rapid growth over the last few years. Recently, their economic growth has slowed, though they still maintain a large trade surplus and seem to have shaken some of their recent inflationary demons (Bloomberg 8/14/06).

It may come as a surprise that the next largest group of certifications in Latin America comes from Cuba, followed by Chile and Argentina. Cuba's certifications grew by 125%, whereas Chile grew by 163% and Argentina by 3%. Chile's economy has been exploding, so this comes as no surprise when contrasted with conventional economic statistics; Argentina's growth is primarily in agricultural exports (Bloomberg 8/15/06). Cuba's increase is difficult to comprehend; it may be due to improvements in local infrastructure as well as a relaxed political process as opposed to a trend toward business process outsourcing (BPO) activities.

Latin America remains a friend of industry, particularly to the U.S., Canada, and Germany. Working with each country represents an individual challenge. Nonetheless, the BPO landscape is as yet tentative when it comes to these countries, with most of the focus remaining on India and Eastern Europe where levels of English-language proficiency remain high. Nonetheless, the history of political change and upheaval has kept companies tentative about this region. But risk levels (or perceptions of them) have decreased. So India has several competitors looming on the horizon.

---

## FINDING 4

### **China makes a slow – but deliberate - high tech move**

---

China is the world's largest country in terms of population, with India a close second. Along with large foreign firms (including Indian, see Conclusions) building facilities in China to serve the exploding outsourcing market; many small and medium-sized firms are trying hard to serve a variety of high tech needs.

The Chinese, both in their postwar pre-communist and more recently market-friendly form, already knew a lot about working with foreign companies. From cars to combs, stuffed bears to sport coats, "Made in China" has held strong in both the consumer products and B2B landscape. In the past year, the total number of Brainbench certifications achieved by China grew an impressive 82%. But is it the new high-growth spot? It turns out that China may take quite a few years to reach India-like prominence.

According to a recent Economist article (May 2006), there are two major issues limiting China's growth as a BPO partner. First, they've taken all the right courses and graduated from the best universities, but the brightest young high tech aspirants don't know enough to apply their learning to real-business issues. Second, students fresh from school may be able to read English with some expertise, but they aren't as good at writing and speaking it.

Therefore, the ability of a top graduate in their early 20's to jump into a decent tech job (i.e., programming, engineering, design, or development) is often limited. In a stark example (Economist 5/06), GrapeCity – looking to hire software developers in Xian – received 1,200 applications for qualified Chinese graduates, but only found seven to be worthy of consideration.

Nonetheless, there is a definite trend of multi-national and particularly Indian companies building campuses in China to take advantage of the available labor pool with associated cost advantages. In the short-term, China may be able to profit mightily from lower level BPO services such as basic data entry and standard quality assurance and software testing. But also in the short-term, fears of piracy and privacy violations characterize system infrastructure and employee policies in Chinese tech firms. In a recent example, Inquira Inc., a natural-language web search firm based in the San Francisco Bay Area, found that their Chinese BPO management team took pains to address that concern for them: Employees may not leave with – nor bring in – any form of electronic (or even electrical) media. For further security, most engineers' workstations are not linked to an outside network or web server.

The rest of Asia (excluding, of course, the subcontinent of India), for the most part didn't rise as high as China has in terms of Brainbench certifications. Singapore was up by 48% compared with one year before, but the Philippines and Indonesia actually dropped in their certifications (though less than 5%), even though they remain common offshoring destinations, though not really "powerhouses" of BPO work. Malaysia dropped by a surprising 30%, despite steady economic growth. While a direct correlation between certifications and political/economic factors cannot be proven, most of the data is supported by current global events. In many cases, a country's participation and success in skills testing as it relates to attractiveness as an employment outsourcing area is also impacted by risk factors. (CIO Global Outsourcing Guide 2006 - [http://www.cio.com/archive/071506/2006\\_global\\_outsourcing\\_guide.pdf](http://www.cio.com/archive/071506/2006_global_outsourcing_guide.pdf))

.....

## FINDING 5

### Which technical skills are proliferating around the world?

.....

The top skill certifications in each sub-category of information technology evolve – sometimes dramatically – every year. To be sure, the high tech world is a moving target. The table below contains the top 10 IT skill certifications across the globe.

C#
Software Testing
C++
.NET Framework
Computer Technical Support
ASP.NET
RDBMS Concepts
Project Management (2005)
Java 2 Fundamentals
Linux Administration (General)

C# took over as the most popular programming language in 2006, although it was only released less than five years ago but now competes - and in many cases has taken over - the previously dominant languages like C++ and COBOL, with .NET framework also making the top 10 in the programming category. ASP.NET held on as the leader in Web Development and Administration.

In the IT-Systems and Network Administration category, Linux continues to remain more popular both in the U.S. and internationally than Microsoft. This continues a trend toward the popularity of open source languages, as well as perceptions of greater security and less susceptible to viruses and/or hacking of these platforms. Still, in the recent Robert Half Survey of IT hiring (ref), 79% of CIO's were looking for MS Windows administration talent, followed by 76% for network administration, and 69% searching for database management skills.

## FINDING 6

### Which non-technical skills are in high demand?

The name of the game is not simply Information Technology when it comes to online certification of relevant job skills. As with last year's report, non-technical skills of all kinds are being sought after in many corners of the world, and increasing in skills testing popularity.

Project Management remains the most highly certified management skill, with India approaching the certification levels within the U.S. This may be due to project management's emergence as such a critical aspect of successful BPO initiatives as well as the general business trend of assigning specific project managers to do nothing but...manage the project, not provide any technical expertise. India, which has previously lacked skilled project managers (Economist 6/06), is now making such a strong showing in this category that they may soon establish leadership of the project management certification skill area, which currently stands at U.S. 33% vs. India at 32%.

Additionally, IT workers who also have project management and leadership skills are in particularly high demand, according to British Airways CIO, Paul Coby. He believes the lack of these skills in the U.K. will impact Britain's future global competitiveness. (Silicon.com, Aug 2, 2006) <http://management.silicon.com/careers/0,39024671,39161156,00.htm>

Other popular non-technical skills include Accounts Payable Fundamentals, which is led by the U.S. with 50% of the certifications in this area. Business Communication was also led by the U.S., with a 43% share. Still, the Customer Service category is the largest non-technical category on Brainbench. This is not surprising, considering that "Customer Support" was listed as the 2nd largest factor driving IT talent acquisition this year, according to the

most recent Robert Half survey of IT hiring managers. The largest skill area of certification within Customer Service is the Typing Speed and Accuracy assessment (a modern variation on the good old typing test), with the U.S. leading certifications with 67% of the overall total. Moreover, this now-necessary skill in today's world is the most popular Brainbench skill certification in the world.

## FINDING 7

### Growth in Eastern Europe remains steady

Eastern Europe, specifically the former Soviet bloc, has become a fascinating study in social and economic change. For decades, other than jet fighters and petroleum engineering, this area was known for a decided lack of technological innovation. But archaic technology has turned modern, and the new world of outsourcing heavy hitters like the Russian Federation, Romania, and the Ukraine is looking in the mirror at fast-approaching competitors in neighboring Belarus (up 49%), Estonia (up 18%), and Slovenia (up a healthy 59%).

Eastern Europe's surge slowed a bit, but remains steady, with Russia, the Ukraine and Romania still leading the way in total certifications. Although Russia and Romania experienced some drop in certifications between 2005 and 2006 (drops of 18% and 21%, respectively), together they represent 18% of all certifications globally, behind India at 30% and the U.S. at 35%. Other downward movers include Latvia (down 48%) and Lithuania (down 44%). Both experienced slowed growth. In Lithuania, political corruption was boldly revealed and held down economic growth; in Latvia, it seems like the fast growth rate simply slowed, but it is destined to become even more competitive with its open market, rising positive reputation, and inexpensive workforce.

The world between the Atlantic and Asia is decidedly different now. But how does English proficiency influence this trend in skill certification? Whereas proficiency in English was thought to drive some

of these early trends, it appears that education in foreign languages (notwithstanding the quality of that education) has little to do with growth in BPO in certain countries or specific skill acquisition in those countries.

What does appear to drive change is a growing reputation for some large high tech employers in the Eastern Bloc, which drove sustained growth in Database Programming and Administration as well as most other areas of IT. C# and C++ were common areas of certification in the Programming and Development subcategory, placing Russia and the Ukraine in the top 5 in both categories. Linux Administration and Cisco Network Design were also well-represented by the Eastern European workers.

Still thought of as a somewhat different culture compared to the former Soviet bloc and even the eastern part of central Europe, the western part of the European Union is facing stiff competition from its brethren to the east. Trends there are explored in the next section.

---

## FINDING 8

### **Western Europe, led by the United Kingdom, slides again**

---

In Western European countries, few cohesive trends emerged, unless one counts an unending tendency that has been pointed out for the past decade: Western Europe is facing a shrinking professional workforce and is primarily a customer of new, emerging technical skills.

Specifically, the United Kingdom realized a 7% drop in certifications, but still maintained its position in the Global Top 10. In addition, Germany dropped by 30%, and both France and Italy saw a drop in total certifications of 18%. Overall, the U.K.'s drop was not significant compared to its neighbors, but they may remain strong in Brainbench certifications due to their English language prominence.

The U.K. did make it into the top 5 in skills such as DB2 Programming, C++ and Networking Concepts. However, most of Western Europe has become a customer of BPO efforts as opposed to a provider. Despite a strong economic situation in the European Community, birth rates are low and workforce growth is nearly stagnant.

With no growth in certifications in any Western European country except for Ireland and Austria, it seems that skill development in general may remain flat in the U.K., with standard outsourcing destinations providing much of their expertise to the West. Even in reportedly red-hot Ireland, fears of inflation and a new high cost of doing business in major metropolitan areas may slow growth.

---

## FINDING 9

### **Where in the world? Emerging regions**

---

There are several emerging “New kids on the block” throughout the world. Briefly, these include big upward movers such as Nigeria, which was up by 137%, and Cuba, which, as discussed in a previous section, was up 125%. Nigeria, in particular, is the site of a large Accenture operation and was the only country in Brainbench’s top 25 to realize triple-digit growth over 2005.

Some large countries that are somewhat behind their neighbors are experiencing steady growth in skill certifications. For instance, Pakistan grew 8%. Apparently, riding the coattails of India is slower going than may be expected; however, the political tension between the two countries may have limited cross-border cooperation. Skill certifications in Thailand grew by 40%, and business leaders there appear to be concerned about being left behind in the strong BPO growth in Southeast Asia.

Decliners include high tech destinations such as Israel at -46% and New Zealand, which dropped 36%. These represent different situations, with Israel

affected by high risk to security and political issues. In the case of New Zealand, recent figures released in a report by the New Zealand National Party (12 Aug. 2006, <http://www.scoop.co.nz/stories/PA0608/S00204.htm>) indicate that 32% of its native born skilled workforce has moved overseas, many going to Australia. The government of New Zealand has responded by creating a Skilled Immigrant program offering incentives to people to come live and work in their country.

## FINDING 10

### United States leads the way in Cyber-Security

Security and integrity of both data and technical infrastructure have become standard, mainstream concerns in all pockets of business, both domestic and global. In the U.S., caution regarding the real, long-term security of personal and business data, as well as accidental and overt thefts of data files, have kept this issue in the media and in front of business leaders.

Disaster Recovery and Planning and Information Technology Security Fundamentals remain more popular tests in the U.S. than worldwide due to real and perceived threats to cyber-security. IT Security Fundamentals certification was completed by a group represented by one-third U.S.-based workers. However, this is not a majority; India came in second (though with only 8% of certifications), and it is likely to increase on a global scale.

At the state level, New York most definitely led the way in Disaster Recovery and Planning, but no state really carried the weight of skill certifications to any significant extent.

## FINDING 11

### Oh, what a state we're in: U.S. internal rankings

The top 10 states in terms of number of certifications are detailed in the table below, with ranks from 2005.

	2006 Rank	2005 Rank
California	1	1
Texas	2	2
New York	3	4
Florida	4	3
Virginia	5	5
Illinois	6	6
New Jersey	7	8
Ohio	8	9
Pennsylvania	9	7
Georgia	10	10

Representing few substantial increases in certifications from 2005, the following table lists the biggest increases by state.

State	% Change
New York	24.28%
New Mexico	14.48%
Mississippi	14.01%
West Virginia	12.00%
North Dakota	10.56%
Michigan	10.53%
Alabama	9.42%
Georgia	8.17%
Wisconsin	8.13%
Virginia	6.42%

As can be seen above, California was the leader in total certifications, but their number of total certifications dropped by 21% over 2005. In fact, several highly ranked states experienced drops from last year, including Texas, Florida, and Pennsylvania. Reflecting the Robert Half survey of IT hiring optimism, New Mexico led a strong Mountain region,

which had the largest net increase in projected hiring demand in their report.

Another highly ranked state, #3 New York increased 25% since last year in total certifications. In terms of individual states, NY ranks in the top 5 of all System Administration skills, and the presence of many Fortune 500 companies may drive this trend. Also, New York featured largely in many diverse skill categories, much as it did last year.

In terms of skill penetration into different states, Virginia, New Jersey and Colorado lead as a percentage of their populations. On the other hand, Hawaii, Montana and Mississippi are the laggards as a percentage of their population. Virginia, New Jersey, and Colorado are longtime locations of technological centers as well as research and innovation.

In other areas, Texas leads the way in Web Development and Administration. California leads most finance categories, and California and Florida lead the Customer Support categories. Most categorical rankings reflect population differences; however, some current data on concentrations of skills among different states and regions highlights some of what may be observed in this data. For example, according to the California Job Journal (Published 6 Aug 2006. <http://www.jobjournal.com/thisweek.asp?artid=1774>), 30% of the Customer Service reps who work in call centers are concentrated geographically in four states: CA, TX, FL, and NY.

According to a recent Forbes report on the highest paying technical jobs (2006), Virginia leads the U.S. in high tech employment. California, New York, Massachusetts, and Washington round out the top 5 in terms of sheer numbers. However, the types of jobs prevalent in each state do vary. For example, the highest paying computer-related jobs (i.e., those least involved in IT support and most involved in product management and development) appear in the Northeast, but

the South and West are close behind. In addition, a recent Business Week article points out that greatest number of large technology firms (41 of 100) are located in California.

The rather inconsequential shift in skill certifications among states reveals a distinct lack of any clear trend other than the large shifts in certifications witnessed in the large states. This state-of-affairs reflects the major point of this report: We are in an era of a global market for relevant workplace skills. Individual regions around the world – along with individual states in the U.S. – don't reflect the larger movement of available workers and changing business needs in technology and beyond.



# CONCLUSION

---

## Onward to 2007 and Beyond

Since the time we published the first Global Skills Report, the scope of skills measured has expanded greatly from both a content standpoint and geographic coverage. It's not just a game of high technology anymore. Here in the 21st Century, this 200-nation skills market includes many other functions of typical business operations - relational sales, management, product strategy and high-level design - of the organization.

Five key trends are discussed below. One development underlies all others: An increasing proportion of jobs, roles, tasks, and entire operations will be performed less often on the property of the organization that markets and sells a particular product or service. Furthermore, this work may be carried out by a firm based in a different state, country, or continent. What's more, this outsourced effort may then be further delegated to an office in another country, or the work may be performed by yet another entirely different company. The decision-making parameters around people strategy, logistics, strategic planning, and job design have irrevocably shifted.

## I. U.S. technology skill set pools are in decline

One of the early tenets of outsourcing was that North America and Western Europe sent work overseas for strictly economic reasons. But now the issue is more often where is there an available supply of capable professionals, not just their pay scale. In the U.S., claims of under-education of future workers, a pending deluge of retirement, and current employee scarcities in some job categories have driven the perception that skills are on the decline. Does this match reality?

Currently, the U.S. maintains domination of the systems and network administration job categories. This is understandable given that these functions often require an on-site presence. However, remote network management is a new trend in IT, which may eventually threaten or erode a U.S. lead in these skill areas.

Another area where the U.S. will likely continue to feel a competitive squeeze will be in application development. The Robert Half IT Hiring Report details that the most common driver of the need to acquire employees is growth in revenue – an obvious factor, but one severely impacted by wages. On the other side of the pincers, the latest IT salary survey by Enterprise Systems reports that applications programmers saw the greatest rise in their pay in the past year. Given these competing trends, the cost to U.S. employers to maintain positions at home may be too great, and these U.S.-based jobs may be further at risk.

But added to the cost issues, the pools of potential U.S.-based technology professionals and managers are definitely declining. In 2004, Computer Resource Associates found that the number of computer science graduates will continue dropping for the foreseeable future – at a time when the U.S. Bureau of Labor Statistics estimates that the need for software engineers will be 50% larger in 2012 than it was in 2002. Truly, there is no greater one-sided



debate than the one that assumes trends in American training and education are not keeping pace with the demand for professionals of all variety. Brian Marquez (\*\*\*)Ref Insight Business, published by USC's Center for Management Communication Marshall School of Business. <http://www.usc.edu/org/InsightBusiness/archives/spring2005/outsourcing.htm>) points out that it isn't simply a matter of birthrates and early retirement: American students are turning away from careers in technology. This wouldn't be an issue if it was all about money, but Tom Koulopoulos, author of Smartsourcing (quoted in Forbes 8/11/06) notes that education is one of three key factors in which businesses choose to spend their wage bill (the other two being cost and how easily work can be moved.)

Where, then, will the jobs go? To be sure, pay scales in India and other BPO leaders are on the increase, and the supply of engineering and high tech talent both in India and China is lately portrayed as limited despite huge populations. But will this stem the tide or accelerate the next five or even 25 years of offshoring? Only time will tell.

## **2. Where India leads, others will follow**

It is clear that India is driving many of the outsourcing trends highlighted in this report. Not only have they long been the supplier of skilled technology services to mostly U.S. and U.K.-based companies, their own largest firms in turn have become outsourcers.

While it may seem that the sheer number of skilled engineers in India is driving much of this growth, this argument does not explain the increase in other categories of skills. India has become a truly global player of its own accord. Deutsche Bank's chief economist, Norbert Walter, predicts a decline in U.S. fortunes in 2007, but says that India, unlike America's other trading partners, won't be affected because their GDP is actually more internally driven than most large economies. And the pace of the U.S.' offshoring efforts won't be affected by stagnate business growth.

Business process outsourcing is clearly important to India (\$36 billion in 2005, representing roughly 5% of GDP), but will India remain an important destination for jobs in the eyes of future prospects? Most signs point to a definite yes, with India's dominance (in terms of market share) limited only by parallel growth and innovation in other parts of the world. McKinsey consultant Noshir Kaka states, "This industry can do for India what automotives did for Japan and oil for Saudi Arabia." (The Economist, Jun 1 2006)

Salaries are increasing, and competition for the brightest graduates and most experienced managers is getting fierce in many parts of India's BPO sector. But any near-term trend one examines is almost always headed upward, especially with an increase in the sector of over 30% in the past year and BPO employment that now exceeds one million workers. By valuation, three of India's six largest companies are in IT: Tata Consulting Services (TCS), with 63,000 employees and plans to hire another 30,500; Wipro and Infosys with 50,000 employees each. All three companies experienced revenue growth in excess of 30% last year. And all three firms, along with other Indian tech providers, have taken proactive growth steps by establishing campuses in China - Hangzhou, Shanghai and Beijing respectively. TCS is even opening a facility in Hungary. These top tier firms are poised to take on full-provider consulting work that was the realm of giants IBM, EDS and Accenture.

## **3. Change accelerates, adaptability is crucial**

Last year, we noted that "skills will find their proper place." However, it may be more accurate to note that certain varieties of skills are often concentrated in broad and temporary ways. For example, while India dominates some skill areas (e.g., DB2 Programming, SQL, Java 2) in the Brainbench rankings, it is not necessarily true that they will continue to do so if economically it makes sense to shift expertise to other programming languages or database structures. There will always be a need to not only to learn, but to develop the "next new thing."

It is also difficult to predict the outcome of specific country and regional specialties over time. For example, in the late 1940's, probably few companies realized the long-term economic impact that would result by building manufacturing facilities and contracting with outsourcing operations in communist China to take advantage of cheap labor. Now an entire infrastructure has built up around this familiar reality, creating an ever-widening trade deficit between the U.S. and China.

China is a particularly intriguing case. Today they have multiple and diverse streams of BPO demand leading straight to Shanghai, Beijing, and beyond. But will they be short-circuited by what some are calling 'theoretical vs. practical' education and poor understanding of applied English, as detailed in Finding #3, or will sophisticated training and workforce planning fuel growth not predictable by engineer graduation rates or a rise in visas granted to young professionals? As is increasingly occurring, demand may drive the foundational support (e.g., government cooperation, better training of young professionals) that the market requires.

However, China is not the only alternate for India as a skilled labor pool choice.

Many countries have reaped the benefits of a single large investment by an outsourcing company and from that seed built proficiencies. Tata of India is about to impact the technical pool in Hungary where they've chosen to build their newest facility.

#### **4. Non-technical skills are expanding in the outsourcing world**

Non-technical skills and roles have become more important on the BPO landscape in the last few years. The most well-known is customer service, with few actual customers surprised to find they are talking to a customer service representative in the Philippines when their new software fails to install properly, or to a Delta ticket agent rebooking a flight from India.

The finance and accounting world may more quickly expand their BPO footprint for two reasons: 1) there is a substantial labor shortage for a wide variety of accounting roles; and, 2) the U.S. may adopt worldwide accounting standards as a replacement for its own rules, which have been subject to scrutiny due to various corporate reporting scandals. It is not a stretch to suggest that more bookkeeping will be completed offshore, as a specifically American style of accounting is already widely performed outside of North America.

Certifying individuals over the Web in non-technical skills represents a frontline trend in online assessments. IT skill certification has become commonplace, part of a standard hiring process now; however, it is not yet commonplace for a person to seek certification in 'soft skills' over the web and still relatively uncommon for an employer to require these types of tests in an unproctored environment. However, this is changing every day and widespread use of various online assessments will likely become as commonplace as certification for common technical skills such as JAVA or C# are today.



## 5. Implications may be global, but are always judged locally

Will efficiencies in offshoring lead to growth both in the U.S. and across the globe, even in areas not known as outsourcing targets? This is the credo of most BPO proponents, who cite the positive long-term effect of innovation and efficiency as the primary reasons to not fret over local job losses.

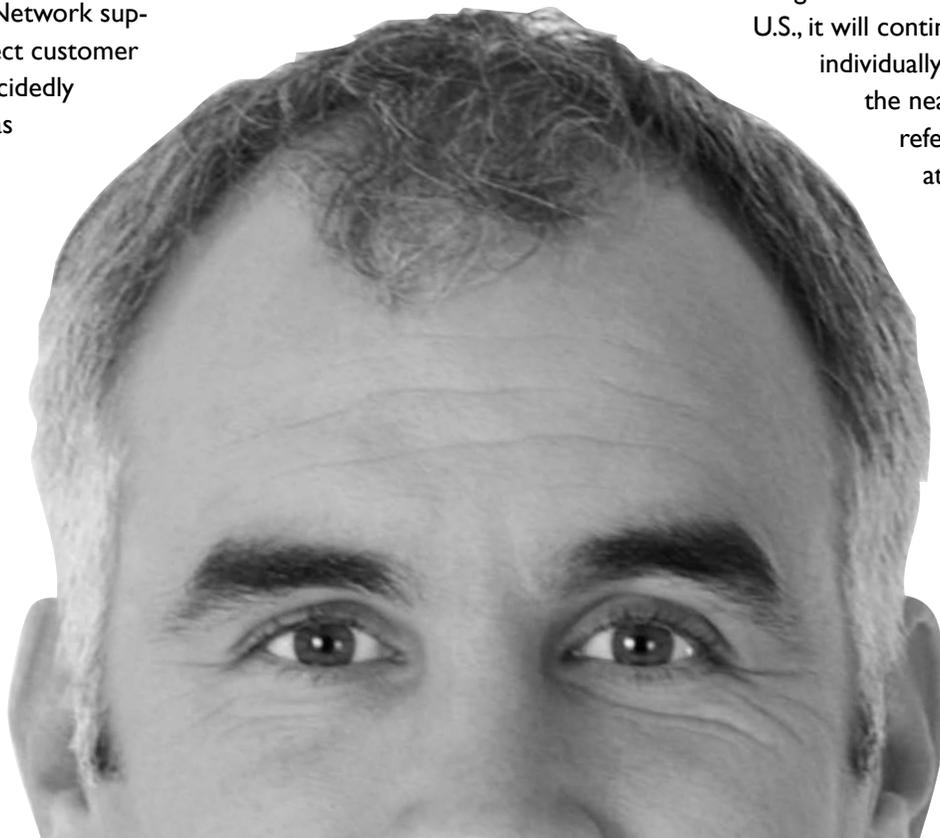
With the cultural change and adjustments to local economies that necessarily occur when new industries come to town, most people care mainly about what happens in their own backyard. They generally find it difficult to see the value in long-term growth abstractions and “trickle down” theories. But indeed it turns out that what happens out-of-view, in other countries, actually can affect business at home sooner rather than later, and not only in the U.S. For example, Thailand has been compelled to alter trade policies and expand into business areas that haven’t characterized their business culture due to the successes of India and China. This was not due to any dramatic failure in their economic growth, but like any other global business leader, they simply wanted to join the party.

Stability, rather than change, will characterize some areas of BPO. For example, software testing is now a ubiquitous part of the Indian tech sector. Network support and direct customer contact is decidedly mainstream as well. Like the

vast sector of manufacturing that supports the production of consumer goods, innovation will smooth the technical and interpersonal hurdles of managing remote development and support activities, creating efficiencies in common IT tasks.

But then there are also the unexpected costs of BPO. The cost of managing far-flung operations is just the beginning. Even Convergys (probably the world’s largest outsourced call center, HR, and AP/AR operation) has stated concerns about the potential effects of a bird flu pandemic, and is sending out disinfectant wipes to most of its associates worldwide. This need to take action globally is a relatively new turn of events for a company based in Cincinnati, Ohio.

So is the expansion of skills and workforce talent a good thing, then? Ultimately, what makes it good or bad is seen in hindsight, or in relation to one’s personal financial and quality-of-life situation. Certainly, it is easier to look backwards than to look into a crystal ball of the future. For example, U.S. auto-makers clearly missed the chance to retool their supply chain and approach to labor, perhaps leading to even greater job losses at home than if they had off-shored some production tasks even earlier than they did. But as inevitable as this non-American global skills proliferation is, for those of us looking at it from inside the U.S., it will continue to be individually judged in the near-term with reference to life at home.



# APPENDICES

## A-I: Country ranking based on number of certifications received

1	United States	103380	59	Macedonia,		114	Bhutan	29	167	Bouvet Island	5
2	India	89374		Republic of	214	115	Fiji	28	168	Ethiopia	4
3	Russian Federation	12704	60	Japan	213	116	United States Minor		169	Turkmenistan	4
4	Ukraine	12002	61	Kuwait	211		Outlying Islands	28	170	Vanuatu	4
5	Romania	10484	62	Bosnia and		117	Barbados	28	171	Tunisia	4
6	United Kingdom			Herzegovina	211	118	Antigua & Barbuda	27	172	Netherlands Antilles	4
	(Great Britain)	7564	63	Afghanistan	203	119	Morocco	26	173	Turks & Caicos	
7	Canada	6470	64	Switzerland	198	120	Namibia	26		Islands	4
8	Belarus	5545	65	Turkey	197	121	Costa Rica	24	174	San Marino	4
9	Philippines	4594	66	Bangladesh	190	122	Uganda	24	175	Liechtenstein	4
10	Bulgaria	3705	67	Jordan	181	123	Benin	21	176	Saipan	4
11	Pakistan	3491	68	Islamic Republic		124	Panama	20	177	Micronesia	4
12	Indonesia	3467		of Iran	147	125	Guatemala	20	178	Eritrea	4
13	Latvia	2482	69	Colombia	138	126	Isle of Man	20	179	Northern Mariana	
14	Australia	1999	70	Portugal	138	127	Saint Lucia	19		Islands	4
15	Mexico	1621	71	Hungary	136	128	Reunion	17	180	Channel Islands	4
16	Germany	1489	72	Puerto Rico	135	129	Zambia	17	181	Heard & McDonald	
17	Brazil	1340	73	Denmark	133	130	Luxembourg	17		Islands	3
18	Singapore	1306	74	Qatar	131	131	Zaire	16	182	Seychelles	3
19	Poland	1282	75	Iraq	130	132	Belize	15	183	Faroe Islands	3
20	Estonia	1040	76	Kyrgyzstan	126	133	Cayman Islands	15	184	Gibraltar	3
21	Lithuania	1005	77	Azerbaijan	123	134	Guyana	14	185	Wallis & Futuna	
22	Slovenia	850	78	El Salvador	122	135	Myanmar	14		Islands	3
23	South Africa	823	79	Iceland	115	136	Guam	13	186	Cote D'ivoire	
24	Nigeria	757	80	Hong Kong	112	137	Tanzania,			(Ivory Coast)	3
25	Italy	730	81	Jamaica	102		United Republic of	13	187	Paraguay	3
26	Malaysia	640	82	Algeria	101	138	Cape Verde	12	188	Senegal	3
27	United Arab		83	Cyprus	100	139	Gabon	12	189	Togo	3
	Emirates	634	84	Peru	95	140	Rwanda	12	190	Burundi	3
28	Czech Republic	561	85	Uzbekistan	95	141	Suriname	11	191	Guadeloupe	3
29	Ireland	544	86	Uruguay	86	142	Falkland Islands		192	Cocos (Keeling)	
30	Saudi Arabia	538	87	Oman	84		(Malvinas)	11		Islands	2
31	New Zealand	538	88	Lebanon	83	143	St. Kitts and Nevis	10	193	Monaco	2
32	France	595	89	Ghana	74	144	Brunei	9	194	Samoa	2
33	Netherlands	492	90	Kenya	72	145	Sierra Leone	8	195	Madagascar	2
34	China	491	91	Trinidad & Tobago	71	146	Papua New Guinea	8	196	New Caledonia	2
35	Armenia	488	92	Honduras	68	147	Yemen	8	197	Djibouti	2
36	Cuba	467	93	Bahrain	67	148	Haiti	7	198	Solomon Islands	2
37	Yugoslavia	464	94	United States		149	Kiribati	7	199	Korea, Democratic	
38	Sweden	441		Virgin Islands	66	150	Vatican City State			People's Republic of 2	
39	Moldova	438	95	Botswana	56		(Holy See)	7	200	Niger	2
40	Slovakia	414	96	Bahamas	54	151	Cameroon	7	201	Tajikistan	2
41	Thailand	335	97	Andorra	52	152	Somalia	7	202	Lesotho	2
42	Egypt	319	98	Malta	48	153	Macau	7	203	Tonga	2
43	Belgium	316	99	Bolivia	48	154	Greenland	6	204	Liberia	1
44	Chile	313	100	Zimbabwe	46	155	Mongolia	6	205	Christmas Island	1
45	Kazakhstan	312	101	Taiwan	44	156	Tuvalu	6	206	St. Helena	1
46	Israel	300	102	American Samoa	43	157	Pitcairn	6	207	Svalbard & Jan	
47	Argentina	299	103	Syrian Arab		158	British Virgin			Mayen Islands	1
48	Greece	296		Republic	41		Islands	5	208	Malawi	1
49	Viet Nam	282	104	Anguilla	40	159	Nicaragua	5	209	Cook Islands	1
50	Croatia	278	105	Mauritius	36	160	Lao People's		210	Palau	1
51	Spain	257	106	Bermuda	36		Democratic Republic	5	211	Mozambique	1
52	Norway	256	107	Angola	35	161	Maldives	5	212	Grenada	1
53	Austria	256	108	Nepal	35	162	Central African		213	Congo	1
54	Albania	245	109	Ecuador	34		Republic	5	214	Burkina Faso	1
55	Finland	238	110	Aruba	34	163	Swaziland	5	215	Gambia	1
56	Georgia	237	111	Korea, Republic of	32	164	Sudan	5	216	St. Vincent & the	
57	Venezuela	218	112	Cambodia	30	165	Comoros	5		Grenadines	1
58	Sri Lanka	216	113	Dominican Republic	30	166	Libya	5	217	Norfolk Island	1

## B-1: Country Skill Rankings (Top 5) Presented in order of popularity

### IT – Database Development and Administration

#### RDBMS Concepts

India	48%
United States	22%
Romania	4%
Russian Federation	3%
Ukraine	3%

#### SQL (ANSI) Fundamentals

India	60%
United States	14%
Russian Federation	5%
Ukraine	5%
Romania	3%

#### MS SQL Server 2000

##### Programming

India	33%
United States	32%
Romania	7%
Russian Federation	5%
Ukraine	4%

##### DB2 Programming

India	71%
United States	18%
Philippines	1%
Romania	1%
United Kingdom (Great Britain)	1%

##### Oracle PL/SQL

India	50%
United States	20%
Russian Federation	5%
Romania	3%
United Kingdom (Great Britain)	3%

### IT – Programming and Development

#### C#

United States	29%
India	22%
Russian Federation	9%
Ukraine	8%
United Kingdom (Great Britain)	6%

#### Software Testing

India	71%
United States	11%
Ukraine	4%
Belarus	2%
Pakistan	1%

#### C++

India	22%
United States	20%
Russian Federation	17%
Ukraine	10%
United Kingdom (Great Britain)	6%

#### Java 2 Fundamentals

India	58%
United States	14%
Russian Federation	5%
Ukraine	4%
Romania	3%

#### .Net Framework

India	47%
United States	19%
Russian Federation	6%
Ukraine	6%
Romania	5%

### IT – Systems and Network Administration

#### Linux Administration (General)

United States	22%
India	16%
Russian Federation	9%
Ukraine	7%
Romania	6%

#### MS Windows Server 2003

##### Administration

United States	37%
India	19%
Russian Federation	6%
Ukraine	4%
Romania	3%

##### Networking Concepts

United States	34%
India	17%
Ukraine	6%
Russian Federation	5%
United Kingdom (Great Britain)	4%

##### Unix Administration (Solaris 9)

India	37%
United States	27%
Russian Federation	5%
Canada	3%
United Kingdom (Great Britain)	3%

##### Information Technology

##### Security Fundamentals

United States	33%
India	12%
Ukraine	6%
Poland	5%
Russian Federation	4%

## B-2: Country Skill Rankings (Top 5) Presented in order of popularity

### IT – Technical Support

#### Computer Technical Support

United States	44%
India	11%
Romania	4%
Ukraine	4%
Russian Federation	4%

#### MS Windows XP Desktop

##### Administration

United States	43%
India	12%
Ukraine	5%
Russian Federation	5%
Romania	4%

#### Technical Help Desk

United States	53%
India	8%
Romania	4%
Ukraine	4%
United Kingdom (Great Britain)	3%

#### Network Technical Support

United States	37%
India	14%
Russian Federation	7%
Ukraine	5%
Indonesia	4%

#### Computer Electronics

United States	46%
India	17%
Ukraine	4%
Romania	3%
Russian Federation	3%

### IT – Telecommunications

#### Cisco Network Support

United States	29%
India	24%
Ukraine	6%
Russian Federation	5%
Romania	4%

#### Telecommunications Industry

##### Knowledge

India	34%
United States	22%
United Kingdom (Great Britain)	8%
Ukraine	4%
Pakistan	3%
Romania	3%
Russian Federation	3%

#### LAN/WAN Communications

United States	25%
India	14%
Ukraine	8%
Romania	7%
Russian Federation	5%

#### Cisco Network Design

United States	32%
India	21%
Ukraine	8%
Russian Federation	6%
Romania	6%

#### WAN Technologies

United States	32%
India	20%
Russian Federation	6%
Ukraine	5%
Indonesia	3%

### IT – Web Development and Administration

#### ASP.NET

India	42%
United States	23%
Ukraine	3%
Romania	2%
Russian Federation	2%

#### HTML 4.0

United States	26%
India	25%
Ukraine	10%
Russian Federation	7%
Romania	5%

#### Java Server Pages (JSP 2.1)

India	62%
United States	19%
Ukraine	2%
Belarus	2%
Russian Federation	2%

#### PHP 4

India	18%
Ukraine	15%
Russian Federation	14%
United States	11%
Romania	7%

#### Web Development Concepts

United States	25%
India	16%
Ukraine	13%
Russian Federation	10%
Romania	6%

### B-3: Country Skill Rankings (Top 5) Presented in order of popularity

#### Finance

##### Accounts Payable Fundamentals

United States	50%
India	21%
Pakistan	6%
Philippines	5%
Canada	5%

##### Accounts Receivable/Billing Fundamentals

United States	56%
India	22%
Canada	4%
Pakistan	3%
Philippines	2%

##### Bookkeeping Fundamentals (U.S.)

United States	63%
India	13%
Canada	5%
Malaysia	3%
Pakistan	3%

##### Financial Accounting (U.S.)

United States	35%
India	22%
Pakistan	8%
Canada	6%
Philippines	6%

##### Payroll Fundamentals (U.S.)

United States	81%
India	10%
Malaysia	2%
Canada	2%
Russian Federation	2%

#### Management

##### Project Management (2005)

United States	35%
India	33%
Romania	3%
Ukraine	2%
United Kingdom (Great Britain)	2%

##### Business Communication

United States	43%
India	21%
Ukraine	4%
Russian Federation	4%
Romania	4%

##### Managing People (U.S.)

United States	50%
India	13%
Belarus	11%
Ukraine	4%
Romania	4%

##### Coaching

United States	53%
United Kingdom (Great Britain)	9%
India	6%
Ukraine	4%
Romania	3%

##### Time Management

United States	44%
India	28%
Ukraine	5%
Romania	3%
United Kingdom (Great Britain)	2%

#### Customer Support

##### Typing Speed & Accuracy

United States	67%
India	12%
Canada	7%
Philippines	2%
United Kingdom (Great Britain)	2%

##### English Vocabulary

United States	50%
India	19%
Romania	4%
United Kingdom (Great Britain)	4%
Canada	3%

##### Listening Skills

United States	48%
India	14%
Ukraine	7%
Russian Federation	4%
Romania	3%

##### Telephone Etiquette

United States	63%
India	10%
Canada	3%
United Kingdom (Great Britain)	2%
Ukraine	2%

##### Customer Assistance

United States	69%
Ukraine	3%
Canada	3%
India	3%
Romania	2%

## B-4: Country Skill Rankings (Top 5) Presented in order of popularity

### Sales & Marketing

#### Presentation Skills

United States	38%
India	25%
Ukraine	9%
Romania	3%
United Kingdom (Great Britain)	3%

#### Marketing Concepts

United States	30%
India	21%
Pakistan	15%
Ukraine	4%
Canada	3%
United Kingdom (Great Britain)	3%

#### Outbound Sales Skills

Canada	33%
United States	28%
India	18%
Ireland	3%
United Kingdom (Great Britain)	3%

#### Marketing Strategy

United States	30%
India	25%
Romania	5%
Canada	4%
Pakistan	4%

#### Negotiation Strategy

United States	41%
India	18%
Romania	7%
United Kingdom (Great Britain)	3%
Bulgaria	3%

### Most Popular Software

#### Computer Fundamentals

##### (Win XP)

United States	39%
India	18%
Romania	5%
Philippines	3%
United Kingdom (Great Britain)	3%

#### Computer Fundamentals

##### (Win 2000)

United States	40%
India	25%
Ukraine	4%
Romania	3%
Philippines	3%

#### Computer Fundamentals

##### (Win 95/98)

United States	50%
India	25%
Philippines	4%
Pakistan	3%
Romania	2%

#### MS Word 2003 Fundamentals

United States	52%
India	12%
Romania	4%
Ukraine	4%
United Kingdom (Great Britain)	2%

#### MS Excel 2003 Fundamentals

United States	51%
India	16%
Romania	4%
Ukraine	3%
Canada	2%

### Health Care Specific

#### Medical Terminology

United States	73%
India	8%
Canada	4%
Pakistan	2%
United Kingdom (Great Britain)	2%

#### Medical Billing

United States	75%
India	15%
Pakistan	8%
United Kingdom (Great Britain)	0%
Canada	0%

#### Anatomy & Physiology

United States	69%
India	9%
Romania	3%
United Kingdom (Great Britain)	2%
Canada	2%

#### First Aid Core Knowledge

United States	69%
United Kingdom (Great Britain)	9%
Canada	6%
Australia	3%
India	3%

#### ICD-9 and CPT Coding

United States	85%
India	11%
Pakistan	3%
Philippines	0%
Ireland	0%

### C-1: U.S. States ranking based on number of certifications received

1	California	7999	18	Wisconsin	1863	35	New Mexico	577
2	Texas	7850	19	Minnesota	1816	36	West Virginia	560
3	New York	6838	20	Tennessee	1779	37	Mississippi	472
4	Florida	5819	21	Arizona	1563	38	Nebraska	442
5	Virginia	5767	22	Massachusetts	1549	39	New Hampshire	370
6	Illinois	5237	23	Alabama	1231	40	Delaware	363
7	New Jersey	4758	24	South Carolina	1208	41	Idaho	295
8	Ohio	4387	25	Connecticut	1154	42	Maine	226
9	Pennsylvania	4299	26	Oklahoma	1153	43	South Dakota	205
10	Georgia	3983	27	Kentucky	1126	44	District of Columbia	201
11	Michigan	3306	28	Kansas	1037	45	Hawaii	184
12	North Carolina	2931	29	Oregon	950	46	Rhode Island	179
13	Maryland	2256	30	Louisiana	845	47	North Dakota	178
14	Colorado	2245	31	Iowa	711	48	Alaska	144
15	Indiana	2169	32	Arkansas	676	49	Montana	142
16	Washington	2023	33	Utah	661	50	Vermont	137
17	Missouri	1929	34	Nevada	639	51	Wyoming	86



## D-1: U.S. States Skill Rankings (Top 5) *Presented in order of popularity*

### IT – Database Development and Administration

#### RDBMS Concepts

New Jersey	12%
California	8%
New York	8%
Texas	7%
Illinois	5%

#### MS SQL Server 2000

##### Programming

New Jersey	10%
New York	9%
California	8%
Georgia	8%
Texas	6%

#### SQL (ANSI)

New York	10%
California	8%
Texas	6%
Washington	6%
New Jersey	6%

#### Oracle PL/SQL

California	11%
New Jersey	8%
Virginia	8%
Texas	7%
Florida	6%

#### DB2 Programming

New Jersey	13%
Illinois	9%
New York	6%
Texas	6%
Michigan	5%

### IT – Programming and Development

#### C#

Texas	13%
California	10%
New Jersey	10%
Illinois	7%
New York	6%

#### C++

Illinois	16%
New York	12%
New Jersey	12%
California	10%
Texas	7%

#### Java 2 Platform Enterprise Edition (J2EE) 1.4

New Jersey	14%
Illinois	9%
California	8%
Texas	7%
New York	6%

#### .NET Framework

New Jersey	13%
Texas	11%
California	9%
Ohio	7%
Florida	6%

#### Visual Basic.NET

New Jersey	9%
Texas	8%
Florida	8%
Illinois	7%
California	7%

### IT – Systems and Network Administration

#### Linux Administration (General)

California	11%
Texas	8%
New York	6%
Illinois	6%
Florida	6%

#### MS Windows Server 2003 Administration

New York	12%
California	9%
Texas	8%
Florida	7%
Illinois	7%

#### Networking Concepts

New York	9%
Texas	8%
Illinois	7%
Pennsylvania	7%
Florida	6%

#### Information Technology Security Fundamentals

Illinois	10%
New York	9%
Texas	7%
Ohio	6%
California	6%

#### Disaster Recovery and Planning

New York	16%
Texas	8%
Illinois	8%
California	7%
Virginia	6%

**D-2: U.S. States Skill Rankings (Top 5)** Presented in order of popularity

**IT – Technical Support**

Computer Technical Support

Texas	9%
Florida	9%
California	8%
New York	7%
Pennsylvania	5%

MS Windows XP Desktop

Administration

Virginia	9%
Florida	9%
New York	8%
Texas	8%
California	7%

Technical Help Desk

Texas	9%
Pennsylvania	7%
California	7%
New York	6%
Florida	6%

Network Technical Support

Texas	10%
California	8%
Florida	8%
New York	5%
Pennsylvania	5%
Indiana	5%

Computer Electronics

Virginia	13%
Texas	9%
Pennsylvania	5%
California	5%
Florida	5%

**IT – Telecommunications**

Cisco Network Support

Illinois	11%
Florida	10%
New York	10%
California	9%
Texas	8%

Telecommunications Industry

Knowledge

California	11%
Texas	11%
Ohio	7%
Pennsylvania	7%
Colorado	7%

LAN/WAN Communications

Illinois	11%
Texas	11%
Ohio	8%
New York	8%
California	7%

Cisco Network Design

Illinois	12%
New York	10%
California	8%
Texas	8%
Florida	5%

WAN Technologies

California	9%
Illinois	9%
Maryland	7%
Texas	7%
Virginia	5%

**Web Development and Administration**

ASP.NET

Texas	13%
New Jersey	8%
California	8%
Florida	7%
Illinois	7%

HTML 4.0

Texas	11%
California	9%
New York	8%
Florida	6%
Illinois	6%

Web Design Concepts

Texas	11%
California	9%
Florida	6%
New York	5%
Pennsylvania	5%

PHP 4

California	13%
New York	8%
Florida	8%
Texas	8%
Virginia	7%

Java Server Pages (JSP 1.2)

New Jersey	14%
New York	14%
Texas	7%
California	7%
Michigan	7%

### D-3: U.S. States Skill Rankings (Top 5) Presented in order of popularity

#### Finance

##### Accounts Payable Fundamentals

California	11%
Florida	9%
Texas	8%
Ohio	5%
Georgia	5%

##### Accounts Receivable/Billing Fundamentals

California	9%
Texas	8%
New York	7%
Florida	6%
Ohio	6%

##### Bookkeeping Fundamentals (U.S.)

Florida	11%
California	10%
Illinois	6%
New York	6%
Virginia	6%

##### Payroll Fundamentals (U.S.)

Florida	11%
Georgia	9%
New York	9%
Ohio	8%
California	8%
Texas	8%

##### Financial Accounting (U.S.)

California	12%
Florida	10%
New York	10%
Virginia	10%
Utah	7%

#### Management

##### Project Management (2005)

California	9%
Texas	9%
New Jersey	7%
Ohio	7%
Virginia	5%

##### Business Communication

New York	21%
California	6%
Texas	6%
Florida	6%
Ohio	4%

##### Managing People (U.S.)

New York	14%
Texas	8%
California	7%
Ohio	7%
Virginia	6%

##### Sexual Harassment Awareness (U.S.)

Texas	11%
Florida	9%
California	5%
Virginia	5%
Pennsylvania	5%

##### Coaching

New York	26%
Texas	7%
Oregon	6%
Ohio	5%
California	5%

#### Customer Support

##### Typing Speed & Accuracy

California	8%
Texas	7%
Florida	6%
Virginia	5%
Pennsylvania	5%

##### English Vocabulary

California	10%
Texas	9%
Florida	6%
New York	5%
Pennsylvania	5%

##### Listening Skills

New York	23%
Texas	8%
California	6%
Florida	6%
Ohio	4%

##### Telephone Etiquette

Florida	8%
California	7%
New York	6%
Texas	6%
Georgia	6%

##### Customer Assistance

Florida	9%
Texas	8%
California	8%
New York	6%
Illinois	5%

**D-4: U.S. States Skill Rankings (Top 5)** Presented in order of popularity

**Sales & Marketing**

Presentation Skills

New York	17%
Texas	10%
Virginia	6%
Florida	6%
California	6%

Marketing Concepts

Florida	15%
Pennsylvania	8%
Ohio	7%
California	7%
Texas	6%

Sales Concepts (U.S.)

Florida	9%
Texas	9%
Ohio	8%
California	7%
Maryland	5%

Advertising Industry Knowledge

California	14%
New York	13%
Ohio	8%
Florida	7%
Texas	6%

Negotiation Strategy

Ohio	13%
Texas	10%
New York	10%
North Carolina	6%
Illinois	6%

**Most Popular Software**

Computer Fundamentals

(Win XP)

Texas	8%
California	7%
Florida	7%
Georgia	6%
Pennsylvania	6%

Computer Fundamentals

(Win 95/98)

Texas	8%
California	7%
Florida	6%
Illinois	6%
Georgia	5%

MS Word 2003 Fundamentals

Texas	9%
Georgia	8%
Florida	7%
California	7%
Virginia	5%

MS Excel 2003 Fundamentals

California	8%
Texas	8%
Florida	7%
Wisconsin	7%
Virginia	6%

MS PowerPoint 2003

Fundamentals

Georgia	14%
Virginia	10%
Texas	8%
California	6%
Illinois	5%
Ohio	5%

**Health Care Specific**

Medical Terminology

Texas	10%
California	7%
Florida	6%
Pennsylvania	6%
Ohio	6%

Medical Billing

Texas	12%
Florida	7%
Pennsylvania	6%
New York	6%
California	6%

ICD-9 and CPT Coding

Ohio	9%
Florida	8%
California	7%
Georgia	6%
New York	6%

First Aid Core Knowledge

Florida	8%
Pennsylvania	7%
California	6%
Texas	5%
Ohio	5%

Anatomy & Physiology

Indiana	11%
Pennsylvania	7%
Texas	6%
New York	6%
California	5%

## REFERENCES

---

- A.T. Kearney (2005) 2005 Global Services Location Index. Retrieved from [http://www.atkearney.com/shared\\_res/pdf/GSLI\\_Figures.pdf](http://www.atkearney.com/shared_res/pdf/GSLI_Figures.pdf).
- Bloomberg (2006, August 14). Brazil Economists Cut '06 GDP Growth Outlook to 3.55%. Retrieved from [http://www.bloomberg.com/apps/news?pid=20601086&sid=a.r17KJjxEzA&refer=latin\\_america](http://www.bloomberg.com/apps/news?pid=20601086&sid=a.r17KJjxEzA&refer=latin_america).
- Bloomberg (2006, August 15). Argentine exports to surpass \$45 Billion this year. Retrieved from [http://www.bloomberg.com/apps/news?pid=20601086&sid=aozCz3xJlVpg&refer=latin\\_america](http://www.bloomberg.com/apps/news?pid=20601086&sid=aozCz3xJlVpg&refer=latin_america).
- Business Week (2006). *The Info Tech 100*. Retrieved from <http://bwnt.businessweek.com/it100/2006/index.asp>.
- California Job Journal (2006, August 6). Could Tele-marketing Be Your Calling? Retrieved from <http://www.jobjournal.com/thisweek.asp?artid=1774>.
- CIO Global Outsourcing Guide 2006. Retrieved from [http://www.cio.com/archive/071506/2006\\_global\\_outsourcing\\_guide.pdf](http://www.cio.com/archive/071506/2006_global_outsourcing_guide.pdf).
- Computer Resource Associates (2004). Cited in Frauenheim, E. & Yamamoto, M. (2004) Reforms, not Rhetoric, Needed to Keep Jobs on U.S. Soil. Retrieved from [http://news.com/2009-1070\\_3-5198156.html](http://news.com/2009-1070_3-5198156.html).
- Economist (2006, May 4). Watch Out, India. Retrieved from [http://www.economist.com/display-story.cfm?story\\_id=6878397](http://www.economist.com/display-story.cfm?story_id=6878397).
- Economist (2006, June 1). India's IT Stars are still Rising Fast. Retrieved from [http://www.economist.com/displaystory.cfm?story\\_id=6969722](http://www.economist.com/displaystory.cfm?story_id=6969722).
- Enterprise Systems (2006, August 14). 2006 ESJ Salary Survey, Part 1: Salaries Grow for All IT Staff Positions. Retrieved from <http://www.esj.com/enterprise/article.aspx?EditorialsID=2087>.
- Koulopoulos, T. (2006, August 11). Quoted in R. Malone, Beyond Outsourcing to Smartsourcing. *Forbes*.
- Maidment, P. (2006, August 1). Where The Best-Paying High-Tech Jobs Are. *Forbes*. Retrieved from [http://www.forbes.com/technology/2006/08/01/technology-careers-jobs\\_cx\\_pm\\_0801techjobs.html](http://www.forbes.com/technology/2006/08/01/technology-careers-jobs_cx_pm_0801techjobs.html).
- Marquez, B. (2006). The Overlooked Effects of Outsourcing. *Insight Business*. Retrieved from <http://www.usc.edu/org/InsightBusiness/archives/spring2005/outsourcing.htm>.
- Monster Intelligence (2006, June). *The Boston Job Market: 2006 Recruiting Outlook*. Maynard, MA: Author.
- New Zealand National Party (2006, August 12). Ozzie Figures Confirm Seriousness of Income Gap. Retrieved from <http://www.scoop.co.nz/stories/PA0608/S00204.htm>.
- Robert Half Technology (2006, June 14). *Robert Half IT Hiring Index and Skills Report*. Menlo Park, CA: Robert Half International.
- Silicon.com (2006, August 2). Leader: Why we don't need more techies. Retrieved from <http://management.silicon.com/careers/0,39024671,39161156,00.htm>

## Dr. Charles Handler

Charles Handler, Ph.D., is the president and founder of Rocket-Hire (<http://www.rocket-hire.com>), a consultancy dedicated to helping organizations use technology and best practices to build effective, legally sound employee selection systems. Dr. Handler is an internationally known thought leader in the development of online screening and assessment technology. Since starting Rocket-Hire, he has specialized in partnering with customers to develop strategies to help increase the efficiency and effectiveness of the employee selection process. In addition to Internet based hiring practices, Charles has also conducted extensive survey work and created training/development and performance management systems for a variety of companies. He has recently launched the online version of his breakthrough publication: *The Buyer's Guide to Online Screening and Assessment* (<http://buyersguide.rocket-hire.com>)

Dr. Handler's work in building new models for selection using technology has appeared in HR publications worldwide. He is a regular columnist for the *Electronic Recruiting Exchange*, *Workforce Management Magazine*, and *SHRM's Employment Management Today Magazine*. Dr. Handler has also played an active role in education, serving as a member of Tulane University's Business Studies faculty, where he currently teaches Recruitment and Selection, and other HR related topics. He is frequently asked to speak about best practices for employee selection at events such as the Society for Industrial/Organizational Psychology's annual conference, the Electronic Recruiting Exchange Annual Expo, and a many other user conferences and workshops.

Dr. Handler is a member of the American Psychology Association (APA), The Society for Human Resource Management (SHRM), and The Society for Industrial/Organizational Psychology (SIOP). He holds a Ph.D. in Industrial/Organizational Psychology from Louisiana State University and has been working as an employee selection specialist for over 10 years.

## Mark C. Healy

Mark C. Healy is a consultant specializing in organizational assessment, hiring, and leadership. He helps business leaders develop human capital strategies and designs hiring, leadership development, and training programs. Mark is a broadly published writer and presents research in a variety of venues, including the Society for Industrial/Organizational Psychology – of which he is a member - and the Decision Sciences Institute. He is the Communication Director for the Bay Area Applied Psychologists organization online. Mr. Healy teaches General and Business Psychology at De Anza College in Cupertino, California. Mark received an M.A. in Industrial/Organizational Psychology from The University of Akron.

## Brainbench, Inc.

With more than 6 million registered users and more than 800 different assessments, Brainbench, a PreVisor Company, is the global leader in measuring the individual skills, abilities and personality traits that drive a company's bottom-line success. Brainbench helps clients test, track, and improve their employees' vital job characteristics, using the industry's largest ISO 9001:2000 library of tests. Their online assessment solutions improve hiring, retention, training success, customer satisfaction, and profitability for organizations such as Advance Auto Parts, British Telecommunication, Citigroup, IBM, Manpower, OPM, TEKsystems, the U.S. Army and Wells Fargo and over 5000 other organizations.

For more information visit [www.brainbench.com](http://www.brainbench.com).