

21st Century Human Capital Management: Adapting to the Demands of Change

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PERSPECTIVE

In 1999, Bob Stambaugh asked me to provide a chapter for the forward-thinking IHRIM book *21 Tomorrows*. I was pleased to be among the respected colleagues who contributed, and I still reference many of the works. Last year Lynne Mealy, IHRIM's current president and CEO, gave me the honor once again by inviting me to make a contribution to the second edition of this book.

Reviewing my *21 Tomorrows* chapter written almost 10 years ago (“HR 20/20: Clarifying the View of HR in the Year 2020”), I reflected on what was deemed important then and how much has—or has not—changed, as well as what still needs to happen. That chapter emphasized three areas: the demographics of the new workforce, the changes in how people will conduct business along with what that “business” will look like, and the impact technology will have on both.

While we have made progress, research suggests that we are still not where we need to be. I believe that tomorrow's dynamics in the three areas of change—multiplied by the effects of their influence on each other—will continue to have a major impact on the role of business, the nature of work, the way work is accomplished and the human resources (HR) organization itself. This chapter provides an update on the future outlook for these areas, along with additional predictions and recommendations for the HR practitioner.

After almost 40 years in the HR and HR technology profession, I remain confident that this profession has the potential to be a change agent in any organization. It is my hope that readers will find some nuggets in this chapter that help in the transformation of their roles and their companies as we continue to reinvent Human Capital Management (HCM).

THE CHANGING WORKFORCE

The makeup of the workforce is shifting and will continue to do so in nearly every respect. Significant alterations in the pool of available talent will occur both in measurable demographics and in the accompanying worker attitudes and preferences.

Demographics and the Diversification of Worker Groups

Four generations of completely diversified workers comprise the workforce: traditionalists,¹ baby boomers, Generation X and Generation Y. These generations represent the reservoir of talent upon which HR will draw: the workforce past, the workforce present and the workforce future.

Shaped long ago by historical influences, the generations differ widely. The attitude of each generation toward technology is a good example. Broadly speaking, traditionalists are more comfortable not using technology, baby boomers find that it holds them back, those in Generation X deem it necessary, and for Generation Y-ers, technology is a routine part of each day.² HR should be aware that differences among the groups are just generalizations to help establish awareness, not hard-and-fast rules. There are often exceptions to the characteristics described in this section.

The generations' concerns and value to an organization will evolve with time. HR professionals who understand each generation's perspective and the forces that shaped it will have the following advantages and more when leveraging talent:

- HR can give each generation the right form of management, compensation, training and even technology to best retain top performers and maximize productivity.
- HR can improve succession planning with respect to upcoming talent shortages as the generations shift.
- Each generation has innate work experiences, habits and expectations, and therefore conflicts might occur.³ HR must enable the diverse groups to work together side-by-side.
- Generational awareness will help HR prepare to understand the needs of emerging groups that follow in the footsteps of employees currently in their 20s.

HR spends a lot of time developing practices and policies that are standardized for all employees. However, the diversity among the four groups of workers makes it impractical to think that one size will fit all. HR must get away from the notion that uniform procedures will bring optimal results.

The first step is to gain an understanding of each group. The following is a decade-by-decade analysis describing the generations.

Those born in 1950 and earlier

These individuals, consisting of traditionalists and large numbers of baby boomers,⁴ grew up in a tough but stable post-war world. They worked hard and expected their sacrifices to pay off in both material and personal ways. Most employers of an older workforce benefit from this group's loyalty. To enjoy the payoff from extensive overtime while they can, aging baby boomers often choose

to retire early. For many, the future will also herald the emergence of second careers.

Those born in 1950 and earlier are becoming HR's "workforce past." To take advantage of the longstanding base of knowledge, expertise and experience these senior workers represent, HR must look ahead by leveraging this group's capabilities as an excellent, qualified source of contingent workers (part-timers, temporaries, contractors and consultants).

Even more importantly, HR should groom these workers as mentors and recruiters for younger generations. Rapid workforce change coupled with emerging new talent makes knowledge retention and transfer critical. Long-term employees—storage vessels for company history and knowledge—are extremely valuable for passing on their repository of information.

Those born between 1951 and 1960

Workers in this timeframe are all baby boomers, representing an extensive resource. They entered the workforce with the knowledge that they were special and they had a voice. They believed they could change the world and hard work would lead them to the top.

These individuals' skills are maturing. HR should be carefully grooming them and ushering them into managerial roles. Worker shortages will create a demand for their experience in middle management and leadership positions. This is the primary age group that should be shepherding tomorrow's workers.

Fortunately, 76 percent of baby boomers will continue working past retirement age, according to a 2005 Merrill Lynch study.⁵ HR is responsible for carrying out well crafted succession plans that develop and leverage this segment as effective leaders.

Those born between 1961 and 1970

Upon entering the workforce, this group faced a world tumbling down. With the dissolution of the nuclear family, many workers had learned to face challenges alone. They lacked the foundation of a conventional home environment and possessed no real hero figures.

Because many of them resist strong ties to a given establishment, workers in this group will require compelling reasons for continuing to work for the same employer. Retention of top talent is crucial, and due to individualistic viewpoints of many in this age group, HR should build more flexibility and a larger array of choices into compensation and benefits programs. Work style and the structure of the work environment, along with learning and career planning opportunities, should also provide give-and-take.

Those born in 1971 and later

These workers seem to have found some stability, primarily based on self-reliance. Even more than those 10 years ahead of them, they are tough minded realists. Most of them are familiar with technology and open to the electronic economy of the future, and many belong to Generation Y.

Conscientious career planning will benefit these individuals in the days ahead, and HR will do well to encourage their eagerness to gain knowledge and move forward. The task will be to direct their energy toward planning their careers along the lines of development and upward mobility within the organization. HR must leverage these young, talented workers by finding out what it is they want to do, then structuring a learning environment that retains them by helping them grow.

Shifts in the Demographic Status Quo

The average age of the global workforce will increase as baby boomers—by far the largest grouping—grow older. Many of them will remain in the workforce later in life, possibly even changing careers. Generation Y, a much larger group than Generation X, will provide a new wave of human capital.

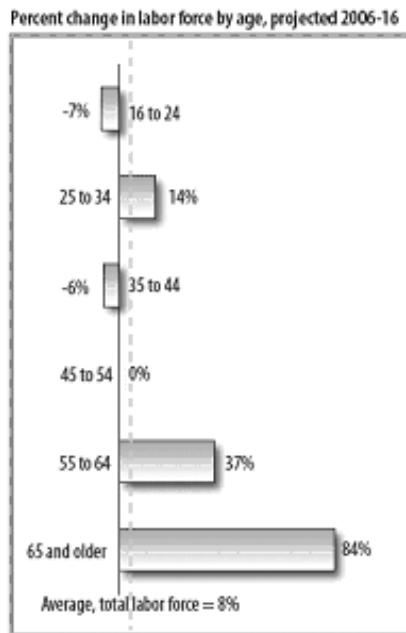


Figure 1: From 2006 to 2016, the number of U.S. workers 65 and older will grow more than 10 times faster than the average.⁶

The rise in numbers of contingent workers has been and will continue to be overwhelming.⁷ Training managers to evaluate and manage workers who are logging variable hours in unsupervised situations will become another challenging task for HR. Telecommuting, where work is time-driven but no longer time-bound, is becoming more and more common.

By leveraging networking technology, teams of workers will remain in contact around the clock. “Because of shifting demographics, workers of the future will be younger and older than before. They will live in different countries and have unorthodox work arrangements. Highly mobile, they will not be wedded to one company or career as the New Economy puts a premium on the literate, the empowered, and the master of technology. It is this workforce that Human Resources must manage and satisfy.”⁸

According to the U.S. Bureau of Labor Statistics, the number of women in the workforce is increasing at a faster rate than the number of men and will continue to do so through at least 2016. The workforce participation rate of men will continue to decline. “By 2016, about 59 percent of women and 72 percent of men are expected to be in the labor force.”⁹



Figure 2: The gap between the percentage of U.S. working men and women is narrowing.¹⁰

Numerous workers today have family for whom they are responsible, whether it be a spouse, children, parents or grandparents. The number of children per family will decline, but there will be no decline in the divorce rate. There will continue to be large numbers of single people in the workforce.

With respect to cultural diversity, it is reasonable to assume that eventually the term “minority” will disappear from the workforce. While the number of whites in the workforce will grow the most through 2016, the number of blacks, Asians and other races will grow more rapidly.¹¹ The fastest growth will be exhibited by the “all other races” category.¹² Due to the increasingly heterogeneous racial mix, cross-cultural communication will soon take on a life of its own.

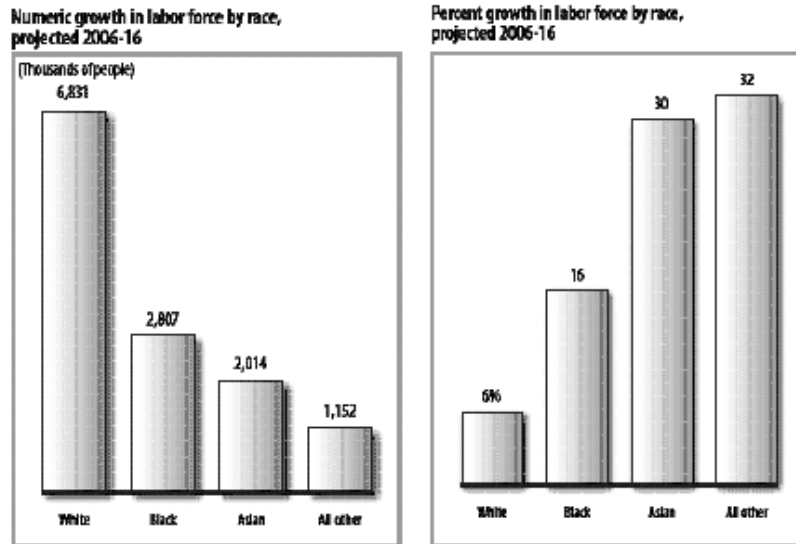


Figure 3: By 2016, whites in the U.S. workforce will have the greatest numeric growth, while other races will grow by the highest percentages.¹³

Some predict that the dominant language by 2050 will be Chinese. Yet there is another language, of a very different, futuristic kind, vying for attention: the language of genomics. Genetic code will soon transform the economy and society.¹⁴ We address this topic later in this chapter in the discussion of the radical changes to be introduced by technology.

Competition for a Diminishing Workforce

The rate at which the world population is growing is declining, and as Figure 4 indicates, the U.S. Census Bureau forecasts that this will continue at least through 2050.

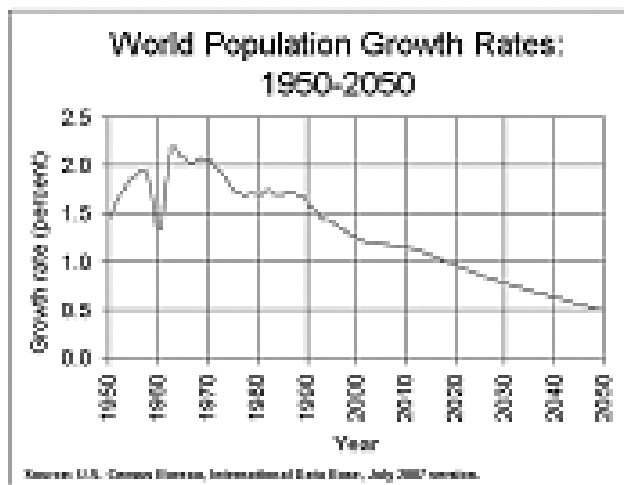


Figure 4: Projected decreases in world population growth will contribute to an ongoing decline in the size of the workforce.¹⁵

Overall, we can foresee that the drop in the number of workers will be accompanied by a decline in the numbers of exemplary performers. As older workers retire or change careers, they will move out of the mainstream workforce. Baby boomers in particular will make an impact as they enter less responsibility-intensive occupations, decrease their involvement in their careers or leave the workforce entirely. Competition for top talent will therefore become more and more aggressive.

It was only 25 years ago when workers would spend their entire careers with a single employer. In some industries and professions today, it is remarkable for an employer to retain an employee for two or more years. Moving from the Industrial Age to the Knowledge Age has altered the attributes HR looks for in the ideal worker and what workers want in their work environment.

Instead of long-term careers with stable employers, college graduates seek employers who will give them the most knowledge the quickest. These graduates also look for flexible compensation, a fantastic work culture and choices for work/life balance to suit their individual lifestyles. “The movement of human capital around the world will be influenced by lifestyle and economic growth areas, regardless of borders, and that’s a new phenomenon of the future.”¹⁶

The HR practitioner needs to be a relentless, ever-vigilant competitor in the global war for talent. While job seekers will have increasing numbers of options, employers will struggle to design strategies to address the attraction and retention dilemma. A recent study conducted by Manpower Inc, a top staffing firm, revealed that out of 1,275 U.S. employers, 44 percent indicated they had trouble filling positions. A full 45 percent would have hired more individuals with university degrees during the prior six-month period if suitable candidates had been located.¹⁷

The war for talent is becoming more and more ferocious in the knowledge economy, where the focus is shifted from tangible assets to intangibles such as patents and people. “The economy truly is changing from one in which many employees are interchangeable to one in which knowledgeable employees are key to competitive success. Given this change, recruiting and keeping the right people would be key even if the labor market weren’t quite so tight.”¹⁸

The U.S. Department of Labor anticipates a shortage of 10 million workers by 2010.¹⁹ However, IT managers will “be feeling pressure by 2010 and very much pressure by 2015. We may be a couple million workers shy in 2010 and 10 million shy around 2015,” ComputerWorld indicates.²⁰ This shortage of 10 million applies to technology alone.

We will see a noticeable shift to outsourcing in the next five years. As is already occurring with manufacturing, organizations will rapidly move intellectual jobs to the lowest cost providers. Education improvements in countries like India, Poland and China will make them low-cost producers. We expand on this topic later in the section entitled “Impact of the Global Economy.”

In addition to the knowledge economy, global markets are increasing the ferocity of the war for talent. For example, according to futurist James Canton, Ph.D., “For the first time in the United States there’s a brain drain of human capital going to Singapore and Europe for genomics research particularly around stem cells.”²¹

It is likely that the brain drain to which Canton referred will impact all jobs and professions, not just genomics research. He also stated that “human capital will be attracted to fast-growth, high-tech centers that will be located in Africa, South America and Asia, and not just Europe and the United States.”²² However, companies should not rely on outsourcing as a simple answer to the talent shortage. While outsourcing may be an effective solution for certain companies in certain situations for certain business processes, it is neither an easy nor reliable way to address an upcoming talent deficit—because many countries that are major outsourcing providers today are beginning to see the impact of their own talent shortages.

The successful HR department of the future will leverage existing talent via succession planning and training. Proactively and aggressively securing the best people is also important. Both top performers and headcount in general will be in high demand.

Strategies for Attracting and Retaining Employees of the Future

While HR policies and procedures will continue as grassroots HR functions, far more important will be the innovation and flexibility required to achieve and perpetuate employer-of-choice status. In light of the significant variations among generations and age groups, the HR practitioner will require know-how and insight when it comes to incenting, training and creating customizable compensation packages. Making meaningful connections with each group will be critical for attraction, retention and organizational productivity.

What will drive the employer selection process? In general, the diversified workforce of the future will work and stay working for you on the basis of a number of characteristics.

Access to knowledge and technology in a learning environment

Top talent will not settle for working with antiquated technologies. As technology change gains momentum, an employer of choice must keep pace. The majority of desirable workers are upwardly mobile, seeking an environment of learning where they can enhance and develop their expertise, learn new skills and take on additional responsibilities. “What we are finding today is that the more training workers get, the more likely it is that the employer will retain them.”²³

People want access to knowledge. Be prepared—as you give them this access, they will want more. Workers across the globe, and Generation Y-ers in particular, are accustomed to finding close to anything they want at any time via the Internet.

Participatory management

The worker of the future requires a voice. Organizational hierarchies have already begun to flatten and will continue to do so. Across the board, all workers of the future desire to participate in company decision-making and will prefer to be intensely involved in any form of organizational change.

Total compensation

The benefit plans of 25 years ago were stringent, uniform and straightforward—everyone had the same health insurance and same retirement plan. The successful HR department of the future will further advance the existing flexible benefits environment to make customization available across all compensation, not just benefits.

Employees will work when and how they need to work, and a company will determine a worker's value according to a composite. Salaries will be defined in terms of compensation. For example, an organization might value a worker at \$100,000 yearly. Payment of that amount will be discretionary, within the bounds of legality. Younger employees might include additional education in their compensation. A married employee might take some of it in child care. Some might want parental care, deferred compensation or early retirement. Employees will be able to take more vacation one year than another.

Flexibility in forms of compensation will be a big motivator for choosing an employer in the future. As a general rule, salaries won't necessarily be increasing, but they will instead become more variable based on employee lifestyle. Just as we saw the evolution of flexible benefits in the 1970s and 1980s, that kind of flexibility will cover the entire spectrum of compensation in the years ahead.

An attractive corporate culture

An organization attracts those who agree with the tenets of its culture. HR must carefully evaluate culture-related decisions as they pertain to an organization's talent requirements, as well as the needs and wants of available workers of the future. This is no small feat, as it includes baby boomers, Generation Xers and the up-and-coming workforce from Generation Y. All workers want to be influential in company decision-making.

The more clearly HR defines and propagates corporate culture across all mediums, the easier it will be to attract like-minded employees. Culture will also continue to be a key identifier for customers and suppliers. A successful organization builds a widely recognizable culture that values and treats people as primary assets and seeks employee input. As keepers of the corporate culture, HR professionals take responsibility for providing a sense of purpose, accommodating and celebrating diversity, and allowing active participation in company decisions by giving employees a voice. The extent to which an organization provides a learning environment also contributes to corporate culture, as does work/life balance.

Addressing work/life balance will require flexibility in the years to come. Variations in marital status, family situations and values among workers will demand increasing numbers of choices for adjusting this balance, because one size does not fit all.

HR has an important role to play in creating work practices for a diverse work population. Telecommuting, flextime and part-time options, as well as PCs and entire home offices furnished by employers, are now all supported by technology that allows work to be done and decisions to be made from anywhere, anytime. Therefore, HR practitioners should be creative when addressing work/life balance. Why not innovate by establishing a temporary or part-time environment in which the 50-plus population will want to work? What about giving the new mom or dad opportunities to balance hours between work and home?

A New Wave: Generation Y

When it comes to the talent shortage, will it be Generation Y to the rescue? Sometimes called echo boomers or millennials, this new wave of workers numbering more than 70 million was born between 1977 and 2002.²⁴ One third of Generation Y is from a racial minority.²⁵ A good number have already begun to work, following on the heels of the smaller Generation X, which is composed of those born between 1965 and 1976.²⁶

While Generation Y mainly represents the offspring of the 72 million baby boomers, the values and preferences of Generation Y are far different from their parents'. "Raised in the late 1970s and '80s—the height of the self-esteem movement in parenting—Gen Y is an extraordinarily confident group, and its members are entering the workforce with high expectations for both themselves and their employers."²⁷ It will be HR's challenge to understand and leverage these self-assured workers.

Research indicates Generation Y-ers will write their own rules—and they anticipate having careers and plan for work/life balance and home ownership, some even while in their teens.²⁸ A suitable career is more important to Generation Y-ers than simply finding a job, and for an overwhelming majority of them, the rewards of job satisfaction take higher priority than monetary returns.²⁹

These young workers like to keep their options open. As new hires, they rapidly change careers, frustrating employers who put a great deal of effort into recruiting and retaining top talent.³⁰

Familiarity with technology and rapid change

HR will have Generation Y-ers entering the world of work who have never lived in a world without technology. Modern advancements such as instant messaging, DVDs and cell phones are second nature to the majority within this group. Some were using computers in kindergarten and earlier.

Reinforcing familiarity with the electronic world is the active implementation of technology programs in schools. These initiatives give youth a running start with applying technology to the world of education and work.

“We’ve rapidly been exiting what could be described as a *linear culture* - a world where life, communication and education moved in streams, in sequence and in a structured order. That culture is being replaced by a *non-linear culture*, a faster-paced, more random and uncertain world where we work, live, love and learn.”³¹

The Generation Y world is non-linear, running at a rapid pace and full of limitless stimuli. Generation Y-ers are accustomed to numerous concurrent sources of information. “Our culture has conditioned them to expect speed and change.”³²

Many Generation Y-ers seem to have it all as they prepare more effectively than any other generation to enter the workforce. Yet some of them will lack skills HR has taken for granted in the talent pool.

Training needs

While Generation Y can help fill the job deficit, many will need training in specific competencies, ethics and other work skills. While numerous Generation Y-ers grow up in technology-savvy environments, their comfort level with technology for academic and personal uses does not always translate smoothly to the world of work.

According to Hudson Institute president Herb London, “...Most high-school graduates simply lack the literacy and numeracy skills necessary to thrive in the technology-based knowledge society. The number of students pursuing and obtaining degrees in computer science and other information technology fields is plummeting. And not coincidentally, high-tech employers from Silicon Valley to NASA to government intelligence agencies are scrambling to find homegrown talent.”³³

Generation Y-ers are highly adept at using technology for social networking. One of HR’s tasks will be to help them translate the use of social networks on a strictly social basis to taking advantage of social networks in a work environment. Once they gain critical skills, the independent, individualistic, change-oriented Generation Y-ers should thrive in the world of mobile knowledge workers, role-based portals, personalization, and learning and travel opportunities.

“In an age of information and innovation, that means children must be grounded in timeless truths but prepared for constant change. Formal learning can no longer be confined to the first 18 or 21 years of life. Instead, learning must become a part of life, as constant as change itself. Only those individuals, businesses, and nations capable of coping with this change and adapting to it will be able to flourish in the 21st century.”³⁴

Many workers today, age notwithstanding, carry some Generation Y traits. In general, employees will become increasingly selective about where they work, what

tasks they perform and the kinds of compensation they receive. Generation Y challenges the status quo, and will also challenge HR in the areas of corporate culture, loyalty, recruitment and retention.

Generation Y-ers are accustomed to continuous feedback, getting recognized in school, by coaches and by parents for their achievements. This translates into the world of work: Earlier generations were used to having an annual review, but Generation Y might experience resentment or lack of direction if regular communication from superiors is absent.³⁵ Therefore it is critical for HR to prepare for this generation's preference for feedback.

For years HR has worked with the traditionalist and baby-boomer "live-to-work" mentality. While the Generation X mindset has been "work to live," the primary emphasis for Generation Y is work/life balance itself. Creating options for work/life balance is pivotal to remaining an employer of choice in upcoming years.

Increasing Complexities in the Legal and Regulatory Arena

Legal and regulatory issues were related primarily to payroll, benefits or diversity in the past. For many years HR has been involved in compliance around such regulations as the Occupational Safety and Health Act (OSHA), Employee Retirement Income Security Act (ERISA) and Health Insurance Portability and Accountability Act of 1996 (HIPAA). These are examples of regulations specific to the United States, and comparable laws extend throughout the world. Country-specific rules and regulations, workers' compensation issues, payroll tax filing and reporting, and more all represent responsibilities that will continue as basic HR functions.

However, the Enron debacle expanded HR's function to include responsibility for compliance in the executive ranks. There is a plethora of new rules focusing on corporate governance and accountability for upper management. The United States' Sarbanes-Oxley Act (SOX) is a case in point. While many consider SOX to be primarily financially-oriented, HR must track reporting hierarchies, authority, roles, responsibilities, positions and titles. Compliance with SOX also means tightened requirements and increased levels of detail and accuracy in upper management reports. HR must now work closely with upper management to conduct strict tracking and sign-off procedures.

Corporate malfeasance is a global phenomenon, and SOX is only one country's reaction. Most importantly, SOX and similar acts are not the end of regulation at the executive level. As the legal and regulatory police—both blue collar and corporate—HR can expect additional legislation along similar lines in the future.

The need for vigilance will also increase due to globalization, which multiplies the variety and number of compliance areas. Each country or region has different laws. As we will see in the next section on technology, the role-based nature of a portal is very effective for delineating laws and regulations that apply to a specific worker in any given region.

THE IMPACT OF TECHNOLOGICAL INNOVATION

Technological change has shaped HR dramatically over the years, and will continue to do so at increasing speeds. Possibilities we can hardly imagine today might soon be commonplace.

Technology: Building Momentum

Like a jumbo airliner gathering speed as it takes off from the runway, technology has been changing faster and faster—and there’s no end in sight. History tells part of the story, and developments waiting in the wings indicate a quickening of technological change with each generation. If for 25 years we used the mainframe and in the next 10 years jumped to client/server architecture, only to find it replaced by Internet applications, what’s next? Will every new technology have half the shelf life of the last one?

Developments came slowly at first. The mainframe era lasted close to 25 years before the introduction of dumb terminals and the mid-sized computer. These early systems were mainly batch-oriented, and HR leveraged them for certain financial functions such as payroll to help ease the burden of routine administration activities. The application software industry in itself was still in its infancy in the late 1960s, but as the personal computer (PC) gave rise to client/server architecture, HR soon began to realize the benefits of computerization. Networked systems and intranet/Internet applications yielded vast benefits in the form of self-service, analytics and other collaborative functions.

HR processes readily evolved as technology ramped up, and innovative applications from the HRMS community appeared to fill HR’s demand for specialized advancements in such areas as e-recruiting and e-performance applications. The goal: automating the end-to-end HR business process to drive productivity through HCM.

The visual portrayal of paradigm shifts in technology in Figure 5 shows how each leading technology is maximally useful for a short period before its peak drops off as another technology moves in to replace it.

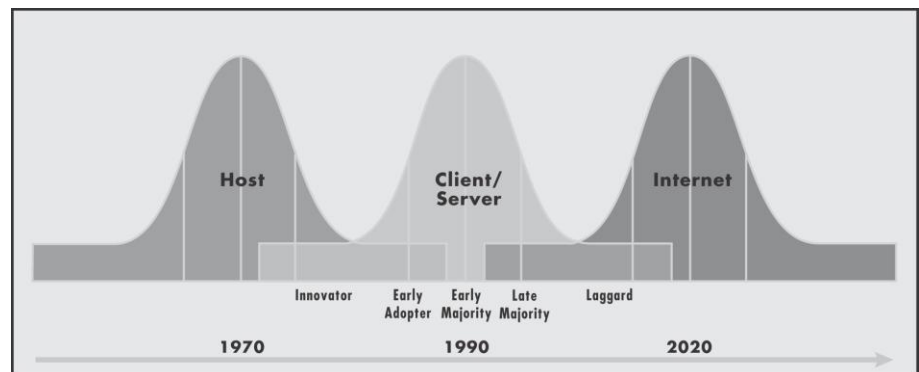


Figure 5: Technology marches onward.³⁶

The HR Technologist

During the host era, the primary user of HR and all other systems was the IT professional. Technology evolved, and the primary user during the client/server era became the departmental user—in HR's case, it became the HR staff. As more and more organizations move to the Internet economy, for the first time HR technology is appearing on the desktop of every employee.

Now an integral part of any business, technology will be increasingly indispensable in the future. The HR practitioner therefore must become a technologist to effectively leverage innovation and bring about measurable productivity improvements from it. Just as an engineer, CIO or operations manager wields technology as a regular component of the job, to thrive in tomorrow's corporate world HR must regard technology as second nature, a tool of the trade. From becoming a formidable contender in the war for talent to leveraging analytics that help drive corporate strategy, HR professionals of the future must fully understand and actively exploit technological advancements to be competitive.

Era of the Knowledge Worker

With the Internet as the foundational delivery mechanism for company information, HR systems will expand to embrace participation by every employee. Technology will enable employees to own larger and larger portions of the HR process as portals and related collaborative systems become integral to every HR infrastructure.

Technology is under continuous transformation, becoming smarter, cheaper, easier to use and less structured. As this occurs, the working environment will also evolve to become more and more about the access of knowledge. We are moving quickly into an information-intensive world where knowledge is accessible by all and continuous learning and knowledge retention are critical.

Studies by the Hudson Institute underscore the influence of the Knowledge Era on the workforce. "Consider how 20th-century conceptions of career and time have already begun to collapse. Yesterday, workers in industrial economies went to school from the age of 5-18, earned vocational certificates or degrees from 19-25, paid their dues from 25-35, rose through the ranks from 35-50, ascended to senior levels of management and business ownership from 50-65, and then retired. But in a knowledge-based society, workers will go to school throughout their careers, rise and fall within multiple organizations, work in virtual offices for virtual organizations, and be productive well beyond the age of 65."³⁷

Highly structured data environments of the past have given workers only a small percentage of the knowledge that they actually need for optimization. The available knowledge has been segregated and scattered across written materials, data storage systems, information accessible electronically and third-party sources.

The Internet, coupled with supporting technologies such as sophisticated document management systems and telephony, now opens the door to accessing

unstructured data. We're adding voice clips, text and more to make information not only acceptable but easily digestible.

Designing portals that are increasingly intelligent will result in more advanced use of the Internet, thus boosting the agility of the knowledge worker. For example, the more often a user interacts online with Amazon.com, the more the site "knows" about that person. With every order, Amazon.com's system learns more about a person's style, tastes and preferences, making correlations between past purchases and available merchandise. The system itself suggests new items to purchase and takes advantage of cross-selling opportunities without human intervention.

The same will be true of HR systems. The more people use online information via a portal, the more data portal systems will gather about how well various types of individuals digest that information. Portals that incorporate languages such as XML and intelligent self-service will identify for HR professionals whether a person is left- or right-brained, whether HR should deliver training interactively or establish a mentoring program, what kind of incentives are appropriate for workers in a given country and cultural environment, and so on.

Knowledge workers will have fingertip access to anything they need to do their jobs. Material will be customized and digestible for each individual in the form of better, cheaper, faster and easier technology as HR pushes out role-based information in precisely the right way. Intelligent self-service and portals will provide just-in-time knowledge in a form that fits a given person's work style.

As we will see later in the chapter, future technologies resulting from cognitive science and studies of the human brain will bring enhancements to the workforce that reshape the way HR addresses training and learning for the knowledge worker.³⁸

The Near Future in Technology

As we step into the technology of the future, our view encompasses what's just around the corner: more widespread use of collaborative technologies and the interchangeability of collaborative tools. Ubiquitous computing leads us to the edge of what we can currently grasp.

The collaborative, connected enterprise

The technology of the future will be both collaborative and connected. We can see the first hints of this as greater numbers of companies implement pure-Internet systems that allow collaboration among employees, customers and suppliers.

Increasingly widespread use of intelligent self-service is imminent. Also called smart self-service, this indispensable collaborative HR tool—best administered through a portal—integrates content and analytics, and filters information based on a user's role. The result is secure access to material as well as improved

decision-making. The portal recognizes an individual's role, work styles and preferences, and supplies quick access to material required for task completion.

Intelligent self-service via an employee portal means just-in-time information delivery to the knowledge worker. Portal delivery will become increasingly personalized and customizable, furthering training initiatives via intuitive learning. Service Oriented Architecture (SOA) allows the workplace portal to bring in transactions and content from secure sources both inside and outside the organization.

The near future will also bring increased use of HR scorecards that are coupled with workforce analytics and decision trees. A convergent business model will drive transaction processing, and we'll be seeing increases in process automation and the use of online analytical processing (OLAP) for analyzing raw data.

Collaborative systems turn data into organizational intelligence so many people can work together on a common task, problem or issue. Collaboration integrates both internal and third-party content, transactions, and analytics with back-office applications. The entire collaborative enterprise is connected via an intranet or the Internet. HR applications specifically designed for collaboration are XML-based for Internet systems integration. Ideally, information is available company-wide through a portal that maintains data security by revealing only the material authorized by a user's role upon sign-on.

The collaborative, connected enterprise of the future will provide the workforce with higher and higher percentages of all available knowledge in increasingly palatable, individualized forms. As a result, we will see better and more rapid decision-making across those organizations whose HR departments are wielding collaborative technology effectively.

Interchangeability of devices

The future will undoubtedly bring faster and cheaper access to accurate real-time HR information. Data access tools will be interchangeable for HR staff and the rest of the workforce. We can already see this happening as innovative enhancements to telephony, video, e-mail and fax are making collaboration easier and increasingly convenient. These and other communication tools are blending to the point where it is increasingly simple to convert one to the other.

For example, advancements in wireless technology will soon integrate phone, handhelds such as personal digital assistants (PDAs) and personal computers. Voice activation and automated answers will be increasingly sophisticated to the point that they will be a more acceptable customer service offering.

Systems turn voice into text, and convert text to knowledge that is made available across networks. Interactive media makes collaboration almost second nature.

The worker of the future will be able to work anywhere, anytime—and on any device. This represents both good news and bad news for the HR professional.

Employees interested in true work/life balance will have more options and more control. They'll be able to work where it's convenient for them to work, and strongly motivated employees can become maximally efficient. For example, a two-hour commute will mean two hours will now be spent working from home or at another convenient location, and if one happens to lack access to electricity or wired networks, satellite will be an easy alternative.

The bad news is that the workaholic will now have access to work 24 hours a day. There are always individuals who are not good at balancing work and day-to-day life. When people are able to work all the time, some workers will abuse the situation and suffer from burnout. Other bad news comes in the form of unexpected workloads for HR because employees can work at varying times. This means no quiet time for HR anymore.

As collaborative options meld, we will see the resulting ubiquitous access create great improvements in employee effectiveness and efficiency. Ubiquitous computing will blur the boundaries we now see as walls and lead the way toward startling developments in the future.

Bizarre but Likely: Radical Changes

In the past, people made things in a manufacturing-centric economy. Now people service things and other people in today's knowledge-centric economy.³⁹ As the dynamics of the Knowledge Age point toward increasing emphasis on human capital, we face the likelihood of technologically enhanced humans and biologically enhanced robotics—perhaps not in the near future, but likely before we're prepared. Unfortunately, people can only see technology as far out as they can touch it.

The ongoing challenge for HR will be balancing the use of technologies with the variability inherent in the human element.⁴⁰ As lines become blurred, HR must also distinguish between the two.

In *Technofutures: How Leading-Edge Technology Will Transform Business in the 21st Century*, Dr. James Canton combines research and little-known facts of the technologically feasible with imaginative exploration of future realities. Founder of the Institute of Global Futures,⁴¹ Dr. Canton describes in his book what he calls the four Power Tools that together will drive future change: computers, networks, biotech and nanotech.⁴²

Computers⁴³

Computers of the future will become intelligent agents that make decisions and deliver information to workers on demand. Reduced in size, systems will be far more powerful, intuitive and interactive. Dr. Canton even sees the computer as becoming a close model of the human brain.

Computers already dwarf the efficiencies of human-run processes. Onboard computers manage aircraft flights and recommend action in threatening

conditions. Computerized data mining and analytic functions suggest online purchases and help make business decisions. The list goes on. Reliance on computers to manage and improve upon functions customarily performed by humans will increase as computers provide valued extensions of human faculties and boost organizational productivity.

The computer-in-a-shoe and a mouse that reads emotions already exist. By 2015, some scientists predict that microchips will be embedded not only in appliances, but in clothes and human hearts and brains. It's possible that in many instances computers will think with and for people. The highly functional computers of the future—robots—will be able to see, hear, smell, taste, touch and talk. Computers are beginning to embody the dream of artificial intelligence.

Software is critical in and of itself. "Software may be the digital cognitive glue that makes this emerging intelligent infrastructure of commerce work. It means now that what I can do as a human, I can do so much more with the right software tied to the right infrastructure that's tied to the right on-demand global supply chain for products or services."⁴⁴

Cognitive software can help maximize the capabilities and productivity of a workforce increasingly limited in numbers.⁴⁵ "The next generation of cognitive software will help us make decisions faster, make connections faster, and build networks and supply chains. The task will be to enable companies to build tools so human beings can multiply their capability set. That change will occur by 2020."⁴⁶ Transformations in cognitive software will bring an additional HR challenge: integrating the technology in a way that empowers, instead of threatens, workers.

Networks⁴⁷

Earlier we mentioned the upcoming interchangeability of telephony, video, e-mail and fax. The convergence of the Internet, digital TV and various wireless communication devices will incorporate communication technologies into a network of networks that will transform the way the world does business. This vibrant network system is already in the making.

Human capital strategists must balance the corporation's struggle to compete in e-business with the basic human need for rest, coupled with computers' tireless capability of working non-stop.

Biotech⁴⁸

The revolutionary manipulation of DNA to redefine human life, health and science, biotech uses the microchip to advance gene research. The biotechnology industry creates biochips, which resemble the integrated circuits of a PC but incorporate portions of DNA. Biochips placed in analytical instrumentation sharply reduce the time and costs involved in biochemical experimentation.

As scientists increase their understanding of the human genome, affordable analytic tools based on biochips will help physicians predict, diagnose and custom-

treat illnesses. The computer world will boost translation of human genetics to make people healthier and increase life expectancy. We will see smart drugs, implants and innovative medical devices and bio-engineered food as better medical care become commonplace.

The HR practitioner must be prepared for the possibilities of an artificially enhanced workforce. “Cognitive science and HR have not become friends, and part of the reason they haven’t become friends is that we have not invested in this science and know very little about it,” stated Dr. Canton in an interview. “Some people may be enhanced in the future by having actual devices at the nano scale embedded in their brains to give them advanced capabilities they need for their jobs.” Such capabilities might include total recall memory or the ability to download and learn several spoken languages in an afternoon. However, given advanced future research surrounding cognitive science and the human brain, “we may be able to create new kinds of learning, human capital enhancement tools and education to help people acquire the same types of capabilities without having to have invasive or synthetic augmentation.”⁴⁹

Nanotech⁵⁰

The fourth of Dr. Canton’s Power Tools, nanotechnology refers to extremely minute, atomic-level engineering. To grasp this radical, hardly imaginable phenomenon, consider Star Trek, where the mechanical race called Borg powers and controls drones.

Industry leaders such as IBM, Lucent and Sun, in company with scientists from well-respected institutions—MIT, Cal Tech and NASA, for example—apply extensive resources toward nanotechnology. Their efforts to develop equipment one-thousandth of the diameter of a human hair might one day result in injecting machines into the bloodstream for such purposes as attacking cancer cells. These infinitesimal machines could also rearrange atoms to create food, energy, steel and water.⁵¹

Is this science fiction? After all, it was only a little more than one hundred years ago when Henry Ford first introduced his horseless carriage to the world in 1896. In light of technology’s quantum leaps in the last 50 years, the ideas outlined from Dr. Canton’s work—as well as numerous others’ predictions—could easily become day-to-day reality. HR’s future points to awareness and preparedness. At the same time, we must continue to deal effectively with concrete issues we face in the present.

Security Re-Defined

Technology is transforming and perfecting itself, taking on a life of its own. Paradoxically, as much as we desire to be connected, we’re also creating an entire body of technology simply to help us remain separate. The Internet in particular has given rise to the concept of data privacy. Powerful steps are being taken in the security space to make sure people, organizations and political entities only reach

information they have the right to see. From an international standpoint, privacy is an extremely complex issue.

Certainly security will continue to be an issue—for awhile. By 2015, however, computing will be so ubiquitous that security will almost become a non-issue. Technology will have become impossible to control and monitor. Implications for HR are again in the form of both good news and bad news. The good news is that, as an HR professional, you will have access to almost limitless information about everything. The bad news is that others will also have access to a lot of information about you and your company.

IMPACT OF THE GLOBAL ECONOMY

Hudson Institute's book *Workforce 2020* emphasizes that growth in the economy hinges on “a vibrant workforce, and the vibrant workforce of the future would be shaped by new technologies, openness to immigration, training and education, and liberal trade policies.”⁵²

Globalization is propelling us to the point where the diverse workforce, worksite flexibility and technology will make immaterial the actual location where work is accomplished. One direct result of this development is that e-business will move outsourcing to the forefront. Organizations of all sizes will be global.

However, future trends in outsourcing herald something very different than just letting a specialized firm handle payroll. Outsourcing might involve processes, talent, content, development, manufacturing or an entire department. Some might be competency-, time- or finance-driven. Technology's speed of change will increase the attractiveness of outsourcing of all kinds because of the difficulty of keeping current with the latest innovations that boost competitive advantage.

From a technology standpoint, outsourcing will be transparent because all a worker requires is a browser and an Internet connection. Work will occur from anywhere, anytime—and from anybody. HR will be responsible for the virtual mobile worker in a virtual global workplace full of telecommuters, contractors, contingent workers and more.

The cultural aspects of globalization are the most difficult. HR professionals must be experts at bridging cultural diversity gaps and making sure worksites in each location do not become isolated. Active communication and collaboration should transcend distances and time zones.

The employee portal represents a critical tool for managing international worker populations. Role-based collaboration via a portal will become increasingly valuable as HR addresses workers of varying cultures and culture-based motivations. Portals will handle multilingual applications and translation issues on the fly.

When it comes to fluctuating worldwide economic conditions, HR will need to be aware and nimble. The growth of e-business and its powerful impact on both the

global economy and the nature of competition is a case in point, forcing HR to either capitalize on opportunities or sink beneath them. As always, the forward-thinking HR practitioner must master the skill of leveraging analytics to maximize employee productivity in times of scarcity or plenty. We have seen how economic boom and bust—such as the rise and fall of the dot-com era—drives corporate decision-making. The faster an HR department can arrive at intelligent business responses to external and internal variables, the healthier an organization will be as it rides the waves of change.

FROM TANGIBLES TO INTANGIBLES

Today, only 15 percent of our resources are tangible, represented by easily quantifiable equipment, products and plants. A whopping 85 percent of our assets are intangible: knowledge capital and people.⁵³

If we looked back 50 years, we'd find that statistic to be just about the opposite. However, throughout these years, we've seen no change in our accounting practices, which were developed for tangible asset accounting. HR must look for better ways to account for intangible assets, emphasizing the entire people side of the business.

The Intellectual Capital Model

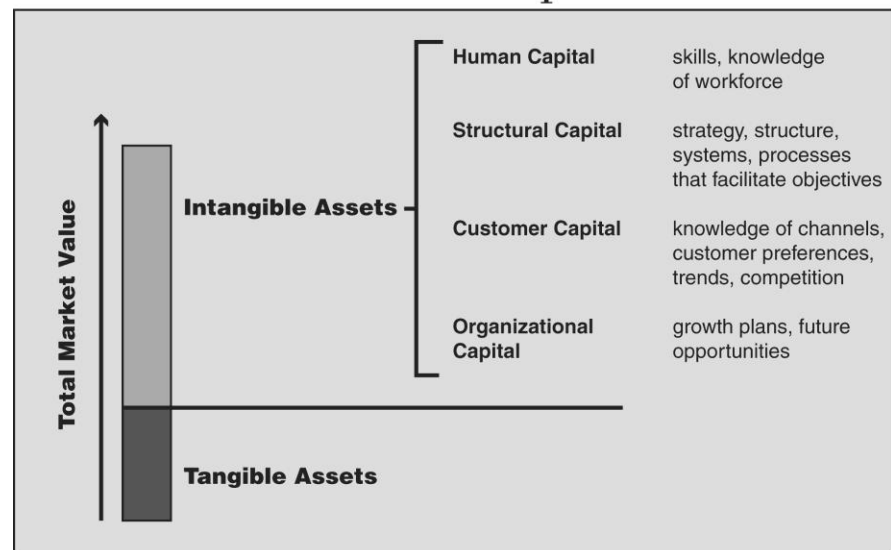


Figure 6: We categorize the difference between total market value and book value as intangible assets.⁵⁴

Intangible Assets

“Behind the tremendous productivity improvements enabled by information technology are the people who do all of the knowing, building, planning, collaborating, executing, supporting, and competing.” While executives understand

a cost focus, it does not account for the dynamics of people. Human capital is the key strategic factor that drives the return on all tangible capital investments.⁵⁵

People will continue to become an increasingly critical part of an organization's intangible assets. HR therefore must adapt its financial practices to the unprecedented: accounting for intangibles.

Future employees will plan on staying with an employer for only about three years. Unless HR can retain a worker, that person becomes a very fleeting intangible asset. The successful HR practitioner will become extremely skilled at identifying true talent and increasing the amount of time those particular people want to stay with the company. This has extensive monetary implications due to the high cost of hiring top performers.⁵⁶ An updated financial system will clearly account for the fact that the practice of retaining the best workers and turning over non-performers does have bottom-line implications.

Technology and Intangibles: A Balance

We've looked at the tremendous power of technology to propel us forward. However advanced technology becomes, it is and will be limited in its ability to accommodate for the ambiguity inherent in organizations driven by the unpredictable: human beings. In his article *Hard Systems, Soft Systems: New Challenges for Twenty-first Century HR Systems, Stakeholders, and Vendors*, Bob Stambaugh elaborates on this ambiguity and the importance of the quality of life as well as systems quality.⁵⁷

Our good news/bad news predictions for the future underscore the necessity of embracing the realities of intangibles. The good news is that we have much better technology at our fingertips than we did 25 years ago. The bad news? Technology is changing so quickly, we have difficulty keeping up with it. HR must be smarter than technology when it comes to the variability of the intangible.

Stambaugh outlines eight criteria that distinguish between the requirements of what he appropriately calls the structured world (technologically supported and quantifiable processes) and the unstructured world of intangible assets, where quality of life is paramount. To summarize:

- Identifying distinct functions and addressing them with stakeholders in isolation detracts from effective holistic systems thinking.
- Variability promotes longevity, and too much specialization leaves organizations vulnerable to destruction. HR must standardize with caution because the greater the human component, the greater the need for flexibility.
- Human capital often means disorder of a necessary kind. HRIS should support structure in some key areas but keep an open space for questioning, creativity and the overall nurturing of human capital.

- Because measurable goals can be meaningless by the time HR realizes them, HR must abandon rigid strategies in favor of strategizing, scenario planning and incorporating flexible processes. Extrapolating from metrics mainly works with the tangible and stable.
- HR and HRIS need to consciously but informally foster a culture of collaboration for the sharing of ideas in an arena meaningful to all employees, not only to management systems.
- Advanced HR reporting of the future will involve storytelling, a comprehensive, big-picture communication tool that frees executives from the distraction of detail and helps them combine their experience with intuition for decision-making.
- Boundaries are still important when eliminating silos. To avoid the destruction of critical but perhaps hidden intangible assets, HR and HRIS must carefully assess the full impact of structural changes on all aspects of the workplace and preserve limits when necessary.
- In a healthy system, change will be evident everywhere. Too much stability indicates sickness, or at best, a lack of growth.⁵⁸

THE PRACTICAL SIDE OF THE FUTURE: HR AS AN ANCHOR

HR functions have long been the backbone of every organization. This is true whether or not they have been acknowledged as such. HR will continue providing the stability that anchors the world of work.

HR professionals are accustomed to wearing many hats—and obviously the HR role is not becoming any simpler. Amidst workforce and technology changes, HR organizations will be extremely valuable as a consistent force that guides the adaptation to change, like quality shocks and good steering on an automobile. However, HR practitioners must be careful to manage their time and energy efficiently amidst the increasing complexities of their role.

HR also faces the organizational challenge caused by resistance to change. For example, certain managers can only manage what they can see, creating a backlash in the face of efforts to collaborate and innovate. HR must be prepared for this.

The often-discussed shift from record-keeper and administrator to strategic business partner will become a reality as long as it is a shift HR embraces—because it is up to HR to change its own self-image. HR practitioners should begin seeing themselves as the main organizational infrastructure and view workers as valued intangible assets. HR must focus on building processes and HR practices that align managers and employees with the overall goals and objectives of the organization.

Becoming a true business partner is also about implementing best practices. These involve building an infrastructure that makes the right information available to the right people, building an employer-of-choice environment, creating compensation structures that are competitive and enticing, finding innovative ways to retain

talent, and more. To the extent that it is possible, HR practitioners will become predictors of the future as they examine competencies the organization will require and conduct workforce planning and optimization. Measuring the impact of these activities will also continue to belong to HR.

Looking into a future fraught with upheaval, some have questioned if HR will continue to exist. It certainly will—if HR attends to the responsibilities outlined in this section. The HR department that stays back-office operational will be the one that is outsourced.

Although HR might retain the connotation of being strictly a department, we're moving to a blended environment where everyone who has responsibility for a worker also has ownership of human capital. More and more, HR professionals will be delegating specific activities to line managers. It will be the line managers who perform many functions previously assigned only to HR such as hiring, managing performance, and assigning access to knowledge.

ADDITIONAL RECOMMENDATIONS FOR THE HR PRACTITIONER

Today, the access to technology is phenomenal. Things we never dreamed of 25 years ago, we can now do quite easily. For example, we can bring together information from many sources into one cohesive portal that is usable by all employees. This is a massive shift, and it occurred in just the last 10 years. The future, then, will bring untold technological advancements.

Can fallible human beings keep up with mercurial technological changes? HR needs to continually address the balance between technological structures and the human element. The practical, people-side of business has never been an exact science. At the end of the day, HR will and must do what needs to be done, moving forward within the bounds of systems and people.

HR will continue to adeptly interpret, cushion, and leverage powerful upcoming developments to effectively respond to change while advancing the productivity of human capital. “When things slow down a bit I’ll get to this,” is a common statement. Yet things are never going to slow down. We need to figure out how to get things done now—because the world of work will only change more quickly in the future.

HR practitioners need to be better at understanding employees and delivering information to them. Here are a few more tips on the practical side:

- Learn how to measure the impact of people on the bottom line.
- Learn how to communicate the impact of your human capital to management.
- Develop practices that are in alignment with the overall goals and objectives of the organization.
- Be the owners of your corporate culture.

- Don't be afraid to delegate to line managers certain tactical tasks and responsibilities formerly associated only with HR.
- Learn how to cover every aspect of talent management: planning, recruiting, performance, learning, career development, succession planning, compensation, and measuring and reporting.
- Don't be afraid to be strategic.

Organizations of the future will be human capital asset-driven, and those that leverage best practices in the HR discipline must be leaders, not laggards. For HR professionals, the challenge is to step up to that leadership role.

AN ATTITUDE OF ADAPTABILITY

Because change is not only certain but also increasing in velocity, only a mindset of resourcefulness and flexibility will keep HR above water. To succeed as an HR professional in the future, awareness and adaptability will be mandatory.

HR will continuously revolutionize its thought leadership out of sheer necessity. Instead of being blindsided by change, the nimble HR organization will ride the waves of internal and external forces to capitalize on opportunities and minimize negative effects of the unavoidable.

The future will bring new solutions to old problems and new, unforeseen problems accompanied by the need for innovation to address them. Solving problems generated by change will increase the challenges inherent in the HR function. Dramatic shifts are ahead, resulting from combined, interdependent transformations in the workforce and technology, and compounded by the way these interact with global economics to transform businesses. These shifts will drive HR's adaptation for survival.

As we have seen, the future will range from predictable demographic shifts to bizarre futuristic technologies that impact the workforce, HR, human resources information systems (HRIS) and world economics. Instead of asking, "How do we become a better strategic influence?" HR professionals might be wondering how to categorize a worker whose brain, eyesight and strength have been reinforced by biochips.

This will be the world in which HR must evolve and adapt.

"The critical asset of the 21st century is knowledge. The critical skill is adapting quickly to change. The secret is learning—learning to adapt to a new digital economy will be the most strategic weapon of the next millennium. Adapting to the changing technology, the changing customers, the changing products and services, and the changing rules of the digital economy is *necessary*. Digital Darwinism means the end of companies stuck in the Industrial Age."⁵⁹

Regardless of what HR departments are called in the future, HR has the potential to own intangible assets and corporate culture. The world today is about

knowledge, which makes this the most exciting time in the history of HR and human capital. In this knowledge economy, the primary asset in all organizations is human capital—HR’s domain.

¹ Born prior to 1946, traditionalists preceded the baby-boomer generation.

² Lancaster, L.C. and Stillman, D. *When Generations Collide: Who They Are. Why They Clash. How to Solve the Generational Puzzle at Work*. Wheaton, IL: Harper Business, 2003.

³ Ibid.

⁴ Those of the baby-boomer generation, 72 million strong, were born between 1946 and 1964.

⁵ Miller, Kerry. “Gen Y Rewrites the Rules for Family Biz.” *BusinessWeek*, March 19, 2007.

[www.businessweek.com/smallbiz/content/mar2007/sb20070319_730816.htm] Page 2, para 5.

⁶ *Occupational Outlook Quarterly*. U.S. Bureau of Labor Statistics, Fall 2007, page 42. Illustration courtesy of U.S. Bureau of Labor Statistics.

⁷ Joseph H. Boyett of Boyett & Associates supports this assertion with respect to the United States in his discussion of workforce trends at www2.msstate.edu/~dd1/Boyett.htm.

⁸ Henson, Row. “Human Resources in 2020: Managing the Bionic Workforce.” *Benefits & Compensation Solutions*, 2001.

⁹ *Occupational Outlook Quarterly*, page 43.

¹⁰ Ibid. Illustration courtesy of U.S. Bureau of Labor Statistics.

¹¹ Ibid, page 44.

¹² Ibid. The *Occupational Outlook Quarterly* states, “The ‘all other races’ category includes American Indians and Alaska Natives, Native Hawaiians and other Pacific Islanders, multiracial individuals, and any other people who do not identify themselves as white, black, or Asian.”

¹³ *Occupational Outlook Quarterly*, page 44. Illustration courtesy of U.S. Bureau of Labor Statistics.

¹⁴ “Genomics will Transform Economy and Society,” news release, November 21, 2003. Juan Enriquez, chairman and CEO of Biotechnology and former director of the Life Sciences Project at Harvard Business School, emphasized that human capital is of primary importance in the knowledge economy. Genomics (the language of genetic code) will have a revolutionary impact on numerous industries. The biggest future challenge will be regulation.

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¹⁶ Canton, James, Ph.D., futurist, as interviewed January 21, 2004, by Row Henson, HCM fellow, Oracle Corporation.

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[www.computerworld.com/action/article.do?command=viewArticleBasic&articleId=112240] Para. 3.

²¹ Canton, James, Ph.D., as interviewed by Row Henson.

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²³ Jamrog, Jay. AMA Business Brief adapted from *The Perfect Storm: The Future of Retention and Engagement*, page 6.

²⁴ Armour, Stephanie. "Generation Y: They've arrived at work with a new attitude." USA Today, November 6, 2005. [www.usatoday.com/money/workplace/2005-11-06-gen-y_x.htm] Sidebar, para. 1.

²⁵ Ibid., para. 30.

²⁶ Ibid., sidebar, para. 1.

²⁷ Miller, Kerry. "Gen Y Rewrites the Rules for Family Biz."

[www.businessweek.com/smallbiz/content/mar2007/sb20070319_730816.htm] Page 1, para 3. This statement is in reference to "Welcome to the Gen Y Workplace," BusinessWeek, May 4, 2005.

[www.businessweek.com/bwdaily/dnflash/may2005/nf2005054_4640_db_083.htm]

²⁸ Canton, James, Ph.D., as interviewed by Row Henson.

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³⁰ Armour, Stephanie. "Generation Y: They've arrived at work with a new attitude."

[www.usatoday.com/money/workplace/2005-11-06-gen-y_x.htm] Para. 4.

³¹ Piotrowski, Tom. "Connect the Dots." Center for Parent/Youth Understanding (CPYU). [www.cpyu.org/Page.aspx?id=76874] Para. 3.

³² Ibid., para. 16.

³³ "Beyond Workforce 2020: A Hudson Institute Program Overview." Hudson Institute. [www.hudson.org/index.cfm?fuseaction=workforce_narrative] Para. 5.

³⁴ Ibid., para. 4.

³⁵ Armour, Stephanie. "Generation Y: They've arrived at work with a new attitude."

[www.usatoday.com/money/workplace/2005-11-06-gen-y_x.htm] Para. 23.

³⁶ This illustration extrapolates from a drawing on page 19 of *Inside the Tornado* by Geoffrey A. Moore (HarperCollins Publishers, Inc., New York, NY, 1995). Mr. Moore's drawing shows the first two of the three bell-shaped curves.

³⁷ "Beyond Workforce 2020: A Hudson Institute Program Overview."

[www.hudson.org/index.cfm?fuseaction=workforce_narrative] Para. 9, bullet 3.

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⁴³ Canton, James, Ph.D. *Technofutures*. The bulk of this discussion about computers is sourced from Canton's coverage of this topic on page 11.

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⁴⁵ Ibid.

⁴⁶ Ibid.

⁴⁷ Canton, James, Ph.D. *Technofutures*. The bulk of this discussion about networks is sourced from Canton's coverage of this topic on pages 11-12.

⁴⁸ Canton, James, Ph.D. *Technofutures*. The bulk of this discussion about biotech is sourced from Canton's coverage of this topic on page 12.

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- ⁴⁹ Canton, James, Ph.D., as interviewed by Row Henson.
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- ⁵¹ Ibid. This marks the end of the coverage of nanotech.
- ⁵² "Beyond Workforce 2020: A Hudson Institute Program Overview." [www.hudson.org/index.cfm?fuseaction=workforce_narrative] Para. 2.
- ⁵³ Lev, Baruch. "Intangibles: Management, Measurement, and Reporting."
- ⁵⁴ Source: Oracle Corporation.
- ⁵⁵ Lange, Mark. "Human Capital Management: Strategies and Technology for Competitive Advantage." *Heads Count: An Anthology for the Competitive Enterprise*, PeopleSoft, Inc., Pleasanton, CA, 2003, page 335.
- ⁵⁶ Henson substantiates this with a quote from Jac Fitz-enz of The Saratoga Institute in "HR in the 21st Century: Challenges and Opportunities." *Heads Count: An Anthology for the Competitive Enterprise*, PeopleSoft, Inc., Pleasanton, CA, 2003, page 256.
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Author: Row Henson, an HCM Fellow, Oracle Corporation

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Oracle Corporation
World Headquarters
500 Oracle Parkway
Redwood Shores, CA 94065
U.S.A.

Worldwide Inquiries:

Phone: +1.650.506.7000

Fax: +1.650.506.7200

oracle.com

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