

**THE KNOWLEDGE CHAIN: SUCCEEDING IN THE INFORMATION AGE**  
**A Speech to the Canadian Club of Toronto, January 25, 1999**  
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Good afternoon. I'd like to begin with a story about a knowledge worker. Early in this century, Charles Steinmetz, an inventor and electrical engineer, was called to fix a generator problem that had puzzled other experts. He arrived at the plant, walked around the giant machine, looked and listened. Then he took a piece of chalk and drew an "X" on one component. "Replace that," he said, "and your problem will be solved."

Sure enough it was. When he sent in his bill, the owners of the plant were shocked by the large amount he requested. A thousand dollars. "How can you justify charging a thousand dollars for ten minutes work?" they asked. Steinmetz replied: "Well, \$1 is for the chalk I needed to make the X, and \$999 is for knowing where to put it."

Steinmetz was an unusual figure. He was a knowledge worker and was highly paid for his skills. He stood out in a world where most people needed little schooling to perform their industrial or agricultural jobs.

Today knowledge workers have become the most important competitive advantage for industries in the developed world. Without a full complement of skilled employees a company will falter. It will become an also-ran in today's tough marketplace. And that leads me to my message: success with knowledge workers requires attention to each of five links in a chain.

The chain begins with educating them and ends with providing an environment where these employees contribute and are motivated to stay with your company. I'll discuss these links and show why every step is so important. I'll draw many of my examples from the company I manage and know best: Motorola Canada.

### ***CREATING KNOWLEDGE WORKERS: THE ROLE OF EDUCATION***

The first link in the chain is our educational system. Businesses depend on Canada's post-secondary institutions to create knowledge workers. True, trained talent comes here from other countries. But we also look to our own colleges and universities to help fulfill the growing demand for knowledge workers. How are these institutions doing? I would give them high marks. The quality of our graduates is excellent. No wonder Canadian and American companies are in hot pursuit of our grads.

But as outstanding as these post-secondary programs are, they can't do the job alone. We must look to the earlier grades where the process of filling the pipeline really

begins. High school students, and even elementary students, need to be motivated to explore careers in science and technology so they can prepare themselves for university. And we as parents can play an important role here. When I was a young girl, I played with dolls and mechano sets, thanks to my parents. And when I decided to study engineering in university, my parents supported me, even though their friends wondered why. Yet my parents never wavered – they held their ground. And that's one of the reasons I'm here today.

In 1998, Canada graduated fewer than 5,000 computer scientists and engineers, while the demand was for twice that number. Motorola Canada takes these figures very seriously. Over half of our Canadian workforce is engaged in research and development. A shortage of skilled workers can affect our operations. We in the private sector must do everything we can to expand the supply of knowledge workers. Exploring non-traditional sources of talent is a start.

A subject near to my own heart is: women in engineering. Consider these figures: There are 160,000 engineers in Canada and only 5% of these are women. Progress at universities has been excellent where women make up 20% of the engineering students. But we need to encourage more women in science and engineering because we are simply not making good use of our resources.

Aboriginal students under the age of 30 represent a fast growing population in Canada. The Aboriginal community is encouraging its youth to take math and science and to consider engineering as a career. And, for the first time in Canadian history, students with disabilities comprise a sizeable group in the university and college system. Companies need to work with universities and colleges to ensure that we draw upon such sources of talent. There is much to be gained when education and the business community partner together. Universities win because they have access to increased resources. Companies benefit through co-op and intern programs that groom future employees.

Motorola Canada is proud to be one of a growing list of Canadian companies that supports our universities. We match employee donations to universities, and, we recently announced our partnership with McMaster University's new Department of Computing and Software. Our donation will result in McMaster being eligible for a further contribution by the Ontario Ministry of Education's Access to Opportunities Program that is dedicated to expanding our pool of knowledge workers.

When education, business and government combine forces to create knowledge workers, they strengthen the first link in the knowledge chain.

## ***RECRUITING KNOWLEDGE WORKERS***

The second link in the knowledge chain is recruiting talent. Finding workers is a major challenge for every high tech firm -- and it's a challenge that will only intensify in the years ahead. These figures, compiled by the Information Technology Association of Canada and International Data Corp. (Canada) show: 60 percent of Corporate Canada says that the shortage of skilled high-tech workers has caused project delays. In the IT sector at least 20,000 jobs are now unfilled. In the transportation, utilities and communications sector almost half of companies say the shortage of high-tech workers has slowed their overall growth. The problem is still worse in other countries. Seven out of 10 companies worldwide complain they face serious shortages of knowledge workers. Many are scaling back on new systems development because of this.

What's the answer? Expand your recruitment to groups that have been excluded or have played a marginal role in the job market. Our full-time diversity manager has hosted Community Partnership Fairs to which we invite individuals from the First Nations, the Canadian Institute for the Blind, the Canadian Hearing Society, and similar organizations. We encouraged other firms to attend our Fair, so they too could consider hiring from these groups. Of course, companies must also rely on more traditional approaches to attracting talent. To survive a company must have an excellent reputation, offer competitive salaries, and more. And that more should include excellent working conditions, attractive projects, and the chance to develop crucial skills. Some employees are attracted to companies with opportunities to apply for positions across Canada, or around the world. Use this to your advantage. The worldwide web is important recruitment tool. It makes it easy for candidates to apply. Implementing an Employee Referral Program with rewards for employees who successfully recommend friends and family can also yield positive results. And that brings me to my next point.

## ***DEVELOPING TALENT***

The third link in the knowledge chain consists of developing the talented people brought into the company. Education does not stop when an employee earns a degree. In fact, the term "Commencement" aptly describes graduation. That's when learning as a lifelong pursuit begins. It's estimated that a third of what an electrical engineer learns and half of what a computer scientist studies are out of date within three years of their graduation. Whatever the exact figures, it's clear that skill sets need regular updating no less than do your company's information systems. That way knowledge workers can keep abreast of the ever-changing needs of the industry. Training has other advantages: it allows you to promote from within. It rewards those who have shown commitment to your company. It lessens the need to search the highly competitive external market for scarce talent.

And training must not be limited to your top employees. When we examined our job postings within Motorola we found that the lack of education posed a systemic barrier to the advancement of women. To remedy the situation, we approached York University, and asked them to teach their “Bridging Program” at our company. This has allowed our employees to upgrade their skills so they can enter university. We’re also committed to the ongoing development of our employees. Today Motorola University has operations around the world, including here in Canada, where it is a non-degree granting institution.

### ***MAKING FULL USE OF YOUR COMPANY’S TALENT***

The fourth link that must be forged in the knowledge chain is making full use of the talent in your company. As the Nobel laureate economist Friedrich Hayek remarked: “Practically every individual ... possesses unique information.” But it can be put to use only with their “active cooperation.” Companies must create the circumstances that foster this “active cooperation.” How do we realize the potential of these knowledge assets?

To begin with, knowledge workers are more productive when they have a clear sense of direction — a vision of where the company is going. No one can help you achieve corporate goals unless they know what they are and buy into them. Employee communication is important. Knowledge workers are also more productive when they come together in cross-disciplinary teams. Silos of information hurt productivity. Project oriented teams with diverse membership encourage employees to think in new, valuable ways.

At Motorola Canada we’re fully persuaded about the power of such cross-functional teamwork. We even used them to develop our annual strategic plan. Our planning teams are made up of high potential people from all levels, not just senior management. These teams are sensitive to a broad range of challenges and ideas. In the end they create a far better plan than any elite group of managers could. And knowledge workers are more productive when they tap into extensive information and to each other. Networked computers with access to E-mail and the Internet are only a starting point. In a far-flung company, like Motorola, still other steps are taken to make sure communication is seamless. I know it is no surprise to you that we actually rely on our pagers, cell phones, the Mike network, and Iridium satellite phones to help us keep in touch.

### ***RETAINING YOUR TALENT***

The fifth link in the knowledge chain is retaining your talented knowledge workers. Retention is a much more critical issue today than in the past. While companies used to own the means of production, today the means of production — brainpower — does not belong to the company. And employees know they’re free agents. Peter Drucker and

other commentators have pointed out that people's loyalties are shifting away from their employer and toward their profession. Individuals now view themselves not as employees of XYZ Corporation, but as system analysts or communications specialists. Any company that wants to retain its employees must acknowledge this changed outlook. The successful company must create programs that allow workers to strengthen their skills, work on exciting projects, rise in the ranks without jumping ship, and to share in the success of the corporation via pay for performance to the individual and stakeholder programs.

At Motorola we're taking important steps to address the concerns of a new generation of employees. For example, we're pioneering Skills Competency Mapping in Canada. As part of this program, we're creating a profile for every job in the company. Therefore, if someone had their eye on my position, they can easily find out what skills they have to develop. We've also created an environment where we provide our engineers with tough, exciting challenges; diverse tasks; and an opportunity to grow in their chosen fields. And because we compete in a tough marketplace, we insist that our researchers help shape the new technology. And our employees, far from being overwhelmed, thrive on these challenges.

I'd like to conclude by coming back to my message: success in the Age of the Knowledge Worker demands attention to all five links of a chain that begins in education and ends in retention. Looked at more closely, these are the concerns that every Information Age company must share: Society must turn out adequate numbers of these highly skilled individuals. Education needs our support. Children need our encouragement. Steps must be taken to recruit these knowledge workers, and broaden the base of supply. Training and upgrading should be an ongoing process. The company must have an environment that allows these employees to express and share their knowledge. And to retain these workers, you must create a workplace that's Challenging, Rewarding and Provides Career Opportunities.

Face these challenges successfully, and your company is likely to prosper in the new millennium. At Motorola Canada we're working hard to be a model employer of knowledge workers. It's the right thing to do. And it's the key to leadership in the field of technology during the years to come.