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Making Innovation Part of the Canadian Corporate Culture

*W. Brian Hewat**

Andy Warhol, the well-known artist and iconoclast, once said that, in the age of electronic mass media, everyone will be famous for fifteen minutes. One might add that everyone can also be innovative for fifteen minutes. The real difficulty and challenge, and the most impressive achievement, is being innovative on a regular basis, day in and day out, year after year. That is the challenge that many companies, my own included, face in this increasingly global and competitive marketplace.

Tonight I would like to talk about innovation *inside* my own company, Bell-Northern Research (BNR). Before I do, though, let me spend a few moments introducing you to BNR and then discussing the environment *outside* of BNR—the environment into which our innovations eventually find themselves.

BNR is the R&D arm of Northern Telecom—the second largest telecommunications manufacturer in North America and the sixth largest in the world. Northern Telecom's revenues last year were about nine billion dollars. BNR, I am proud to say, also has world stature as one of the largest and most successful telecommunications R&D organizations. We now have labs in North America, Europe, and Asia/Pacific. In total, we have about 15,000 employees around the world in some twenty-five labs located in ten countries. In addition to our own corporate labs, we also have established a number of R&D joint ventures with partners around the world: in China, India, Turkey, Austria, France, and, most recently, in Germany, with Daimler-Benz.

The key strength of BNR, throughout its twenty-four year history, has always been its ability to combine advanced technologies into innovative products and services. In fact, some eighty percent of Northern Telecom's revenues today come from products and services that BNR has developed within the last five years.

Successful innovation in the telecommunications industry used to mean simply improving the performance of a stable, almost static, activity — voice communications by telephone. And our customers tended to be large monopolies, typically run by government. These cus-

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The following text was compiled from the transcript of the remarks made by Mr. Hewat at this Conference.

tomers wanted new technology to improve the efficiency of their operations and to lower the costs of simple voice calls. Notice I said "cost," not "price." The lower they could drive their costs, through technology, the more profit they could realize. But that environment has changed. Competition has struck. We have entered The Age of the Customer. The Age of Choice.

One of the key drivers behind the change in the telecom industry has been deregulation and market liberalization in advanced economies around the world. Deregulation has increased competition exponentially. Telephone operating companies want to offer cable television, cable companies want to sell dialtone, and a host of new vendors are offering wireless, satellite, and personal communications services.

Emerging nations are also changing the competitive landscape. The two most significant nations are both billion-person countries: India and China. Each of them is four times the size of the United States. But unlike the United States, where there is about sixty telephones for every 100 people, there is only one or two phones for every 100 people. Because a telecom infrastructure is seen as being the key to economic growth in the Information Age, these nations desperately want basic telecommunications services—and they want them now. This urgency is creating many opportunities for innovative ways of getting service to these countries quickly.

Technology advances represent the third key driver. Progress in integrated circuits, fiber optics, wireless, and transmission technologies holds the promise of a quantum leap in the way we access, share, and manage information of all types. These drivers of global telecommunications are creating a diverse and turbulent world market. Although there are tremendous pitfalls, there are also unprecedented opportunities. Rich opportunities.

This brings me back to innovation. To cope with the unprecedented challenges posed by this environment, BNR emphasizes a dual approach to innovation: first, we strive to create a corporate culture and environment that fosters innovation—an environment where new ideas can thrive and people are not afraid to take risks; and second, we put in place systems and processes that enable us to turn good ideas into profitable products.

Successful innovation really requires a careful blending of these two elements. You need both exceptional ideas and the ability to make them a reality, both creativity and structure, both inspiration and perspiration. The tension between creativity and structure is an important root of our strength in innovation and leadership in telecommunications technology.

Let me begin by talking briefly about the first — creating a corporate culture where new ideas can thrive. "Culture" is a key word, because innovation is not a task or a function, or a department down the

hall. It is an attitude, an approach to problems and opportunities. Innovation is the shared responsibility of all employees, managers, and executives. That sharing is particularly essential in large organizations which, out of necessity, tend to be structured and process-oriented. Structures and processes are not natural breeding grounds for innovation. Innovation is not a neat process, so it is threatened by a structure that becomes overly bureaucratized—one that is focused more and more on forms and procedures than on content and creativity.

In BNR, we continually make efforts to ensure we do not become too structured or have too much bureaucracy. We do not want employees to feel that their jobs are totally defined when, in fact, their *real* job is to be creative and innovative in finding new solutions to problems or in taking advantage of new opportunities. We continue to look for ways to reduce the number of reporting levels, to push the decision-making power lower in the organization, and to remove useless procedures. In many ways, BNR is in a privileged position when it comes to creating an inspiring environment that fosters innovation.

First, as a recognized global leader in high technology, we are able to attract many of the best and the brightest. Every year, hundreds of new grads from around the world join our company—grads who are at the very top of their classes in electrical engineering, computer science, physics, mathematics, management, and other disciplines. Bringing these bright young people together almost inevitably results in the generation of exciting new technologies and products. In fact, BNR's ability to achieve leadership in innovation is ultimately dependent on the knowledge, expertise, enthusiasm, and creativity of its workforce. World-class engineers and scientists are absolutely essential to move the company forward with tomorrow's technology.

The field of telecommunications itself also provides another important advantage in fostering innovation. Every day new telecom technologies and products arrive in our labs from inside and outside the company. These innovations feed on each other and create the impetus for even more innovations. Telecom and related technologies are growing explosively, and we are inevitably a part of this innovation-rich environment.

Another way in which innovation is fostered is by the global nature of BNR and Northern Telecom. Globalization generates many benefits for the corporation. It enables us to maintain close contact with key customers in order to truly understand and respond to their unique needs and specific requirements. It also brings new resources into BNR. This is important because different regions show different strengths in technologies, processes, and people. Our network of labs allows BNR designers to draw on expertise from around the world to deliver the very best solutions to our customers.

The glue that holds our global organization together is a very

high-performance voice, data, and video network. It is one of the largest and most advanced networks in the world today. It links, for example, more than 12,000 workstations and handles more than nine billion packets of data every month. We refer to it as the Productivity Network for good reason. It enables technology experts at any site to support the activities of any other site; permits and facilitates co-design; and serves as a testbed for the verification of products.

Another key to a workplace that fosters creativity and innovation is the informal atmosphere in BNR. Casual clothing and work hours that match project demands, not the clock, are the norm. BNR employees are given a good deal of freedom and are encouraged to take full responsibility for the 'total job' in their assignments.

We are also flexibly structured. One of our key strengths, in fact, has been our ability to adjust and adapt our structure rapidly to capitalize on new opportunities. The structure is in a continual state of evolution with new divisions, project teams, and specialist groups constantly forming, accomplishing their missions, and disbanding. In fact, I think that fluidity is one of the major reasons BNR has been so successful. We have not been afraid to alter our structures. We realized long ago that it is often the mixing of the most unlikely people, divisions, and technologies that create the most innovative solutions to problems or exciting new opportunities.

Within a large organization, you have to recognize that it is okay to form what may seem, at first, to be odd mixtures of people and technology, as long as those couplings provide the best solutions. By crossing divisions, designers in one area can begin to understand the challenges of those in other areas. This kind of interaction, within and between divisions, is healthy. It increases the corporation's agility, and it spawns innovation.

Let me use an example of one of the products we have developed using this approach. The product is Meridian Norstar—a business key telephone system that some of you may be familiar with. It has the largest market share of any other key system in the world. When it entered the market about seven years ago, it created a major discontinuity in the traditional key system market. It was the first digital key system; it was easier to use than any other key system on the market; it could compete head to head with the cost of traditional analog systems; and it had the unique capability of being able to hook up to computers. The reason Norstar is such a market success today is because we brought together a diverse mixture of specialists from very different disciplines—hardware, software, manufacturing, distribution, marketing. And we involved the end users from the beginning.

Let me move on to the second part of the innovation equation: process and structure. Linking the words "innovation" and "process" in the same sentence is in many ways contradictory. Innovation often oc-

curs in small groups who work creatively out of the mainstream. Corporate structure, with its inherent processes, can stifle that creativity. Our objective, therefore, is to achieve a careful balance: blending a fair amount of freedom to stimulate innovative ideas with enough process to ensure that the ideas pursued are market successes.

This is more important than ever before because the key to successful innovation today is a companion business strategy. BNR can have a certain amount of backroom invention, but we are not interested in innovation that cannot be applied to meet the needs of Northern Telecom's customers. We are not a basic research house. We have a broad range of technological capabilities and we keep a close eye on technological advances. But our basic strategy is to apply available technology more quickly and better than our competitors.

A companion business strategy gives the product, system, or service sustainable advantages in the marketplace. The challenge is to package innovations appropriately for the marketplace. Technology alone is not enough. Regardless of how innovative the technology itself is, it is sterile until it is applied and marketed.

BNR uses a number of processes to help ensure our innovations can be applied to the market. I will talk about four of them today. Let me start with our Gate Process. Introduced ten years ago, this process is firmly entrenched in the BNR and Northern Telecom culture. And it is one of the most effective processes we have for ensuring that innovative ideas become market successes. This process substantially enhances our ability to produce timely products and services that deliver real customer satisfaction.

The Gate Process slices the product development cycle into four logical phases—definition, development, verification, and deployment. Each phase is separated by a gate, which marks a key business decision point in the cycle. At each gate, team members review the project with senior executives from both BNR and Northern Telecom to decide whether or not the project can pass to the next gate. The process serves to keep development projects on track and to eliminate defects before they become serious.

The Gate Process also continues to evolve and improve. Today, we are sharpening our focus on the definition phase of the Gate Process—the point at which the most attractive business and product opportunities are identified. It is at this stage that we determine whether we are going in the right direction. And it is here that the greatest potential for adding value—or wasting resources—can occur.

Another way in which we ensure our future products will be competitive is by undertaking, every year, a number of advanced projects, which we call lead projects. A lead project has two goals. One is to explore the feasibility of a new product before we commit the product to the marketplace. This makes it possible to examine alternatives for

implementing new system architectures, technologies, and design procedures without jeopardizing milestones that represent customer commitments.

The second major goal of a lead project is to select, develop, apply, and drive forward various technologies. This is important because, although the actual timing of introducing a product to market is really a business decision, that business decision is enabled by technology. As a result, the technology must anticipate the business decision. When a new immature technology is factored into system design, developing a high-quality product depends on having already established some expertise with the technology. Such technological advancements will be used not only in a particular product of immediate focus, but also for a range of future telecommunications systems.

This brings me to the next process we use in BNR and Northern Telecom — this one to strengthen the corporation's strategic focus. That process is known as the Futures Council, and it is made up of executives from different divisions throughout the corporation. The Futures Council does not focus on product development. Rather, through the use of future-oriented planning tools and methods, it identifies the capabilities and the key technology solutions required for our next-generation products and applications—across all of Northern Telecom's network businesses.

A key tool we have been using in Futures Council meetings is scenario-based planning. Derived from the work of Cold War military strategist Herman Kahn, scenarios were first applied to corporate strategy in the early 1970s by the planning group in multinational oil giant Royal Dutch/Shell. Planners in Shell used the scenario approach with resounding success to predict the oil shocks of the 1970s.

The scenario approach is particularly valuable in its ability to anticipate discontinuities. Discontinuities can spell the death knell for companies that fail to adapt to them—but major new opportunities for those who can capitalize on them. Traditional planning forecasts typically rely on an extrapolation of the past into the future. In today's fluid and turbulent business environment, traditional planning can be dangerously wrong, leading corporate decision-makers to embrace strategies that miss fundamental changes in the business environment.

In contrast, scenario-based planning accepts uncertainty and rapid change as a fundamental characteristic of the business environment. Rather than confining the planning exercise to a single set of anticipated future circumstances using a simple extrapolation of the present into the future, scenarios are based on constructing alternative possible futures. Armed with the information and insight gained, corporate decision-makers are much better prepared to pilot their companies in the uncertain and turbulent waters of today's business environment.

Recently, senior management in Northern Telecom and BNR

have adapted scenario-based planning to our own business environment. Like the oil business in the early 1970s, telecommunications today is in a period of exciting churn. What, for example, will be the dominant telecommunications delivery technology to homes and businesses in the future? Will the hardware simply involve upgrades to the copper wire used in today's telephone systems? Or will it be another hardware technology such as optical fiber, coaxial cable, cellular radio, or direct broadcast satellites? Does today's explosive growth in the Internet and World Wide Web foreshadow a future in which these systems dominate? And which of today's major players will be leaders in tomorrow's market? Traditional telephone companies, alternate carriers, wireless companies, cable television providers, satellite distributors, or international supercarriers?

Managers in BNR and Northern Telecom have developed a series of scenarios to explore these possibilities. Scenario-building helps us to anticipate future market directions and envision future product needs.

Once we have a sense of the future, another tool we use to ensure market success is something we call "backcasting." With backcasting, as with scenario-based planning, the key is to avoid extrapolating the present into the future. Let me tell you a true story to illustrate my point.

In 1971, National Cash Register of Dayton, Ohio, stunned its workers, managers, and investors by announcing that \$140 million worth of newly designed cash registers were impossible to sell and would be written off. In the months that followed, thousands of workers were laid off, the CEO was fired, the stock price plummeted. The problem? The machines used electromechanical parts and could not compete with new, cheaper-to-make, and easier-to-use electronic machines. The transition from electromechanical to electronic systems seems simple compared to today's technology environment. But the analogy remains sound because it highlights a continuing challenge for all of us.

Even if we are sure that our technology is current, we can still run into problems by relying solely on extrapolation. Using this structure, we tend to be preoccupied and obsessed with the "ers" . . . products that are faster, cheaper, smaller, stronger, or better. But merely adding such enhancements to existing products can result in a product that has low or even no customer value, even though we used the latest technology.

Extrapolation or forecasting, looking at the future solely in terms of the present, is a dangerous and ultimately self-limiting strategy by itself. Sooner or later, existing products will reach plateaus of diminishing return, become too complex, carry too much baggage, or be broadsided by a power shift.

So what is the solution? One interesting alternative is to postulate future power shifts in product design, and then look back to assess their

impacts on current and evolving business realities. The chief advantage of interpolating from future needs to current design strategies is that it changes your viewpoint. By using "backcasting," you can get a much clearer picture of the strengths and weaknesses of your current product design.

Why is that important? Because it can tell you where you are in terms of the markets and the competition. It provides invaluable intelligence on what it will take in the future to maintain leadership in the industry. It also gives an alternative that challenges the solutions you generate from forecasting.

All of these concepts—extrapolation, interpolation, and anticipation of power shifts—are key elements for shaping our future. And this makes backcasting a powerful technique for next-generation product designs. Rather than working from the present forward, we need to envisage the future and work backward. Once we have a vision of future needs and a hypothesis about a product or service that will satisfy these needs, we can start testing and refining this hypothesis. It is vital to test the concept with users using every available technique you can imagine. There is no such thing as too much end user involvement.

Of course, user needs are not the only critical success factor. Technology is important and is still a critical success factor as well. To be successful you need to have the right technology, in the right market, at the right time. If, for example, you do a wonderful job of identifying the need and somebody else has the technology, they still may beat you. The spoils go to those who both understand the need and who can best configure the technology to meet that need.

BNR has developed a corporate culture that fosters creativity and has put in place a series of structures and processes to help guide and manage innovation. For more than a quarter century BNR's approach has worked extremely well. The company is an acknowledged technological leader and its innovative products and services have propelled Northern Telecom to the forefront of the global telecommunications industry.

It would, however, be a mistake to think that BNR's system could be adopted holus-bolus by another company. There is no single recipe for winning innovations—no "one-size-fits-all" solution. Instead, each company must blaze its own unique path, suited to its own particular circumstances. But one thing *is* certain. Although new product developers tend to emphasize leading-edge technologies and fresh designs, the worth of an innovation is not judged by the cleverness of the technology or the beauty of its design. Rather, the final arbiter of the value of a new product or service is the marketplace. An innovation is judged solely by its ability to satisfy a customer's needs—by its ability to deliver enhanced customer value better than competitors.