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which is headquartered in Montreal. I am the company's chief scientific officer and, by way of background, I currently sit on the National Advisory Board for Science and Technology. Also, I have been a member of the Science Council of Canada for the last four or five years. Earlier in my history I had a tour of duty in this city as an assistant deputy minister and I also spent a long period as a professor in two Canadian universities.

Mr. Chairman, I am pleased that you are looking at this issue. The subject we are addressing is one of enormous importance, and I mean important on a much larger scale than perhaps the specific question of matching funds. Therefore I have decided to spend the time I have in trying to fill in some of that framework with the hope that the discussion will broaden somewhat.

However, as a preamble, let me say that I think the objectives of the matching grants program are fine and noble. We, as a corporation, have been participating, and I can talk about that later if you like. However the program, no matter how successful, will impact on perhaps only 10, or at the maximum 15, per cent of the research done in universities in Canada, which overall, is a minute part of the Canadian problem.

The reason the subject is important is that a consensus has formed in the world and in Canada that the next round or the next few decades are going to be enormously competitive economically. We will have winners and losers on a vast corporate scale and also, I believe, on a national scale because of the globalization of markets and the increasingly savage competition out there. At the same time, the low value-added products, which are largely the commodities based on natural resources and raw materials, have moved into chronic surplus in the long term. There are shortages from time to time, but in the long term they are in surplus.

Moreover, the revenues or the profits, if any, fall to the low-cost producers. Therefore, with companies like mine—and it does not matter whether you are making whiskey, wine, wheat or aluminum—everyone is trying to be excellent and trying to have the lowest costs. There are many reasons for that, not the least of which is that productive capacity continued to rise in the 1970s when demand began to slacken. Also, as this expansion took place, a lot of it occurred in countries seeking to produce primary or raw materials for jobs and convertible currency, rather than for profit. Therefore, those are the plants that keep on running, day in and day out, and the result is that the prices become tremendously squeezed and it is very hard to make a sustainable profit out of those kinds of businesses.

Of course, Mr. Chairman, as everyone sitting here knows, those kinds of businesses are the backbone of the Canadian economy. We run from year to year with a trade balance that is generally favourable but close to being balanced. Inside that balance is a most tremendous bias toward materials produced from the natural resources of this country. There is a huge

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trade surplus in natural resources and a correspondingly large deficit in finished goods, manufactured goods and, what we will call for this debate, knowledge-intensive goods, which, increasingly, are the sustainable, profitable, growing businesses. So, if you like, you can think of our economy as having a very large backbone of resource-based industries which are finding it hard to generate the sustained revenues to keep them where they are, and a very shrunken and inadequate—in world terms—collection of knowledge-based industries, which will have to carry the load in this next round of competitiveness.

One can almost use knowledge and technology interchangeably. Technology is using knowledge that has shown up in some form that has been judged socially, politically or economically useful. Because of this, in the 1980s Canada and other countries have converged on science and technology as a key competitive tool. The knowledge is fairly deep, I think, that a lot of economic restructuring is going on, will go on and must go on. My own company has been doing a lot of this sort of thing, and that is probably why I am here to talk to you. We have been going through a tremendous number of changes internally to try to take ourselves, not out of aluminum, which we think is still a very promising and fast-growing industry, but to balance our core businesses with businesses that have higher growth and profit potential. I suppose it is trite of me to say so, but it is not an easy task. It takes a lot of time, courage and energy.

The spotlight then turns to the science and technology performed in this country. Everybody knows that these efforts are partly in government, partly in university and partly in industry. Suddenly it has become important to have technology and knowledge in this country that generates wealth. We have always had this technology to some extent, but it has become a large priority.

Let us look at the three sides of the triangle. The objective of the scientist in the university system is to produce new knowledge and to publish it internationally. I think that part of the testimony here today, including the testimony we heard earlier, involves a difference in perception as between that goal and the goal of generating wealth, which is the goal and task of the private corporation. So the research that is done in the university system tends to be basic. A lot of it is done and published internationally in order to access the rest of the world knowledge in that field. If you do not belong to the club, you do not know what is going on. No matter how munificent the taxpayer in Canada becomes, we will never perform more than 1 or 2 per cent of the research going on in the world. So a major task of universities is to be a listening post, to gather in the other 98 per cent or 99 per cent going on elsewhere. Part of the competitive situation we are in now is that other countries are much better than we are at picking up that knowledge and making money out of it. This problem does not lie in universities, but in Canadian industry.