

2004 Detailed Session 1 Summary

The following is a summary of remarks made during Session 1 of the 2004 President's Conference on Medical Devices held in April 2004. The discussion of this session surrounded the relative roles of the University, Industry and the Government in growing the medical device industry in Minnesota.

Panelists included:

Jeff McCullough, MD, (JM) Session Chair Director, Biomedical Engineering Institute, Professor, Laboratory Medicine and Pathology, Medical School, University of Minnesota

Fred McCoy, (FM) President of Cardiac-Rhythm Management, Guidant
Guidant is based in Indianapolis. Their Cardiac-Rhythm Management is headquartered in Arden Hills, MN.

Mike McQuad, (MM) Vice President, 3M Medical Division
3M Medical Division delivers a broad range of products involved in infection prevention, wound care, and other core medical consumable products and solutions in a global arena.

Peter Gove, (PG) Vice president of Corporate Relations, St. Jude Medical Inc.
Peter's responsibilities include global corporate communications, government relations, reimbursement, and investor relations. He's a member of the Medical Alley Board of Directors.

Dale Wahlstrom,(DW) Vice President and General Manager of the cardiac-rhythm management group and physiological research laboratories, Medtronic

The session discussion is organized through quotes and excerpts categorized into twelve topics, rather than by a chronological order of discussion by the panel members.

Session Goals

(JM) I would like to reiterate or emphasize the question or the issue that has been put to this opening panel: what are the roles in industry to direct and enhance research and development of technologies at the University to the benefit of the individual corporation, to the benefit of industry in general and ultimately to employees, taxpayers, and/or patients?

(MM) This kind of session today is one where we can talk about the substance of how we go about doing what we're trying to do in Minnesota. And I say "we" meaning a combination of academic, industry, and a variety of other resources. I think it is a really important topic for us today.

Start of the Device Industry/ Historical Perspective

(FM) I'd like to do so by describing if I can a microcosm of the success of the medical technology industry in the state of Minnesota. Arguably, the medical technology industry here started right here at the University of Minnesota through the confluence of entrepreneurship and clinical science

together with physician entrepreneurship.

(PG) The innovative design of the product that defined our company's success for almost 20 years originated at this university with the encouragement of the late Dr. C. Walton Lillehei, the father of open-heart surgery. And that heart valve product was first implanted here at the University by the late Dr. Dmitri Nicoloff almost 27 years ago. So a relationship with this University is closely intertwined with the history of St. Jude Medical. And it is certainly our view that the continued growth and expansion of the Minnesota medical or bioscience industry is closely linked with the ongoing support by the governor, the legislature, the business community, and this university. If you think about it, later this year, the University is going to celebrate their 50th anniversary of some of the first open-heart procedures by Dr. Lillehei. In a few years the University will celebrate the historic collaboration between Lillehei and Bakken that led to the pacing industry. So a lot of history obviously starts here.

Growth of the Medical Device Industry/Statistics

(FM) One of the areas in which the state of Minnesota has been successful has been in cardiac-rhythm management, which is the part of the industry in which I operate. Cardiac-rhythm management has been a tremendous success story for us. If you go back ten years, there were nine companies world-wide in cardiac-rhythm management. Two decades before that there were approximately 30. So in the trip between 30 companies and 9 companies there was a lot of failure. And you can imagine that the industry would have settled out at that point in time. But the reality is where as there were 9 companies ten years ago there are 5 companies today on a world-wide basis in cardiac-rhythm management. Three of those companies supply 96% of all the sales-revenue on a world-wide basis. All three of those companies are right here in Minnesota. So you can tell that in medical technology there is success and there is failure, and Minnesota has been successful. In fact, the velocity of progress is difficult to overstate. So, I will share just a few simple examples. Last year in my company, two-thirds of our sales revenue was from products that were less than 12-months old at the time we made the sale. The same is true the year before that, the same is true the year before that. It creates a sense of urgency that is difficult to overstate. Cardiac-rhythm management, if you look at it as an entire industry, for 18 years has had a compound annual growth rate of 14%. My company, perhaps because of the some of the failures of others and the success of ours, is growing at 25% and the same is true of the other companies here in Minnesota in cardiac-rhythm management who have been growing faster than the market.

(MM) 3M is one of the top 25 health care companies in the world. It's one of our best kept secrets. We're an over \$4 billion health care company with headquarters here in Minnesota. That includes the medical business which I have the honor to take responsibility for, but it also includes major research and business in pharmaceuticals, in dental, in health information systems and the application of coding, grouping, and data understanding to help in management in the US and countries around the world.

(PG) I think Minnesota is in a very unique position considering that a handful of companies that are either headquartered here or have major development and manufacturing divisions in the state, account essentially for the world, not just the US, but the world's production in cardiovascular and that's the focus of my remarks, in cardiovascular of some of the most leading and innovative

devices. Whether they be pacemakers and ICDs as Fred mentioned, cardiac-rhythm management products and now cardiac-resynchronization devices, implantable heart valves, catheters, stents, electrophysiology catheters, guiding introducers, surgical devices to facilitate beating heart surgery, vascular closure devices, and this is not an extensive list. As Fred mentioned, three companies represented on the panel this morning account for more than 95% of the world's production of some of these devices, and if we had a colleague from Boston Scientific this morning, I think between Boston Scientific, Guidant, and Medtronic, probably 75% of stents of the world, PTC catheters and stents, between these three companies. And with one exception, all of these markets I mention are large and growing markets and will continue to grow as the population ages. And no other university, certainly no other public university has this proximity to this collection of companies, technology, and future market and opportunity.

Motivation of the Medical Device Industry

(MM) It's a terrific business for us as it is for many who participate in the business, but it has one redeeming feature that we bring home to our employees all the time, and that is that people who participate in the health-care businesses at 3M have the added benefit that what they do in those businesses is something that directly impacts them.

I think it has become very fashionable to say that companies exist to supply value to the shareholders and there's not going to be anybody to argue against that. But I can tell you very clearly that when we stand up and talk to the employees in the healthcare businesses at 3M and I'm sure my colleagues do the same thing, we cannot provide value to our shareholders without improving the lives of the patients we serve. I'm not so concerned about where things appear on a list, but it is absolutely crucial to understand that the reason we have an industry like this is because we fundamentally have a University and you have a government and you have people that are attempting to improve peoples' lives.

(DW) I also would like to reinforce what you said and also the comments just made in that we don't get up—I don't know anybody that works at Medtronic that gets up every morning and goes to work and says I'm going to make 50 bucks today. That's not the motivation. What motivates people to get up and go to work everyday is the fact that they know people who are made better by the products that we provide. I happen to have a father who's a sudden-cardiac-death survivor. He has a defibrillator made by Medtronic, a defibrillator system I might add, not just a defibrillator. And I have a father-in-law who is a patient of a pacemaker. He also has an arterial bypass; he also has a stent, and I might add that the stent is a Guidant stent. And I have a brother-in-law who just two weeks ago became a patient of an implantable pacemaker made by Medtronic. And I have a brother who is targeted to be implanted here shortly. So this whole issue of getting up and adding value to the community, to the health of the society and making life better for everybody is really what drives everyone. And I would submit that's a common denominator and if we could somehow build on that we could kind of get over these impressions and issues that often times get in our way. On behalf of my whole family, I want to thank the University for the role that you played in getting that technology to marketing.

... I think that is why we all come to work everyday, and I think that's a higher level of meaning and purpose that whatever constituency you represent is represented by that common need.

Our number one role in industry is to generate shareholder value. That is what we are accountable for doing. Because of that, the issue of global responsibility becomes really important to us. We need to think globally and act locally whenever we possibly can. But the reality is we are chartered to go out and get what we need from wherever we need to get it to add the most value to the shareholders of our corporation. And that is something that as we look at the focus on education that's occurring everywhere and the hunger that the people across the world have for continuing education to improve themselves becomes more and more prevalent in the decision-making process.

Needs of Medical Device Companies

(FM) In our organization we say there are four things that we are going to have to do very well on a long-term basis and they are very simple – build clinical evidence, develop healthy markets, deliver meaningful innovation, and execute. In partnerships with the University of Minnesota and the state of Minnesota, we have to find ways to get those things done or believe me, our success will be fleeting. It is incumbent upon us to make sure we are great stewards of the assets we have. And that furthermore, we set an environment up by which intellectual and financial capital comes here and then stays here.

Ingredients For Success

(FM) So where does the success come from and what is the role of the state of Minnesota in that success? Well, I've got a few simple postulates. I believe there is a critical mass of scientific and engineering talent here in the state of Minnesota and we got going in that regard about 50 years ago. The second observation I would make is that Minnesota is an attractive place to work. We are able to attract talent from all around the world who are at the height of their field in scientific and engineering disciplines. The third observation I make is that there is a scientific and engineering core here in the state of Minnesota. It has been said that no successful city can be successful without a successful downtown. Well, I firmly believe that the medical technology and medical device industries in the state of Minnesota are going to have a very difficult time being successful long-term if our downtown, which is right here at the University of Minnesota, is not also successful in the fields of engineering, biomedical engineering, and indeed the other disciplines that go along with that, including clinical science through the University's medical school. I think it is also important that we have a stimulating environment. We have among 6600 or so people who work with us in cardiac-rhythm management around the world. Approximately one-third of those individuals are either an engineer, PhD scientist, physician, doctor, or someone with an advanced degree including a masters of business administration such as myself. It's a high-quality, highly-qualified work force, and these people are interested in getting stimulated not just in what they do everyday at work but what they do away from work as well. The University of Minnesota gives us a terrific outlet in that particular regard.

Relationships between Medical Device Industry and the University of Minnesota

(FM) I'd simply cite the relationship we have with biomedical engineering. Some of our scientists teach a class here. It is the case that 2-4 graduates each year come to work for us from each of the engineering schools as well as from the business school. We have a number of relationships in areas of basic research because it does seem to us that basic research is often better done outside the confines of our own organization. While we do basic research in our company, we find that it

works best in collaboration with institutions like the University of Minnesota and we do that. As a result of these activities and many more, I would describe the relationships between our people and the people of the University as long, rich, and deep. Back to medical technology and why we are successful. I think it is pretty simple. Profit-motive is at work, and profit-motive makes a lot of difference. It has been said, and I believe that it is absolutely true, that capital goes where it is wanted most and it stays where it is treated best. Capital in this particular case is intellectual capital and financial capital. I would like to modify that slightly and say that it is the anticipation of future success that actually attracts intellectual capital, and financial capital, and that is the challenge for the state of Minnesota and the University of Minnesota - to create an environment in which it is anticipated that intellectual capital and financial capital are attracted and attractive for the long-term.

(PG) But it is my considered opinion that the future of this industry, whether we call it medtech, biotech, life sciences, whatever, is absolutely dependent ...on a university that has the resources for continued excellence in research and training of healthcare professionals.

I think it is important to remind ourselves how medtech companies have in the past and today interact with this University over and above any grants to the University of Minnesota Foundation or the Minnesota Medical Foundation. Then we can at the panel decide whether this is in the area of directing research or, I think more appropriately, supporting or enabling research. And I just have a list here of what I have observed the last few years of how companies in our industry work with this university. They fund endowed chairs, whether in the Institute of Technology or in the Academic Health Center, with the opportunity for the company to play a role in defining the purview of that chair and participating in the recruitment process. Companies contribute and have contributed back in the late 90s a significant amount of funds to the University for an operating endowment for the Biomedical Engineering Institute to expand undergraduate and graduate education in biomedical engineering. Companies do extensive product development and testing support with individual faculty members and/or through the Experimental Surgical Services group, whose leader Dick Bianco is on the program later this morning. Companies, as Fred mentioned, are involved in clinical trials at the U both for 510k and PMA products. There are technology transfer agreements and technology development agreements between companies and the University. Companies also provide summer internships for biomedical and other University students, mentor biomedical project teams, and obviously recruit here at the University whether from IT, the Academic Health Center, or other areas for a variety of product development, engineering, marketing, clinical regulatory and other positions in our industry. We've been involved here as has Medtronic in endowing chairs here in the area of biomedical.

I'd like to give two examples of how I think at least in cardiovascular that these relationships work well both for industry and the University. And the two cases would be the two chairs that our company and Medtronic have endowed here at the University, the St. Jude chair in Biomedical Engineering and the Medtronic Bakken chair. When we endowed the St. Jude chair in the mid-90s, we did it to recognize, as I said in my remarks, the historic relationship our company has with the University. In some respects, we wouldn't be here without the University and I think as Fred pointed out earlier in his remarks, much of the industry wouldn't be here without the University. I'm not sure sometimes whether the University's priorities and resources are aligned or should be

aligned to continue to support and leverage this cluster, this cardiovascular cluster if you will, in the future.

(JM) The culture of the University and the faculty is such that there are all sorts of things that drive faculty to the kind of new ideas that they pursue and develop. Hopefully some or many of those will be things that can lead through a process to new products, but as I think probably everyone here would agree, to try to target that kind of research is not really very successful.

(MM) There is very clearly a role and it is a well-defined role about the interaction between industry and universities in very specific, let me call it pay-for-play research. Clinical research, clinical trials - there are very well-defined mechanisms in how we do that. University of Minnesota is top-notch at doing that for the betterment of a lot of companies here and a lot of other companies.

Needs in the State of Minnesota

(MM) We use an analogy in our business that people who are working harder, people who are working longer – after you have had one of those days that we all have at some point where you just can't figure out where you are going to get the energy to do something else, then you have to go home and for some reason you may have to interact with the health care system and you feel lucky to see the name of 3M or the name of Guidant or the name of Medtronic or the name of all of those other 3M homegrown industries in the day-to-day practice of medicine that you as a patient have to participate in. So the health and vitality of not only the healthcare industry, but the long-term technology associated with that industry, is vitally important to a company like 3M. It is also crucial in attracting the kinds of people that are key for our success in the business. So the health and vitality of a research organization of that research capability, and the ability to translate that research from an institution like the University of Minnesota into a lifestyle and into a community is key to us attracting the kind of people we bring to Minnesota. Much as we would like to believe that we can always find every employee that we want homegrown in Minnesota, it is just not the case and the attractiveness of the University's environment is crucial to us to bring that in.

(DW) For government, I think that the government's role is primarily to help create the culture, or I should say the environment. And the environment is to support certainly, probably foremost, is to support a high-quality educational system. Because the educational system regardless of what level, whether you're talking kindergarten, middle school, high school, and especially university system, is a draw for talent. It is a draw for creating that overall environment that we need to nurture and grow industry. We also need to create a reasonable tax environment, some centralized infrastructure, some improved infrastructure and those types of things. Again, I'd also like to repose that at some point in time the state of Minnesota starts to look at some sort of product management similar to what we talked about and what I mentioned earlier with the Ireland Development Authority (IDA), or the Puerto Rican Industrial Development Company (PRIDCO) or one of those kinds of organizations because I think it plays a major role. So there is a role that government can play in supporting the development of that environment and a role that we can play within the industry to also help to create that environment and culture.

Current working relationships between Medical Device Industry and the University of Minnesota

(MM) The first question I would ask us to keep in mind as we go is, first and foremost, how do we increase the quality of the dialogue and the thought process? What I'm talking about here is that there are times when we think about 3M as a company being an incredibly complicated place. It is 75,000 people world-wide and there are 50 major different businesses and whenever I think that it can't get any more complicated than that, I come to the University, which is filled with hundreds of departments and technologies repeated in as many different places as possible. The University recognizes that necessity for bringing interdisciplinary interaction to a research environment. How do we coordinate that level of complexity, the level of complexity in our individual companies, and then the level of complexity in the industry to make sure that the dialogue is occurring? Because we can talk and address the issues, we'll talk about roles in driving research, but none of that is going to function properly if we don't have that open dialogue and don't have that open level of communication. Second, how do we increase the understanding from both poles in toward the middle? And by that I mean how do we at the industry level understand exactly what it means to participate in very front-line research, in basic body mechanics, and in basic metabolism, and basic core science? What is the rhythm, what is the pace, what is the underlying cultural architecture that goes on in a university environment that may be different from the way we pace at an industrial environment, where we are trying to drive the front or the back end of the process which is ultimately about commercialization and driving share-holder value? So, how do we balance the dialogue and understanding between those two roles in which ultimately are needed to be successful to bring the technologies we talked about to market? It is daunting the amount of capability we have in this state and in this city. It is daunting to the point where if we are not asking the questions about improving that dialogue and understanding, we will not be successful. It is also just as clear that over the last 50 years we have been enormously successful with that level of collaboration and cooperation.

(FM) I think academic institutions perhaps nation-wide, and certainly I have spoken with Dean Powell about this, deserve to take a bit of a look with regard to how easy it is to work with the institution. I describe that simply as the time, attention, and effort it takes to get an initiative going. Not only are there intellectual property matters that are in early discussion, but there are simple contract matters that are in early discussion. So, beyond the alignment of the fundamental and important research, engineering, and scientific questions that should dominate most of the discourse when we talk about collaboration, there is a bit of overhead that comes along with the work between a company like mine and an institution like this. It simply should be driven out. It should be much, much easier for industry and the University to collaborate on all the things that strike me as overhead to the process.

...there are parts of the University that have suspicions about whether or not this is good for the University or good for society. Perhaps we can arm you with some information and once you become convinced of it yourself, you could advocate on behalf of this relationship and indeed be able to move a few minds and hearts to what seems to be the truth...

Response from David Hamilton, Interim Vice President for Research, U of MN: I am convinced. It's not me that you have to convince. And a lot of people recognize that there is good for society, but they feel that it is bad for the mission of the University. There is the concept of being a "bought" university. And it's just there; we have to work with it. I work with it everyday, and I want you to be aware that that's part of the problem that we have to overcome in order to deal

effectively with businesses...

(MM): The other comment I would make, and David did maybe help in the process here too, is arguing around the issues of a “bought” university, etc. from an industry concern. That argument tends to be less, I don’t want to say relevant, but less diffused if it is on the core of a university which is what we all know, as citizens of the state and as industrial concerns, is crucial for the University which is a core fundamental-research university. So part of the obligations we have as industry is all the things we have been talking about. All the necessity for openness and access and support to medtech companies, and all those other things, only work if they are built on a base of a fundamental, open, and classic research university model. That we need help from you is perhaps a question of how, as industry, we help support that from a philosophical point of view, from a dollar and cents point of view, before we get to the stage of let’s get into the discussion of how close we are in individual issues and individual technologies. The point I would make, and somebody made this comment earlier before, is that 50 years ago the medtech industry in Minnesota did not build the creative capability of this university to support medtech. It worked the other way around. The medtech industry in this state grew out of the University and I think we can’t forget that.

(DW) I also want to make a quick comment on the University’s role and in the sake of time I’m going to rush over much of the many things. The University’s primary role as it relates to industrial relationships in my opinion is to be a tough global competitor. The competitor of the University is no longer the state or other departments. And I think it was alluded to earlier that sometimes you can get competition between departments. I think the University has to take a very special, conscious effort to try to look outside their community and get out as far as they can into the global community and look at who is really their challenge. Who is really out there in front pushing the knowledge base because we are all after knowledge; that’s where value comes from. We also have a need to support a collaborative culture both internally and externally. As I mentioned earlier, sometimes in my experiences, I find it is a very complex organization and it is very difficult to understand how to work between departments. There’s often a departmental focus versus a University focus or even a Minnesota-wide focus. Sometimes we don’t focus as much on building bridges as we do doors, etc. I also just want to make a comment which might be controversial and hopefully not offensive. If I go back in my career 20 years ago or 30 years ago now, and I look at the first decade of my career, we did a lot of work with different universities. A lot with the University of Minnesota, some with the University of St. Thomas, and a lot with other universities around the US. We kind of got out of the mode for a while, for about 10 years, because something happened in the attitude of the University’s system towards industry. The term “dirty-money” was a term that was frequently used to describe a desire or a lack-of-desire to work with us. Because industry, particularly as it relates to a single industry or single company, has negative connotations associated with it. That is a term that I heard frequently and it did not create the best working relationship. Thank God in the last 10 years that has gone away. I don’t hear it or see it, but I’m sure some people probably still feel it.

The last bit, but not least on the University side, there is also a sense I have when working with the different organizations that we don’t always have our rewards systems aligned. The people who are in research and development and supporting this development of knowledge and the transference of that knowledge into the social community, specifically industries right now is what we are talking

about, are not necessarily rewarded in a way that motivates them to continue to expand that role.

...It is a real dilemma, especially when it relates to funding coming from an individual company. And I didn't mean for that to be taken in any kind of statement that is derogatory; it is a statement of attitude. And that attitude exists between industry and the feeling that some academics are just academics and it is too difficult to work with them to gain access to their knowledge. That is a negative for the industry attitude, and it is also a negative for the university or any academic organization that feels to work with industry is in effect in some way subverting their ethical situation. In the context in which I made that statement I was trying to put it in the context of, an example, again, the idea when you go into the organizations that I am interfacing with on a global basis, you do not run into that. Somehow they have gotten over that and they recognize that there is an interrelationship between the university, government, and industry that can be supportive and mutually beneficial. So, it was intended not as a direct cut or as an inflammatory statement, but it was intended to generate discussion around the fact that this state is competing against other countries or states that have somehow dealt with that so the barriers that come up as a result of those attitudes are not there. The result is a momentum and subsequent funding coming from out of their governments that we do not see. That was the intent.

(PG) As someone who has spent a considerable amount of time over the last 10 years working on behalf of not just my company, but our industry, with this university through the mechanism of the Biomedical Engineering Institute's Industry Advisory Committee, sometimes it is difficult to be a consistent supporter of the University. As Mike mentioned in his remarks, 3M's a complicated business but the University's more complicated than 3M. And I think I learned over the years that you have got to work at it and sometimes you have to be a loving critic of the University and push it a little bit because good things happen. Jeff and I have talked over the years, and now Don Gerhardt has sort of institutionalized this at his annual conference. But starting about 5 years ago, through the Biomedical Engineering Institute, we allowed both undergraduate and graduate students to do poster sessions at an annual event, an annual industry event. Once we had that event at the Weisman, once we had it over at the Academic Health Center complex, and most recently Medical Alley has hosted it. It is amazing to watch. It really is interesting to watch the interaction between the students and their posters and industry. And I know that a lot of good things have happened as a result of that. That happens once a year, and maybe it should happen more often than that, but the whole process of communication and getting the word out as to what's happening at the University and what the opportunities are, particularly for small companies. And Don knows these numbers better than I. There are a handful of large medtech companies in Minnesota and a disproportionate number are sitting at this table, but the industry is mostly made up of small companies. Companies that really need the University in some respects more than these companies do. And I think it is always important for those of us in industry and our colleagues at the University to keep that in mind. How is a five-or six-person start-up getting support or having access to the many resources of this university?

Goals, Vision and Global Threats

(DW) Even though Minnesota and the US in particular...has become this center of excellence for the biomedical industry, we are under attack. By that I mean, if you take a look at these three organizations, just as an example, and there are many, many more, but these three organizations:

Ireland Development Authority (IDA), the Puerto Rican Industrial Development Company (PRIDCO), and Singapore Economic Development Board (SEDB). They are structured organizations that are an arm of the government. Their sole purpose in life is to bring industry, academia, and government together to create an environment, and you have heard from all the previous speakers how important the whole environment is to drawing industry and to growing the capability and the output. These organizations are chartered to do that, and having worked with them for decades now, they do it very well. Now granted, they have a lot further to go than we do. Their economic situation in all three areas is starting at a very different place than we're starting, but they share one common vision. Their common vision is they believe that a joint organization between government, academia, and industry, when properly focused, can help to create a better society for their citizens...

I have been involved in several expansions in different countries as well as in different states in my career with Medtronic and prior to that a couple of other companies. In fact, just recently, we finished a very thorough analysis of 14 different countries and states prior to making the decision to invest in expansion. Those three organizations and countries that I mentioned, Puerto Rico which is of course a commonwealth, but Singapore and Ireland have all decided that their focal area is biomedical. Specifically, devices in the biosciences. They are putting tremendous effort and money into it. As an example, Ireland, which is about the size of Minnesota, it has about five million people, four and a half million people in the south, and if you count Northern Ireland about another 500,000. So it has about five million, about the size that we are. Their federal government is putting \$1 billion per year into the biosciences to grow the bioscience infrastructure and knowledge base to support the continued development of the social structure and their knowledge base to continue to evolve it. They have targeted states like Minnesota as a place that is right to try to draw industry away from. They are usually thought of as a manufacturing center. I think everybody recognizes them as manufacturing centers, but the reality is they recognize the only way they can sustain continued growth and the social status of their citizens and its quality of life is if they migrate their societies from one of being manufacturing based to being one with higher-paid jobs such as research and development and the higher level degrees that were mentioned earlier. So they are all migrating in that direction. Take the Puerto Rican operation. In Puerto Rico we have about 2,000 employees right now. Most of them are in manufacturing; almost all of them are in manufacturing. Most of them have four-year degrees. All of our engineering staff have advanced degrees. They continue to go to school until they retire to continue their advanced degree. They recognize this and are targeting us.

...As an example, when I go to Ireland, and we did this not too long ago, and I use that as a model because I think it is one you all know of. When I go to Ireland to do an assessment for a potential expansion, I am met at the airport by someone from the the Irish Development Authority (IDA). They have already asked me what it is I am looking for. They have already asked me the kind of relationships that are important to us. They have a complete profile of what we need. That includes university relationships, \tech-school relationships, local government, access to land, etc. They then have set up, usually in a two-three-four day cruise around the country, pre-established meetings where every meeting that I go to there is a representative from industry, a representative from federal and local government, and a representative from the various training institutions from around the community that we are looking at. When we meet, they talk with one voice. They look

at our complete problem and they come back to us with a proposal that is all inclusive. That's very hard to turn away from because of your local support. And this goes back to your local commitment. They are offering to industry, and many countries and maybe even some states, are starting to do this, a very coordinated approach to the development of wealth-generation-capability for a community. And I think that we within the state, all the constituents, need to take a second look at something along that line and work more closely with that than we have necessarily historically.

How The Medical Device Industry Can Help the University of Minnesota

(FM) One of the things that free markets do especially well is deploy resources through a rather messy mechanism. Free markets attract resources and then deploy resources according to where they are most valuable, and that is that central concept. I think companies like the four that are represented here can help the University substantially because in as much as we are exposed to free market mechanisms on a day-in and day-out basis, there's an opportunity for us to add some value to the conversation, discussion, and the prioritization at the University as a result of the sense that we get what will ultimately be of value.

(MM) I think what we really want to talk about is the influence on more fundamental research - on more technology development - on more technology identification. The role of industry there, in my mind, needs to be much less directed and much more guiding and enhancing. The real issue comes down to how do we as individual companies and as an industry help identify direction, viable direction, for research? How do we identify pathways that are emerging in the potential markets we serve by either identification of how healthcare is delivered or by identification of funding mechanisms for delivery of healthcare? What, in a company like 3M, we call voice-of-customer: how do you define where the market needs to go? Bringing that information to a university environment is probably the single most important thing we can do to figure out where the research itself has to be applied in the future.

(PG) I actually think this might be tempest in a teapot, but let me say that where I think we need to go as an industry is that there is a set of capabilities at this university that can support a set of needs of 500-plus companies. My interest is the communication to make sure that no Minnesota medtech or biotech company that has a requirement that can be met consistent with all the ethical standards of the University has to go someplace other than this university to get that need met. To me, a lot of that is just simple communication. And I know everyday and every week an opportunity is missed in that regards because of lack of communication.

Importance of Student Contact

(DW) I think one of the areas, at least in my experiences over the years, that has created difficulties has been the ability to sustain that relationship. What is it that makes the relationship at one university sustainable or one department sustainable and another one not? It seems like it comes down to how well industry and the academic organization, the department or the area that you are interfacing with, have integrated with each other. By that I mean do they understand each other's problems? Do they work closely together? Do they get down to that lowest level, which I think is student involvement? I think it gets to that level. If you can't get the students somehow engaged in the process, it puts the university in conflict. Frequently - not always, but frequently. So,

engagement at the lowest level to build that infrastructure, having students involved, departmental people involved, I think that is a key part.

I would like to carry on with this theme of student involvement that has been brought forth. I think that really is the key. If we can get to a point where we are involving students in the day-to-day activities that industry works in, that is where the real learning takes place. It is also where the continuity enhances. I will give you a couple of examples. We had a relationship, several relationships here at the University of Minnesota, and a couple with the University of St. Thomas. There are some students here, in fact, that are currently part of those relationships. We usually end up hiring those people, usually whenever we can get a head-count approved. We usually end up hiring those people because the quality of their education when they are integrated into the day-to-day problems that we are trying to solve is so much better. They understand. They connect with the issues. So as they are learning, they can relate what they are learning directly to the problems they will face when they get into industry. Many of them are publishing stuff that is leading edge; it's out there, it's pushing the envelope today. It builds a commitment at that very lowest common denominator level within the organization, meaning that the departmental managers, the senior engineers, etc. that work for the company become dependent on the University for access to those students to do their research to help them work through a problem. As a result of that, the attitudinal issues that we talked about earlier begin to disappear. In fact, they go away because they become part of the team and part of the process. We have had great phenomenal success in the couple of different projects we have done at the University and with St. Thomas. In every case that I can think of, whether it's Medtronic or Burroughs or Lipton, it doesn't matter – it always came down to that lowest level where you have students working with people on a day-to-day basis so they can learn and they can participate. And I think that is a role we can do more with and should do more with.

(MM) In the departments we interface with here in health care research in a university environment, by-and-large many of the students in the graduate part of that stay in an academic institution, and industry has to play a role and we need to help students understand what it is like to pursue a career that is not an academic career. And that is not meant to say that industry's obligation or role is to steal people who really should be in a long-term academic research institution. I think there is room for improvement for us. Somebody mentioned programs with students. That is to make sure that the industrial partners, the corporate partners who are participating in research and development with the University, are also providing access so those students can understand how they can pursue a highly contributory, highly valuable intellectual and academic career in a setting which may be different than what they practice here at the University.

Compiled by Art Erdman, 4/3/05.