

Forum Report

The Second Meeting of the West Virginia Forum on

TECHNOLOGY & INNOVATION

Transforming West Virginia's Traditional Industries

The
West Virginia
Forum on
Technology & Innovation

Hosted at
West Virginia University
National Research Center for Coal & Energy
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Preface

This report documents the second meeting of the West Virginia Forum on Technology and Innovation, held at West Virginia University on April 23, 2001. The purpose of the meeting was to promote dialog and cooperation between the traditional manufacturing industries of West Virginia and computer-based information technology (IT) industries that can potentially provide more efficient, competitive operations through digital solutions. The West Virginia Forum on Technology and Innovation is an activity of the Discover the Real West Virginia Foundation (DRWVF), an organization whose purpose is to promote investment and economic growth in the state.

The meeting was a cooperative effort between the Office of Senator Jay Rockefeller, the DRWVF, the WVU National Research Center for Coal and Energy (NRCCE), the WVU President's Office, and the Industries of the Future – West Virginia program. A core planning committee consisting of Bonnie Morris of the WVU College of Business and Economics, Jan Berkow of Applied Industrial Solutions, LLC, and Carl Irwin of NRCCE met weekly for more than a year developing agendas, contact lists, speakers, and exhibitors for the Forum. Terri Giles of Senator Rockefeller's Office originally proposed the theme for this second meeting of the Forum: "Transforming Traditional Industries through IT."

The planning committee also spent many hours formulating the IT benchmarking survey of West Virginia manufacturers that was conducted prior to the Forum. The results and implications of the survey, summarized in this report, are a call to action for West Virginia's manufacturing companies as well as for the IT service provider community.

West Virginia Public Broadcasting System (WVPBS) covered the April 23rd Forum meeting and telecast a one-hour documentary, produced by Suzanne Higgins, on May 11, 2001 as part of the WVPBS Legacy Series. Beth Voorhees hosted a one-hour interview/call-in radio show on WVPBS with Senator Rockefeller, Jan Berkow, and Carl Irwin as guests.

The Forum confirmed that West Virginia can build on all its strengths — industrial, intellectual, and entrepreneurial — to merge its traditional industries with "new economy" technologies to reduce costs and stay globally competitive. To accomplish this, the state must work very hard to remove barriers and create incentives for modernization and corporate investment in new technologies and value-added businesses.

The goal for this report is that it contributes to West Virginia leading the way among states in transforming traditional industries and creating strongholds of advanced manufacturing. The Forum's inspiring speakers and panelists described new ways of doing business and of running traditional companies, ones that frequently require change and willingness to take chances. The most important work is yet to be done.

Carl Irwin
West Virginia University
November 15, 2001



The West Virginia Forum on **TECHNOLOGY & INNOVATION**

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Table of Contents

Preface	i
Forum Agenda	2
Welcome and Introductory Comments	4
David C. Hardesty Jr., President, West Virginia University	4
The Honorable John D. Rockefeller IV, United States Senator	7
Information Technologies for Traditional Industries:	
A Use/Needs Assessment	9
Bonnie Morris, Associate Professor, West Virginia University	9
Industry Perspectives	11
Patrick Stewart, President & CEO, MetalSite.net	11
Marshall Moore, Technology Leader, GE Specialty Chemicals	12
Philip Biedler, Ph.D. student, West Virginia University	14
Linda Wellings, President, MPL Corporation	14
Questions and Answers	16
Keynote Address: The End-Game of E-Business	
Serving Customers and Creating Shareowner Value	21
Roger Mowen, CIO, Eastman Chemical Company	21
Introduction by Senator Rockefeller	
Questions and Answers	23
Tools for Positioning Core Industries in the New Economy	26
Jan Berkow, President, Applied Industrial Solutions	26
Bart Christner, Cambridge Technology Partners	26
Robert L. Moore, Gensym Corporation	27
Incentives, Opportunities, and Follow-up Action Plans	28
Carl Irwin, Director, IOF-WV	28
John Hewes, Special Assistant to the Director, ATP	28
Lou Sousa, Director of Communications, OIT, U.S. DOE	29
David Warner, Director, WV Development Authority	30
Follow-up Action Plans	31
Our Challenge for the Future	33
Acknowledgements and Contacts	34
Appendix A: IT Survey and Results	35
Appendix B: Forum Participants	43
Appendix C: Forum Exhibitors	49

Agenda

- 8:30 Continental Breakfast - Registration, Exhibits, and One-on-One Discussions**
- 9:15 David Hardesty, President, West Virginia University**
The Role of WVU in West Virginia's Economic Future
- Jay Rockefeller, United States Senator**
The Role of Manufacturing and Production in West Virginia's Economic Future
- 9:40 Bonnie Morris, Associate Professor, WVU College of Business and Economics**
Results and Implications of the West Virginia IT use/needs Survey
- 10:00 Industry Perspectives**
Panel moderated by Senator Rockefeller and President Hardesty
- Marshall Moore, Technology Leader, GE Specialty Chemicals**
GE's Use of Digital Technologies
- Patrick Stewart, President and CEO, MetalSite.net**
Steel and Hardwoods Over the Internet
- Philip Biedler, Ph.D. student in Mechanical and Aerospace Engineering at WVU**
An Engineering Student's View of New Technologies and Traditional Industries
- Linda Wellings, President, MPL Corporation**
IT Support for Manufacturing Processes
- 11:25 Keynote Speaker**
Roger Mowen, CIO, Eastman Chemical Company
The End-Game of E-Business Serving Customers and Creating Shareowner Value
Introduced by Senator Rockefeller
- 12:15 Lunch, exhibits, networking**



Clarence E. Martin

1:30 Clarence E. (CEM) Martin, President, Discover the Real West Virginia Foundation

DRWV Foundation Working for West Virginia

1:45 Tools for Positioning Core Industries in the New Economy

Panel moderated by Jan Berkow, President, Applied Industrial Solutions, LLC

Bart Christner, Cambridge Technology Partners
The Many Facets of e-business: B2B Collaboration

Robert L. Moore, Founder, Gensym Corporation
Maximizing Return on Plant Assets

2:45 Incentives, Opportunities, and Follow-up Action Plans

Panel moderated by Carl Irwin, Director, IOF-WV

David Warner, Director, West Virginia Development Authority
Overview of Financing and Tax Incentive Programs

Lou Sousa, Director of Communications, Office of Industrial Technologies, U.S. Department of Energy
Overview of the U.S. DOE Industries of the Future Program

John Hewes, Special Assistant to the Director, Advanced Technology Program
Overview of the NIST ATP Program

Development of Follow-up Action Plans

4:00 Closing Reception

Welcome and Introductory Comments

The Role of West Virginia University in West Virginia's Economic Future

David C. Hardesty Jr., President



Good morning and welcome to West Virginia University.

I suspect most of you have been to campus before and some of you work here, but ponder for a moment all that happens on a given day at WVU.

On just this, the Evansdale campus of WVU, some of our most exciting and promising research and teaching take place.

For example, we have several research groups working with the Industries of the Future–West Virginia program, the first state-level adaptation of the national IOF initiative (now over 30 states have similar efforts).

Also in this building, outreach programs are supporting small communities across the country in dealing with water quality. Fuel cells and clean coal technologies are also being studied.

Next door, an international center for biometrics is taking shape. In fact, before arriving here this morning I stopped into a biometrics development session led by our faculty in conjunction with representatives of NSF and other partner institutions and businesses.

In the nearby Engineering Research Building, students might be found working on their alternative fuel engines.

This year, a team of WVU students placed first in a national competition for the design, function, and environmental impact of their hybrid powered motor vehicle.

You might also find graduate students working with faculty on high value uses for coal, specifically coal-based carbon products that could create exciting new markets for coal.

Across the way at the Health Sciences Center, a patient is being examined by a state-of-the-art PET scanner, knee surgery is being performed, a child's cancer is being treated by the latest science, and the finishing touches are being put on a new state Eye Care Center. Researchers are studying diseases of the brain, hoping to add to the national effort in finding a cure for Alzheimer's and other cognitive disorders. In fact, West Virginia is fast becoming a world center for this research under the umbrella of the Blanchette Rockefeller Neurosciences Center, headquartered at WVU and in association with Johns Hopkins.

This is just a sampling of all that's happening within a stone's throw of where we are sitting right now.

Three important things are common to these and many other examples of what is being done by WVU on a daily basis in every region of this state.

The first is that our focus is on projects that address needs in West Virginia.

As a land-grant institution, this is part of our heritage. It is our mission.

When we have needs in America, land-grant institutions are expected to lead the way.

When we needed better farming methods, we started agricultural colleges. When we needed to industrialize, we started schools of engineering. When we needed to win the race into space, we increased our emphasis on math and science in our schools and colleges.

Today, this state needs economic development and we have established a technology transfer office and programs such as IOF to encourage and accelerate the translation of our research into jobs.

The second thing is that our work involves many partners. Other universities throughout the country, our Congressional delegation, business and industry leaders, non-profit organizations, national foundations, public schools, and many others are among our partners.

Indeed, we work here today as partners.

And third, technology and innovation are driving our research, its purpose, how it is conducted, and what it can accomplish.

As a land-grant institution, but also as one of only a small percentage of research-extensive universities in the nation, we must engage in research that develops new knowledge and technologies and applies them to our traditional industries.

There is no more important calling upon our institution, our state leaders, and businesses.

For a century, West Virginia has been an industrialized economy—a very competitive one for much of the time.

In fact, at the turn of the last century, optimism was the mood.

In 1902, Granville Davisson Hall, a state founder, wrote:

Under the census of 1900 West Virginia numbered near a million souls, and now, a year later, no doubt the million mark has been reached. Its statistics show an even larger growth in commerce and development.

Among the coal-mining states, it is already third, and the production steadily increases.

In no state in the Union has the tide of prosperity risen higher.

While these last pages are being written, a local paper comes to hand with the statement that sixty-three railroads are at this time (November, 1901), proposed and under construction within the State, ranging in length from ten miles to sixty.

The same paper contains the Thanksgiving proclamation of Governor White, wherein he says:

We are truly a favored people among the nations of the world, and the citizens of no state in the Union have more abundant reason for thanksgiving than those of West Virginia. Our national prosperity has been very great, and we have been shielded from pestilence and distress. Our State has probably been blessed above all others in the progress of material development and in the increased production of the great riches with which God has favored us.

There was just cause for this optimism.

The timbering of the virgin forests, opening of mines, creation of glass and steel industries, and expansion of the oil and gas industries created enormous collective wealth and tax revenues.

Banks were established, with lucrative trust departments.

County court houses reflected prosperity, as did the new large houses and even mansions in almost every town.

And, on the political front, West Virginia was making its mark. By the early 1900's, Henry Gassaway Davis had become a candidate for president of the United States, and by 1922, John W. Davis was a candidate for president of the United States.

But times changed and in the words of WVU History Professor Ronald Lewis, the Great Depression came in like a “dense fog.”

And so, while occasionally bolstered by war, national energy shortages, and federal investment, since 1940 West Virginia has essentially been influenced by the national economy.

There are many external forces that have created challenges for us over the past several decades and continue to do so today. These are unique to West Virginia, but have tended to hit us particularly hard.

Just to name a few:

1. **Diversification of the national economy** away from manufacturing and mineral extraction (our traditional industries) and toward the service and information technology industries.
2. **Consolidation of U.S. industries**, reducing the number of corporate headquarters in West Virginia.

3. **Globalization of competitive markets**, resulting in the movement of plants “off-shore” to lower cost locations.
4. **Mechanization**, resulting in a reduced workforce.
5. **Competition**, sometimes excessive among the states, causing companies to move from one state to another.

In the midst of all these forces, and shaping them at the same time, comes technology.

In fact, technology is sometimes seen as the catalyst behind these challenges, the cause of our problems.

Yet, technology may be what will save our traditional industries and make them stronger and more competitive.

Indeed, as younger generations mature, technology will become ubiquitous. It will become inherent in our businesses, schools, and industries.

We have all experienced this to some extent already. It’s hard to remember how we functioned without email, cell phones, or instant access to information on the Internet.

We cannot wait to become more comfortable with technology.

Almost over night, but with a lot of hard work, the technology revolution has touched the economy of Morgantown and the I-79 corridor, but it will have to reach other regions in the state. And, each region will have different needs and different strengths upon which to build.

We must also expand the capacity for broadband communications. If it is, education, jobs, and the “new economy” technologies can be transported to former coal towns as easily as coal was transported from them on the railroad in the “old economy.”

So for us, the challenge is to use the world of new technologies to build on West Virginia’s strengths rooted in the production of aluminum, steel, glass, chemicals, polymers, wood products, and electricity.

Our traditional industries will serve us well.

We must build on them, transform them into the new economy, and expand on them to increase production of downstream, value-added products.

Industries of the Future is a perfect example of leveraging resources to build for our future.

Today’s meeting is another keystone in our commitment to the future, one that merges new technologies with our traditional strengths.

We are delighted that Senator Rockefeller has brought the second meeting of his Forum on Technology and Innovation to Morgantown.

I have known the Senator for many years now and his resolve to facilitate economic development in West Virginia is without question.

He is our best economic ambassador whether he’s in the halls of Congress, the backwoods of West Virginia, or in the Pacific Rim.

His vision is creating optimism as we open a new century in West Virginia’s history. His leadership is turning this vision into reality.

He has traveled to the out-of-state headquarters of West Virginia companies in an effort to retain those operations in the state, and he has been successful.

He has brought new businesses into West Virginia. He has secured investment in our communities.

He has been doing all of this for years, before the technology revolution and now during its prime. And, I am confident he will be doing so for years to come.

So it is a great privilege to welcome Senator Rockefeller back to Morgantown and ask him to get our morning started.

The Role of Manufacturing and Production in West Virginia's Economic Future

The Honorable Jay Rockefeller, United States Senator

Good morning. Thank you, David, for joining me today and thank you especially for all of your hard work making West Virginia University a partner in this forum.

I think if you look at a lot of the technology and growth clusters around the United States, one of the first things you notice is the active presence of the region's colleges and universities.

There's a critical cross-pollination between the academics and the businesspeople that makes both sides more productive.

Thanks to President Hardesty's leadership, the University is working more effectively than ever to speed growth in West Virginia...not just training our business and technical leaders, but playing a broader economic development role, as well. So I look forward to seeing a lot more Mountaineers at meetings like this and, of course, out in the plants and offices that drive this region's economy.

Thanks as well to our other speakers today. I know that all of you have packed schedules, and other places you really need to be, and I'm grateful that you made time for us.

And thank you to all of the audience members. Building a wealthier, more productive West Virginia is a goal we all share. It's no secret that the first step in that direction is building wealthier, more productive West Virginia businesses.

I can't think of anything that would delight me more than to see your businesses — firms with roots in and a commitment to our state — leading an era of growth and growing regional prosperity. And I think that our forum today will help you take some important steps in that direction.

The work, the challenge we all share, is to find ways to transform West Virginia's traditional industries into concerns that can survive global competition; to adapt so-called "new-economy" technology to "old economy" firms.

Over the last few months, I think we've learned that the "new economy" has a lot in common with the traditional economy. That putting a "dot-com" on your name and rolling out a big IPO doesn't free you from the obligations of selling a quality product, paying attention to customers' needs and, eventually, turning a profit.

The tech shakeout has alerted us to a trap found in too many old-versus-new economy discussions over the last few years.

New economy prophets tended to ignore the jobs, wealth, and potential created by traditional industries. They touted dot-coms as economic saviors, exempt from the rules of the traditional economy.

On the other hand, old economy defenders too often sounded fearful and resentful. Fearful that attention to new technology meant neglect of sectors like mining and manufacturing. Resentful of the glamour and wealth accruing to people who seemed content to let mills rust and refineries rot and workers go hungry.

As we've learned, both sides were wrong. In the last 12 months, we've lost jobs both in the tech field and in heavy industry. The economy is still growing. But the numbers show that neither high-tech nor heavy industry — by itself — can guarantee economic security.

That's why I wanted to focus today's Forum on our state's traditional industries.

West Virginia's 21st Century prosperity demands attention to our industrial bedrock; manufacturing and production must and will continue to provide a vital economic foundation for this state and good paying jobs for thousands of West Virginians.

But, those industries, while maintaining their traditional role as important employers and economic leaders, have to explore and master the non-traditional strategies and technologies that will keep them competitive.

The dichotomy between the "old economy" and the "new economy" is a false one. There is only one economy.

Fortunately for us, one of that economy's highest growth areas is that point where steel and



software come together: where managers and engineers apply high technology to traditional industries to become competitive on a global scale.

Legendary General Electric CEO Jack Welch was surely overstating his case when he said, “The big, old guys are going to beat the daylights out of the pure dot-commers.” But I like his spirit.

I think what he should have said was that, “The big, old guys who can partner with and learn from the dot-commers are going to beat the daylights out of everybody else.”

Because that’s what GE’s doing.

Eastman Chemical’s doing it, too. And later today, keynote speaker Roger Mowen, Eastman Chemical’s CIO, will give you a more detailed look at how his company melded old and new to become one of the countries most sophisticated, and competitive, chemical concerns.

As these case studies show, we’re not so much interested in creating a brand new economy, as we are in upgrading the existing economy. It’s like upgrading your computer software, only instead of moving from Windows 95 to Windows 2000, we want to upgrade from Steel 95 to Steel 2000 ... and start planning for Steel 2005.

Transitions are a difficult time for any industry. Upgrading demands new strategies and talent that can move businesses from a reactive mode to an offensive posture. Washington can help by encouraging research and technical training, and that has become one my top priorities in the Senate.

Last year I reached across the aisle to Senator Bill Frist of Tennessee, and together we introduced the Federal Research and Investment Act, or FRIA, which would double federal funding for scientific and technical R&D over the next ten years. Last year FRIA passed the Senate but died in the house. This year, we’ll reintroduce the legislation and we believe we have good chance of passage.

I worked with Senator Olympia Snowe a few years back to create and pass E-Rate legislation, and now we’re seeing hundreds of schools and libraries networked and on line. A whole generation of West Virginia children is growing up computer literate and ready for the Internet age.

In 1997, I encouraged leaders of Cisco to establish training academies across this state. Now there are 27, all of them offering high school students and adults the computer skills that will enable them to become IT workers — for tech firms or for steel mills.

And I’m fighting for strong enforcement of our trade laws to ensure that our traditional industries aren’t knocked off by unfair trade practices even as they’re finding new ways to maintain their competitive edge.

But the real work of upgrading our industry isn’t being done on the Senate floor; it’s being done on factory floors, and in laboratories and universities.

In all these places, people are discovering new and better ways to mill steel and mine coal and create chemicals, techniques that marry the best of the new technology with industries that have been important to West Virginia for generations.

So, rather than taking up any more of your time, let’s hear from some of the people who are making this important work a growing part of a growing West Virginia economy.

I’m excited about what’s happening, and I think all of you will be excited by what you hear today.

Information Technologies for Traditional Industries: A Use/Needs Assessment

Survey of IT Usage by West Virginia Manufacturers

Bonnie Morris, Associate Professor, Department of Accounting, WVU College of Business and Economics

The Forum planning committee conducted a survey of West Virginia manufacturers to determine the nature and extent of their IT usage and to identify common concerns or obstacles to IT implementation. We felt it was important to get responses from a broad spectrum of the manufacturing firms in the state. To that end, we started with the companies who participate in IOF-WV. The IOF-WV companies represent six industry sectors. Then we added contacts from the West Virginia Manufacturers' Association and from the West Virginia Manufacturers Register, for a total of 256 contacts.

The individuals in our sample for whom we had a current email address were sent an email message asking them to complete our survey. They were given the option of printing and mailing the survey or completing it online at a WVU website. The remaining individuals in our sample were sent a letter with a survey form. The letter also gave the option of completing the survey online. The distribution of the email messages and letters and the collection of both the paper and web responses was coordinated by the West Virginia University Survey Research Center, under the direction of Dr. Ron Althouse.

The response to the survey was very good, both in terms of the number of responses and the demographics of the manufacturers who responded. The overall response rate was 39%, which is quite good. Approximately one-third of the respondents were smaller companies with 100 or fewer employees. One-third were larger companies with more than 300 employees and the remainder had between 100 and 300 employees. Slightly more than half were privately held and almost half were headquartered in West Virginia. About one-third operate out of a single plant. The companies were equally distributed with respect to the type of product they produce: raw materials, component parts, or finished goods. Also, almost equal numbers of respondents categorized their production process as continuous, batch, or make-to-order.

Survey Results

Please refer to Appendix A to view the full response to the Survey. To get a better idea of the environment in which the survey participants were operating, they were asked to identify three key industry drivers that they will have to address in the future. By far, the two drivers listed most often were global competition and the increasing cost of energy. Emissions reductions and environmental issues were also highly cited. Related to global competition were other concerns such as cost containment, demand for new product development, and demand for niche products.

Survey questions related to IT usage focused on three main topics: the use of the Internet, the use of IT to acquire and report plant data, the use of IT to improve process efficiency. With respect to Internet usage, three-fourths of the respondents use email and two-thirds have a "static" web page. High usage of these technologies was expected. In many ways, email and company web pages have become almost as pervasive as fax machines and business cards. They are not investments made to improve competitiveness, but they are low cost activities that seem to be expected by customers and other stakeholders. Half the respondents use an intranet for internal communication. Far fewer reported using the Internet for B2B (business to business) collaboration by using inactive web pages or participating in B2B exchanges for buying and selling goods.

The survey participants were asked to indicate how quickly they could obtain reports on plant labor utilization, production totals, abnormal operating conditions, cost-of-goods-sold and work in progress. The speed with which such data can be retrieved is an indication of the flexibility of the



organization and its ability to recognize and respond to changing customer demand. Forty-five percent of respondents indicated they could get reports on order status immediately and 42% can get production totals immediately. Only 26% indicated they could get cost-of-goods-sold data immediately, while 39% indicated it would take longer than three days to get cost-of-goods sold data or that they do not use IT to obtain such reports. Somewhat surprisingly, 23% indicated that they do not use IT to identify and report abnormal operating conditions in the plant.

Almost two-thirds of respondents indicate that they already use IT for production scheduling, order tracking and marketing. Another 15-20% indicate that they plan to implement those applications. Far fewer are using IT for supply chain management, however. In some ways, this is not surprising. Companies have focused on the applications that have been around the longest, have more stable software and vendors, and have the most case history to look at and learn from, and therefore, more certainty about the return on investment (ROI).

Uncertainty about the ROI of IT investments was, in fact, the most frequently cited obstacle or drawback to IT implementation. Other frequently cited obstacles or drawbacks were lack of certainty about the ability of IT to improve competitive advantage and concerns about workforce availability, training, and retraining.

When asked how the state or federal government could facilitate the use of IT to improve global competitiveness, the survey respondents cited incentives for IT infrastructure improvements, seminars and case studies of IT solutions in manufacturing, and programs to address IT workforce needs.

Summary

The survey served two main purposes. First, it provided the planning committee with guidance about the Forum agenda. As a result of the responses we received, the Forum agenda was designed to include a morning panel with case studies of types of IT usage, sessions on maximizing return on plant assets by using IT to reduce energy usage, trends in B2B collaboration, a panel session with a WVU doctoral student who discussed a project using IT to identify and avoid abnormal operating conditions and the opportunity to partner with colleges and universities, and a panel session that included a discussion of opportunities with government.

The second purpose of the survey was to help us determine future activities. A number of “follow-up” activities have been proposed. Among those that we are most actively pursuing is a proposal to do a series of “IT Assessments.” These assessments would be similar to the energy audits that are currently being conducted by the WVU Industrial Assessment Center. A team of IT professionals and academicians would work with a sample of companies who wish to participate to identify cost effective IT investments for reducing energy consumption and improving the efficiency of the plants. The objective of the IT Assessment is to provide relevant case studies of “best practices” that can be used by others in the same or similar industries.

Industry Perspectives

Panel moderated by Senator Rockefeller and President Hardesty

The purpose of this panel is to present four perspectives of IT success in traditional industries. It is our pleasure to welcome the distinguished panelists: Patrick Stewart, President and CEO of MetalSite.net; Linda Wellings, President of MPL Corporation; Marshall Moore, Technology Leader, GE Specialty Chemicals; and Philip Biedler, Ph.D. Student, WVU Department of Mechanical and Aerospace Engineering.

Patrick Stewart, President and CEO, MetalSite.net

MetalSite is a creation of the old and new economy. I think we've confused the terms new and old economy. Selling to the old economy, businesses have lost sight of the new economy. MetalSite is a concept we had about five years ago. We had an idea and that idea was how to create more efficiency in the world's metal supply chain. Our goal was to take costs out of the supply chain. The metal supply chain in the United States is highly fragmented, but as Senator Rockefeller said, it's one of the most cost effective industries in the world. You have companies like Steel Dynamics and NuCore Steel, who are the lowest cost steel producers in the world, bar none, yet they are having difficulty marketing their products because the industry is so fragmented.

When you think of U.S. Steel, you think of a very large steel company with a dominant position in the U.S. steel industry. Today U.S. Steel's market share is around eight percent versus 25% thirty years ago. The largest steel producer in North America has only eight percent of the market share. The largest service center, a business that takes a product, fabricates, processes, and distributes it to a customer, has only has three percent of the market share. The largest global metals company has three-and-a-half percent of the market share. No matter where you go, you have massive fragmentation in the steel industry. This has been a real problem for the industry.

The U.S. steel industry can really be complimented on the cost reductions they've accomplished in the last twenty years. In 1980, it cost about ten man-hours to produce a ton of steel. In 1999, it was three man-hours per ton showing a decrease of 70 percent.

Unlike the Proctor & Gambles and the Wal-Marts of the world, the steel industry has not focused on how to connect its customer into the supply chain. Back in the late '80's, Wal-Mart developed a one/one/one program and the goal was to allow their suppliers to see through their inventory. Wal-Mart proposed to Proctor & Gamble, "Let me give you my point-of-sales data, then you can look right into my stores and help us manage our inventory." For the last ten years, that's what Proctor & Gamble and Wal-Mart have worked on, and they have been incredibly successful. They have seen a 90% increase in inventory turnover. Proctor & Gamble said that it has saved them about a half a billion dollars on one product line alone.

The savings out there are really about attacking the supply chain. After the concept of MetalSite was finalized, we created an industry consortium. MetalSite is owned by six of the largest metals



Patrick Stewart, Linda Wellings, Philip Biedler, and Marshall Moore

companies in North America, representing about 28% of the U.S. market share. Our goal was to consolidate major partners to work together on solutions, solve these supply chain problems and create visibility opportunities for people to sell and buy their products.

We processed 51,000 sales orders last year. That translates into almost a billion dollars of business, proving that the “dot-com” world does exist. When MetalSite was created I got a call from a reporter who asked me how it feels to be a “B2B” commerce company and I said, “Well, let me call you back.” I had to ask our PR Manager what “B2B” commerce is. We’d created a “B2B” business, and to be honest with you, I didn’t know what a “B2B” was.

A few months ago, The Wall Street Journal recognized us as the oldest “B2B” commerce marketplace still alive today. The key phrase they used is “still alive” and that kind of concerned me. I think we’re “still alive” because we’ve had the benefit of a real business model since day one. That’s not to say it isn’t continuing to be difficult. Maybe we’re in the e-commerce business, but we really looked at ourselves as a supply chain solutions company that builds solutions for the supply chain.

MetalSite’s focus is how to help the participants in our industry. There are 14 U.S. steel companies now in bankruptcy, and the economic conditions we’re experiencing are creating some very trying times right now. Last summer, the industry had the highest levels of inventory in its history, carrying almost a 120 plus days of inventory.

When Weirton Steel created MetalSite five years ago, we did calculations on how many turnovers there were on some of their products. Weirton had one and a half to two turns a year for some of the products, which are pretty dismal numbers. If the turnovers could go to four, to eight, to twelve, or any number above one and a half, there could be substantial increases in the bottom lines of MetalSite participants.

We have saved substantial money for some participating companies. One company went from about a 45-day inventory turn on their excess materials down to 11 days. The Internet has made it possible for new ways of doing business. But the Internet is just an information highway and the business model that people build on top is what makes a difference. The Internet is the best, cheapest, fastest, safest access to information that anyone can get. Of the 25,000 users we have, 40% of them use AOL. They don’t have high-speed connections to their house. They don’t have high-speed connections to their business; they have AOL accounts.

We view the Internet as the access frontier, but not the solution. MetalSite built a solution for the steel industry on top of the Internet. It’s really making a difference. As we go through this panel discussion, we can tell you a little bit more about what we’ve done and where we’re going. We’re proud to be here.

Thanks, again, Senator Rockefeller, for asking us.

Marshall Moore, Technology Leader, General Electric Specialty Chemicals

General Electric is very applicable to the topic of the conference, which is taking a traditional business, in a traditional industry, and moving into e-business. To quote our CEO, Jack Welch, “We have the hard part, hundreds of factories and warehouses, world-leading products, and technology. We have a century old brand identity, and a reputation known and admired around the globe, all attributes that new e-business entrants are desperate to get.”

The challenge is to take this very big traditional industry and speed it up for the e-business world. Our strategy was to take the business processes and segments of the supply chain, break them down, and develop e-business strategies to fit. We talk a lot about buy, make, and sell. You have to buy materials and services to run your operations and make is basically the manufacturing of these products. The sell side, taking sales and orders on-line, is what most of us think of when we hear e-business and e-commerce. There’s also a lot of opportunity in taking out costs and making your business more productive.

On the buy side, the focus is on raw material purchasing and taking direct variable cost out of your business. In procurement, or taking cost out, e-business is a way of creating competition at your supply base. Traditional manufacturing operations have those single supply sources, maybe with a

backup. E-business allows you to take advantage of the breadth of the Internet. It allows you to go out and touch as many suppliers as possible. Real time competition can be created with e-auctions when you need more than a single supplier or sourcing base. The alternative to your purchasing department trying to negotiate contracts one-on-one is to use sites like ChemConnect and World Chemical Exchange to take bids on the auctions in real time. A single e-auction sometimes will take out anywhere from five to thirty percent of the material cost.

On the make side, the idea is to digitize materials usage data within the manufacturing process. In a traditional model, you keep an inventory of raw materials for manufacturing operations and track how much material is used throughout the accounting period. At the end of each month you do a reconciliation to determine usage, which makes it too late to improve that month's usage productivity. We can now use real-time digitization for acquiring and analyzing all that data. It can be used in the control rooms for manufacturing processes, and be made accessible real-time through company Intranets, even to suppliers through the Internet.

With vendor-managed inventory, a key element is to get a Cisco-type of model where you can actually close the books on a daily basis. Not only the engineer or the operator of the manufacturing plant, but the business leaders and sourcing professionals can actually see what the real-time usage is and identify opportunities to improve usage productivity within the manufacturing organizations. That's the focus in the make side of our business, digitizing those processes, speeding up the accountability of the materials that we use.

We talked a lot also about digitization of classical processes. At our site here in Morgantown, West Virginia, we have digitization of pay cards, which sounds like something very simple. We found that on a weekly basis, one person's pay card would be touched over a hundred times to be entered, re-entered, corrected, passed through, re-corrected, and re-entered. Using digital technologies in that process can eliminate most of those steps while increasing the speed and accuracy of the operation.

One of the most classical applications of e-business is making your products available through the Internet. Our sell side strategy has been first and foremost to get an interactive web site where a customer can check the inventory and place their order. For GE Specialty Chemicals, we've got a "SpecialtyChemicals.Com" site where a customer can check the inventory, enter their order, and then check the status of that order. PolymerAdditives.Com is a joint venture site, where with some of our classical competitors, complementary products can be supplied to the same customers. GE has grown a product line from being a supplier of stabilizers to a place where a customer can go online and get a much broader product line, buying from us and our joint venture partners, who are competitors. As soon as an order is placed, the customer can tell whether or not that material is in stock, and if not, whether it's going to be made. It's similar to going to Amazon.Com and ordering a book.

Another site we have is called GECOLORExpress.Com where you can order any color of plastic from GE Plastics. Classically the customer sends in a paint chip or a piece of fabric of the color they want to match. Sometimes, it takes weeks to match that color, send a standard back, wait for acceptance or rejection, and possibly send it back again. All of that can now be done over the Internet with special calibration tools to calibrate the color on the monitor. Customers can actually go in and search for colors, all of this is done real time over the Internet through ColorExpress.Com, which is really a collaborative web site.

Another key Internet initiative of GE is a move to selling services as well as products. Our power systems and transportation systems are good examples of selling services. We've got on-line diagnostics available to customers. An engineer at a power plant can go on-line and get diagnostics for particular turbines or generators and compare their performance to what is in the market. The site will actually recommend upgrades and tell them how much more productivity and power they're going to get from an upgrade. It's a valuable service to the customer as well as a potential source of revenue for GE since it's recommending useful upgrades to the customers.

That's the key strategy for all of the GE businesses: make, buy, and sell, looking for digitization opportunities and providing new services through the Internet for our customers.

Thank you very much.

Philip Biedler, Ph.D. student, WVU Department of Mechanical and Aerospace Engineering, College of Engineering and Mineral Resources

To a large extent, business success today is directly tied to the use of technology, being used to enhance worker productivity and to control cost. This isn't limited to just high tech industries but also applies to traditional industries. My dissertation project is a cooperative effort in the aluminum reduction industry between Century Aluminum, Applied Industrial Solutions, Gensym Corporation, and West Virginia University through the U.S. Department of Energy's Industries of the Future Program.

The first part of our project was on how to better utilize the information that's already there through the data logging from each of the individual reduction cells. Computer techniques are used to calculate trends in the data and predict which cells are operating sub-optimally. The goal is to improve the number of pots operating at optimal condition. Instead of a reactive operational procedure, the operator is pro-active in correcting the pots to maximize efficiency, before they're operating in the sub-optimal condition. The other part of our project is looking at taking new data and utilizing it in conjunction with state-of-the-art controllers to better control the process. The targets for improved operation resulting from the project are to reduce the cell voltage by three-hundredths of a volt and increase current efficiency by three-tenths of a percent.

Now that might not sound like very much, but at Century Aluminum they're operating 675 cells at a voltage of four-and-one-half volts and 93,000 amps, so a voltage decrease of three-hundredths of a volt translates into about 18,000 megawatt hours of electricity per year. This has a huge impact on the amount of energy being used and in a highly competitive and established industry, like the aluminum reduction industry, this can mean the difference between success and failure. Century Aluminum has benefited from the Department of Energy's recognition of the importance of facilitating research in the aluminum industry on the national level and the great resource in having a research university in the state that can help with some of the technology aspects. The Department of Energy also recognized the potential of small businesses in West Virginia.

An important part of incorporating technology is to know what's really important in the process. The data acquisition system we're using on the Century Aluminum project can produce tons of data. We can produce 235 megabits of data per pot every day and it's impossible for a person to scan through that and figure out what's actually happening. It's important to incorporate software to extract useful information and to present it in a way that's useful for specific purposes. A different interface and a different set of data are needed for the people on the production floor than the data for the engineers and management trying to optimize the process.

In West Virginia, K-12 students are exposed to computers. The computer is now a part of life for students entering college. I think use of the computer has somewhat discouraged students from obtaining a fundamental knowledge of the process involved. Students will say, "Oh, well, I can solve the problem on the computer and trust the answer that the computer gives me." Sometimes the computer doesn't give the right answer because the student gave it the wrong input. It's important to have a fundamental knowledge of the process to know when you have the right answer. A blending of the technology expertise of new graduates combined with the expertise of people who have worked in the industry is needed.

Overall, the University has an important role to play in developing students and in partnering with industry to develop new technologies, not just e-commerce business to business, but also within manufacturing processes, improving the computer infrastructure that logs and presents data to operators and engineers.

Thank you.

Linda Wellings, President, MPL Corporation

First, I will give you a little overview of MPL Corporation and then I'm going to focus on two different contracts that we've done with manufacturers. This should help you understand the relationship that IT companies have with different customers.

MPL incorporated in 1985. We're a small business and our original contracts were with college administrations. We installed software and we actually had our first contract out of WVU with the

state Department of Energy. We worked to develop the Miner's Health Safety and Training Information System and also DEP's Oil and Gas Well Information System. We grew with work on other government contracting and Electronic Warfare Associates in Fairmont took us on as a subcontractor.

MPL had a good mix of different types of contracts, state contracts, federal government contracts, and some commercial contracts. An example of one contract we had in Buckhannon was the Utility Billing System.

In the early 1990's, we were invited to Northern Ireland to put on an information seminar, discussing community information systems. The Department of Commerce really embraced us and helped us get background information. We met our Northern Ireland business partner in 1996 at a Department of Commerce Seminar in Pittsburgh.

Two new directions we're working on involve a development effort with multi-media teaching entrepreneurship to high school students and the technology Just-In-Time lectures. An example is Pratt and Whitney Engine Services, located in Bridgeport, West Virginia. They are an overhaul and repair facility. We modified their off-the-shelf legacy system manufacturing package and turned it into an integrated overhaul and repair package. Applications were developed in detailed inspection, warranty, shipping, invoicing, and sales. A centralized mainframe-type architecture was moved into a true client-server arena and other client-server technologies were integrated into an overhaul repair facility package.

The challenge was to coordinate and communicate. There were upper-level managers, middle managers, and users who all had to buy-in as the project progressed. It is a challenge to meet and exceed managers' objectives, but the biggest challenge is to change the users' paradigm away from the way they had always done things. The other challenge was to control costs. It is always a challenge to keep the costs down, make specifications, and to do the job as efficiently as you can.

The benefits I see from working with Pratt were that we saved them time and costs, and that monthly throughput levels were increased. We formed a relationship where we learned from each other and we grew together. We helped them succeed and helped our company to grow.

I want to give you a little background on Just-in-Time Lectures (JITL). This software came from our relationship with Carnegie Mellon University, who actually wrote the software. They designed it to deliver education and training information quickly, effectively, and efficiently on an organization-wide basis to a diverse and scattered audience. JITL uses multimedia, CD-ROM, and web technologies to provide a flexible way to do training and information dissemination. The content is combined with the industry standard compressed digital video to create and do live presentations, briefings, and lectures.

About a year ago we formed a relationship with Simonton Windows. They manufacture all types of windows, primarily distributed through Sears. Simonton may hire as many as 32 employees on any one day. The JITL technology can provide an orientation program. New employees see a production line on a CD before actually working on the line. You have presenters who actually are presenting and you have the digital version of him there. You have questions that are asked and you have an outline for a new employee to go through. This could be used for OSHA training or for production training, which is how Simonton uses it. The challenges we faced with Simonton were that the most valuable people do the training. This technology can capture their best practices, without requiring the presence of their most valuable employees for orientation. Things can improve, and it's easy to change.

Benefits of JITL technology are:

- It's low cost in relation to the traditional training materials
- It has a rapid turn around time
- You use commonly available presentation tools
- It is easily updated and maintained
- It can also include a testing application

I will sum up the benefits of using information technology (IT) to work with traditional industry. I think that it is very important to partner-up for progress. Pratt and Simonton had the expertise they needed and we had the IT means to help them. We helped them be on the leading edge of technology. The state benefited, because a small, in-state business was able to grow.

When we use the best resources we have within the state, the mental capability and talents, we can improve the image of the West Virginia. I've represented West Virginia in various areas across the United States and in the international arena, and it's always a pleasure to say, "Look at all the neat, new things we're doing here."

I want to thank Senator Rockefeller and David Hardesty for giving me the opportunity to share my experiences with you today.

Question and Answer

Q: Philip-Do you think a student's level of education at WVU will affect their relationship with technology in the future?

A: Mr. Biedler: It depends on the field of expertise. Computer engineering, computer science, or electrical engineering students will be directly involved in the development of new technologies. With a bachelor's degree... in a lot of areas the focus will be on using the technology, like being able to use the computer to extract information from the Internet. Higher degrees are more involved in the development of technology.

A: President Hardesty: I would like to comment on the question. We are approaching the point where 100% of students will be wired in the dorms. To them it's like television and ubiquitous computer literacy is part of the undergraduate education. The computer design and program design will be the province of specialist in these fields. The use and idea of technology is coming at a fast rate and is challenging us to handle it.

Q: A lot of emphasis is made about how computer and the Internet can affect traditional business. How much emphasis is being placed on the other hi-tech developments for traditional industry in the state?

A: Senator Rockefeller: As of 17 years ago, the answer was not much. I think there is a lot more being done now. Something new can be developed and those who produce the product in a traditional way resist the changes. State leaders, others, and public opinion simply have to say, "Look, we've got to push aside the old and make way for the new." We can always do a better job of getting new ideas and products into traditional industries. Isn't that the purpose of this Forum, new IT technology for old industries?

A: President Hardesty: Several years ago, we developed six focus areas at WVU. Information technology was one, along with advanced materials, biomedical sciences and others. This morning's conference deals with the application of IT to traditional industries. In fact, there is major growth in other areas of technology, which, of course, also use IT. In the IOF program, for example, there are cross-cutting technologies that will help several different industries at the same time, things like sensors and controls. Some of the most exciting things that are happening in our state and at West Virginia University are in fields assisted by IT, not just the IT industry itself.

Q: Can JITL be used for other applications other than training?

A: Ms. Wellings: Yes. Several customers have used it for marketing. In Northern Ireland, the Belfast Telegraph was giving daily activity presentations to their employees. We did a JITL production that saved them time and could be put on their intranet so that the information could be viewed when they had time. It can be used in disseminating information, marketing, and training.

Q: I'm Chris Ferro, a WVU student, with a question for any member of the panel. A lot of you spoke about change. Change can cause feelings of apprehension in employees for various reasons. My question is, what are some techniques that you use to show the necessity for change and how to use it as a motivational factor with employees and management?

A: Mr. Moore: One of the key techniques we use internally is called CAP, or Change Acceleration Process. It recognizes that when you want to make a significant change, you can't just enforce that change. You have to consider the affected people and how it's going to be accepted in the business. You need to do things like stakeholder analysis. Determine who is supportive, who is against, and take all those factors into account to create a need. Then you put a time line on trying to make it a win/win situation. You have to plan the change, not only what you want to change, but how you're going to do that change.

A: Mr. Stewart: One of the things that we do is to create best practices and use that best practice to go to other companies and demonstrate how to save money. Everything is changing in business on a day-to-day basis. If you can demonstrate real value to the stakeholders in the company, they'll pretty much support it immediately.

A: Ms. Wellings: One other thing is that you train them very well in what they're doing to change. Most users are really afraid of change, but if they understand how to do it, then they're not so reluctant.

A: Senator Rockefeller: You're right. There has been an uneven distribution coming from the federal government. Where money is appropriated in this direction or that direction, it is not necessarily relating to what is the best for the country. Often, it depends on what a particular Senator or group of Senators may be able to affect. In the current administration, the National Institute of Health (NIH) has gotten a very good boost and the National Science Foundation (NSF) has gone in the other direction. It is readily understandable why NIH is looked upon favorably. Everybody who has cancer, a disease or medical problem, is looking for the United States government or the NIH to come up with answers.

Engineering doesn't ordinarily have a constituency. I remember a meeting with some of the top universities in the nation, where they were lobbying me exclusively on the NIH. I said you ought to be lobbying for them, but also you ought to be looking for a balance in your university's research programs. This nation has different needs, and we need to reflect those needs. It's got to be balanced.

In the new budget, the NIH does very well, but not the National Science Foundation. That's wrong. We're going to have to change that in Congress. It will not be easy because the national constituency for life sciences and biomedical sciences is enormous and very well organized.

A: Mr. Biedler: I think the Industries of the Future (IOF) program has pinpointed industries that really need to be focused on in developing technologies that will enable them to compete. The IOF program has directed funding to that area and encouraged interaction between different companies that would not necessarily have interacted. Because it can involve proprietary information, it is a big step to encourage cooperation between different companies to interact and share their knowledge.

Q: I'm Egils Milbergs with the National Coalition for Advanced Manufacturing (NaCFAM) and I have a couple of policy questions. Senator, you brought up the federal R&D budget over last ten years. There's been a huge percentage decline in investment in the physical & engineering sciences, but biotechnology and the health sciences have picked up the marginal dollars. What are the prospects for a shift in those priorities over the next two to three years to recognize the importance of traditional industries? Senators Domenici and Bingaman have introduced a bill to make permanent the R&D tax credit and add a 20% tax incentive for collaborations and partnerships between industry, the universities, small business, and the federal laboratories. I'd be interested in the panel's and your responses in these two particular areas.



Philip Biedler, Senator Jay Rockefeller, WVU President David C. Hardesty Jr.

Q: Do you folks think a tax incentive is necessary in order to accelerate or encourage partnerships between researchers and industry?

A: Mr. Moore: I think it will certainly encourage it. I have to support what Philip said about the Industries of the Future. Programs like that are going to be very important to offset any decrease in terms of private funding or R&D spending. It really facilitates moving from basic to more applied research in academia, which is going to be more beneficial. Tax incentives on either side will offset matching funds from the private sector. That's going to be a driver. To your question, I don't know if it's absolutely necessary.

Q: I'm Christy Shaffer, a student here at WVU. What are some of the resources to assist businesses in utilizing technology?

A: Mr. Biedler: First of all, the experience. The University has been doing research for years in a wide range of fields. They have the ability to extract information that can be useful in multiple industries.

The expertise of the professors is another important factor. One professor in charge of a particular project will often have others available as resources. Individual companies wouldn't necessarily have Ph.D. scientists to work on projects.

The availability of students learning to explore is an important factor. They can benefit by being involved in research, using in real life the cutting-edge technologies they're learning about in the classroom.

A: Senator Rockefeller: I would add a comment about government and it's instincts. People say there's a lot of politics played in Washington, and often that's true. Much more often, there are fundamental philosophical and ideological differences between individuals making decisions and between parties as they decide how to vote. There is a philosophy in Congress that basic research is something government should do, but another philosophy says that application of that basic research to commercial use is not good. In other words, government does the research endlessly, to the deepest level, but you leave to others to apply this research and make it available commercially.

That's the classic parallel to the dichotomy in my opening remarks. You have a new economy and you have an old economy and never the twain shall meet. They're just too different. With a philosophy for one set of folks and a different philosophy for another, is a way a country moves backwards. We must avoid this attitude about basic research and how it's used. As Philip said, let the government be helpful in the process.

One of the ways that government has been helpful in the process is in research programs like EPSCoR and EPSCoT. WVU has made good use of both of these. Those programs say, "Here is money to be used for the purpose of applying research in ways that will be useful to your state." It encourages young researchers, people like Philip, and produces results. It also assumes that, across the nation, you don't have to be in the middle of the biggest city or in the middle of the largest, most prestigious university to have a decent scientific idea, or a good applications idea, or a brilliant basic research concept.

Q: Vickie Carson with HardwoodSite with a question for Patrick. You've obviously learned a lot in the five years since launching your startup operation. What, if anything, would you do differently?

A: Mr. Stewart: Any time you create a startup company, you're creating something that no one has ever done before. There's not a rulebook for right and wrong. One of the things we did well in the beginning was creating a culture that expected some failure. In creating something new, you don't have all the answers. You might have to fail ten times to figure out the right answer. We created a culture that encouraged people to take chances, push the envelope to drive the adoption of the solutions that we have now.

The biggest mistake we probably made was trying to rush things. We also got caught up in the euphoria of e-commerce and we tried to push things faster than the pace we were equipped to handle. That was a mistake. If we had just kept at the same pace, we would probably have been more successful. We've done very well as a company. You have to be able to understand the tolerance that your company has for driving forward. Many of the "dot-coms" got too caught up in the speed, versus the reality, of what they were delivering.

We had very large industry partners keeping us grounded to what we needed to do, when we made the mistake of getting caught in the speed.

A: Mr. Stewart: We're creating something brand new in industry. We're not changing things within the four walls; we're changing how people connect the four walls, which is pretty radically different. If people think it's tough to re-engineer a corporation, try re-engineering a supply chain with 200 participants. That is enormously challenging. Our company had to be able to identify the best ways to do that. We've created best practices and the smartest thing we've done is helping companies create best practices that afforded us the opportunity to benchmark companies to see how they compared. To drive the change, people have to see the value; they have to understand the problems.

Training is key. We created a division called MetalSite University, where we train people on everything from how to use a mouse to how to use our site. The average age of a metals purchasing person is 52 years old, right in the heart of the most difficult age group to train according to a Microsoft study. You have to be able to understand your environment.

If it weren't for companies like MetalSite, Amazon, and others, change would not be happening as fast. Go back and look at the technology. Probably the biggest thing that happened to this country for technology was the breakup of AT&T. It allowed all the technology that was locked up in AT&T to be released. Companies like Cisco and others have just dominated since then, recognizing that with change you have to add real value.

A: Senator Rockefeller: I can add one thought to that and to what you previously said about making mistakes as being part of your culture. We tend to be a little risk adverse. You have to be willing to take a risk. You have to be willing to fail. That's true with our financial institutions; it's true with government. You have to do things that are out of the box. The taking of risks, or the absence of risk aversion, is an important issue for us in West Virginia.

Comment: I'm Alfred Kuehn, CEO of Management Science Associates. I have been on the Graduate School faculty at Carnegie-Mellon for 15 years. What brought me here was the discussion about tax incentives or benefits to different groups. The shift in funding from the science to the medical area influenced us substantially. Incentives like that will provide motivation for going different directions. In 1994, we started looking into various aspects of medical research. We were more into real-time steel processing earlier. We are still in steel, but there's no question that a lot of the people have been shifted from working on steel research into medical and now into media and broadband.

Q: I'm Mike Kincaid with Azimuth Incorporated and my question to Patrick. What has been your greatest challenge in being a founder and leader of a "dot-com?"



Q: I'm Mike Gallogly. I work at the West Virginia Wood Technology Center in Elkins, West Virginia. On behalf of the Center, I'd like to thank Senator Rockefeller for his endorsement of the ARC Grant we were just awarded for 21st Century Programs for the wood products industry. I haven't heard it mentioned a lot, but wood products in this State is about a third of today's GNP.

We have sites spread throughout the State and we're putting in place a video conferencing center, which would also be publicly accessible to the citizens of Elkins. We're also putting together a DVD-based training module so that we can deliver high quality training content. My question for the Senator and the panel is do you see the lack of broadband in this State and the availability of affordable broadband as a major impediment? What can we do as a group to help bring about some change?

Q: I'm Brian Anderson, Student Body Vice-president here at WVU, and my question concerns the need to reach out to all corners of the state on the topic of information technology. What kind of incentives and direction do you think the state has, as far as reaching out to those areas that may not be centered on an institute of higher learning such as West Virginia University?

A: Senator Rockefeller: You don't want to get me started on that!

As a public person and as a human being, I have a basic philosophy that whether you're born rich or poor, black or white, rural or urban is a circumstance of where your parents were or are. There is no American who is inherently better than any other American. Some may prove themselves to be less able, less ambitious, or less creative, et cetera. You cannot make that assumption when they start school and while they're in K-12.

I have talked about the e-rate and computers and Internet access. Internet access alone is going to be totally insufficient to prepare anybody for the 21st Century unless it is supplemented by broadband capacity. That is data, video, and voice at very rapid levels uploading and downloading. It's much more economic to supply it to places where there are lots of people and to corporations. Some people have said to me that there will be large chunks of West Virginia that aren't going to have any broadband access for the next 20 years. I can't and won't accept that because 20 years may be too late. It may be too late for our individual young people growing up or older people to retool themselves to participate. To me, the broad dispersion of broadband, rural as well as urban, unpopulated areas as well as populated areas, is the definition of the information highway on which Patrick points out everything else is built. Broadband throughout West Virginia will be difficult, but there are a number of us who have a bill to try and give incentives to telecommunications companies to do that. In other words, if they will take the next generation of the Internet and take that into broadband, we'll give them a higher tax credit. And it's got to happen. It's absolutely got to happen. You cannot say that somebody from rural West Virginia is not going to have broadband accessibility. That is unfair. It's not the spirit of America.

A: President Hardesty: I just want to endorse and say Amen to those remarks. If you read the history of West Virginia, it becomes pretty clear that when the main transportation routes bypassed West Virginia, it suffered dramatically. Broadband is the main transportation route of tomorrow and we need those technologies today.

One of our graduates is Rouzbeh Yassini, the inventor of the cable modem. At his urging and with the help of our Computer Science and Electrical Engineering Department, we convened a conference last month to look at the technologies associated with broadband. We're going to try to foster that effort here in this corridor around Morgantown. I strongly believe that the future of our state is inherent in your question.

A: Senator Rockefeller: Let me give you a symbolic answer. It's wonderful to go to Gilbert, West Virginia in Mingo County and see a student in a public library doing research and writing a paper on one of the computers in that public library. But it means absolutely nothing for that student's future as an adult, unless they have far more sophisticated access to the full panoply of voice, video, and data available. Unfortunately, that's not the course that we're on now.

A: Mr. Stewart: I have a general concern with the state. I was a senior in 1978 and in my high school we had one computer. I now live in Pittsburgh where they just got state approval to be a pilot school system; 1,200 students are getting notebook computers in September. Every student, starting at grade three and up will have a notebook and the entire school system is going to be wired. They have subsidies for the parents to get Internet access at home. It's going to be the role model of Allegheny County and all of Pennsylvania. I thought that was such a novel new idea, but then the article went on to say there are school systems throughout the United States that have been doing this for five years.

As President Hardesty said, this is a critical moment for West Virginia. The state should really step up and deliver this type of technology infrastructure. I think it's very critical to the future of the state.

Keynote Address

Introduction by Senator Jay Rockefeller

And now, it's my great pleasure to introduce the CIO of Eastman Chemical, Roger Mowen. I can't think of any individual more qualified to talk about upgrading traditional industries. His subject today is, "Vision, Commitment, Transition: Eastman's path to the New Old Economy." Please join me in welcoming a good friend, Roger Mowen.

The End-Game of E-Business:

Serving Customers and Creating Shareowner Value

Roger Mowen, CIO, Eastman Chemical Company

Let me say how impressed I am with this series of conferences and how appreciative I am of what you're trying to accomplish here. Like you, I'm convinced that e-commerce can be the great leveler of business competition. Done correctly, it can create advantages to either get you in the game, or improve your game and let you compete even better.

Despite all the pundits who look at the battered NASDAQ and preach that e-business is dead, that it is just a fad, I'm a believer. I believe it's here to stay. I believe it altered forever the way we manufacture and sell goods around the world. And I believe there's more yet to come, especially if we keep e-business in perspective.

First, let me take a quick poll. By a show of hands, do we have any baseball fans here today? It's hard to go anywhere in this country and not find a roomful of baseball fans. Even those who didn't raise hands probably found it hard to miss all the hype that surrounded the opening day and these first few weeks of baseball.

The hype was everywhere. Radio. TV. The newspapers and magazines. And, of course, on the web.

All the baseball talk before the season opened was on a new rule change. The high strike, as it's called, is now part of the game. Those in power thought that umpires hadn't been calling strikes for anything above the waist. Now, they're calling the full strike zone from shoulder level down to the knees.

A lot of pundits said this rule change would dramatically change the fortunes of a lot of teams. They said teams with older pitchers who made careers out of nibbling away with low fastballs were especially vulnerable.

Well, we're nearly a month into the season and it looks like to me — just a casual observer — that things haven't changed a great deal. The Yankees are still very good. The Mets are still very good. Some teams that were poor last year are still very poor.

For all the hype the high fastball rule created, it turns out that the basics of baseball are the same. In the end, all that matters are the runs on the board. And how do you put runs on the board? By executing the fundamentals.

There's a lesson for all of us who have found ourselves trying to adjust to the new rule changes for business. Who have found ourselves trying to find new ways to put dollars on the bottom line in a business climate changed forever by that little letter "e."

I've been in the chemical industry for more than 40 years, and have seen a tremendous amount of change. But I've never seen anything with more potential to alter the way we do business than e-business. For once, I think the hype is right. It is revolutionary. It is evolutionary. And, as you know, it's necessary to pursue if you want to stay in business.

But let's get one thing straight. While I'm a big believer in e-business, I also think we're just now starting to put it into some perspective. Early, too many companies thought you could survive solely by having the latest in information technology flowing out of Silicon Valley.



It's equivalent to the baseball teams that try to win by relying solely on power hitters. It's entertaining baseball, for sure. And sometimes they even knock off some very good and balanced teams. But eventually, they're beaten by teams that have power hitters and good pitchers. Teams that were able to do the little things to produce runs while playing fundamental defense.

Many companies are learning the same lessons today with e-business. "Killer apps" and whiz-bang marketing won't rule the day. Smart companies are learning that you don't drop the basics; you incorporate the best of these new tools as a way to help you satisfy customer needs. In the end, e-business is still about business. And business, at least for public companies like Eastman, is still about improving shareholder value by serving our customers.

That's the reason Eastman is involved in e-business. A couple of years ago, we embarked on a very purposeful two-pronged business strategy. Transform our portfolio and reduce costs. We put e-business at the heart of both of those initiatives. We didn't put it there because it was the latest, greatest fad. We put it there because it was the right solution at the right time.

Reducing cost is a good example. Digitize the company processes, take work out of the system, and automate transactions. Those are all excellent areas where the right information technology can give you an advantage. There are some big rewards there and we've worked hard to find many of them.

Last year, for example, electronic procurement was 19% of our total spending on raw materials. Plus, 15% of our total sales came through electronic channels.

But we've also been transforming the portfolio. Some of our efforts wouldn't surprise you. Over the past few years we've done quite a few mergers, acquisitions, and divestitures with old-school chemical companies. You might say we've been improving our roster, shoring up our bullpen and adding a few players where we were thin.

Some efforts, though, are different thanks to e-business. We're now investing in true web companies. We're partnering and collaborating with software and hardware developers. We're changing the way we do business. And, in some cases, we're changing the businesses we're in altogether, choosing businesses that promise us a better and more stable future.

We have lots of good stories. Let me tell you about one. WebMethods is one good venture investment example out of the 14 we've done. We invested in that company to gain two important things. One, we got early access to budding technology to connect with customers. Secondly, the implementation of this customer solution gets inefficiencies out of our system. In short, it's good for our customers and it's good for our bottom line.

WebMethods is an example of a company we invested in because they had expertise we needed but didn't have. We've also been serious about getting better leverage from our areas of expertise. We launched three Eastman-initiated ventures, for example, to build on what we do well: ShipChem, Inc., PaintandCoatings.com, and AsiaBusinessNet.com.

All of these ventures and investments promise us greater shareholder value.

E-business rewards us with greater shareholder value in one other way. It makes us more attractive to customers. More attractive because we're using our IT capabilities to improve their buying experience. Our strategy is to make buying from Eastman so straightforward and so simple that our customers wouldn't consider it worth the hassle to buy elsewhere. We're collaborating with them to see what their needs are and, hopefully, achieving lasting customer loyalty.

Now that last part, customer loyalty, may surprise some people. And I can hear what the skeptics are saying: "The web is all about price, transparent value chains, instant auctions." In some cases they're right. That's not true in all cases.

Listen to what two researchers recently discovered. In the Harvard Business Review, they wrote about a study they conducted about customer loyalty on the web. Let me quote from their conclusion.

"Most of today's on-line customers exhibit a clear proclivity toward loyalty, and web technologies, used correctly, reinforce that inherent loyalty. When it comes to customer loyalty, the old rules are as vital as ever. Loyalty is still about earning the trust of the right kinds of customers, customers for whom you can deliver such a consistently superior experience that they will want to do all their business with you."

That's why Eastman has moved as quickly as we have into the e-business arena. We want customers who are satisfied. We want customers who benefit from doing business with us. And we want customers who are loyal.

We can't improve shareholder value without long-term profits. We can't achieve superior long-term profits unless we achieve superior customer loyalty. And we can't achieve superior customer loyalty without an e-business strategy that places our customers first. We're quickly trying to distinguish ourselves in the chemical industry by transforming our company into something that will be much more attractive to investors. That's why we're aggressively establishing electronic collaboration capabilities with our most strategic trading partners. We're also trying to extend our reach by globalizing and localizing our Internet and intranet sites. It's important for us — I think it's important for nearly any company — to move quickly and be among the first movers in e-business.

I want to leave you with one brief thought this morning before I quit. It's a question I get quite often, especially from some analysts who don't quite see the same possibilities that I do. The question is, "Why does Eastman feel such urgency around e-business? Why is it so important to be one of those early adopters?"

There's a school of thought out there that first movers, early adopters, won't have any sustainable advantage over their slower peers. To which I would say, survival itself is a sustainable advantage. And for many companies, including some chemical companies, we very well might be talking about survival. There's no room for hesitancy. E-business isn't the millennium version of the mood ring. It isn't an electronic pet rock. It isn't some fad you can sit back and watch pass. You have to jump in ... and the sooner the better. Of course, you don't want to rush in blindly, either. As too many extinct IT companies can tell you, when you go for broke, sometimes that's exactly what you get.

But there are people who say that the Internet is moving so quickly that technology will eventually level the playing field. That technology will allow anybody, even the laggards, to play catch up. The people who dwell on that miss the point. E-business is less about technology and more about serving customers. Eastman's core competency isn't technology. Our core competency is providing customers with new products and services. When collaboration is at it's best, we're creating new solutions.

The point is that e-business is still business. And business is still all about customers. Just as the payoff in baseball is pushing runners across the plate, the end-game of e-business is finding new, profitable ways to serve your customers.

Question and Answer

A: Roger Mowen: We have very tight metrics around return of investment. I don't think there's anything unique about the metrics we have in that area. In other areas, for example, the venture capital investments we've made, we're pursuing a strategy of a set of options. We knew with those 15 investments, that based on historical norms, probably 70% of those would not have a financial return to us. We did know that they would drive the culture and the change around connectivity. We've had three failures already. Three companies that essentially imploded, but that experience was very beneficial in keeping us out in front. We look at it as you would R & D and frontier research — \$20 million or \$30 million per year out of the \$175 million R & D program. We think about the venture capital investments as a portfolio of options. Actually, it's less risky for us because those options can easily be shut down. It's not like putting a \$300 million chemical plant in Singapore and then finding out that feed stock costs have gone up 40% from your original proposal to the Board.

So in essence, we have two metric sets: the culture need and the business strategy. We're willing to make investments that fail, but not sink the ship. We spend about \$400 million a year in capital, and we've been spending about \$25 million to \$30 million on venture capital investments, not leading investors but early followers. But on the applications and the infrastructure, we apply all the classic ROI metrics the industry has used for years.

Q: George Harker, WVU.
How do you justify an investment in new IT technology? It's kind of fuzzy when you talk about customer satisfaction and service versus a return on investment in a traditional plant environment.

Q: I'm Jim Wingate with BackboneSecurity.Com. To continue with your baseball analogy, I'd ask you how good is your catcher? If you think of the catcher as guarding home plate, your information, assets and resources, could you share with us your special considerations or concerns as the CEO in the area of information assurance and information technology security in general?

A: Roger Mowen: I can give you a good symbolic answer. I have a security guy who reports directly to me. I get an assessment of security capability every month and I report on that to the Board once a quarter. We have not had any significant incidents due to more connectivity. We have capabilities and systems in place to monitor any intervention. I have less concern than I did two years ago. The capabilities are out there. You make sure you know what the right choices are and you have somebody that is absolutely accountable. This isn't dispersed with too many people within the enterprise. I have one guy with a group that handles information security and if I have a problem he knows he's got a problem.

Q: Bob Wentz, Information Research Corporation. I have a general comment and question. We're a small B2B consulting concern, about 15 or so people, and really don't have a customer base. Larger companies seem to always go with the larger companies in the e-commerce arena. From a small company perspective, how do we bridge that gap or how would you suggest that we get investment within the state to help push the small companies in our area? We don't have the middle-size companies and manufacturers to support the base for the smaller consulting businesses. Do you have any suggestions how we could bridge that gap?

A: Roger Mowen: My cynical answer would be to go get a large consulting firm to help you with your business model. I might use a consulting firm early on to learn, but I want business strategy development to be a competency within the enterprise. I have a group of about 35 people that report to me who do the strategy work for the businesses. Most middle to large size companies probably have the internal capability to do strategy development.

Small customers have actually asked us if we would consult for them. We've stayed out of that and I don't think there's an easy answer to your question. You could start trying to convince that small manufacturer on how connectivity would improve that customer experience. The opportunity is not on the cost side. The money is on the growth side with the customer base and improving the experience. That's where I would go with the small companies. Figure how you can get better connectivity so you give them better service.



A: Roger Mowen: We started putting in a large ERP system back in the mid '90's. This year we are moving up with an SAP system from R 2 to R 3 to 4.6, which is the web and evaluation version. In addition, we've been consolidating MIS systems. We had 13 and will only have one at the end of this year. We're using the SAP advanced planning optimizer. As a beta tester of that, we're looking at complete collaboration within the supply chain. We have connections with suppliers and end-use customers, from raw materials to finished product. That transparency within the supply chain will yield efficiencies of working capital, plant loadings, changeovers between operations, et cetera. Have we seen a lot of that money so far? I don't think so. I think that's all out in front of us, but we have capabilities in place now to actually get that value capture in the next year or two.

President Hardesty: Roger, when you go home, tell the coach you were asked to pinch hit in the bottom of the ninth and you hit it out of the park!

Q: Jan Berkow, Applied Industrial Solutions. What were the big payoffs and how did you continue this philosophy of enhancing the customer's experience down to the integration of the plant floor? What are the big payoffs that Eastman focused on in that realm?



Tools for Positioning Core Industries in the New Economy

Panel moderated by Jan Berkow, President, Applied Industrial Solutions

Many forward thinking manufacturing companies have been actively positioning their organizations to increase their competitiveness with investments in information technology-based strategies. This portion of the Forum identified two of those areas: 1) the integration of business processes to e-commerce and, 2) the use of modern process control strategies to improve efficiencies on the plant floor.

The many facets of e-business: B2B collaboration, competing as part of a supply chain, cutting overhead, Intranets, extranets, and B2B exchanges

Presented by Bart Christner, Cambridge Technology Partners

E-Commerce in the New Economy

In the e-commerce portion of the presentation, Bart Christner suggested that e-commerce has created a new paradigm for providing products and services for each market segment. Within each market segment is a unique “complex ecosystem” of the way companies produce products and customers purchase. In order to remain competitive, each company must understand their respective ecosystem, their role within it, and the types of resources that must be in place to address their customers’ needs and wants.

Several examples were provided of the different types of markets that e-commerce has created. Business-to-business e-commerce has created very efficient vertically aligned partnerships where the end-customer’s demand for order quantity, order customer preferences and design variations, and delivery dates is transferred across the supply chain of collaborators. Competitive advantage, in this instance, becomes the ability to respond to these variations as a member of vertically integrated team of producers and distributors. The more specialized and less of a commodity the end product, the greater the differentiation potential the vertically integrated supply chain offers.

E-commerce has created the ability to increase efficiencies in the processes to operate their respective businesses. For the same reason that these information technology-based tools has made life simpler for many, it has lowered the barriers of entry for others and created a more competitive marketplace overall. The Internet has created an ability for a small company to compete on the same playing field as a large company. The affordability of tools to better



Jan Berkow, Robert Moore, and Bart Christner

utilize data about a customer from an on-line marketplace has turned marketing research from an art into a science. Customer relationship management (CRM) software can quickly profile each customer's preference for how they would like to buy, what specific products or related products are of interest, and improve the buyer experience to create a more customer-driven value proposition.

The same advanced data mining strategies used in CRM have also allowed companies to internally better manage themselves. From the sharing of corporate knowledge to the ability to make better decisions for each of the business and operational processes that have been defined for that enterprise, information technology-based e-commerce tools have created new ways to utilize knowledge as a strategic asset and translate this asset to financial performance.

Maximize return on plant assets: collection and use of plant data, developing knowledge workers for industries of the future

Presented by Robert L. Moore, Founder, Gensym Corporation

Process Control in the New Economy

Robert Moore suggests that one of the keys to maximizing the return-on-plant assets is both the improvement in capturing data about the processes on the plant floor as well as better use of this information to both improve the control of processes as well as respond to external changes in demand or market conditions. Dr. Moore's discussion is divided into the areas of process control strategies and production management applications.

Within the context of process control, Dr. Moore begins with expert systems, which have enabled companies to capture existing knowledge from corporate experts concerning "best practices" within the plant, and made it available to all operational personnel. These systems then evolved into more sophisticated strategies that overcame the static and limited usefulness of expert systems by creating process models. Dr. Moore discussed how neural networks were first applied to create mathematical models of how processes functioned by training computers with the large historical repositories of plant data. These models functioned effectively for static conditions but constantly required retraining for new variations in the model.

These strategies have also evolved into other data mining strategies that have allowed for more visibility as to what was determined as to the cause and effect in the model. Model-based reasoning essentially creates a simulator for a process and suggests "best practices" from understanding of what types of actions worked best historically. Another strategy discussed was in the use of intelligent agents where each process is broken down into unique components. A model that reflects a unique process represents its own set of dynamics and rules. Each agent's current operational rule is then factored into an overall operational strategy for current plant conditions allowing for a more holistic approach towards process efficiency.

Dr. Moore also discussed production management applications that have been developed to integrate e-commerce responsiveness down to the plant floor. For the make-to-order industry, he discussed how schedule optimization strategies have been used for better utilization of the different plant resources and to improve plant responsiveness. Manufacturing executive systems are strategies where the enterprise resource planning suite of business tools provide current demand characteristics and resource requirements and translate this information into a suite of production management tools such as material tracking, scheduling, and dispatching for improving visibility of changes in demand within the plant.

Dr. Moore ends with an example of improved decision making at the plant floor level with the work under way on the Intelligent Pot-room Operation project at Century Aluminum. In this instance, computers are used to capture both existing knowledge as well as patterns in operational data of which experts are unaware. Systems such as these benefit the plant in that they provide a better understanding or where to prioritize tasking for limited plant operational personnel and how to provide predictive capabilities to avoid anomalies beyond current reactive capabilities further improving process efficiencies through the use of intelligent process control strategies.

Incentives, Opportunities, and Follow-up Action Plans

Panel moderated by Carl Irwin, Director, IOF-WV

This panel looked at co-funding opportunities available to companies and industry groups that are interested in being involved in technology research and development projects or that wish to incorporate new technologies into their operations. The panelists represented the National Institute for Science and Technology (NIST), the U.S. DOE Office of Industrial Technologies (OIT), and the West Virginia Economic Development Authority (WVEDA). These three organizations provide a spectrum of competitive programs and incentives ranging from high-risk, high-payoff technology-focused research in the NIST Advanced Technology Program (ATP), to the broad array of opportunities and partnerships available in the OIT's Industries of the Future (IOF) program, through specific financing and tax incentives offered by the West Virginia Development Office.

Overview of the NIST Advanced Technology Program **Presented by John Hewes, Special Assistant to the Director of ATP**

The Advanced Technology Program (ATP) has grouped its work into four major categories: (1) chemistry and life sciences: chemical, fuel, and other bulk processing, and health, agriculture, and industrial biotechnology; (2) electronics and photonics technology: photonics manufacturing, microelectronics manufacturing infrastructure, supporting technologies for lithography, advanced wireless communications, and organic electronics; (3) information technology and applications: electronic commerce, advanced learning systems, information systems for healthcare, micro- and nanosystems technology, virtual reality, biometrics and physical security, and intelligent manufacturing; and, (4) Economic Assessment Office: mission, activities, outputs, intermediate outcomes, final outcomes.

The ATP has several critical features that set it apart from other government R&D programs:

- ATP projects focus on the technology needs of American industry, not those of government. Research priorities for the ATP are set by industry, based on their understanding of the marketplace and research opportunities. For-profit companies conceive, propose, co-fund, and execute ATP projects and programs in partnerships with academia, independent research organizations, and federal labs.
- The ATP has strict cost-sharing rules. Joint Ventures (two or more companies working together) must pay at least half of the project costs. Large Fortune-500 companies participating as a single firm must pay at least 60 percent of total project costs. Small and medium-sized companies working on single firm ATP projects must pay a minimum of all indirect costs associated with the project.
- The ATP does not fund product development. Private industry bears the costs of product development, production, marketing, sales, and distribution.
- The ATP awards are made strictly on the basis of rigorous peer-reviewed competitions. Selection is based on the innovation, the technical risk, potential economic benefits to the nation, and the strength of the commercialization plan of the project.

In particular, in the chemicals and advanced materials area, ATP has recently co-funded three projects that are attempting to develop breakthrough infrastructural technologies for applications in polymer coatings and in heterogeneous catalysts. The ATP continues to encourage applications for co-funding in the area of high throughput methods for RD&E of chemicals and materials, as well as other high technical risk areas that have the potential for broad economic benefit to the nation

Overview of the U.S. DOE Industries of the Future Program Presented by Lou Sousa, Director of Communications, U.S. DOE Office of Industrial Technology

The goals of the IOF program are energy efficiency and waste reduction in the nation's nine most energy intensive industry sectors: aluminum, steel, glass, chemicals, forest products, metal casting, petroleum refining, agriculture, and mining. The IOF program pursues these goals through a variety of cost-shared programs and strongly encourages partnering between industry, land-grant universities, state energy offices, Industrial Assessment Centers, and national labs.

OIT maximizes its technology investments through collaborative R&D partnerships the nine energy-intensive industries. These industries use large amounts of heat and energy to physically or chemically transform materials. Collectively, they supply 90% of the materials vital to our economy, produce \$1 trillion in annual shipments, directly employ over 3 million people, and indirectly provide an additional 12 million jobs at all skill levels.

- **Aluminum** — R&D partners are developing advanced processes, including revolutionary smelting technologies that could cut the industry's electricity use by 25% or more.
- **Steel** — Energy accounts for about 15% of the total manufacturing cost for steel. This vital industry is responsible for about 2% of all U.S. energy use.
- **Glass** — Our industry partners represent all sectors of the glass industry and share a common interest in R&D on energy-efficient melting technologies.
- **Chemicals/Polymers** — The U.S. chemical industry produces 25% of the world's chemicals to meet our most fundamental needs and support our most advanced technologies.
- **Forest Products** — OIT provides cost-shared support for top R&D needs in such areas as sustainable forestry and improved energy and environmental performance, including work with other federal offices on advanced gasification technologies.
- **Metal Casting** — Cost-shared R&D projects are improving the energy and materials efficiency of U.S. metal casters, who must compete against foreign producers with access to lower-cost energy.
- **Mining** — Energy represents about 5% of the value of all mining products. R&D projects include technologies for energy-efficient mining and processing of coal, metals, and industrial minerals.
- **Agriculture** — Cost-shared R&D focuses on technologies to increase the use of bio based materials as feedstocks for the chemical industry.
- **Petroleum Refining** — Cost-shared R&D projects focus on petroleum refining, the most energy-intensive U.S. manufacturing industry.

In support of the nine basic IOF industry sector programs, the OIT's Enabling Technologies program offers cost-shared funding for R&D in three key technology areas common to most energy-intensive industries: Combustion, Sensors & Controls, and Industrial Materials.

Through the OIT's Best Practices program, industrial partners receive in-plant assessments, tools, training, and other resources to help them identify their best opportunities to cut energy use and save money.

OIT also offers financial assistance programs to help inventors and small businesses launch their energy-saving ideas (Inventions and Innovation) and to promote demonstrations of energy-efficient technologies by state-industry partnerships (NICE³).

Solicitations are issued throughout the year for proposals to cost-share long-term precompetitive research, mid-term technology and process improvement, and near-term energy savings opportunities. For example, the National Industrial Competitiveness through Energy, Economics, and the Environment (NICE³) program will cost-share up to \$600,000 for implementation of novel energy efficiency technologies.

Precompetitive research projects are based on technology roadmaps for each of the nine industry sectors that broadly define and prioritize topics that help achieve that industry's long-term vision.

The OIT provides near-term assistance through energy and waste assessments to identify productivity-enhancing, money-saving opportunities for small- and medium-sized companies. The Plant-Wide Energy Assessment Program provides a more in-depth analysis and development of a comprehensive strategy for energy efficiency.

The national IOF program has attracted the interest of approximately 25 states that have initiated state-level IOF programs to reflect the industry profiles and economic development needs of individual states. In 1997, West Virginia became the first state to launch an IOF program on the state level.



David Warner, John Hewes, Carl Irwin, and Lou Sousa

Overview of financing and tax incentive programs **Presented by David Warner, Executive Director of the West Virginia Economic Development Authority**

The State of West Virginia provides a variety of opportunities and incentives to West Virginia companies.

- Direct Loans — The WVEDA can provide up to 45% in financing fixed assets by providing low interest, direct loans to expanding state businesses and firms locating in West Virginia. Loan term is generally 15 years for real estate-intensive projects and five to ten years for equipment projects.
- Indirect Loans — The WVEDA provides a loan insurance program and a capital access program through participating commercial banks to assist firms that cannot obtain conventional bank financing.
- West Virginia Capital Company Act — WVEDA administers a program that provides for debt and equity venture capital investment to small business.
- Industrial Revenue Bonds — This provides for customized financing through the federal tax-exempt industrial revenue bonds. \$35 million of the state's bond allocation is reserved for small manufacturing projects.
- Small Business Development Loans — This program provides capital to entrepreneurs for new or expanded small business with loans from \$500 to \$10,000. Details are available from the West Virginia Small Business Development Center.
- Jobs Investment Trust — The Jobs Investment Trust is a \$10 million public venture capital fund that uses debt and equity investments to promote and expand the state's economy. For more information, contact Richard Ross at (304) 345-6200.

Follow-up Action Plans

Based on results of the IT benchmarking survey and comments at the Forum, three of the main obstacles West Virginia manufacturers perceive to implementation of IT solutions are: (1) not assured of ROI; (2) not convinced IT will improve competitive position; and, (3) concerns about hiring, retaining, and training in-house IT staff. In order to develop an action plan for addressing these and other concerns, a brief brainstorming session was held at the close of the April 23rd Forum. Furthermore, a follow-up letter was sent to all Forum participants inviting them to offer suggestions for future actions.

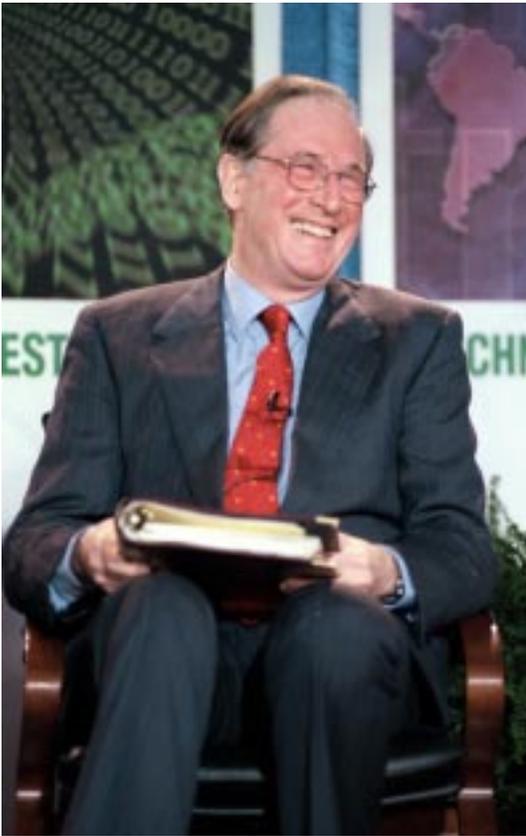
The following points summarize some of the suggested follow-up actions that would help with identification and implementation of IT solutions in West Virginia's manufacturing companies.

- Develop better communications and more cooperative projects between the state's technology providers and the traditional manufacturers, especially between small companies providing technology services and manufacturers that don't have in-house IT staff
- Determine what tools West Virginia industries need to be more competitive and productive
- Coordinate with companies, regional educational facilities, and state training programs on the use of new technologies and procedures
 - Facilitate various forms of on-line training, Internet-based courses, and distance learning
 - Develop follow-up programs on topics such as, "cost-effective techniques for dealing with component and systems obsolescence"
- Study issues related to availability and use of broadband technology in West Virginia such as, how it relates to IT workforce training
- Develop a strategy for using IT to help create and retain higher paying manufacturing and technology jobs in the state
- Develop strategies to make technology more affordable and accessible to manufacturers
- Set up a consolidated service group to help support IT projects
- Set up a support group to make suggestions for greater efficiency in internal operations and opening international markets through use of technology; provide free initial counseling to make traditional managers aware of the opportunities available
- Share IT staff between companies to reduce cost and risk
- Organize a non-profit group of IT consultants as a starting place to raise knowledge and comfort levels
- Provide up-to-date IT information through West Virginia's universities and colleges
 - Offer mini-courses at or through WVU to bring manufacturers together to learn "Best Practices" and see real world examples of IT successes
 - Establish group of WVU researchers to mentor companies
 - Develop basic training programs through WVU to help companies benefit from the IT age
- Convene a program advisory committee with representatives from basic manufacturing companies, technology provider companies, the West Virginia Development Office, the Governor's Office of Technology, and universities
- Work with an advisory committee to develop more detailed plan of action, priorities, schedules
- Work with the West Virginia Legislature and state agencies to develop incentives for West Virginia companies to go on-line; also provide incentives for companies to make investments that enhance competitiveness and corporate value through IT
 - Present program to appropriate Legislative committees and the Governor
 - Work with legislators to develop incentives for training IT professionals

- Assist West Virginia companies in working closely with the Governor's Office of Technology on their plans for on-line bidding and purchasing
- Create an IT best practices assessment initiative to evaluate, justify, and prioritize IT investment options for IOF-WV companies
 - Identify key areas of opportunity within plant processes where the use of IT would enhance plant performance, lower energy usage, or reduce the impact on the environment.
 - Educate plant management on best-of-breed IT strategies and the most effective implementation plans for maximum gains
 - Incorporate sound financial metrics as a means of overcoming skepticism regarding ROI for IT expenditures
 - Develop case studies based on the assessments to educate others and to begin to create a shift in thinking about the strategic value that IT can provide towards plant performance including return-on-assets, energy usage, and environmental impact



Our Challenge for the Future



The Honorable Jay Rockefeller, United States Senator

Albert Einstein looked at the arrival of the nuclear age and said, “Everything has changed except the way we think.” A few years ago that same thing could have been said by many traditional industries about the Internet Age.

We’re dedicated to changing the way we think, and Forums like this are an important part of that effort. We’re learning to understand and embrace technologies that, as unfamiliar as they may be at first, help businesses do what businesses have always wanted to do: work harder, function more efficiently, and produce better products.

We’re not going to reinvent our economy overnight, or achieve the kind of growth we’re after in a quarter or a year. But we can do it and, with our traditional industries in many senses leading the way, we will do it.

At gatherings like this, in my meetings with entrepreneurs across the state and investors around the world, I sense a new confidence and a creativity that can become the foundation for growth, change, and renewed economic vigor.

Change is hard. But it’s liberating, as well, and I think any force that unleashes the potential I felt in this room today is good for you and good for West Virginia.

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Discover the Real West Virginia Foundation	www.drwvfoundation.org
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GE Specialty Chemicals	www.geplastics.com/specialtychemicals
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Appendix A: IT Survey and results

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A decorative graphic consisting of seven blue geometric shapes: three squares and four diamonds, arranged in a loose, circular pattern to the right of the text.



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