Executive Summary from a report co-published by The Brookings Institute and CEOs for Cities

Information technology (IT) saturated American business in the 1990s, and countless new companies sprang up around Internet applications. In response, economic development officials across the country have tried to catch the "tech" wave by stimulating the growth of high technology companies and "clusters."

This effort has been impressive, but as this paper argues, it may have remained too narrow. The IT revolution extends far beyond the technology sector, after all. All kinds of firms--not just "tech" companies--are finding ways to cut costs dramatically by automating tasks, outsourcing certain functions, and linking customers to the factory floor. IT is also accelerating the ongoing fragmentation of large firms into separately located functional units, and the establishment of strategic relationships with other firms to perform functions formerly kept in-house.

In view of these changes,
The net economic benefit to the city of Boulder is estimated to be $340 million from 2001 to 2005, and $57 million in 2001. At the county level, the net economic benefit is projected to total $1.3 billion from 2001 to 2005, and $221 million in 2001. The majority of this impact comes from the wages paid to workers at the facilities and indirect benefits derived from the multiplier effect.

Fiscal contributions - Fiscal contributions focus on local taxes for real and personal property, local sales taxes, impact and other fees, occupation taxes, and visitor-related taxes. Fiscal contributions are not included as part of the economic benefit, but are important to consider to help understand the direct impact of the Federal Laboratories on local treasuries.

Federal Lab employees living in the city of Boulder are expected to pay approximately $4.0 million in retail sales and property taxes in the five-year period from 2001 to 2005 and about $700,000 in 2001. Although the tax structure for the city and county are different, employees who live in Boulder County are also expected to pay $4.0 million in retail sales and property taxes to the county of Boulder from 2001 to 2005 and about $700,000 in 2001. From 2001 to 2005, employees who reside in the state are expected to pay $21.7 million in retail sales and personal income taxes to the State of Colorado. In 2001, this total is expected to be $3.8 million. Finally, employees who live in Boulder County are expected to pay $9.5 million in property taxes to the school districts in Boulder County from 2001 to 2005 and $1.8 million in 2001. The per capita retail sales tax contribution and property tax contribution of Federal Lab employees living in Boulder County is greater than that of the average Boulder County resident.

Additional Benefits - For the past 50 years, the Federal Labs have provided stability to the local economy, which is important during economic downturns. The labs have also served as an incubator for other high-tech companies. In addition, the technological, fiscal, and intellectual capabilities of the Federal Labs have contributed greatly to the evolution of the high-tech industry in the city and county of Boulder. The Federal Labs provide economic stability to the community as a result of their ties to the security and economy of the United States, and the fact that their funding comes from a variety of sources. Other contributions include the cultivation of an environment that encourages and develops emerging high-tech companies, the economic-related benefits not defined as part of the economic benefit analysis, intangible benefits, and an increase in the intellectual firepower imparted to the community. All of these contributions are not directly measured in the study, but have a substantial positive effect on the Boulder community.

Thirteen companies have been identified as off-shoot companies of the Federal Labs by the staff at the Federal Labs and a study conducted by Neck, Cohen, and Corbett. The companies include: Boulder Metrics, Coherent Technologies, Colormetrics, Composite Technology Development, Engineering Measurement Company, ENSCI, Materials Research, High Precision Devices, Micro-g Solutions, Particle Measuring Systems, Picosecond Pulse Labs, Scientech, and Winters ElectroOptics. The total 2001 employment for these 13 companies is estimated at over 450 employees.

Other Benefits provided by the Federal Labs are listed below:

- The Federal Labs provide contracts for small businesses, minority-owned businesses, and women-owned businesses.
- Federal Lab employees have served in a number of voluntary community and civic groups, including the Boulder City Council, Mayoral office, and committees of the Boulder Valley School District.
- Professor Carl E. Wieman of the University of Colorado at Boulder and Senior Scientist Eric A. Cornell of the National Institute of Standards and Technology were awarded a Nobel Prize for leading a team of physicists that created the world's first Bose-Einstein condensate.
- Local school children have been benefactors of voluntary, free lab tours and other scientific based activities, both on-site and at the schools. Also, meeting rooms have historically been made available to a multitude of Boulder civic and nonprofit organizations.

The Federal Labs contribute greatly to the intellectual capacity of Boulder County. Of total Federal Lab employees, approximately 27% have Ph.Ds, 15% have Master’s degrees, 26% have Bachelor’s degrees, and the remaining 32% have less than a Bachelor’s degree. This compares to total Boulder County residents age 25 and older, where 21% have graduate or professional degrees, 31% have Bachelor’s degrees, and the remaining 48% have some or no college. At the state level, 11% of the 25 years and older population have graduate or professional degrees, 22% have Bachelor’s degrees, and the remaining 67% have some or no college.

The Department of Commerce (DOC), the parent agency for NIST, NOAA, and NTIA, owns and manages six properties in the city, county, and state. All of these sites are maintained by the DOC and provide varying benefits to local communities, as listed below:

- The Federal Labs own approximately 206 acres in Boulder, of which 100 acres will remain undeveloped.
- NTIA manages 1,704 acres on Table Mountain in Boulder.
- NOAA owns 112 acres in Erie.

There are an additional 1,040 acres in Colorado owned by the Federal Labs. NIST owns and occupies 394 acres in Ft. Collins. NOAA owns 640 acres in Platteville and the Fritz Peak field site in Rollinsville is 5 acres.

Background on the Federal Laboratories (NIST, NOAA, NTIA) - The Federal Laboratories are the 11th larg-
est employer in Boulder County, with about 1,800 employees and affiliates, most of whom are part of the state’s high tech workforce. According to the Office of State Planning and Budgeting, during 1998, approximately 6.1% of the state’s workforce is employed in areas of high technology. Boulder County has the largest share of the high tech workforce in the state. About 18.9% of the Colorado advanced technology workforce is in Boulder County. The labs play an integral role is supporting and advancing high technology in Colorado.

_NIST_ – NIST operates eight research divisions in Boulder. These include: Electromagnetic Technology which solves measurement problems using solid-state quantum effects, low temperatures, and state-of-the-art lithography; Magnetic Technology which researches advanced measurement methods and standards for the magnetic data storage and superconducting power industries; Materials Reliability which develops measurement methods and standards to enhance the quality and reliability of materials; Optoelectronics which develops measurements, technology, standards, and traceability for the optoelectronic industry; Physical and Chemical Properties which produces measurements, standards, data, and models for the thermophysical/chemical properties of gases, liquids and solids, and for low-temperature refrigeration systems; Quantum Physics which investigates atomic and chemical physics, precision measurements, and laser and optical physics; Radio Frequency Technology which deals with fundamental microwave quantities, high-speed microelectronics, electromagnetic compatibility, antennas, and electromagnetic properties of materials; and Time and Frequency which develops standards of time and frequency and disseminates time using radio broadcasts and the Internet.

Research and development in advanced technology is another key component of the NIST laboratories that contributes directly to the local and national economy. NIST funds and supports several technology and manufacturing research and development programs, and the Advanced Technology Program (ATP), which co- funds high-risk, high-payoff research. ATP increases spending and the transfer of knowledge in high-risk technology ventures, while also encouraging further investment in these ventures. Another NIST sponsored program is the Manufacturing Extension Partnership (MEP). It offers small and mid-sized manufacturers technical and business tools via regional centers. The MEP state center for Colorado is part of the Business Research Division in the Leeds School of Business at the University of Colorado at Boulder.

_NOAA_ - NOAA also brings many researchers to the area and houses 6 of the 12 laboratories of NOAA’s Office of Oceanic and Atmospheric Research in the newly constructed 372,000 square-foot David Skaggs Research Center. NOAA researchers include world class scientists who have been recognized for their leadership with numerous medals and awards. Their scientists led the expedition that discovered the ozone hole in Antarctica, and continue to measure the ozone hole each year. NOAA scientists also measure greenhouse gases using a global network of observers, improve weather predictions by developing new forecast models and observing instruments, obtain important weather and air pollution data by flying into coastal storms, and measure the chemicals that cause ozone depletion. Researchers and forecasters also work at the Space Environment Center, the nation’s official space weather forecasting center, which issues forecasts, warnings and alerts of solar activity for NASA shuttle missions, and to users in government, industry and the military. The new computer system that National Weather Service Offices throughout the country use was developed at one of NOAA’s research labs here in Boulder.

All these projects and many more are part of NOAA Research. In addi-
WASHINGTON -- To best protect an individual's privacy, specific guidelines should be followed when designing systems to authenticate the individual's identity, says a new report from the National Academies' National Research Council. Supported by an in-depth examination of the related technical, legal, and policy issues, the report offers a comprehensive set of guidelines to ensure that an individual's privacy is not unnecessarily compromised, whether by commercial or government organizations.

The report provides a conceptual toolkit for designing an authentication system that is sensitive to privacy concerns. "Authentication" refers to the act of confirming a specific claim, such as "I am Joe Smith." The first design step -- even before settling on a particular security technology such as passwords, smart cards, or facial or voice recognition -- is determining what type of authentication, if any, is necessary. A key question is whether the person's identity is important in a particular circumstance.

The committee stressed that appropriately designed authentication systems require the minimum information necessary to achieve a specific security goal. For example, ensuring that only golf club members and their guests enter the clubhouse does not require knowing their bank account or Social Security numbers. The information people must reveal to interact with a system -- be it a business, workplace, or government office -- is often more extensive and invasive than is necessary.

Conversely, some authentication systems are inherently insecure because they rely upon information that is disclosed often and to many requestors, and therefore not secret, such as a Social Security number. For situations where intrusive methods of authentication are necessary, such as verifying a specific individual's identity during the process of opening a bank account, the report provides a list of issues to consider and actions to take that will enhance security while reducing the risk of invasion of privacy.

Read the full text of Who Goes There? Authentication Through the Lens of Privacy for free on the Web, www.nap.edu/books/0309088968/html/.

BIODEFENSE AND EMERGING INFECTIOUS DISEASE RESEARCH OPPORTUNITIES

National Institute of Allergy and Infectious Diseases

In response to growing concerns about the use of biological agents in acts of terrorism, NIAID has expanded its biodefense research program. The ultimate goal of that expansion is to develop effective diagnostics, vaccines and therapeutics to protect the public in the event of a biological attack or the sudden emergence of select rare or eradicated diseases.


DYNAMICS OF TECHNOLOGY-BASED ECONOMIC DEVELOPMENT

The Office of Technology Policy has released the third edition of an annual report to measure S&T indicators that influence economic outcomes, such as R&D investment, number of patents issued, number of technology companies, high-tech wages, etc. This years report is based on NIACS, North American Industry Classification System, codes that better reflects high-tech industries and services.

As background, the report cites the “successful impact on economic development and the sustainable power of S&T” evidenced in specific areas of the country, including Boulder. The report notes the importance of “S&T resources” such as research universities and Federal facilities, to development in these locations. “These communities demonstrate that S&T-based businesses exhibit the tendency to cluster in areas that have strong technology assets and infrastructure.”

The report provides statistics for each state with indices measured in terms which permit comparison and ranking of states, i.e. data by percentage of gross state product, percentage of overall businesses, or percentage of workforce. Using this measurement system, Colorado ranks 3rd among states in SBIR (Small Business Innovation Research) award dollars per dollar of gross state product and 4th in number of SBIR awards per number of businesses. The state also ranks 3rd in the percentage of workforce with recent S&E degrees at the bachelors and masters levels.

The full report is available online at: http://www.ta.doc.gov/reports

SIGNS OF LIFE: THE GROWTH OF BIOTECHNOLOGY CENTERS IN THE U.S.

Biotechnology is at the heart of a fast-growing new sector of the U.S. economy, and as the industry expands, it has become a focal point of many local, regional, and state economic development strategies. This report provides an analysis of biotechnology activity in the 51 largest U.S. metropolitan areas and finds that the industry is heavily concentrated in nine regions. These nine areas excel because they possess two key ingredients necessary for biotech growth: strong research, and the ability to convert that research into commercial activity. By comparing the 51 metro areas on their research and commercialization capacities, this report can help inform regions seeking to capture a share of the nation's biotechnology growth.

JEFFERSON COUNTY HONORS NREL WITH GENESIS AWARD

Golden, CO—The U.S. Department of Energy’s National Renewable Energy Laboratory (NREL) has received the Jefferson Economic Council’s (JEC) Genesis Award for the Lab’s contribution to the economic vitality of Jefferson County and its citizens.

The annual award is given on behalf of Jefferson County in recognition of outstanding economic development that has significantly added to the long-term vitality of the county.

NREL was praised for its longevity in the community and the employment and capital investment the Lab has contributed to Jefferson County over the years.

NREL is the nation’s premier laboratory for renewable energy research and development and a lead lab for energy efficiency research and development. Since its inception, NREL’s research has won 34 R&D 100 awards - the most per staff member of any Department of Energy laboratory. In 2002, NREL celebrated its 25th anniversary.

The Genesis Award was presented to NREL at the annual Jefferson County Industry Appreciation Awards Breakfast on March 6 at the Arvada Center for the Arts and Humanities. Photos and event coverage can be found on JEC’s Web site http://www.jeffco.org/jec_site/Pages/jec/2002ia.html

NEW BRAKE ALERT SYSTEM AT CU-BOULDER WINS AWARD

The Brake Alert System technology, presented by Travis Garvin, Matt Glissmann, Jordan Jones, Chaun Powell, and Chris Yakacki and through the Robert H. and Beverly A. Deming Center for Entrepreneurship along with the Entrepreneurial Business Pan Preparation course at CU-Boulder won the Spring 2003 Ray and Dottie Joyce Undergraduate Business Plan Competition. They were awarded a $2,000 check and are in the midst of discussing LLC filing, website registrations, and creating more prototypes.

The Brake Alert System started as an engineering concept at the University of Colorado in the fall of 2002. Engineering Professor Jack Zable asked Entrepreneurial Professor Julio DeCastro about creating a joint program between the College of Engineering and Applied Science and the Leeds School of Business to make the concept as feasible as possible. A group of mechanical engineers, Yakacki, Daniel Prull, John Stinar, and Samantha Watson, requested aid to bring the technological idea to fruition.

The National Highway and Traffic Safety Administration (NHTSA) estimates that “½ second of early warning would reduce rear-end collisions by 60%”; and says “at least 37% of rear-end collisions are preventable by any early warning systems”. The Brake Alert System using the inclusion of an early warning system and dynamic lighting configurations, accurately relays the braking actions of a vehicle, more effectively than any of today’s standard on/off brake lamps. For more information visit www.brakealertsyste.com.

CU ENGINEERS APPLY THEIR EXPERTISE TO MEDICAL DEVICES

Two engineers from University of Colorado at Boulder have found that their work in the field of Aerospace Engineering can be used to improve medical devices. They are part of an interdisciplinary trend to consider biomedical applications for some new discoveries in the fields of Electrical, Mechanical and Aerospace engineering.

Dr. Kamran Mohseni is working on a disposable, swallowable, wireless capsule that captures video images as it is steered by a novel MEMS (Micro-Electro-Mechanical-System) device through the digestive system will be designed for a close up viewing of the small intestine, tissue biopsies, and local on site drug delivery. The new device allows the physician to make diagnosis and direct appropriate treatment for a variety of diseases that were previously difficult to detect. When a comfortable level of controllability and orientation of the capsule is achieved, Dr. Mohseni will add MEMS devices for obtaining tissue biopsies from the intestines to assist further with diagnosis using a wireless system. A small gated cavity will be designed for local on site drug delivery. Further refinement of the technology may allow physicians to eventually treat disorders of the GI tract non-invasively. The capsule offers a painless, comfortable, cost effective, and non-invasive gastrointestinal exam, tissue biopsy and local on site drug delivery capabilities.

Dr. Dale Lawrence is working on novel actuator joints that enable dexterous manipulation of micro-scale objects, with applications for microsurgery and minimally invasive surgery. The joints are scalable to very small stages, yet are very strong, have large range-of-motion, and have high energy output per unit volume. This combination enables dexterous manipulation because the resulting manipulator has a size comparable to the object within the body, enabling the manipulator to reach around obstacles, precisely position objects in position and orientation, move along complex paths in the body, and apply significant forces to objects. Rose Biomedical recently held a successful brainstorming session with Dr. Lawrence and surgeons from the University of Colorado Health Sciences Center to determine the best use for the micro-manipulator.

The University of Colorado at Boulder’s Technology Transfer Office is now seeking commercial partners to commercialize this technology. For more information, contact Kate Tallman at 303-492-5732 or kate.tallman@colorado.edu.
INTERNATIONAL PATENTING OF INTERNET-RELATED BUSINESS METHODS

The Internet has provided a radical new platform for business communication and for processing many commercial transactions. With the Internet as the enabling technology, new business methods were developed and inventors and companies sought protection for these new products under intellectual property laws. National governments grant such property rights to inventors in the form of patents. With a patent, the inventor (or the owner of the patent) has the legal right to license others to make, use, or sell an invention. Patent owners can benefit economically when inventions result in new or improved products or processes with indirect benefits often times spilling over to associated users and consumers. But the Internet is a revolutionary new form of communication that creates seemingly unlimited opportunities for innovation. Those nations whose innovative activities exploit this enabling technology in important ways may gain competitive advantage in domestic and international markets.

This InfoBrief explores the relative strength of America's inventive activity with this enabling technology through an examination of international patenting of Internet-related business methods by U.S. inventors.[1] It compares the position of the United States with those of more than 40 other countries, including Japan, European countries, and other major industrialized and industrializing countries. It is the second recent InfoBrief to investigate international patenting activity in new and controversial technology areas.

Based on this examination of selected variables of international patenting of Internet-related business methods, the U.S. science and technology enterprise is a leader in this new technology area. During the period examined, 1995-99, the United States had filed more patent applications for Internet-related business methods than all other nations combined, most U.S. patents became international patents (patented in more than one country), and the United States had the most organizations actively filing patent applications for Internet-related business methods. The United States also had a large number of highly cited patents in this technology area and a number higher than would be expected based on its overall level of patenting.


A LOOK AT INTERNATIONAL MARKETING: GETTING STARTED

BY DENNIS R. CHRISBAUM

As you begin exploring international business opportunities, please consider attending export training sessions in your community, if at all possible. These will connect you to the international business network in your local community. Such programs are typically put on by the U.S. Department of Commerce, U.S. Small Business Administration, state international trade offices, World Trade Centers, Small Business Development Centers, and local community colleges. In addition, there are a number of web sites that can help you get started.

Although international business is different from domestic business in some regards, certain business principles will not change. You still need to do proper market research, and you still need to address the four “P’s” of marketing which define marketing in any environment: product, placement, promotion, and pricing. Let’s look at each of these briefly in an international context.

1. Product [and product modification]: One of the first laws of marketing is to ask what the customer wants! Americans frequently make the mistake of thinking if it sells here, it should sell overseas. Sometimes products have to be modified. In Japan, cars have steering wheels on the right side, so it doesn’t make sense to try to sell them our standard models with steering wheels on the left. Another important difference is that outside of the United States, the entire world is on the metric standard! So your products will need to be produced to metric standards. In much of Europe, ISO-9000 certification often is required before buyers will talk to you, and electrical standards vary around the world. Even in Canada, labeling must be in French and English, so packaging frequently will need to be adjusted, as well.

2. Placement [Distribution]: Distribution channels are determined by industry and tradition and can vary greatly among markets. This is something you will have to research. What is the normal channel of distribution for your product in the targeted country? It might be quite different from the U.S. norm. Sometimes you can go around normal channels, but it should be a well-calculated risk. Will you try to sell directly to the end-user, or should you sign up an agent or distributor? Does your product require after-sales service? This is a critical question that may well dictate the distribution channel that you will need. Your Export Assistance Center can help you locate qualified agents, distributors, or partners overseas. A list of their services is at www.export.gov. Also consider getting trade leads through the SBA’s Trade Mission Online program (www.sba.gov/oit) or the Department of Commerce’s www.BuyUSA.com program.

3. Promotion: How will you promote your product in a particular country? Will sell directly to potential buyers, or create buyer demand through advertising? Investigate how promotion is typically done for your product in the targeted
This article is drawn from Annex I, a Summary by Booz Allen Hamilton, of the report “Between Invention and Innovation,” released November 2002 by the U.S. Department of Commerce. The report is based on interviews with thirty-nine individuals from corporations and venture capital firms.

“The observed trends in R&D have resulted in two critical problems that are forcing organizations to re-evaluate their approaches to funding and managing the innovative process. Technology complexity has altered the scale and scope tradeoff of R&D while financial and life-cycle pressures have created a bias toward supporting product development for established firms.”

The interviews revealed three key trends that are shaping the environment for corporate R&D, including its approach to early stage technology development (ESTD) investments. These include the increasing complexity of technology development, increased pressure to demonstrate financial value from R&D investments, and differences in industry and company life cycles.

The development pathway presented in the interviews followed four phases: Basic, Concept/Invention, ESTD, and Product Development. In reality, however, respondents agreed that development is not linear or simple. “The actual pathway includes multiple parallel streams, iterative loops through the stages, and linkages to developments outside the core of any single company.” In addition, the complexity of the process is increased by the speed of scientific advances and the knowledge required across multiple scientific fields, to achieve significant new technologies. “Consequently, the ability of any one company to develop all of the technological elements required to deliver significant advances has rapidly diminished. There are simply too many potential ideas and too few resources to go it alone.”

“Increased pressure on R&D to deliver measurable results was also cited as a key factor that has driven corporations almost entirely away from basic R&D, and makes it difficult to justify many activities that do not support existing lines of business. Projects that did not have demonstrable financial benefits were not funded, and the R&D portfolio shifted dramatically toward product development.”

“The final major influence observed was differences in R&D investment related to industry and by company that are in part linked to life-cycle positions. Overall, ESTD spending was estimated at $13.2 billion annually, 9 percent of total corporate R&D spending. However, the level of spending on ESTD differs widely by industry, and by company within specific industries. For example, the estimated ESTD spending in the computer software industry is essentially zero, while the bio-pharmaceutical industry spends about 13 percent of its R&D funds on ESTD. Within the bio-pharmaceutical industry, spending on ESTD ranged from 0 percent to 30 percent at the companies interviewed.”

The authors believe “that the key driver of these differences is the life-cycle position of the industry and the individual company. More mature industries such as automotive tend to invest a smaller percentage of R&D into earlier stages such as ESTD than do industries at an earlier stage of development such as biotech. However, individual companies may make disproportionate investments in early-stage R&D compared to their peers as an attempt to break out of their existing positioning or to rejuvenate their innovation resource base.”

Other key findings: Most large corporations are interested in ESTD for a few specific applications related to their core businesses, and are often not interested in fully exploiting ESTD in other markets; Interviews with Venture Capitalists revealed a strong preference for investments targeted to exploiting a technology in a specific market application. Seed funding often goes to help

(Continued on page 12)
The Advanced Technology Program: Assessing Outcomes

The National Institute of Standards and Technology (NIST) asked the National Research Council’s (NCR) Board on Science, Technology, and Economic Policy (STEP) to review the operations of the Advancement Technology Program (ATP) to ascertain if the program is achieving its legislated objectives and to recommend potential improvements in its operations.

The ATP is a program administered by the Department of Commerce’s National Institute of Standards and Technology to provide cost-shared funding to industry to accelerate the development and broad dissemination of challenging, high-risk technologies that promise broad based economic benefits for the nation. The program seeks to support

• emerging and enabling technologies facing technical challenges, which, if overcome, would contribute to the future development of new and substantially improved products, industrial, and services in diverse areas of application;
• technologies whose development often involves complex “systems” problems requiring a collaborative effort by multiple organizations;
• technologies that, because of their risk, or because firms are unable to fully capture their benefits, are unlikely to be developed by individual firms, or may proceed too slowly to compete in rapidly changing world markets without the impetus of an ATP award.

The ATP provides a leading role for industry, balanced by government and outside expert review. Companies conceive, propose, co-fund, and execute all of the projects. The ATP role is to identify the most promising projects that require outside support and contribute to their development on a cost-shared basis. The core findings and recommendations of the study are listed below.

1. The Committee finds that the Advanced Technology Program is an effective federal partnership program. The selection criteria applied by the program enable it to meet broad national needs and help ensure that the benefits of successful awards extend across firms and industries. Its cost-shared, industry-driven approach to funding promising new technological opportunities has shown considerable success in advancing technologies that can contribute to important societal goals such as improved health diagnostics (e.g., breast cancer detection), developing tools to exploit the human genome (e.g., colon cancer protection), and improving the efficiency and competitiveness of U.S. manufacturing.

2. The program’s peer review for both technical feasibility and commercial potential supports its goal of helping advance promising new technologies that are unlikely to be funded through the normal operation of the capital markets.

3. The program has set a high standard for assessment involving both internal and independent external review. The quality of this assessment effort lends credence to the program’s evaluation of its accomplishments.

4. The extensive assessments of the program show that it appears to have been successful in achieving its core objective, that is, enabling or facilitating private sector R&D projects of a type, or in an area, where social returns are likely to exceed private returns to private investors.

The Committee does recommend a series of operational improvements designed to make this program more effective and suggests several measures designed to bring the benefits of the ATP to other national initiatives and to state technology programs through enhanced cooperation.

[National Academies Report Charts New Course for Agricultural Research]

Factors such as globalization, trade liberalization and consumer preferences have changed the way agricultural research is conducted, and advances in biotechnology and genomics, ecosystem science and social science have altered the overall agricultural landscape. However, the United States’ leading agricultural research service is not quite ready to adapt to this changing environment with its traditional organizational structure, states a new report published by the National Academies.

Frontiers in Agricultural Research, conducted for the U.S. Department of Agriculture (USDA), is the result of the National Academies' efforts to review USDA's Research, Education, and Economics (REE) mission area and offer suggestions for the future of agriculture in the U.S. The report positions REE as the nation's principal driver of publicly funded agricultural research – one which oversees nearly $2 billion in federal research each year – that executes its mission through four member agencies.

Frontiers in Agricultural Research is available at: http://www7.nationalacademies.org/banr/BANR_Recently_Released_Reports.html

More information on REE is available at: http://www.reeusda.gov/

[source: SSTI Weekly Digest, March 28, 2003]
this report seeks to give readers a look inside companies to see how they are using IT, and to begin a conversation about what regional leaders can do to support technology-based development. The study builds on interviews with the chief information officers (CIOs) and information architects of 28 firms located in five metropolitan areas—Atlanta, Cleveland, Minneapolis/St. Paul, Phoenix, and Seattle. Ultimately, it seeks to clarify the nature and direction of key trends in order to explore their implications for public policy.

Several key insights emerge from this analysis that shed light on the impact of IT on regional economic development:

Both "new" and "old" economy firms are embracing IT, which means that both Sunbelt and Rustbelt cities and metropolitan areas can benefit from the technology revolution. Traditional industries in diverse sectors of the economy are also integrating new technologies into their operations. Companies like Parker Hannifin, a Cleveland engineering firm, employ computers and computer-controlled tools to design and manufacture products, and they increasingly use web-based purchasing technologies. That means that even manufacturing regions need to recognize companies' shifting needs, and ensure that their economic development strategies respond to them.

IT enables the "fragmenting firm" to split off key functions throughout the U.S. and abroad, which presents both opportunities and challenges. The cluster phenomenon is still alive and well, but it increasingly revolves around portions of firms and functions within firms—from data processing to distribution—rather than whole companies and industries.

IT generates new criteria for firm locations, which may bring competitive advantage to some regions. IT helps firms go "global," increasing the need for U.S. regions to market themselves internationally.

Regional leaders can, however, work to create a competitive setting for all business' survival and success in a high tech era. This means investing in IT infrastructure; providing the right education programs at adequate scale to meet new skill requirements of employers; supporting innovative firms with research and development programs at universities and institutes; and assuring adequate venture capital for startup companies.

For the full report visit: http://www.brookings.edu/es/urban/publications/sommers.htm
COLORADO-CHINA CONNECTION

On March 14th the Colorado-China Connection, a Colorado Environmental Business Alliance (CEBA) and University of Colorado Business Advancement Center (CUBAC) project partnership, returned from a 2-week trade mission, led by Mayor Wellington E. Webb, to China. In our exchanges, across China we asked our hosts the question: What can Colorado environmental companies offer China’s environmental market? The consensus was two-fold: technology and capital.

During the tremendous and rapid growth China is experiencing, cutting-edge and cost-saving environmental technologies and solutions are widely sought after. In China, the U.S. is perceived as the source for the most innovative technologies in the world. For them it is imperative that these solutions not only address the environmental issue, but also, when possible, have an immediate cost-saving advantage.

Environmental projects in China are plentiful. It is finding financing for these projects that is the issue. The billions of dollars that will be required for China’s countless environmental projects are to be covered by 11% federal, 34% provincial and 55% industry financing. Some foreign investors have access to grant money from their home government in supporting project financing; this creates a significant advantage in winning projects. Large businesses are able to cover the own project financing, while for other U.S. businesses the Asia Development Bank may offer solutions. Understanding and taking advantage of the loan process can facilitate winning projects. At any rate, U.S. businesses ought to be prepared for this situation if they are exploring projects in China and must consider options ahead of time.

One final point: Having the perfect technology and producing financing are not necessarily enough. U.S. businesses must also learn to adapt to Chinese business strategies. Guanxi, in China, ostensibly means any type of relationship. However, like many things in China, there is far more going on below the surface. In the Chinese business world, Guanxi is also understood as a network of relationships. Incoming businesses should take time to establish these relationships; cooperate together, support one another and exchange favours. Like any complex and involved relationship, Guanxi takes time to become established, so be patient. Colorado companies are finding the China market to be profitable and hope to build on what promises to be an increasing marketplace.

15TH ANNUAL COLORADO CAPITAL CONFERENCE

Thursday, June 12, 2003; 7:30 a.m. – 4:30 p.m.
Denver Marriott City Center, 1701 California

Presented by KPMG

The reality of today’s market is that good things happen to those who make them happen. One of your best chances to make something great happen is to attend the 15th Annual Colorado Capital Conference. This is the must attend event that brings together the people, experts and insight you need to be successful today and tomorrow. Whether you’re an investor searching for innovative business plans, an entrepreneur actively seeking funding, or an entrepreneur looking to discover what works in the new entrepreneurial environment, you’ll find it right here, right now.

This year’s conference will feature:
• Opening Keynote Speaker
• Lunch Keynote
• Venture Capital Panel
  • One of the highlights of the conference, this panel will showcase two companies and their funding venture capital partners.

Two Tracks
Track I – Education, featuring breakout sessions on key issues of importance to entrepreneurs and business owners.

Session I: Fundamentals for Success: how to make fundamental management decisions to survive
Session II: Sales and Marketing Strategies: Today and Tomorrow
Session III: Angel Training: how to put your money to work in today’s marketplace
Session IV: Variations in Valuations: how to plan to protect yourself from market driven valuations

Track II - Investor Forum, featuring presentations for capital of interest to both angel investors and the venture capital community.

Networking … networking … networking!

Register online at www.rockiesventureclub.org, or call the RVC office at 303.831.4174.
The University of Colorado’s Technology Transfer Office recently executed a license agreement with Medical Simulation Corporation, headquartered in Denver, CO. Medical Simulation Corporation has created a national network of hospital-based SimSuite™ Education Centers that give healthcare professionals access to a realistic learning experience that poses no risk to patients. The Centers feature a three-phased learning approach in an environment that simulates a minimally invasive surgical laboratory. The centerpiece is the SimSuite Education System, an interactive solution for professional healthcare education and assessment. The experience includes a presentation of patient history which requires a diagnosis, the performance of an interventional procedure on simulated patient “Simantha,™” and an opportunity for self assessment based on procedure outcome as well as for post-procedure care planning.

The agreement sets licensing terms between CU and Medical Simulation Corporation for the commercialization of new 3-D reconstruction software for coronary artery structures. Under the Agreement, Medical Simulation Corporation retains exclusive rights to market the software for the purposes of educational medical simulation. The software is a revolutionary improvement over traditional 2-D Angiography, providing cardiologists with more accurate, higher quality images of the beating heart. The project is the collaborative effort of two inventors at the CU Health Sciences Center, Dr. James Chen, a computer scientist and Dr. John Carroll, a cardiologist.

Last Fall, the Technology Transfer Office entered into a separate agreement with Philips Medical Systems NV that enables Philips to integrate the software code in all applications directly involved in patient care, including medical equipment and clinical workshops software and support.

TTO also announced execution of an option agreement with Avigen, Inc. for therapy of chronic pain, developed by Professor Linda Watkins, Professor of Psychology. Professor Watkins has shown that, in mice, chronic pain can be controlled by the administration of cytokines. She plans to collaborate with Avigen and use their gene therapy expertise to translate her animal model studies into human therapies, with the goal of initiating clinical studies within a year.
Los Alamos National Laboratory has developed technological advances in polymer electrolyte membrane (PEM) fuel cells that are potentially useful for the development of readily manufacturable, low-cost, high performance fuel cell systems operating at near-ambient pressures. The technology’s advantages include: (a) simple total system (minimal number of components); (b) inexpensive balance of operating plant, (c) unpressurized system with net performance comparable to a pressurized system; and (d) rapid startup. U.S. patent rights are available for licensing on a nonexclusive basis. More information is available at http://www.lanl.gov/worldview [Source: FLC NewsLink]

Los Alamos National Laboratory Technology Available to License

For more information, email Dennis R. Chrisbaum at dennis.chrisbaum@sba.gov.

Technology Community is published bimonthly as a cooperative venture of Colorado organizations involved in development, transfer and commercialization of new inventions, products and technologies. Technology-based companies and related business and technology organizations are invited to submit brief articles via mail, fax or e-mail.

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All readers of Technology Community are now receiving the newsletter electronically. Starting this month, some subscribers will find their news delivered via an email notice linked to the news on line. They can read this issue in PDF format, print a hard copy at their desk, and forward the email notice to colleagues. This change allows us to continue providing technology news to a larger number of readers, in a more timely manner, and at less cost. If you experience any difficulty with this distribution method, please let us know so we can make this a smooth transition for everyone. Telephone 303-554-9493, Tara McCarthy, extension 15 or Karen Eye, extension 13.

Country. For instance, if you have an industrial product and Germany is your target market, but you decide not to participate in the annual industrial trade shows, you are definitely making a mistake. The Germans have been doing trade shows for at least 1000 years! It’s a tradition, and your participation, or lack of participation, will indicate the extent to which you are serious about the market. This is not necessarily the case in other countries. Contact your Export Assistance Center about programs for advice in this area.

4. Pricing: It’s almost impossible to determine your pricing without primary research (having someone in the country evaluate your competition and the demand elasticity for your product). However, you should be able to get a sense of whether you want to go into a market with a premium pricing, or a low pricing/high volume, strategy. How do you want buyers to view your product, related to its price and quality, compared to that of your competition? Also, please remember that your buyer will need to absorb transportation costs and import duties. So, to keep your product competitive, you might need to back out your domestic marketing and overhead expenses, in order to arrive at acceptable pricing in a given market.

Market research is really at the heart of any international expansion plan, so please make sure you devote adequate time to this effort. Unfortunately, if the market research is wrong, it’s unlikely that your international sales efforts will succeed. Good luck as your begin what is sure to be an exciting adventure in global marketing! Please contact me if I can be of assistance.

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