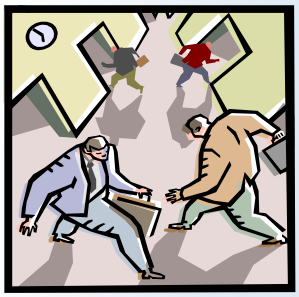

Workforce Development and Competitiveness

Workforce development and economic competitiveness in the global economy

Human capital is one of the fundamental building blocks of economic competitiveness. Underpinning the success of a business, community, or nation is the presence of a labor force with the appropriate skills and knowledge needed. Workforce development acts as the catalyst for:

- Creating a sophisticated, adaptable labor force;
- Increasing the potential for entering and sustaining innovation-based industry clusters; and
- Establishing the intellectual power for succeeding in the knowledge-driven global economy.

As the global marketplace becomes increasingly interconnected, a workforce that is dynamic and competitive helps communities, regions, and nations improve economic growth and achieve sustainable development. SRI assists our clients in meeting the demands for a more globally competitive workforce by providing a full range of services, methodologies and tools:

- Assess the needs and impacts of workforce development;
- Foster increased public-private sector stakeholder collaboration to address workforce issues;
- Analyze the "skills value chain" to help industries improve their competitiveness;
- Assist local and national governments, NGOs, and education institutions to assess, design, implement and evaluate workforce development programs;
- Enhance a region's capacity to develop and implement sustainable workforce development strategies;
- Improve education and skills development policy and reform efforts; and
- Facilitate access to technology-based, on-demand learning and employment opportunities.

SRI International®

SRI's Cluster-Based Workforce Competitiveness Strategy

Industry clusters have become a commonly accepted framework for defining economic development strategy around the world. It is a fact that businesses tend to cluster together in order to take advantage of suppliers and specialized services that are attracted by concentrations of customers.

SRI pioneered the economic cluster approach to economic analysis and strategy development. This approach is based on the identification and analysis of *economic clusters* of competing, complementary, and interdependent firms within a region that are related to each other through buyer-supplier linkages and shared *economic foundations*.

In recent years, many have begun to stress the importance of workforce development in a knowledge-based economy. Practitioners have learned that industry clustering is first and foremost influenced by talent – the concentration of skilled and experienced labor – supported by customized and specialized education and training that produces and upgrades skills and knowledge on a continuous basis.

In this context, projects conducted by SRI have shown that industry clusters are useful "units of analyses" to tackle human resources development issues, because they provide a fairly straightforward breakdown or boundary by which to analyze the competitiveness of an industry or region or nation. Examining workforce development activities as a part of a cluster places workforce issues in a dynamic context of an industry value chain, rather than as static goals, such as increasing employment or a particular skill set. On a macro level, increasing the supply of high quality human resource is central to building competitive industry clusters and sustainable national economic growth. On a micro level, improving the skill sets of employees is critical to improving company competitiveness.

SRI works with public and private sector clients to develop strategies for enhancing the competitiveness of nations, regions, and localities through workforce development. In each case, our staff engages in extensive on-site data collection, consensus building, and strategy development rather than relying on secondary sources and "cookie-cutter solutions."

SRI International

SRI International is one of the world's largest and most respected research and consulting organizations. Founded in 1946 as the Stanford Research Institute, SRI is an independent, nonprofit corporation serving business and government clients worldwide. The Institute boasts a staff of 1,400 professionals located in a worldwide network of offices. SRI International is a problem-solving organization that provides a broad spectrum of basic and applied research and consulting services to business and government clients throughout the world. Initially organized under the auspices of Stanford University, SRI formally separated from the University in 1970, but retained its nonprofit status. Further general information on SRI is available at the website: www.sri.com.

SRI is known worldwide for its scientific and business contributions, such as invention of the computer "mouse" and computer interface, development of electronic checking and clearing, innovative new market identification techniques, site selection for Disneyland, and creation of numerous anti-cancer drugs. Nearly two-thirds of our staff members have professional and technical expertise, including management consultants, economists, marketing consultants and researchers, computer scientists, psychologists, scientists, engineers, and other specialists. We are unique in our ability to draw from a variety of technical, marketing, and management groups to establish interdisciplinary consulting teams tailored to meet our clients' needs. SRI's clients include foundations, public/private partnerships, private corporations, associations, donor organizations and agencies of local, state, and federal governments.

Each year, SRI serves more than 2,000 clients around the world. At any given time, approximately 1,000 research and consulting projects may be under way. More than 75 percent of SRI's business comes from repeat clients. What sets SRI apart from most research and consulting organizations is our ability to harness a diversity of expertise to meet the needs of each project.

Center for Science, Technology and Economic Development (CSTED)

SRI's Center for Science, Technology and Economic Development integrates three disciplines and skill sets – economic development strategy, science and technology policy, and university strategy and workforce development. We have discovered that the effective combination of these factors serves as the key driver of long-term economic growth.

The Economics Practice

The Economics Practice is the professional resource within SRI charged with providing top quality research, analysis, and strategic planning on economic development issues. The reputation of the Economics Practice is built upon years of experience providing comprehensive, individually tailored assessments of economic and competitiveness issues. The Economics Practice staff have conducted in-country assignments in over 60 states and regions in

the United States, and 115 countries throughout the world, acquiring recognition as respected authorities on policy concerns, for conducting high quality and objective analysis, and for developing concrete solutions to complex economic problems. These assignments have allowed us to develop a strong, international experience base. Economics Practice clients have included, among others, many U.S. local and state governments, public/private partnerships, national governments, international banks and insurance companies, travel and entertainment companies, multinational business and manufacturing corporations, multilateral financial institutions such as the World Bank and the Asian Development Bank, and U.S. government agencies.

Science and Technology Policy Program

Since 1980, SRI's Science and Technology Policy Program has provided policy makers with interdisciplinary research and analysis of major national and international scientific and technological issues. Commissioned studies are designed to produce a range of future policy options together with objective evaluations of past policies and programs. Areas of research have included assessments and analyses of national and regional S&T policies, programs, research systems, and capabilities, both in public and private sectors; assessments of state technology programs; and surveys of U.S. scientists and engineers involved in S&T programs. The Center uses a multidimensional research approach, integrating the analysis of S&T policy formation, R&D infrastructure, resources and outputs, together with evaluation by technical experts in the field under consideration. STPP staff members have considerable experience in metrics of technology transfer, technology commercialization, and technical assistance.

What Distinguishes Us from Other Consulting Firms

Reputation and Objectivity. SRI has developed a strong reputation as the "consultant of choice" on business and economic issues. This reputation for objective, in-depth analysis has given SRI a high degree of credibility among government leaders and business executives.

Extensive National and Global Experience. Having worked with business and government leaders throughout the United States and in over a hundred countries throughout the world, we have broad experience and databases on international best practices.

Versatility. The wide range of skills available in SRI's CSTED, supplemented by SRI's industry, engineering, and technical experts, allow us to assemble the optimal team of professional talent to solve complex, multidisciplinary problems for business and government clients.

Depth. SRI has acquired recognition as respected authorities on economic policies, and as sought-after sources of objective analysis on economic development, investment site selection and risk analysis, policy assessments, market studies and industry/sector growth strategies.

Extensive Contacts. Our established reputation and extensive contacts in government circles and multilateral agencies provide us with inside track to the latest policy and economic developments, and access to the most up-to-date information.

Relevant Project Experience

State, Regional and International Workforce Development

SRI University – Training on the Discipline of Innovation™. SRI has developed a comprehensive training course designed to introduce and expand innovation at the organizational level. This course proceeds through a logical set of modules designed to improve innovation discipline and performance. This course has been conducted for public and private sector clients in the United States, Europe, Asia and the Middle East.

Michigan Technical Workforce Development Incentives. In this study funded by the Michigan Economic Development Corporation, SRI reviewed the state's post-secondary financial incentives, policies and programs that support technical careers. The study also reviewed the federal resources that were being leveraged by the state, its students, and other potential technical workers. A set of national best practices in the design of vocational education incentives was compiled. The results of the study were used to assist the state to align all available financial resources to ensure that they make technical careers more attractive, desirable and achievable for young people entering the workforce.

Dallas Metroplex Higher Education Evaluation and Benchmark Study. For the Dallas Citizen's Council, SRI conducted an evaluation of higher education in the Dallas-Fort Worth Metroplex area. The study was designed to inform the Council's strategy to create a Tier 1 university in the region, and to guide future state spending requests. The study identified the key strengths and weaknesses of four public universities in North Texas, and identified models and options for possible structural changes in the region's higher education system. A focus was placed on developing world-class research capabilities relevant to the region's commercial base.

Egypt Workforce Cluster Development Strategy. A workforce development team from SRI International and PricewaterhouseCoopers assessed the workforce competitiveness challenges in three industry clusters in Egypt: including information technology; agribusiness; and tourism. The workforce development team assessed workforce "demand" conditions such as current skill levels and skills gaps. The team also assessed current educational "supply" strengths and weaknesses. Based on the assessment, SRI developed stakeholder-driven action plans to enhance competitiveness in three industry clusters, and to bridge the gap between what educational/ training providers are supplying, and what industry is demanding in terms of skilled human capital.

Egypt Tourism Workforce Development: SRI designed and managed the implementation of a large-scale tourism workforce training program in Egypt, in collaboration with the Educational Institute of the American Hotel & Lodging Association, the Federation of Egyptian Tourism Industries, and PricewaterhouseCoopers. This highly successful program trained more than 10,000 hospitality workers in an 18-month period on international hospitality standards. SRI designed the training program structure, provided ongoing evaluations and impact assessments, and developed a financial model to help the Federation design a financially sustainable training structure for the hospitality industry.

Forecasting Malaysia's Science and Technology Human Resources and Research and Development Investment Needs Leading to the Year 2020: This two-year study was conducted for the Malaysian Ministry of Science, Technology, and the Environment under funding from UNDP. SRI assessed Malaysia's current status with respect to its human resources in science and technology, as well as ongoing investment in R&D, using a variety of techniques, including a large-scale survey of Malaysian industry to determine its current employment of scientists and engineers, shortages in available human resources, and anticipated investment and human resource needs. The country's current S&T infrastructure was assessed using bibliometric and other methods, and data gathered on the educational system's capacity and overseas sources of training. Finally, an econometric model was developed and a forecast of requirements for various occupational categories was carried out to determine the country's needs in order to achieve its ambitious investment goals. SRI also provided recommendations aimed at improving Malaysia's future S&T infrastructure and resources. The report was adopted as an official document by the Malaysian Cabinet.

Cluster-Based Economic Development Strategy for Iowa: SRI Identified opportunities in fast-growing, high-tech, high-wage industries and industry segments in Iowa, including the Biotechnology, Life Sciences, and Information Technology clusters. The team assessed Iowa's competitiveness, and economic, technology and institutional infrastructure supporting the target industry clusters. SRI then created a strategic plan for Iowa to stimulate growth in those sectors, including public-private R&D partnerships, human resource development, and supply chain management strategies.

Benchmarking South Africa for Labor-Intensive Development: For the Industrial Development Corporation of South Africa, SRI benchmarked South Africa's strengths and weaknesses in developing labor-intensive industries. The study team undertook both quantitative benchmarking and international case studies analysis. SRI identified preliminary action plans in six different industries which we believe offered the best prospects for rapidly increasing employment in South Africa.

Education and Human Resource Development

An Evaluation of the National Science Foundation's (NSF) Institution-wide Reform of Undergraduate Education Initiative: The NSF Institution-wide Reform initiative was launched in 1995 to encourage reforms in undergraduate science, math, engineering and technology education throughout the United States. Through competitive grants, NSF funded campuses that demonstrated reforms that would permeate the entire culture of an academic institution. SRI examined how awardee institutions, ranging from two year colleges to research universities, undertook comprehensive curricular reform, pedagogical reform, and occasionally reform of tenure policies. SRI prepared an overall assessment of the Institution-wide Reform initiative's national impact, as well as case studies detailing various strategies that awardees used to improve undergraduate science and mathematics education across disciplines.

Progress of the Engineering Education Coalitions Program: The Engineering Education Coalitions program began in 1989 and NSF ultimately funded six coalitions of universities involving nearly fifty schools distributed across the country. The objective of the program is to stimulate systemic reform of undergraduate engineering education across a broad range of institutions. Each coalition has a somewhat different focus in developing new curricular materials, laboratory settings for undergraduates, and other pedagogical approaches, and represents a collection of diverse institutional settings in which these developments take place and are tested. NSF contracted with SRI International to conduct a study assessing the progress of the Program as a whole, across a broad range of issues.

Planning for S&E Workforce Data 2000: By statute, the National Science Foundation (NSF) has the mission not only of supporting high-quality science and engineering (S&E) research but also of tracking the status and health of the nation's S&E enterprise by collecting and analyzing statistics related to them. Crucial to this mission is NSF's SESTAT (Scientists and Engineers Statistical Data System), consisting of three integrated surveys designed to track the nation's S&E workforce at various degree levels (bachelor's to doctorate) and within all employment sectors—academe, industry, self-employment, government, nonprofit, and others. SRI undertook a multi-year, multi-phase project to help assess how NSF can improve and enhance its S&E workforce data system for the next decade.

Literature Review of Documents on National Workforce Policies: The governing body of NSF, the National Science Board, has asked SRI to assist a Task Force established to assess long term national workforce trends and needs in science and engineering and their relationship to existing Federal Policies. Under the project, SRI studied:

- Literature on U.S. demographic trends, S&E preparation and degree attainment by domestic students, and availability and mobility of foreign students, scientists, and engineers;
- Workforce demand and its relationship to the preparation of students/workers at all levels for technology-based careers, including employer requirements such as formal credentials or non-degree workforce training;
- S&E graduate training opportunities and their link to career opportunities both inside and outside of research;
- Policies directly relevant to workforce development, including the teacher workforce, emanating from Federal law, Federal agency and state programs, practices of educational institution and systems; and constraints such as national security considerations.

Workshop on International Aspects of Graduate Science and Engineering Education and International Mobility of Scientists and Engineers: This project was intended to provide NSF's Science Resources Studies Division with up-to-date analyses concerning recent changes in graduate science and engineering education and the international mobility of scientists and engineers. The analysis focused on three regions: Europe, Asia, and Latin America. SRI engaged experts in each of the regions to develop papers that served as the basis for a workshop. The information generated by this effort assisted NSF in its continuing efforts to promote the human S&E infrastructure in a changing global environment.

Identifying Top Undergraduate Engineering and Computer Science Programs: For a major computer company, SRI developed a system for evaluating the quality of undergraduate programs in five fields of engineering and computer science. The algorithm SRI developed included various quality indicators (e.g., number of faculty publications, rated effectiveness of graduate programs) and enrollment data that took into account not only numbers of graduating seniors but also numbers of minority and female students in the graduating class. Once the system was developed, data was used from the National Research Council, the National Center for Education Statistics (the Integrated Postsecondary Education System database), and the American Association of Engineering Societies (the Engineering and Technology Enrollment database) to rank more than 400 U.S. colleges and universities that have programs in the fields relevant to the client's interests.

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