Fit for Competition

The Colorado Workforce Coordinating Council Report on
Colorado's Training Needs, Growing Industries, and Employer-led Solutions to Colorado's Skilled Workforce Shortage

April, 1999

Prepared for
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(The data analysis, findings, and recommendations contained in this report represent the views of the project team and do not represent official policies of the WCC, CCCOES, or the CACI. This document is available in alternate formats.)

SECTION I - PROJECT DESCRIPTION

Introduction

The Colorado Workforce Coordinating Council has contracted with the Colorado Community College & Occupational Education System to conduct research, write a report, and disseminate findings related to three aspects of workforce development in the state of Colorado.

1. Identification of Training Needs
2. Examination of Growth Industries in Colorado
3. Analysis of Inter-firm Collaboration in Workforce Development in Colorado

This project was structured on the assumption that numerous reports and surveys in recent years have examined Colorado's growth industries and workforce training needs. The purpose of this project is to provide a coherent analysis of these existing resources to uncover the sources of information (and, in the case of inter-firm collaboration, conduct original research); compare the findings; and develop implications.

Methodology

The work has developed in several stages. This report represents the culmination of the research stage–an analysis of results from three previous (and more comprehensive) reports. The first, **Growth Industries in Colorado** (written and edited by William Charland) reviews and analyzes the growth industries identified most frequently in several recent industry reports. Next, **Training Gap Findings** (also written and edited by William Charland) identifies and analyzes Colorado's training needs**. Inter-Firm Collaboration** (written and edited by Russell Hamm) uses original research to identify various collaboratives convened by employers to address workforce development challenges. This report presents the findings of this long-term project.

A project team was established at the inception of this project to provide guidance and resource assistance to the researchers and writers, and to provide input in developing the findings and implications of this paper. The project team, led by Mary C. Gershwin, PhD (CCCOES), included the following: Shelley Parker (CCCOES); Rick Voorhees, PhD (CCCOES); Russell Hamm, PhD; Jim Leonard, CE (Colorado Advanced Technology Institute); Dan Pilcher (Colorado Assn. Of Commerce & Industry); Chris Lepore (research consultant); William Charland (writer); Jim Podolak, PhD (Director, Colorado State Occupational Information Coordinating Committee); and Susan Blansett (President, Economic Developer's Council).

SECTION II - RECOMMENDATIONS

The continual development of a skilled and accessible workforce is critical to Colorado's future as a national, and international, competitor. As the project team examined findings from our analysis of training needs, industry clusters, and growth industries in Colorado, three overarching conclusions framed the discussion:

1. Workforce development is the top priority concern for Colorado employers. In order to remain competitive, Colorado must address workforce development directly, rapidly, and effectively.
2. While workforce development is a key issue across all regions, each area of Colorado has its own economy: Needs, assets, and issues vary with the terrain of the state. State-level policy must be flexible to meet these diverse regional needs and perspectives.
3. Colorado's private sector, including businesses, trade associations, and chambers, is a key partner for building a

skilled, competitive workforce. These key stakeholders should be actively utilized as state-level policy is constructed.

Extensive efforts have been applied toward defining the status of workforce development needs in Colorado, and examining potential solutions. These solutions must respect the principles of local control and market-alignment and use limited public resources strategically. Judging from results around the state and nation, cluster-based strategies (strategies based on building a coordinated infrastructure which is aligned to geographically-concentrated, networked groups of firms –refer to pp. 21-24 for more on Cluster-Based strategies) fit the mandate and warrant consideration for statewide implementation. The recommendations included in this report contribute toward a stronger economy for Colorado and its citizens by building the state's capacity to identify and address workforce development issues on a continuous basis.

RECOMMENDATION:
Develop market-driven, aligned workforce and economic development policy to strengthen key geographic and industrial clusters

Corporate, individual, and community prosperity will depend upon the involvement of both private and public sectors in directly addressing our workforce problems. Alignment of state-level economic and workforce development policy is crucial to support (and energize) local, privately led efforts. State leaders and policy- makers can promote more efficient and productive use of limited resources through the following initiatives:

Initiative 1:

Define a vision for Colorado's economic well-being which reaches all regions of the state and hinges on the continuous development of a world-class workforce. Political leaders, beginning with the Governor, play key roles in building this vision in the minds of employers, workers, state officials, educators, and broker organizations. The power of a positive "bully pulpit" for workforce competitiveness should not be underestimated, particularly the power of a vision so closely linked to the future success of Colorado families, communities and businesses.

Initiative 2:

Develop a workforce investment climate that leads the nation in encouraging private investment in building the broad workforce advantage of the state. Under leadership from the Governor's office, Colorado should analyze current incentive structures and develop options to promote greater private sector investment in workforce development, thereby strengthening the economic health of our state. Public economic development efforts have traditionally worked to attract capital or new employers in order to sustain economic growth. Given the current workforce crisis, the time has come for Colorado to examine how it can attract resources dedicated to solving our workforce issues.

1. Offer tax incentives for employer investments in workforce development. Colorado should examine policies in other states (such as Florida, Oregon, Iowa, and Indiana) and construct incentives designed to support achievement of Colorado's workforce goals.
2. Create "Competitiveness Learning Accounts." Colorado should explore funding mechanisms to build a line of credit to supplement individual investments in training and education.
3. Provide consumers (both firms and individuals) with timely information on the performance of educational and training providers.
4. Strategically participate in federally funded workforce development initiatives that promise direct benefit for

Colorado's families and employers. Colorado should examine the benefits of participation in national projects such as regional skills alliances, the voluntary skills standards projects, and America's Job and Talent Bank.

Initiative 3:

Colorado should address the information technology skills shortage:

From agriculture to telecommunications, Colorado businesses depend on information technologies. The severe workforce shortage in this area must be addressed. Colorado should:

1. Offer incentives for employers that provide/promote/reimburse their employees for IT training.
2. Provide incentives for individuals who want to join the IT workforce by offering tax credits and scholarships for IT education and training programs.
3. Create opportunities for all IT education/training providers to fall under the tax credit/grant partner umbrella.
4. Develop and promote community-based solutions such as, regional training consortia; IT industry curriculum advisory boards; replicating successful training models; disseminating best practices; increasing the capacity of existing partnerships; and creating new programs and partnerships.
5. Charge community colleges to bring innovative programs in incumbent worker training to scale and ensure adequate infrastructure funding for this assignment.
6. Support higher education linkages to business and economic development.

Initiative 4:

Align policy in workforce development, economic development, international trade, and education to support the development of self-selecting industry alliances. Colorado's diversified economy is comprised of a wide array of mainstay industries (such as agriculture, construction, services, manufacturing and trade) and emerging technology-based industries (such as telecommunications, software development, and computer storage). The authors found that firms are beginning to join together in self-selected alliances designed to tackle workforce issues, but these alliances have yet to reach scale, particularly in rural communities. Through leadership from the Governor's office, Colorado should align policy in workforce development, economic development, international trade, and education to support the development of regional and industrial clusters. **A cluster-based strategy should be driven by the following principles:**

1. Emphasize clusters, not single industries or firms. The inclusiveness of the cluster approach enables regional stakeholders to aggregate resources, widen community commitment, and develop better solutions through working together.

Emphasize self-selected alliances. Colorado's cluster strategy should be designed to support firms that voluntarily elect to join together to build the quality of their combined workforces.

Focus on building broad advantages, not narrow incentives.
Narrow incentives are quickly consumed. In contrast, the development of broad resources produces benefits that continue

to feed the economic and workforce health of communities. Aligning the broad spectrum of state-level resources can support locally led cluster development.

4. Emphasize a strong role for private-sector leadership. Colorado's private sector, including business, trade associations, and chambers, is a key partner for building a skilled, competitive workforce. State level policy should be constructed in concert with these key stakeholders.

5. Provide technical assistance and planning resources to build teamwork across local communities. This study revealed that many workforce development efforts across the state have spent precious resources on duplicative research. Integrated, state-level strategy can help local communities make wise investments by providing ongoing workforce and labor market information, information on best practices, and technical assistance to support the development of cluster-based strategies.

Initiative 5

Build the capacity of the Workforce Centers to function as information and resource brokers to link the demand and supply sides of workforce development.

A three-pronged plan would increase effectiveness:

1. Workforce Centers should strengthen service to employers by providing a *localized* interpretation of workforce information for employers.

Workforce Centers should be the 'first stop' for unemployment statistics, training options, training providers, and funding opportunities. Models demonstrating how Workforce Centers can package workforce information for local employer consumption should be shared broadly.

2. Workforce Centers should offer *industry specific* information and perspective.

Workforce Centers can build customer service by developing expertise in industry sectors. Workforce Centers may want to consider assigning staff to sectors to act as advisors or industry specialists. Industry specialists should develop expertise in the demand side (employer needs) and supply side (training and workforce development sources) for key industry sectors.

3. Workforce Centers should build expertise as a *broker* for workforce development services.

Workforce Centers should be sources of information about the array of public and private workforce development

resources available to local employers. As brokers of diverse training and development services, Workforce Centers can offer objective, credible information on a range of training issues: potential training programs; training grants available to employers; financial aid for training programs, employee assessment and recruitment options; and guidelines for selecting a training provider.

SECTION III - FINDINGS

Summary of Findings

The continual development of a skilled and accessible workforce is critical to Colorado's future as a national, and international, competitor. Examination of Colorado's growth industries, training needs, and solutions emerging through privately led collaboration reveals the following findings discussed in Section III.

PART ONE-TRAINING NEEDS

A review of twenty-four studies of industry training and workforce development needs suggests that an accessible, skilled workforce is a critical component of Colorado's economic competitiveness. Tight labor markets, along with an explosion of knowledge and new technology, have placed new demands on employers and workers in Colorado. The need for training is great, and well documented. **This section presents key findings from these studies** (see appendix A for an annotated bibliography of all studies).

- **Inadequate skills, of both potential and current employees, is a consistent, high priority concern for employers in *all* industry sectors in Colorado.**

As was discovered in growth industry surveys, inadequate skills of potential and current employees is a top priority concern. These workforce-related needs are

often cited as more critical than the traditional business concerns, such as tax policy and government regulation (National Federation of Independent Business, 1999).

Finding and keeping qualified workers is the most challenging problem facing Colorado small business owners. Out of ten potential problem areas, respondents rated the workforce problem as number one- outweighing all other business issues (business property tax ranked second; and health insurance availability ranked third).

-Survey, National Federation of Independent Business (1999)

- **Demand for training is growing in three key areas:**

    - **Essential Skills**
      Colorado, like the rest of the country, faces a significant challenge to upgrade the skills of its workforce. However, increasing technical skill levels is not the only area of concern. As many employers struggle to find employees that suit current needs, dissatisfaction with 'soft' (referred to here as 'essential') skills of job applicants can be as great a problem as finding people with technical skills (Alpern 1997; Murnane and Levy 1996). Essential skills are defined in this paper as: communication, problem solving, teamwork, basic math, writing, and English proficiency.

The workplace increasingly demands an employee who can be flexible, team-oriented, and able to benefit from retraining, since it is estimated that 75% of the US workforce will need significant retraining over the next decade. Yet, a significant percentage of Americans are not equipped with the essential skills needed to contribute in this new work environment. Over forty million American adults (21-23%) *cannot* perform simple tasks associated with literacy and problem solving (see chart below).

Twenty years ago, there were jobs for employees with low skill levels. These employees could learn how to perform a task, and continue to perform it until retirement. Today, those types of jobs are disappearing due to the following forces:

- Automated equipment that replaces the lowest level worker
- Increasing requirements that every level of employee be able to use technology
- Requirements to communicate and work in teams
- An expectation that employees will upgrade knowledge and skills sets continuously over the life span of their careers

Training efforts need to be focused on increasing the 'essential skill' levels of Colorado employees.

CHART:

Skills of Adults at Level I –

21-23% of American adults test at this level:

Can	**Cannot**
Sign their name	Locate eligibility from a table of employee benefits
Identify a country in a short article	Locate an intersection on a map
Locate one piece of information in a sports article	Locate two pieces of information in a sports article
Locate the expiration date info on a driver's license	Identify/enter background information on an application
Total a bank deposit entry	Calculate total costs of purchase from an order form

Information Technology Skill Sets

Colorado employers report crippling workforce shortages in the information technology arena. A recent headline in the Denver Rocky Mountain News, Business section depicts the depth of the problem: "State short 7,000 tech workers." It is anticipated that the technology worker shortage could climb to 30,000 in the next decade. Although community colleges and universities are working to respond, more training and incentives are needed to bring potential and incumbent workers up to speed.

Workers are needed in many different capacities, within the Information Technology sector. With salaries averaging $60,000, employers report an urgent need for both technical and service employees.

Nationwide, 350,000 'high-technology' positions currently stand open, including about 7,000 in Colorado. By 2010, it is expected that Colorado firms will have 35,000 high-tech positions unfilled

–Information Technology Association of America, 1998.

Technical Skill Sets

Employers continue to express concern about the essential skills-- communication, work ethic, literacy, math, and writing continue to be a problem in the workplace. Moreover, the advance of technology requires workers – many among them at entry level—to possess a strong foundation for developing new skills (U.S. Chamber of Commerce, 1998).

- **While employers rate workforce development problems as a top concern, training & employee development are not commonly employed strategies for solving "The Problem."**

The Rocky Mountain Manufacturing Study (1997), by Arthur Anderson reported: "The availability of workers and the lack of adequate work force skills were rated as the top two business concerns." However, the study simultaneously determined that manufacturers were *not* inclined to invest in workforce development

to solve their problems. This disconnect between problem-recognition and problem-solving is noted in several other studies.

Several factors that are barriers to employer investment in workforce development:

- **Employers lack knowledge of workforce development resources, options, and potential benefits** (Cluster-Based Economic Development, 1998)**.**

Employers are not well informed about recent advances in delivery of training and development such as *work-first approaches* (which tie learning directly to work), *asynchronous learning* (which enables employees to learn anytime/ anyplace*), modularized curriculum* (which enable employees to learn on a "just in time" basis). They also require more knowledge of the training marketplace –where to go to procure high quality workforce development services.

- **Employers are unclear about the benefit in investing in training and development.**

Employers express concern that investments in employees will produce only short term gains because "If you train them, they will leave."

Although research suggests investments in training (particularly for entry-level employees) produce greater employee loyalty and retention (Pennsylvania State University, 1998), employers express concern that they will not reap direct benefits from their training investments.

- **Tax policy may provide disincentives for employer investments in workforce training and development. Tax policy permits corporations to claim expenditures for equipment as investments that add to a firm's assets. Expenses for employee training and development, however, are treated as costs for which the firm reaps no long-term benefit.**

Significant progress has been made on the documentation of training needs and identification of best practices.

Local efforts can benefit from this progress (see Appendix A). Products available to local workforce development planning address the following related areas:

Training content: rigorous analysis of skills for a wide range of fields. (See, for example, Skill Standards for Information Technology).

Needs assessment process: best practices for convening employers to examine local needs and develop solutions.

Delivery options: best practices for using technology to expand training options.

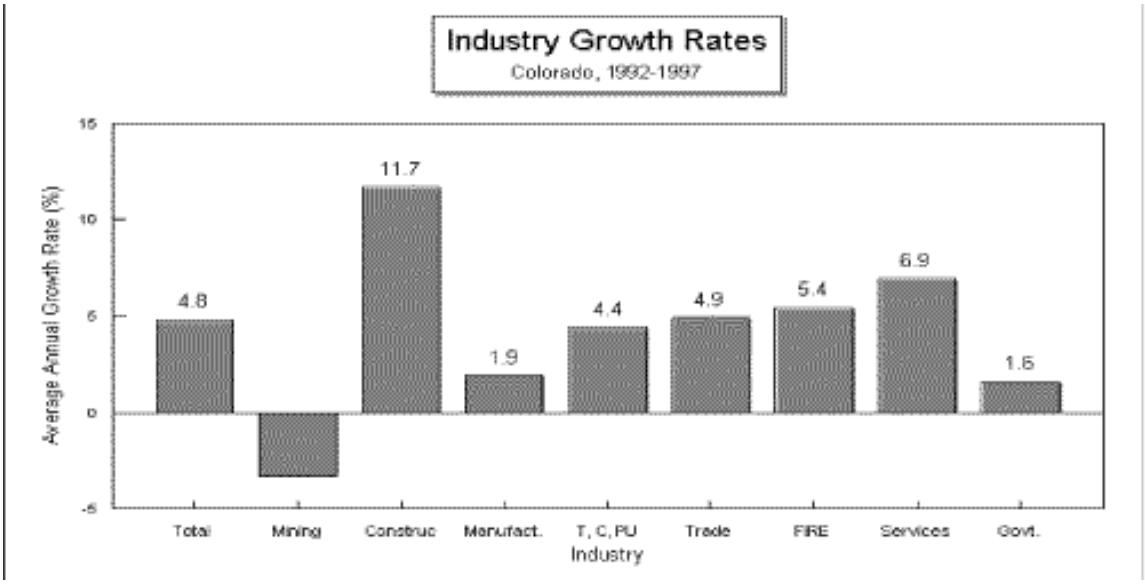
- **Firm-by-firm approaches to solving workforce issues needs are the most common and less efficient**
  Although firms are beginning to explore collaborative solutions (see Part Three), "recruit and raid" approaches to solving workforce problems are common (U.S. West, 1998). Competition over a limited pool of skilled workers, rather than investment in raising the skill levels of loyal or potential employees, is costly. Dollars spent on recruitment and showering skilled hires with bonuses and other incentives could be invested in training. Raising the skill level of the labor pool is ultimately the only logical solution to a labor crisis as extreme Colorado's. Since competitive approaches do not contribute more workers to an already scant workforce, the energy of "recruit and raid" is spent inefficiently.

PART TWO-GROWTH INDUSTRIES

What industry sectors in Colorado are adding to the economic vitality and growth of the state? What sectors have the potential to provide long-term, high-quality, economic stability and prosperity? Information gleaned from twelve recent studies on growth industries in Colorado begins to address these questions. Findings reveal the common needs of growth industries, as well as the disparate viewpoints and vocabulary of groups attempting their identification.

- **Growth has been widely spread across all industrial sectors**

(mining excepted).



(Source: http://lmi.cdle.state.co.us/api/indgrow.gif)

Ten consecutive years of positive job growth in Colorado have been fueled by strong international trade growth, large infrastructure investments, and an influx of new residents to the state. Nationally, Colorado ranks 11th in total new, non-farm job growth over the past 5 years (1993-1998), adding 380,900 new jobs. The term 'growth' describes a majority of industry sectors in the state.

In the twelve surveys examined for this project, growth industries in Colorado are identified and discussed in different ways. Two issues in defining growth industries emerged through the analysis: inconsistent criteria for growth and inconsistent definitions.

1. **Criteria for "growth" industries are inconsistent across studies.**

In some surveys, criteria are listed in terms of growth in exports or production. In others, criteria relate to growth in employment.

Case in Point:

Criteria for MDN and Bureau of Labor Studies

In its 1998 study, the Metro Denver Network establishes clear criteria for growth industries. A "growth industry" rates highly in these ten categories: critical mass; growth; wage/skill level; traded sector; environmental impact; value-added; profitability; leading edge; global; and communications. Using this criteria, four industries emerged: Computer Storage and Peripherals; Biomedical Products and Devices; Equipment for Communications; and Software for Telecommunications.

In contrast, the Colorado Business Economic Outlook (Bureau of Labor, 1998) has a single criterion: new jobs created. Applying this standard, its report that the three strongest growth areas in absolute numbers are: Services; Wholesale and Retail Trade; and Government.

2. **Industry sector vocabulary is inconsistent.**

The development of consistent data on growth industries also has been limited by deficiencies in the official tools the government uses to describe and monitor the U.S. economy. Until recently (1997), the U.S. government has used SIC

(Standard Industry Classification) codes to calculate employment and economic activity. Under this classification system, for example, computer programmers and computer systems analysts on temporary contracts are classified together with all temporary workers. Originally published in 1941 (and refined in 1987) these SIC codes do not capture many new industries, particularly in the technology sector (Cyberstates Update, 1998).

The U.S. government has begun to implement a more flexible system of classification designed to address some of these problems. However, in the meantime, non-standard classifications have been applied in several studies. With all other studies, no firm categories cross studies. The two examples below illustrate the point: analysts discussing growth industries are not consistent in the sectors they assign to various industries.

Case in Point:

Where does Software belong?

The emerging arena of software development can be classified as a service, or it can be considered a sub-group of a particular industry (such as, software for financial services), or software can be a part of a sector (such as, "Transportation, Communications (software), and Public Utilities" or it can be considered part of a broad category (such as "Services").

Case in Point:

Who's High-Tech?

Some studies, such as the American Electronics Association "Cyberstates Update" present completely new categories for viewing technology-based industry. For example, the American Electronics Association refers to its employees as "High Tech."

This raises a question: If a customer service representative works in a high-tech company, are they "High Tech" as well?

- **The emerging "technology-based" sector is critical to Colorado's economic health and vitality; labor shortages are severe.**

While nearly all sectors in Colorado are experiencing growth as measured by employment, technology-based industry appears to be growing on a very broad range of measures.

Four studies outline the growth within the technology-based sector, and the potential future benefit of these industries and the implications for Colorado.

The Information Technology Industry in Colorado's Front Range: A New Engine for the Regional Economy reports that the largest providers of jobs within Colorado's Information Technology (IT) industry are computer services (32%), telephone services (27%), computer hardware manufacturing (17%), and electronic components (10%). This report argues that the information technology sector brings significant benefits to the Front Range economy, including.

High wage jobs (1995 average earnings of $48,000)

Traded sector (over 80 percent of Front Range IT industry is traded)

Multiplier impact: (80,000 traded sector IT jobs account for 271,000 direct, indirect and induced jobs).

This study also examined the needs of employers in the IT sector. The top issues were: labor availability, labor costs, and labor force skills. Issues such as highways and tax structure were also listed, but not as highly ranked.

Colorado's Challenge: Sustaining the Boom; Preventing the Next Bust reports that there are currently 7,000 "high-technology" positions open in Colorado. Over the next decade, the number of open positions is expected to grow to 30,000 in Colorado. The report argues that a commitment to technology-based education is vital to ensuring Colorado's leadership in the new economy.

Metro Denver Network's Techvision concludes that Denver is poised to become the virtual hub for four "leading edge segments." They are:

Biomedical Products and Devices

Computer Storage and Peripherals

Software for Telecommunications

Equipment for Telecommunications Infrastructure.

By the year 2020, Techvision projects that these industries will yield a potential local economic impact of $7.5 billion and create as many as 117,000 jobs. The MDN report concludes that addressing workforce shortages is vital to bringing this vision to reality.

Economic Development in Colorado, by Price Waterhouse Coopers (1999), identifies venture capital flow into Colorado. Technology-based industries comprise 82.5% of the venture-backed companies in Colorado. The chart below depicts the Colorado venture capital investments by industry. This study reports that education is the number one critical need of Colorado's technology industry (followed by intellectual capital, infrastructure, and incubator help).

Industry	**% of 1998 Venture Capital Deals**
Communications	41.6
Software	19.8
Consumer	12.2
Biotechnology	7
Healthcare	5.6
Other	13.8

Labor shortages appear at opposite ends of the occupational spectrum.

What opportunities await Coloradans as they seek employment in High-Growth industries in 1999? Labor shortages in Colorado appear to be occurring primarily at opposite ends of the occupational spectrum. At the low end, thousands of service sector jobs are standing vacant, impeding the ability of firms to staff critical positions. At the high end, shortages of knowledge workers with specialized skills inhibit the growth of existing and new industries. The Colorado Department of Labor & Employment information (below) offers some detail:

Colorado Occupational Projections 1996 - 2006 Top 10 Growth Occupations

Occupational Title	1996 Employ.	2006 Employ.	Annual Percent Growth	Absolute Growth	Annual Growth	Annual Replace-ments	Annual Openings
Salespersons, Retail	79,543	103,076	3.0%	23,533	2,353	2,522	4,875
General Mgrs & Top Execs	55,106	73,672	3.4%	18,566	1,857	1,174	3,031
Cashiers	38,776	51,863	3.4%	13,087	1,309	1,691	3,000
Marketing/Sales Supervisors	42,338	55,165	3.0%	12,827	1,283	677	1,960
Systems Analysts	9,125	21,308	13.4%	12,183	1,218	62	1,280
Waiters & Waitresses	41,665	52,850	2.7%	11,185	1,119	2,125	3,244
General Office Clerks	53,230	63,979	2.0%	10,749	1,075	1,214	2,289
Computer Engineers	8,731	19,357	12.2%	10,626	1,063	59	1,122
Clerical Supervisors	27,885	38,296	3.7%	10,411	1,041	647	1,688
Child Care Workers	18,169	28,102	5.5%	9,933	993	202	1,195

Few studies address issues in rural communities.

The efforts of the project team to identify growth industries and their training needs produced only a few surveys of the rural areas of Colorado. Perhaps because the studies tend to be funded by Front Range stakeholders, there is limited perspective on the needs of rural communities (see Economic Outlook, 1998, University of Colorado at Boulder and The Healthy Communities study for examples of studies that include rural analysis).

Common assumptions/approaches for analysis are emerging.

Although "growth industry" identification remains slippery for the above reasons, all of the studies analyzed for this report covered common ground.

Sector Focus

Rather than tracking the growth of individual firms, research is focused on the development of attractive sectors. Studies

that applied this approach include:

MDN Techvision

The Information Technology in Colorado's Front Range

The 1997 Rocky Mountain Manufacturing Study Results

For a complete list of Colorado Clusters, see Appendix C.

Regional Focus

Rather than undertaking statewide investigations, planners are often focused on the needs of a specific region in Colorado. Studies that applied this approach include:

Boulder County Workforce Characteristics and Opportunities

The Metro Denver Business Issues Survey

The Colorado Springs Economy: NOW WHAT?

For a complete list of Colorado Clusters, see Appendix C.

Private Sector Leadership

"Growth industry" research tends to be increasingly conducted by private sector groups, such as chambers or trade associations. These groups appear to be taking on new leadership roles in workforce development, including: convening employers; identifying workforce needs; aggregating demand for education services; and lobbying for state training funds.

Traded Sector

Many studies focus on primary industries that create wealth by exporting goods and services out of the state.

Review of Selected Growth Industries

This project has identified a number of clusters that merit attention. William Charland has identified the following growth

industries in Colorado:

Biotechnology & Biomedical Devices

Business and Financial Services

Electronics and Advanced Manufacturing

Telecommunications

Information Technology

Wholesale Trade and Transportation

His criteria: the outlook, impact, and fit of these industries in the state (Charland, 1998).

Lessons in promoting growth industries are emerging: An alternative to "growth industries;" many states are moving to "cluster based" economic development.

A growing number of states (including Arizona, Indiana, Oregon, Washington, and Wisconsin) and individual regions (such as the San Francisco Bay Area) have refocused their economic development efforts around "cluster-based strategies." Rather than attempting to "pick" winning industries (or firms) to support, cluster-based strategies focus on building a coordinated infrastructure which is aligned to geographically-concentrated, networked groups of firms.

What is an "Industry Cluster?"

Industry clusters are agglomerations of competing and collaborating industries in a region networked into horizontal and vertical relationships, involving common buyer-supplier linkages, and relying on a shared foundation of economic institutions.

-Cluster-Based Economic Development (1998)

These inter-firm groups are comprised of interrelated, geographically-concentrated industries, along with key suppliers and supporting economic institutions (see Figures 1 and 2 on p. 23 for diagrams of the relationships).

What do clusters do?

Firms form (or join) clusters in order to increase their resources in the following areas:

- **Access to global marketing**:

For example, as a part of an overall competitiveness strategy, the state of Oregon encouraged the development of clusters for the purpose of increasing exports to foreign markets.

- **Access to capital:**

Geographical clusters have demonstrated the ability to draw capital (Price Waterhouse, 1999).

- **Improved infrastructure:**

Clusters have focused on improving communications, transportation, power and environmental systems to promote more efficient operations.

- **Improved workforce infrastructure:**

Clusters have combined forces to bring access to skilled employees and find resources to continuously improve the existing and potential workforce.

While clusters may begin their collaborations by addressing other issues (such as access to capital), the 'workforce variable' becomes a critical piece in the overall goal of building competitive advantage within a region, community or industry.

Figure 1 This figure describes the inter-relationship between the growth industries and their suppliers. MDN TechVision, 1998.

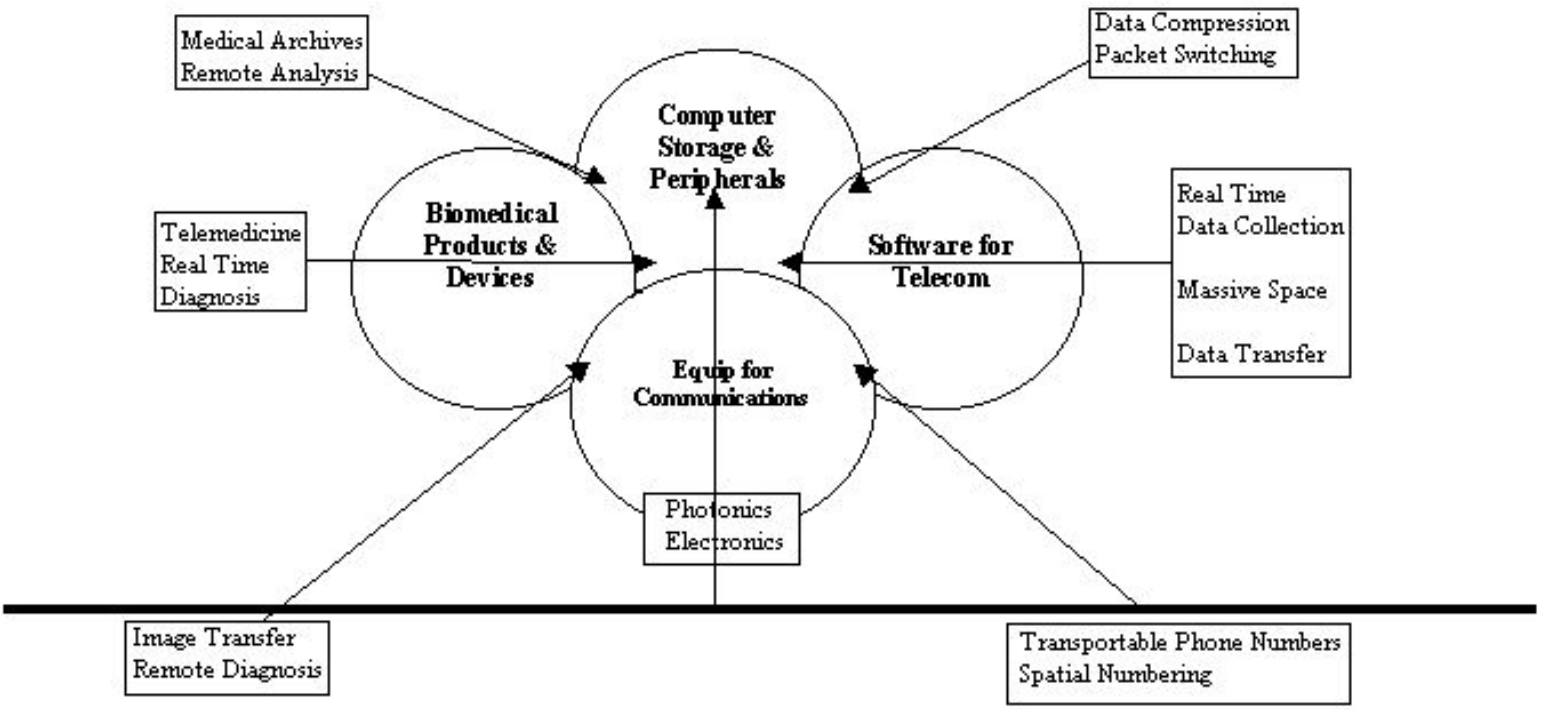
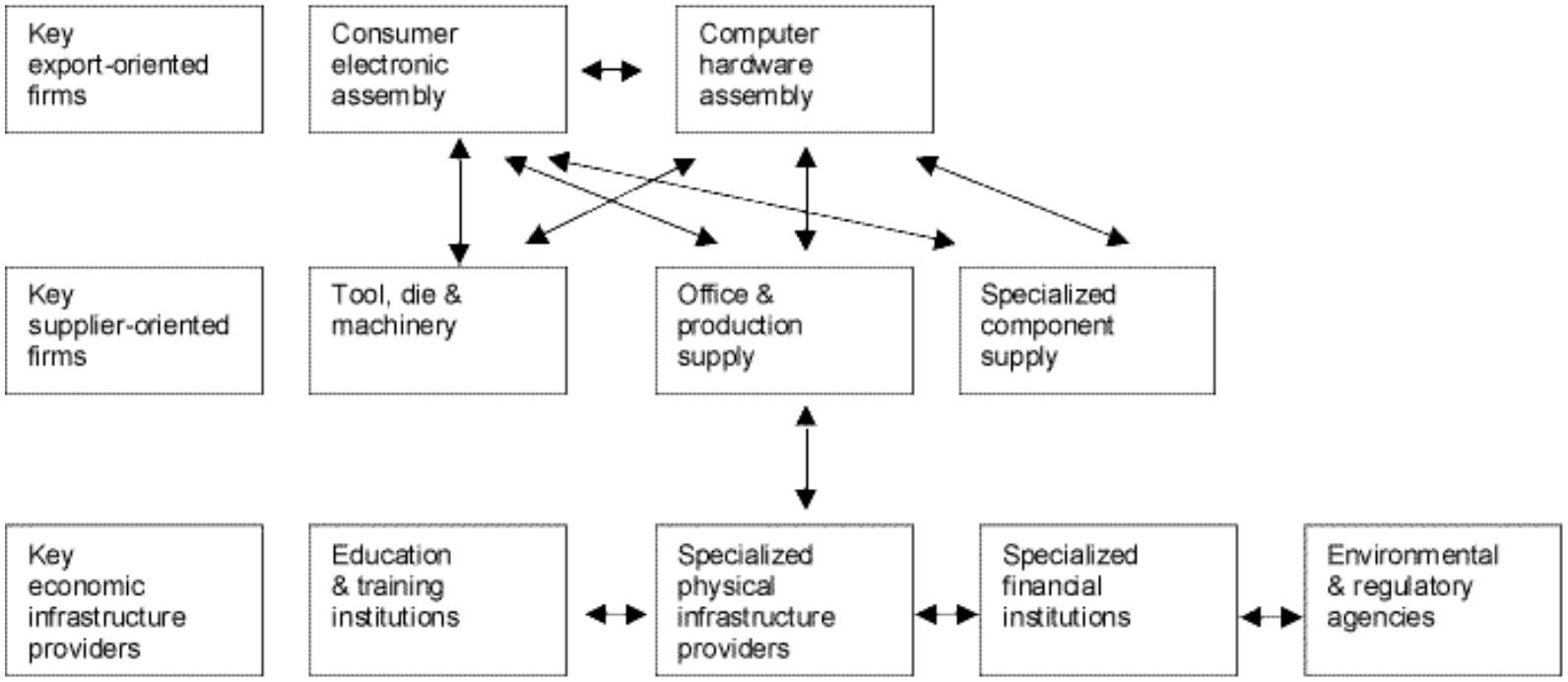


Figure 2 Electronics industry cluster



Definition of an industry cluster: Industry clusters are agglomerations of competing and collaborating industries in a region networked into horizontal and vertical relationships, involving strong common buyer-supplier linkages, and relying on a shared foundation of specialized economic institutions. Because they are built around core export-oriented firms, industry clusters bring new wealth into a region and help drive the region's economic growth.

What makes a cluster effective?

Critical forces that appear to influence the effectiveness of an industry cluster include:

- concentration of related industries, suppliers and services in a geographic region;
- access to specialized economic resources come from avenues other than the business sector;
- well developed inter-firm collaboration processes.

PART THREE - INTER-FIRM COLLABORATION
for
WORKFORCE DEVELOPMENT

The Project Team conducted original research for this report to identify cases of collaboration among firms in addressing workforce needs in Colorado. The following discussion will introduce definitions and relate findings.

Definitions:

This study defines "Inter-firm workforce development collaboration" as the *process* by which parties with a stake in the

workforce problem actively seek solutions. By definition, collaboration includes: key stakeholders on the **demand side** of workforce development (employers and individuals); those on the **supply side** (community colleges, K-12 education providers, community based groups, state agencies, and others); and the emerging group of i**ntermediaries** between demand and supply side (trade associations, chambers of commerce, and in some cases, Workforce Centers).

Supply side institutions have a long history of convening employers to address workforce development concerns. Traditionally, for example, vocational programs have been required to have advisory committees comprised of employers for matters of curriculum and program development. Workforce Centers form local boards comprised of employers. These supply side groups are well-known and it is not the purpose of this research to describe them. Exploration of demand side collaboration involving groups of firms revealed the following findings:

Colorado Collaborations: over 23 inter-firm collaborative processes are currently active in Colorado.

Groups of firms are already working collaboratively to address workforce development issues in Colorado. Although no previous studies exist describing these collaborative processes, they are a part of the economic picture in our state. Research conducted for this project identified twenty-three cases of inter-firm collaboration (for an annotated listing of Colorado Clusters, see Appendix C). The following are some representative examples of the types of collaboration found in Colorado today.

Project Invest was developed by The Colorado Professional Insurance Agents and the Western Insurance Information Services to address industry workforce skills shortages. The program facilitates the relationship between the employer community, secondary education, and the post-secondary institutions in the Denver area.

The Colorado Contractors Association is a coalition of heavy construction contractors with over 300 members. The association has an education arm with the purpose of developing a workforce with skills demanded by the industry. Apprenticeship training programs provide work-site training and require participants to take two classes a week at Red Rocks Community College.

The Colorado Restaurant Association is implementing ProStart program aimed at improving the quality of the labor pool for the hotel, lodging and restaurant industry. Through partnerships with the Colorado Community College and Occupational Education System and seven high schools across Colorado, ProStart enables students to gain comprehensive experience in all aspects of the hospitality and restaurant industry by participating in paid internships which are integrated with academic course work.

The private sector has a key role in developing/maintaining inter-firm collaboration

Private sector leadership has evolved primarily through trade associations and chambers of commerce. These organizations appear to be uniquely positioned as leaders in addressing employers' common workforce challenges. Ways in which trade associations and chambers are positioned to play a leadership role:

- Associations and Chambers have a history of creating employer alliances to address shared concerns. In the past, they may have built credibility among employers by focusing on issues other than workforce, such as tax policy, immigration, transportation, or government regulations. Over time, chambers and trade associations have developed

the networks of inter-firm relationships required to build collaborative workforce solutions.
- Members expect these groups to address their key concerns.
- In 1999, members are concerned about Workforce.

As noted above, public, 'supply-side' institutions, (such as community colleges, Workforce Centers, and school districts) and non-profit organizations (such as the Piton Foundation) are traditional leaders in bringing employers together. As these entities continue to convene stakeholders for collaborative efforts, they operate in a more complex environment. The private sector's role as leader is emerging.

The Metro Denver Network Techvision (1998) study advocates a coordinated, 'grow-your-own,' approach to developing the metro region's high-tech workforce. Recommendations include:

- Increase coordination of workforce training programs with specific industry needs. The Colorado Community College System is working in partnership with MDN to ensure that technology-based employers can easily access existing training and development resources.
- Explore employer incentives. Techvison reports, "Iowa offers 100% tax deductions for paying tuition for workers in critical manufacturing occupations."

Explore educational incentives for individuals.

The collaborative process depends on: 1 clear purpose, (2) supporting structures, (3) commitment from formal leaders, and (4) key agents who make the collaboration succeed.

Interviews with individuals involved in building successful inter-firm collaborative processes reveal that four key areas are critical to the success of inter-firm collaboration to be successful:
1. Clear purpose: The goals of the group are concrete, clear to all participants, and attainable.
2. Supporting structures: The collaborative process is supported by an organizational infrastructure which provides resources to further the collaborative work.
3. Commitment from CEOs and top leadership: Research confirms that the actions and attitudes of top leadership play a central role in the construction of a successful collaborative process. Leaders bring vision of what collaboration can accomplish and promote the collaborative work to external constituencies.
4. Key Agents: Agents, as contrasted with formal leaders, are those staff people who do the day-to-day work required in collaboration. Collaborative success is dependent on these agents who must balance accountability to their employer organization with accountability to the broad collaboration. Key characteristics of these individuals include: embracing accountability to the interests of their employers; working as intermediaries to integrate the interests of various groups; and educating others to build and sustain support.

Inter-firm collaboration for workforce development involves common functions.
Inter-firm collaborative efforts in workforce development seem to focus on the following kinds of activities:

Convening stakeholders and defining common vision. The Metro Denver Network exemplifies how groups develop a shared understanding of the environment and how they work collaboratively for mutual benefit.

Marketing the industry to increase and improve the potential workforce. The Colorado Restaurant Association illustrates how a sector (united by a trade association) can develop statewide strategies to promote the industry to potential employees.

Training the Shared Workforce. The Colorado Contractors Association demonstrates how firms can collaborative to build a larger pool of skilled employees.

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