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**BUSINESS INCUBATORS AS AN ECONOMIC DEVELOPMENT STRATEGY:
A CASE STUDY OF OAKLAND'S COMMUNICATIONS TECHNOLOGY CLUSTER**

by

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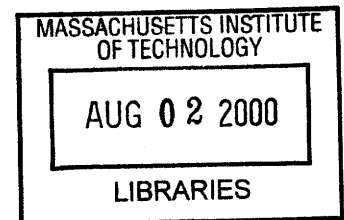
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ABSTRACT

Business incubators are a rapidly growing trend in economic development. The National Business Incubator Association estimates there are nearly 600 incubators in North America today which each help create over 500 jobs. Through the provision of real estate, physical amenities, and business services, incubators can improve the success rates of small businesses, which in turn translates into jobs, diversification of the local economy, and tax base expansion. The growth of the high technology sector promises to generate quality, well-paying jobs. Therefore, communities are pumping large sums of public dollars to support and sustain high tech business incubators. However, without a full understanding of how incubators impact local communities, it is difficult to justify these public investments. Moreover, without evaluating its strengths and weaknesses, and how the incubator fits within the communities' larger business development strategy, opportunities to further improve this economic development tool in practice may be overlooked.

This thesis assesses the impact of the Communications Technology Cluster (CTC) located in Oakland, California. Using business attraction, job creation, business retention, and effects on city image as evaluation measurements, this research shows that CTC has produced mixed results. In the process of evaluating CTC, several larger issues emerge, of which workforce development, business services, and the city's hard and "soft" infrastructure are identified as key impediments to the realization of the city's economic development goals. In light of these findings, this thesis proposes an action strategy for improving the incubator's operations and for considering new ways of thinking about the incubator's role in the overall economic development strategy.

The thesis concludes with the argument that the publicly affiliated incubator should be integrated into the community's overall strategy in order to achieve its full impact. This has implications for economic development practitioners. By extracting lessons from the case study of CTC in Oakland, economic development practitioners can begin to consider the existing assets and liabilities of the city, and design an incubator strategy tailored to best meet the needs and objectives of the local community.

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CHAPTER 1

INTRODUCTION

In 1998, the City of Oakland embarked on aggressive economic development strategies to attract high technology firms. Companies in five industries, including telecommunications, software/multimedia, biotechnology, transportation, and food processing were the targets of 10 year tax abatements. In addition to these tax incentives, leaders in Oakland early on recognized the potential of innovative economic development models, including the business incubator. In order to attract new high-tech communications firms to a lackluster downtown, Oakland developed the Communications Technology Cluster (CTC), a high tech incubator, charged with the goal of creating new jobs, expanding the local tax base, and attracting and retaining high-tech start-ups.

The business incubator is a relatively new economic development strategy, but is not unique to Oakland. Candace Campbell refers to business incubators as "change agents." The underlying assumption is that by providing low-cost space, business management assistance/services, and access to networks, the incubator will help nurture small, new firms to grow and reduce their business failure rates. Once this is achieved, the business incubator can expect to help generate jobs, diversify the economy, and improve the business climate and image of an area.¹

Since one of the fastest growing industries in the small business sector is engineering and management², local governments have taken a special interest in high tech business incubators. The high-risk, time-sensitive nature of high tech business

¹ Campbell, Candace. *Change Agents in the New Economy: Business Incubators and Economic Development*, Minneapolis: Cooperative Community Development Program, 1988. p. 27

² <http://www.sba.gov/advo/stats/facts99.pdf>

development however, makes this industry extremely vulnerable to changes in the market, thereby increasing its failure rates. High-tech start-ups therefore require intensive assistance during the initial product development phase, and as such, effective incubator programs are those that are designed to respond to these needs. Moreover, an understanding of the impact of the business incubator model has implications for how to think constructively about economic development.

PURPOSE

The proliferation of business incubators across America has been fueled in part by the notion that incubators help cities successfully harvest home-grown high tech firms. Studies including those by the National Business Incubator Association (NBIA) attempt to examine large samples of incubators in order to make statistically significant findings for national policies. But there have been few studies which provide in-depth analysis of the impact of business incubator investments for specific localities. The contention that business incubators are effective strategies for job creation, diversification of the local economy, and municipal tax base expansion can be resolved only by evaluating business incubators under the local conditions and specific objectives for which they were created. Therefore, my research seeks in part to bridge this gap in the literature by examining the impact of the Communications Technology Cluster (CTC), one non-profit high tech business incubator based in Oakland, California.

Given that the City of Oakland has channeled large subsidies to CTC since 1996 and will continue to subsidize the cluster for the next five years, it is important to determine CTC's level of success. This research is the first attempt at quantifying some of the outcomes of CTC. It identifies and assesses the strengths and weaknesses of the incubator strategy within the context of Oakland. It is designed first to inform CTC and Oakland about the impact of the business

incubator strategy. Second, the findings coupled with an investigation of best practices from other incubator models will help guide a set of recommendations to link the incubator to other resources in the City. This suggests a more comprehensive approach to local economic development, of which the incubator strategy is a critical component.

The primary research questions are: What has been the impact or benefits of CTC to the start-ups and how has tenant firm growth impacted the community? What are the strengths and weaknesses of this incubator strategy as applied to Oakland? What are best practices from other incubator models? What are the implications and recommendations for CTC and Oakland?

My main hypothesis is that the incubator strategy has produced mixed impacts in terms of firm retention for the City of Oakland. While CTC helped to grow and nurture new high tech businesses in Oakland and has created new jobs which pay high wages, several graduates of CTC have relocated outside Oakland and the benefits have not accrued to Oakland residents. The inability to retain these firms and generate jobs that Oakland residents can fill is not a flaw of the model per se, but relate instead to larger challenges inherent to inner cities like Oakland. I argue that CTC needs to improve its business services, and more importantly, the City should link the incubator to a larger economic development strategy in order to increase its effectiveness. In sum, I argue that if the primary goal of cities is high tech business development, incubators are but one piece of a larger strategy.

METHODOLOGY

A case study approach is used because incubators are developed within the economic context of a specific area. The case study approach is also useful for the purpose of developing a comprehensive understanding of the impacts of a business incubator and how it relates to a city's economic development objectives. Before the author can embark on an assessment of the

incubator's impact on the host community, its impact on the clients, namely the tenant start-up firms and graduates, must first be determined. Borrowing from Campbell's 1988 study, Business Incubators as Change Agents, my units of analysis are the business incubator, the residents and graduates of CTC, and the City. There are different benchmarks to assess the impact of business incubators including job creation, subsidy per job, firm retention, employee benefits, and improved local image.³

Given that CTC is created under a specific set of economic and social circumstances, I measure CTC's actual impact against the stated objectives it originally set out to achieve. I evaluate the impact/outcome of CTC by measuring CTC's ability to do the following: 1) attract high tech firms which would otherwise not have considered locating in Oakland; 2) address the firms' needs through the adequate provision of business services/assistance thereby spurring growth and reducing the failure rate of start-ups; 3) generate a substantial number and quality of new jobs for the local community; 4) retain incubator graduates in Oakland; and 5) improve City's image. These measures are consistent with economic development theories that "the attraction, creation, or retention of business activities is the best way to establish or maintain a healthy local economy."⁴

Both quantitative and qualitative data are used to assess the benefits of the incubator strategy. Quantitative data comes from surveys and interviews with current tenant firms and graduate firms of CTC (See Appendix I: Survey). The response rate among CTC graduates was over 90% and nearly 50%⁵ of the tenant firms responded. The data reveals the number of new firms "hatched" from the incubator, its survival rate, the number of jobs created, the number of

³ EDA. *Impact of Incubator Investments*. Athens: NBIA Publications, 1997. p. 5

⁴ Blakely, Edward J..*Planning Local Economic Development*. Thousand Oaks: Sage Publications, 1994. p. 178

⁵ Despite the fact that only 50% of the tenant firms responded to the survey, information on job creation statistics was available for over 85% of the tenant firms.

firms retained by Oakland, salary range of firms, and the skills requirements of the new jobs. It is important to note that significant job growth will not occur until some time after the firm graduates from the incubator and therefore the potential longer term impacts of CTC cannot be fully captured in this thesis.

Qualitative information comes from more in-depth interviews with City officials, community stakeholders, CTC's Director and Operations Manager, and the founders or managers of graduate and resident firms. These interviews help determine the quality of CTC services and CTC's ability to retain the high tech start-ups in Oakland. To assess less quantifiable impacts, stakeholders and community leaders were asked about their perceptions of the incubator and its impact on the business climate, city image, and vacancy rates. A quasi-experimental analysis would provide a more complete picture of the impact of CTC by comparing firms which received services from CTC to a control group. However, the difficulty lies in identifying a set of similar firms like those in CTC since they focus on new niche markets, many which did not previously exist in Oakland; therefore a control group was not identified and this level of analysis was not conducted.

THESIS OUTLINE

Following this introduction, **Chapter 2** describes the needs of high tech firms and focuses on the necessary ingredients of success for small high-tech start-ups. By first profiling the history of incubators and the different types of incubators in existence, I then turn my attention to focus on how incubators can respond to the needs of high tech start-ups. In addition, I lay out a larger set of requirements for high tech firms as they graduate from the incubator and consider the factors for their location decisions. Cities interested in nurturing and retaining high tech businesses must consider these other factors.

Using CTC as a case study of how incubators have responded to the needs of high tech communications/internet firms, **Chapter 3** describes CTC's origins, profiles CTC's clients, evaluates its service quality, and measures the incubator's ultimate outcomes. This analysis helps determine the impact of CTC on both start-up firms and the Oakland community to shed light on the strengths and weaknesses of the incubator strategy. In addition, this chapter addresses challenges external to CTC confronting the city and its ability to attract and retain high tech firms.

In uncovering the key issues and challenges facing CTC, other incubators were surveyed for best practices. By profiling a cross section of public and private incubators in San Jose, Berkeley, San Francisco, Cambridge, Springfield, and Boston, I draw lessons and best practices from these other incubators in **Chapter 4**. This provides the basis for the final analysis, and based on these cumulative findings, a set of recommendations for CTC and the City of Oakland are established.

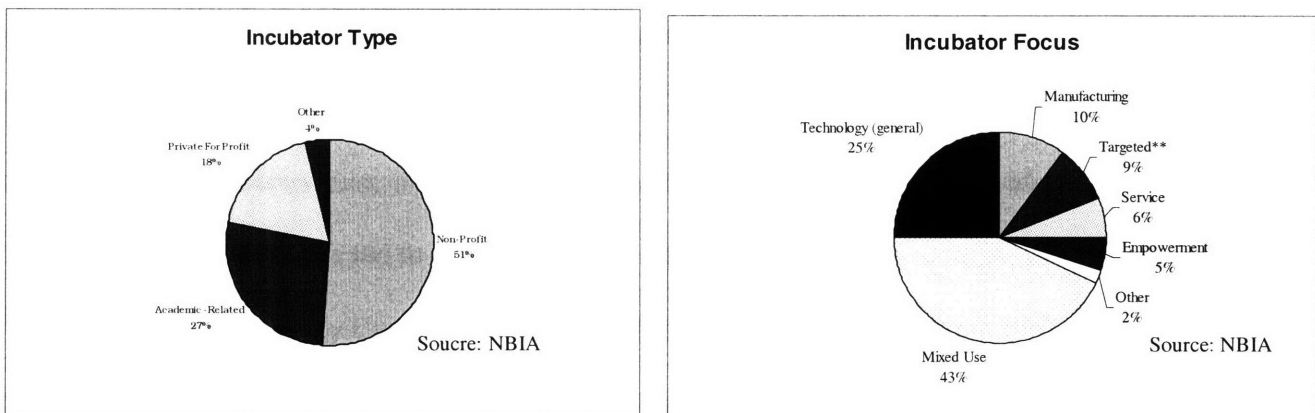
Chapter 5 lays forth the recommendations for both CTC and the City of Oakland. These recommendations revolve around workforce development, improvements in CTC's program services, and the provision of a hard and "soft" infrastructure. The implications of these factors are examined in detail to arrive at a set of recommendations for CTC and the City of Oakland.

CHAPTER 2 DYNAMICS OF BUSINESS INCUBATORS AND ECONOMIC DEVELOPMENT

OVERVIEW OF INCUBATORS

The first incubators appeared over 30 years ago, but the industry burgeoned in the 1980's and 1990's and today, nearly 600 incubators are in operation across the U.S.⁶ Of all the North American facilities, 51% are government sponsored and non-profit, 27% are university and college affiliated, and 18% are private, for-profits.⁷ NBIA further classified incubators by the following focus: manufacturing, mixed use, service, technology, empowerment, and targeted.⁸ (See Chart 1).

Chart 1: Incubator Types and Incubator Focus



The different incubator types may have a similar set of goals but vary in their set of priorities depending on their funding sources. For example government, quasi-public/non-profit incubators are focused on job creation, economic diversification, and improved image. The second set of university-affiliated incubators focus on training/employment opportunities for

⁶ <http://www.nbia.org>

⁷ <http://www.nbia.org>

⁸ <http://www.nbia.org>

students and seek venues for the commercialization of faculty member research. Finally, private incubators aim to achieve a high return on investment.

The traditional form of the incubator which populated the landscape during the last three decades has evolved. As economic development tools, business incubators have its roots in the 1960's, and were further developed in response to macro-economic events like the recession in the 1970's and 1980's. One of the earliest incubators originated from the redevelopment of an urban renewal site in Delaware Valley, Pennsylvania, wherein University City Science Center, a service organization of 28 colleges and universities provided real estate space and assistance to small businesses.⁹ Science and innovation centers used to promote entrepreneurship and new technologies were led by the National Science Foundation in 1973.¹⁰ In places like the Northeast and Midwest which suffered large plant closures and massive layoffs, community-affiliated incubators were established in the 1980's to create new employment opportunities. These early incubators began in factories, warehouses, and vacant buildings and were also used as redevelopment tools to reuse underutilized properties.¹¹ Other efforts to provide inner-cities with small businesses and jobs led to the establishment of early private business incubators like the Business and Technology Centers of Control Data Corporation. The current high tech business incubator became increasingly popular in light of heightened interest in the economic development potential of high tech industries. According to David Allen:

The main impetus for the development of state and local advanced-technology initiatives came during the recession of the late 1970's and early 1980's...The mystique of sophisticated technology, and the promise of high economic growth and job creation made technological development initiatives politically attractive.¹²

⁹ Campbell, Candace. *Change Agents in the New Economy: Business Incubators and Economic Development*, Minneapolis: Cooperative Community Development Program, 1988. p. 13

¹⁰ *ibid*, p. 13

¹¹ *ibid*, p. 14

¹² Allen, David and Victor Levine, *Nurturing Advanced Technology Enterprises, Emerging Issues in State and Local Economic Development Policy*. New York: Praeger Publishers, 1986 p. 38

ROLE OF BUSINESS INCUBATORS AND HIGH TECH DEVELOPMENT

According to the U.S. Small Business Administration (SBA), small businesses generated approximately 80% of the net new jobs between 1990 and 1995¹³ and employed 53 percent of the private work force in 1999.¹⁴ The fastest growing small business industry is in engineering and management services, both in terms of new firm start-ups and job creation.¹⁵ An estimated 37.9% of the 4.5 million workers in the high tech industry were employed by small firms in 1996, with an increase of 7.7% between 1997 and 1998.¹⁶ Despite these promising statistics which suggest high tech small firms are strong job generators, the life cycles of high tech start-ups are often short-lived. It is estimated that the failure rates of small enterprises are high and varies between 65% and 80% during the first five years of the operation of the business.¹⁷ But NBIA reports promising statistics that incubated graduates have a success rate of 87% within the first five to seven years of operation.

High-tech business incubators provide one model to meet the rigorous demands of high tech start-ups and thereby reduce their failure rates. The availability of low-cost real estate and centralized services commonly found in incubators can help reduce the overhead operating costs for firms, enabling start-ups to focus their attention on critical areas of the business, including product/service development, marketing, and business development. But physical infrastructure alone is insufficient to address the multi-faceted needs of high-tech startups. Describing the challenges of high-tech start-ups, Slatter writes:

The small high-tech firm is competing in a hostile environment where considerable technological market and competitive risk exists with resources that

¹³ <http://www.sba.gov/advo/stats/thirdmill.pdf>

¹⁴ <http://www.sba.gov/ADVO/stats/fact1.html>

¹⁵ <http://www.sba.gov/advo/stats/>

¹⁶ <http://www.sba.gov/advo/stats/facts99.pdf>

¹⁷ Slatter, Stuart. *Gambling on Growth*. New York: John Wiley & Sons, 1992. p.27

they themselves are scarce (money, management, know-how, company reputation, etc).¹⁸

Fast pace technological changes, increased competition in the marketplace, short product life cycles, and sudden changes in the market demands are placing pressures on start-ups to accelerate the commercialization of their products/services. Given the rapid changes in technology and the threat of competition, start-ups have a short window of opportunity to advance the product from conceptualization to prototype development, to commercialization.¹⁹

Time to market therefore, is of essence. Early market entry affords firms steeper learning curves but the first mover advantage eliminates the possibility of a crowded market and this can help attract investors in a new market space. In addition to addressing the issue of time, the start-up needs a "flexible product."²⁰ This has specific applications to the internet environment, where the response time of products is shortened and products are constantly changing in reaction to a highly volatile market.

Often times the market opportunity or demand for the entrepreneur's product is that which is perceived by the entrepreneur rather than actual predicted analysis of the market, particularly in the case of new technologies and new markets. Incubators, through its on-site managers and/or incubator-affiliated industry experts can intervene in these situations to provide the entrepreneur with a "reality check" on the actual market potential for their entrepreneur's product/service offerings. Tapping into the resources of on-site expertise or off-site incubator-affiliated expertise in the legal, marketing, and financing departments can shorten the learning curve and reduce risks for the entrepreneur.

¹⁸ Slatter, Stuart. *Gambling on Growth*. New York: John Wiley & Sons, 1992. p. 24.

¹⁹ Iansiti, Marco, MacCormack, Alan, *Creating Value in the New Economy*, "Developing Products on Internet Time," Harvard Business Review, 1999. p. 91

²⁰ *ibid*, p. 91

Start-ups require capitalization to set up the firm, build a management team, and develop a prototype. They typically do not begin operations with a completed marketable service or product. This combined with the lack of complete information about the product and its market potential increases the risks for investors. Therefore traditional financial institutions involved in debt financing are not likely to fund high risk, high-tech start-ups. However, there exists a large available pool of venture capital funds for these start-ups. During the first quarter of 1999, venture capital investments were an estimated \$22.7 billion, a 266 percent increase from 1998.²¹ Investments in internet companies were an estimated \$13.2 billion, a 283% increase from 1998.²² The IT sector captured 59.8% of all venture capital investments.²³ These figures indicate that finance and capitalization, a main ingredient for the success of technology start-ups, can be met by the growth and abundance of venture capital funds. How to access these funds, however, remains a greater challenge for start-ups. With its extensive and strong entrepreneurial networks, incubators can play a key role in helping start-ups access venture capital or angel funds.

Once venture capitalists are identified and the start-up receives funding legal representation is needed when. To incur the additional risks of financing the high-tech start-up, venture capitalists typically demand a compensating equity stake in the firm, and the terms of such detailed contractual agreements requires legal counsel. Moreover, since most new technology products involve intellectual property rights and patents, advice from qualified legal experts is needed. Incubators can provide programs and seminars on how to handle the legal aspects of the business and provide direct access to law firms. In addition to lawyers, other aspects of the firm's day-to-day operations must be maintained. Start-ups may not consider

²¹ <http://www.nvca.com/>

²² <http://www.nvca.com/>

marketing and financial planning as top priorities, yet they are critical success factors in the operation of the business. For example, marketing is necessary from the initial stages of market research to product marketing and actual customer acquisition which generates the bottom-line revenues and profits for the firm. Programs developed by incubators to provide access to capital funding and necessary professional services therefore is key.

The management team of the start-up can be the major determining factor in the fate of the start-up. Management skills and high tech talent are often in shortage due to business growth and expansion in this sector. The number of jobs in the IT sector is expected to increase by 30% from 1996 to 2006.²⁴ But the scarcity of high tech talent has already created a workforce gap, and 6-7% of the high tech jobs in regions like Silicon Valley remain unfilled.²⁵ Nevertheless, start-ups require a team of experts in the areas of management, product development, and marketing. Indirectly, affiliation with a successful incubator can attract high tech experts to the join the incubator start-up's management team. Incubators can also act as brokers to link firms to professional services before they are venture-backed. Providing access to an entrepreneurial network of experienced industry executives who advise/mentor or refer start-ups to experienced professionals, therefore, are key roles incubators can play.

From the tenant's perspective, the critical success factor of incubators help to develop credibility for the start-up, shorten the learning curve, solve problems faster, and provide access to business and entrepreneurial networks²⁶. The ability of high tech incubators to link together

²³ <http://www.nvca.com/>

²⁴ <http://www.sba.gov/advo/stats/thirdmill.pdf>

²⁵ This figure does not include the large percentage of jobs which are filled by international recruits. Source: http://www.jointventure.org/initiatives/edt/work_gap/workgap.html

²⁶ Smilor, Raymond, and Michael D. Gill Jr, *The New Business Incubator: Linking Talent Technology, Capital, and Know-How*. Lexington: DC Heath and Company, 1986, p. 37-39

the four key components as identified by Smilor - talent, technology, capital and know-how can enhance the survival rate of start-ups.

INCUBATORS AND ECONOMIC DEVELOPMENT

The success of enterprise development via the business incubator translates into job opportunities to bolster the local economy. Rice and Matthews best summarizes the relationship between business incubators and economic development in the following:

The reasoning behind this premise [to make the mission the development of companies] is simple: as companies develop they will grow and add jobs. As more employees are added, more money will be pumped into the economy, more people will become self-sufficient and more will feel empowered. Neighborhoods will be revitalized and economic development will occur.²⁷

Beyond developing and nurturing new businesses, business retention leads to further job growth and longer term economic stability for a community. From the city's perspective, the ability to capture and retain local knowledge via the incubator strategy is only as successful as the ability to retain the start-ups in the host city. As firms successfully incubated in the conditioned, supportive environment of the business incubator prepare to graduate, their location decisions will ultimately affect the benefits the host city receives.

High tech businesses create quality, well-paying jobs and ancillary spin-off effects. A 1998 NBIA study estimates that for every one job directly generated by incubator firms, an additional half a job is indirectly created.²⁸ It is not surprising, therefore, that fierce competition exists among communities to attract tech businesses. But the agglomeration of similar or related businesses also creates a "clustering" effect and the goal of cities is to develop strong industry clusters. Brian Bosworth defines these cluster firms as "complementary businesses with active channels for business transactions, communications, and dialogue that share specialized

²⁷ Rice, Mark and Jana B. Matthew, *Growing New Ventures, Creating New Jobs*, Westport: Quorum Books, 1995. p. 3

infrastructure, labor markets, and services that are faced with common opportunities and threats".²⁹

Attracting and developing high tech firms to create a cluster is advantageous for cities, but not all cities can meet the location needs of high tech firms. In a study conducted by AT Kearny for the Joint Venture Silicon Valley (JVSV) group, executives of high tech firms, including those firms in the communications and internet sector, noted six critical location factors for high tech firms. These include access to a talented workforce pool, location to core (non-internet) firms, infrastructure (real estate with bandwidth), access to capital, and access to educational and research institutions. If JVSV's report is correct, then despite the Michael Porter's "competitive advantages" of doing business in the inner cities which include a large market, central location and diverse workforce, these benefits are diminished by the liabilities of inner cities. They are associated with high crime, uneducated and unskilled labor force, and blighted neighborhoods. These factors increase the costs of doing business and deter firms from locating in inner cities. Moreover, the "soft infrastructure"³⁰ including a talented workforce, living amenities, cultural and educational institutions which are at the core of business location decisions, are absent in the inner cities. Therefore, few inner cities will have the ability to attract or retain high tech businesses and reap the ancillary benefits associated with high tech start-ups.

Summary

Today's economy is characterized by knowledge-intensive high-tech enterprises. Given the growth of the high tech sector and the use of information technology, cities have gone to

²⁸ EDA, *Impact of Incubator Investments*, Athens: NBIA, 1997

²⁹ Harrison, Bennett and Marcus Weiss, *Networking Across Boundaries, New Directions in Community -Based Job Training and Economic Development*, Volume 2 -Peer-to-Peer Workforce Development Networks. Boston: Economic Development Assistance Consortium, 1998. p. viii

³⁰ Blakely, Edward J., *Planning Local Economic Development*. Thousand Oaks: Sage Publications, 1994. p. 302.

great lengths to attract high technology businesses. After all, Blakely, Roberts, and Manidis writes:

High technology has become the Holy Grail of the last two decades of the 20th century... Many analysts argue persuasively that for most communities the policy choice is either new high tech jobs or no jobs at all.³¹

Inner cities lacking the amenities to attract high tech firms are harvesting their own high tech businesses, via business incubators. A high-tech business incubator is one effective tool to spur economic development in cities if it can be effectively implemented to address the multi-faceted needs of high tech start-ups and the host community.

Through the incubator's intensive assistance, the new high-tech enterprises will survive and grow to generate well-paying jobs and produce spin-off effects in the form of income to be re-spent within the city. But in addition to growing new jobs, if the city's goal is to capture the maximum benefits of the high tech incubator for the local community, its ability to retain its graduates and create local jobs is key.

Chapter 3 provides an in-depth look at the incubator strategy in practice. This analysis provides the foundation for understanding how incubators can fit into the economic development strategy of Oakland and seed inner city growth.

³¹ Blakely, Edward J., *Planning Local Economic Development*. Thousand Oaks: Sage Publications, 1994. p. 296

CHAPTER 3

A CASE STUDY OF OAKLAND'S COMMUNICATIONS TECHNOLOGY CLUSTER

The traditional strategies of smoke-stack chasing and more recently "chip chasing" have had limited impact in Oakland. Therefore, rather than channel energies targeted only to attracting outside firms, Oakland's attempts to promote high tech industry culminated in the development of the CTC incubator. The idea of developing an incubator with a cluster or industry focus was conceived in 1996 by Jim Robbins, a former consultant to the City of Oakland. The notion of business clusters has its roots in agglomeration economies in that it focuses on the concentration of related companies which can develop backward and forward linkages to support suppliers and buyers and to tap into other external assets like skills, technology, and infrastructure. CTC was developed as a cluster targeting communications-related firms, including those involved in cable TV, wireless communications, software, cellular phone, computer networking, fax, modem, and multimedia communications.

CTC WITHIN THE CONTEXT OF OAKLAND

Strategically located in the heart of the San Francisco Bay Area, Oakland is the 8th largest city in California; it has a convenient public transportation system and relatively low real estate costs.³² Yet despite these advantages, negative perceptions of high crime, blight, and an uneducated, unskilled labor force have deterred high tech companies from locating in Oakland. In 1999, Oakland public high schools received a California statewide ranking of two³³ which implies that they performed at the bottom tier of California's public schools. Moreover, only a third of Oakland's population of 25 years and older have a college degrees, and 26% of those 18

³² For example, class A office space is \$34 in Oakland vs. \$42 in San Francisco.

³³ The academic performance index is calculated using test scores "sorted from lowest to highest and then divided into ten deciles, each with 10% of the schools. The deciles are numbered from 1 (the lowest) to 10 (the highest). Source: <http://www.ed-data.k12.ca.us/dev/School.asp>

years and older do not have high school diplomas³⁴. Moreover, inner cities like Oakland remain overshadowed by San Francisco and Silicon Valley and without certain assets to offer, it has failed to attract a critical mass of high-tech firms. One graduate of CTC notes "We would not have looked to locate in Oakland without CTC because it is not known for it's high tech.... The sidewalks roll up by 5 p.m."

While there have been some successes and today there are over 352³⁵ "high tech" firms residing in Oakland, such figures pale in comparison to its neighboring cities including Fremont, Palo Alto, San Ramon, Emeryville, and San Francisco which have fully taken advantage of the spill-over effects generated by Silicon Valley, the global high tech capitol.³⁶ In Oakland, there are an estimated 36 internet firms; employing 320 employees.³⁷ Some of the largest internet employers in Oakland include Cybergold, Digiscents and Xpede.³⁸

Oakland's aggressive strategies to attract, create, and retain high tech businesses are a relatively recent phenomena despite the fact that areas like Downtown Oakland has had an underlying infrastructure since the 1980's to support telecommunications businesses. In the early 1980's, corporations including Pacific Bell invested over \$500 million to help line downtown Oakland with telecommunications copper lines.³⁹ Fiber optic cables were added to these existing lines after the Loma Prieta earthquake in 1989; these costs were folded into the City's public spending on seismic building renovations⁴⁰. (See Appendix II: Downtown Oakland). Once the lines were laid, it seemed logical that the City would take advantage of the downtown's connectivity. However, for a city which historically relied on manufacturing and shipping,

³⁴ U.S. Census, 1990

³⁵ Munroe Consulting "Oakland's Emerging New Economy, Oakland 2000 Technology Summit". p. 6

³⁶ For example, San Ramon has over 16,600 telecommunications related firms alone. Source: EDAB Telecommunications Industry Report, 1999. p.6

³⁷ Munroe Consulting "Oakland's Emerging New Economy, Oakland 2000 Technology Summit", pp. 6

³⁸ CEDA Report, December 1999

³⁹ Platoni, Kara, "Oakland is Wired", Express, February 12, 1999, Volume n21, No. 19, p. 12

politicians and citizens were not convinced of the idea at its outset. Not until after the mid-1990's did the City embark on more aggressive economic development strategies to recruit, retain, and create high tech businesses.

The City's business attraction strategies culminated City Council's adoption of a tax incentive program in 1997. Companies in five targeted industries, including telecommunications, software/multimedia, biotechnology, transportation, and food processing are required to pay only \$60 in taxes during year one and slowly this increases each year until taxes are paid in full at the end of 10 years.⁴¹ In addition to business tax credits, workforce hiring tax credits are also available to encourage firms to hire Oakland residents. The overall goals of the City of Oakland's Community Economic Development Agency (CEDA) pertaining to business development include the retention, expansion, and attraction of businesses. CTC's establishment is consistent with these goals to attract and nurture new communications high tech firms, which in turn would generate new jobs. The promotion of high tech through CTC combined with CEDA's business attraction and marketing efforts seek to create thousands of jobs and millions of dollars in salaries each year.⁴²

CTC was planned in the mid 1990's as a part of the Rotunda Project's Technology Interchange to expand "opportunities for knowledge-based workers and knowledge-based industries through education and technology programs in the Rotunda Building and within a 20 block area of Downtown Oakland⁴³." At that time, downtown Oakland was an economically distressed area. With the lack of investment in private real estate holdings to upgrade damaged and technologically inadequate buildings, the deterioration continued. Therefore, the Rotunda

⁴⁰ Platoni, Kara, "Oakland is Wired", Express, February 12, 1999, Volume n21, No. 19, p. 13

⁴¹ <http://www.oaklandnet.com>

⁴² Economic Development Budget Implementation Plan, CEDA 8/2000

⁴³ CEDA, Rotunda Technology Interchange Report, 1996

Project was a public-private redevelopment initiative designed to breathe life back into the downtown core by attracting high tech firms and educational institutions⁴⁴. Once part of the "Interchange," CTC today is part of the Oakland Innovative Technology District (OITD) designed with similar intended goals.

Joe Gross, Executive Director of CTC, spearheaded efforts to develop the incubator concept by introducing businesses and elected officials including Councilman Ignacio de la Fuente to San Jose's Software Cluster which CTC later came to be modeled after. Robbins advised on the creation of CTC as well as ten other incubator clusters in California. Robbins, also the Executive Director of San Jose's Software Cluster (SBC), noted at the time:

the site [Downtown Telecom Interchange] within Oakland will create a central focal point for collaboration between government, universities, businesses and communications groups interested in stimulating new communications start-ups and commercializing such technology as well as develop a regional focus for emerging communications technologies.⁴⁵

CTC was scheduled to open in the Rotunda Building in May 1996. However, the Rotunda required tremendous retrofitting; subsequently CTC opened operations in a 20,000 square foot office space on 2201 Broadway, seven blocks further uptown from City Hall on Broadway (See Appendix I: Map of Downtown Oakland). The 2201 site was chosen in part because the neighboring Jack London Square area was becoming a more vibrant area; the Redevelopment Agency viewed the 2201 building as a strategic site to link Jack London Square with the other parts of uptown Oakland and ultimately bolster business development.⁴⁶

COMMUNICATIONS TECHNOLOGY CLUSTER

⁴⁴ Interview with Lillian Yeh, April 23, 2000

⁴⁵ Robbins, Jim. "Downtown Telecom Interchange Concept Paper." 1996

⁴⁶ Interview with Michael McPherson, Executive Director of Oakland Business Development Corporation March 2000

Opened in June 1996, the main objectives of CTC are to develop, grow, and retain communications-related start-ups in order to increase the City's revenues and create new jobs in the local community. To support new high tech firms at their critical early stages of development, CTC seeks to do the following⁴⁷:

- Provide real estate amenities including shared conference rooms, copiers, fax, and kitchen facilities;
- Provide business management advice and services available at reduced or no cost from Cluster staff and community resources;
- Provide networking opportunities with CTC firms, local corporations, and sponsors to help start-ups access mentoring, advice, and financing assistance;
- Develop a process which encourages local job growth from resident and graduate firms; and
- Create synergistic opportunities for Cluster start-ups to work together and learn from similar communications firms.

PARTNERS AND RESOURCES

Founded by Oakland's Redevelopment Agency, Pacific Gas & Electric Company, and the Oakland Business Development Corporation (OBDC), CTC operates as a non-profit entity. OBDC maintains fiduciary responsibility of CTC and oversees the collection of rents, provides payroll for CTC staff, and oversees other financial matters. The City of Oakland's Redevelopment Agency under the auspices of the Community and Economic Development Agency (CEDA) provides real estate subsidies for the incubator's facility.

Other partners of CTC include law firms, financial institutions, and financial services firms which provide some level of pro-bono consultation and business assistance services. Sponsors typically pay \$5000 to become a board member and in turn they receive access to the firms. Set up to meet on a quarterly basis, the Advisory Board sets CTC policy and determines

⁴⁷ CEDA Council Report, January 1996

the admissions criteria to CTC. Presently, some of the Advisory Board members include representatives from the Oakland Redevelopment Agency, law firms including Gray Cary Ware and Freidenrich, PG&E, and Citibank. CTC's Advisory Board is comprised of few entrepreneurs, however they are seeking to expand this. The Advisory Board reviews the applications submitted by interested start-ups and interviews firms from a broadly defined spectrum of communications start-ups. According to Gross, the criteria for admittance into the CTC include the following: compatibility with the building constraints, financial feasibility of the business, market demand for product/service, potential to generate jobs, extent to which business can benefit from Venture Center services, and the likelihood the graduating firms will remain in the City upon leaving the incubator.⁴⁸ As of March 2000, CTC had a waiting list of eight companies awaiting space in the incubator which has reached full occupancy.

ANAYSIS OF CTC FINDINGS

CTC FIRMS

In order to assess the impact of CTC, several outcome measurements were devised and on the basis of these measurements, an evaluation of CTC was developed. Between June 1996 and May 2000, CTC served 50 firms. The majority of the firms are young one to six month old firms. During the first year of CTC's operation, the incubator facility was only half full. Pressure from the City for CTC to reach full occupancy played a part in the initial selection of companies. The early firms consisted of sole proprietors, consultants, a calling card firm, architecture consultant, and computer system firm. Today, there are fewer sole proprietors and over 75% of CTC residents are internet-based dot-com firms with high growth potential (See Appendix III for full list of firms).

⁴⁸ Interview with Joe Gross, January 17, 2000

ATTRACTING HIGH TECH FIRMS TO OAKLAND

When asked to speculate what might have happened to their business without CTC, over 65% of the graduates and a majority of the current tenants reported they would not have located in Oakland. Both surveys and interviews suggest that the presence of CTC influenced their decision to launch their business in Oakland. Firms were attracted to the incubator space which provides a conducive environment for new start-ups and frees up time for the entrepreneur to focus on the core aspects of the business during its critical early stages of development. Other important reasons for locating in CTC include the flexibility of the short-term real estate leases, its relative proximity to San Francisco and the East Bay cities, and the availability of shared equipment and services.

DO CTC'S BUSINESS SERVICES/ASSISTANCE ADDRESS FIRM NEEDS?

The service most frequently used by CTC clients was shared equipment including conference/meeting rooms, copiers, fax, and a kitchen facility. The majority of the entrepreneurs worked out of their homes prior to joining CTC, but the home environment was not conducive to conducting business. Therefore, CTC's physical amenities helped reduce the overhead costs for firms and provided a professional space for start-ups to operate. Over 80% of the respondents rated shared equipment as either outstanding or satisfactory. However, two problems emerged with CTC's physical infrastructure. First, the internet infrastructure including T-1 lines was not put in place for early tenants who moved into CTC. A second common complaint is the problems associated with a non-working HVAC systems. Although CTC has approached building management regarding this issue, it could not be easily remedied without physically moving all the resident firms to a different location for an undetermined period of time. In order to avoid disruption of CTC and resident firm business operations, CTC opted not to move. Instead, CTC

plans to move into the Rotunda Building, which is expected to complete renovations at year end 2000 (See Appendix IV).

Of the business services indirectly provided, referrals to financial accountants and legal attorneys were reported as most frequently used by 35% of the firms. CTC firms credit Gross for providing them with referrals. Financial services like accounting have been provided by CTC's partner, Rooney Ida Nolt Ahern Accountancy Corporation (RINA), and Diverse Strategies, a CTC tenant; these services have been satisfactory. Tucker Technologies reported a high level of satisfaction with the services of CTC's legal partner, Donahue Gallagher Woods and Wood (DGWW). For instance, Frank Tucker, founder and CEO of Tucker Technologies, notes that DGWW worked with him to negotiate government and labor union contracts; and this contributed in part to Tucker Technologies' precipitous increase in revenues over a three year time period from \$150,000 to over \$5 million.⁴⁹ On the other hand, a few internet firms reported that legal services provided by CTC's partner, DGWW, were unsatisfactory. This may be attributable to the needs of internet start-ups which require lawyers who have IT knowledge and specialize in intellectual property law. DGWW's strength is not in serving internet start-ups and smaller high technology companies, but rather in larger traditional corporations. This may be differ from the business style of Silicon Valley's notorious law firm, Wilson Sonsini, Goodwich & Rosati, which recognizes the short cash flows of start-ups are willing to take a small equity share in the firm or work out a payment option. To meet the growing demands of CTC firms, CTC has also established a partnership with Gray Carey Ware and Freidenrich, a law firm specializing in high technology.

Other events such as brown bag lunches which provide speakers and sponsors to discuss issues related to the start-ups business development, have also received mixed feedback. One

recurring complaint rests in the tendency for speakers at these events to market and sell their products or services which have little value added for the firms. For example, Citibank introduced their products and services in a session designed to discuss access to capital. However these traditional financial institutions which are in the business of debt financing, are unable serve the equity financing needs of internet start-ups. Furthermore, commercial banks are unwilling to bear the high risks associated with large investments in start-ups since these firms do not generate a profit or have a revenue stream until a later point in time.

Recently, CTC became affiliated with BARTA, an executive mentoring and marketing program. CTC incurs an annual cost of \$500 per firm. However, none of the firms interviewed reported having used BARTA. Therefore, it is difficult to assess the quality of BARTA's services.

Only a few firms reported having used CTC's resources to access venture capitalists. Yet, access to venture capital which provide the lifeblood for the start-ups' development and growth remains one of the top priorities for these firms.

Young, rapidly growing companies go through financial hell compared to existing, ongoing firms, small and large alike, with established customer bases, revenues, and thus cash flow streams. The faster a firm grows, the more voracious is its appetite for cash.⁵⁰

Therefore it is not surprising that the majority of CTC firms would like to see additional networking opportunities and access to venture capitalists or angel investors.

Based on the interviews, CTC services associated with access to venture capital was not sufficiently provided and could be enhanced. Whereas, less than half the graduates cited lack of access to venture capital as a weakness of CTC, over 50% of the resident firms interviewed cited this as a criticism of the incubator. The discrepancy between the graduates' and residents'

⁴⁹ Interview with Frank Tucker, January 4, 2000

responses is partially due to the fact that by the time the firms received the first or second rounds of funding necessary to grow exponentially, they have outgrown CTC's space and in essence graduated from the incubator. This is in contrast to resident firms seeking venture capital and are experiencing the woes that venture capital is not easily accessible, particularly if the entrepreneurs lack the networks and introductions to this external source of funds. Discussing the issues related to venture capital access based on his own experiences, Ike Eze, founder and CEO of Q-Space, a graduate of CTC, notes:

It's a myth that a good business plan will close the deal. The truth is that VCs [venture capitalists] like company introductions; this gives you access, because VCs will not read all the business plans.⁵¹

CTC firms secured a total of \$60 million in venture capital funds in 1999⁵². However, much of this is attributable to the individual firms' efforts rather than CTC's direct introductions. CTC's shift to dot-com companies in recent years only further highlights CTC's need to find ways to satiate the start-ups thirst for venture capital.

Over 80% of the graduate and resident firms rated their overall experience in CTC as either very satisfactory or somewhat satisfactory, while only one reported dissatisfaction with CTC. 30% of the graduates reported their start-up would have been delayed without the assistance of CTC and 30% of resident firms noted their businesses would have grown but at a slower rate. In the dissatisfaction case, the firm manager believed that the inability to add staff at CTC's facility given the incubator's full occupancy coupled with challenges to attract people to work in Oakland hindered the firm's growth.

JOB CREATION

⁵⁰ Bygrave, William and Jeffrey Timmons, *Venture Capital at the Crossroads*, Boston: Harvard School Business Press, p. 4

⁵¹ Eze, Ike, Founder of Q-Space, CTC Brown Bag Lunch 3/22/00

⁵² Interview with Joe Gross, March 21, 2000

Benchmarks and baseline data for assessing CTC's impact on the community include the number of jobs created by CTC. The twelve graduates of CTC for which data was available have helped create 421 jobs.⁵³ Current residents generate an additional 111 jobs. Gross notes that over 60% of the founders or managers of the start-ups are minorities and this reflects the diversity of Oakland's population.

The majority of the firms had one to two employees when they moved into CTC. The level of job expansion within CTC varies, depending on CTC's occupancy rate and space availability. However, after graduation, the employment base of the firms can expand exponentially. Xpede, for example, expanded the number of jobs by 100% over a five-month period. Table 1 shows the current status of CTC firms and the number of jobs generated by CTC graduates and resident firms.

Table 1: Summary of the Current Status of Incubator Firms and Job Creation

Firm Status	Number of Firms	Number of Jobs Created	Number of Jobs Retained	Oakland Resident Jobs
Current Tenant	24 ⁵⁴	111	111	20
Merged/Bought out ⁵⁵	2	N/A	N/A	N/A
Graduated, Still Operating ⁵⁶	12	421	245	58
Discontinued/failed ⁵⁷	13 ⁵⁸	N/A	N/A	N/A
TOTAL⁵⁹	51	532	356	78

As of March 2000, CTC assisted a total of 51 start-up firms. Of this, 25% of CTC's firms ceased operations.⁶⁰ CTC's graduate and tenant firms helped generate a total of 532 new jobs.

⁵³ These are total figures taken from interviews and surveys from January 2000 to May 2000

⁵⁴ As of March 2000

⁵⁵ Refers to firms that merged or were bought out while they were in the incubator and those which had already graduated.

⁵⁶ Zimba, a current CTC tenant has plans to graduate at any time and therefore it is counted as a "graduated firms."

⁵⁷ Refers to firms which discontinued while they were still in CTC

⁵⁸ Failure rate may be inflated or may reflect issues external to CTC

⁵⁹ Totals reflect those firms for which information was available.

This figure may underestimate the number of jobs created as it does not take into account economic multipliers. In NBIA's 1997 study on the impact of incubator investments, NBIA assigns as economic multiplier of 1.5 in its calculation of total jobs created by incubators; in other words, for every one job created directly by the incubator, another half a job is created in the local community. Even without the economic multiplier, the number of jobs created by CTC firms remains significant. However, less than 15% or 78 of the total jobs created were accrued to Oakland residents.⁶¹ Additionally, with the relocation of graduate firms outside Oakland, approximately 33% of the total jobs left Oakland.

COST BENEFIT ANALYSIS

The bottom line of economic development impacts can be determined by examining the cost-effectiveness of job creation through the business incubator. Table 2 shows the costs per firm and per job.

Number of Operating Firms	Subsidy Cost Per Operating Firm	Subsidy Cost Per Retained Firm	Subsidy Cost Per Job	Subsidy Cost Per Oakland Job
51	\$22,263	\$60,428	\$1,590	\$10,846

Nearly \$850,000⁶² in investments in CTC were made between July 1996 and April 2000.

Dividing the total number of firms by total investments yields a cost-per-firm value of approximately \$22,000 per firm. The cost-per-job value is approximately \$1,590.⁶³ While this

⁶⁰ The failure of these firms cannot be attributable entirely to CTC as Smilor notes in his analysis of incubators, "Many firms will fail despite the best efforts of incubators. An incubator cannot completely overcome poor management or undercapitalization."

⁶¹ This figures excludes one graduate firms which got acquired and could not be contacted. The analysis also focuses on gross impact as opposed to net impact.

⁶² Calculation based on data extracted from City Council Agenda Reports, February 1999 and June 1999; total investments was \$846,000

⁶³ This figure uses the most recent number of jobs which were available as reported by firms between January and May 2000, and does account for the change in jobs over the three and half year period.

figure is higher than NBIA's public subsidy cost per job of \$1,109⁶⁴, it compares very favorably to the \$3500 to \$7000 cited in Campbell's 1988 study of business incubators.⁶⁵ Unfortunately, this number is shadowed by the limited impact of CTC firms to generate jobs that accrue to Oakland residents. Dividing the total investments by the number of jobs filled by Oakland residents yields a cost of approximately \$10,846 per job. Such numbers are considerably high, but before the full benefits can be assessed, Smilor cautions that a more accurate evaluation of incubator impact would require the incubator to have been in operation for a five year period. Moreover, Campbell writes in the following:

The complicated mix of acquisition and operational costs, the difficulty of distributing these costs over time and the volatile growth of small businesses make precise job per dollars figures impossible... While these figures reflect dollars invested in business incubator projects, it should be noted that they shadow both the economic and other benefits that a business incubator may bring to a community⁶⁶.

Of the current tenants in CTC which have helped create 111 jobs, only 20% or 22 jobs went to Oakland residents; of the graduates which stayed in Oakland, only 18% or 58 of the positions were filled by Oakland residents; and finally, of those graduates which relocated outside Oakland, only 8% of the employees or 13 are Oakland residents. The fact that even among firms which remained in Oakland, the number of Oakland employees are relatively insignificant suggest there are other issues involved.

Part of the issue is that firms within the San Francisco and South Bay Area can draw from a regional workforce. It is likely that Oakland residents are commuting to employment centers in other cities. However, proximity to the place of work is becoming increasingly

⁶⁴ NBIA's jobs creation figures takes into account a multiplier of 1.5, whereas no multipliers are used in CTC's case.

⁶⁵ Campbell, Candace. *Change Agents in the New Economy: Business Incubators and Economic Development*, University of Minnesota: Cooperative Community Development Program, 1988. p. 60

⁶⁶ Campbell, Candace. *Change Agents in the New Economy: Business Incubators and Economic Development*, University of Minnesota: Cooperative Community Development Program, 1988. p. 27

important as traffic congestion increases the cost of commute for these residents who commute. A second larger factor is inextricably linked to the high percentage of Oakland residents who are unskilled and uneducated and therefore ill-equipped to meet the demands of the high tech labor market. An estimated 26% of Oakland's population of 18 years and older do not have high school diplomas and only 33% of those 25 years and older have a college or associate degree.⁶⁷ These factors contribute to the fact that the majority of the jobs are not accruing to Oakland residents and hence the City is unable to capture the full benefits from its investments in CTC. This cannot be viewed as a symptom of the incubator program, alone but rather, it is related to the perceived and actual lack of an educated, skilled workforce, and strong infrastructure in Oakland.

Jobs in Demand

CTC helped create quality, well-paying jobs. Web-development, computer programming, and sales and marketing are the jobs in highest demand according to the start-ups. Several employers noted the challenges in recruiting workers who are both technology savvy with sales skills. Fueled by a strong economy and the large capital investments targeting high tech companies, there is a shortage of high tech workers in the East Bay as well as Silicon Valley. Given this labor shortage, the jobs provided by both well-established high tech corporations and start-ups command high wages. The salaries for the residents and graduates of CTC vary from \$30,000 to over \$100,000 depending on the job description and position. In addition to wages, the majority of the workers receive medical benefits and profit sharing in the form of stock options. Stock options is perhaps one of the most attractive elements of working with a start-up as one worker notes in the following:

⁶⁷ U.S. Census, 1990

The potential return of owning stock options in the firm coupled with the ability to learn in a challenging, small business setting which gives you a great deal of responsibility and allows you to be creative with your projects were what attracted me to work for a start-up in the first place.⁶⁸

The majority of the jobs require high skilled workers and over 90% of the firm's employees have four year bachelor's degree or higher levels of education.

IMPACT ON COMMUNITY IMAGE

CTC has also produced investment paybacks which are less quantifiable, nonetheless significant. This includes an improved City image and the creation of synergistic relationships among firms. In the survey with CTC graduates and residents, several firms revealed that their image of Oakland has improved as a result of doing business in Oakland. Moreover, community stakeholders representing the Chamber of Commerce, Oakland Advisors, City Council, and the City's Community Economic Development Agency as well as Oakland building owners spoke positively about CTC. Catherine Roth, President of Oakland Advisors, remarked that CTC has helped add a "spark" and some optimism to the business environment in Oakland. Summarizing her awareness of CTC's positive effects on the Oakland's ability to attract new businesses, she states:

Today Oakland may be able to reach out to high tech companies, but not in 1996. So to the extent that CTC has and continues to encourage business development, it's been very effective. Secondary effects are the general improvements in the business atmosphere knowing this type of facility is available and the atmosphere is definitely more business friendly. So it [CTC] has enhanced the business climate and the image⁶⁹.

Echoing Roth's remarks, Councilman Ignacio de la Fuente testifies to the positive perceived impacts of CTC:

The press has been very positive in this respect (to increase the profile of CTC). The cluster provides tools to be used by entrepreneurs to build a synergy of communications businesses; this can be seen as a benefit to the community in

⁶⁸ Interview with an employee of GetRelevant, a CTC graduate firm

⁶⁹ Interview with Catherine Roth, Oakland Advisors, March 14, 2000

Oakland. It presents an economic development opportunity... We would not hesitate to do it again.⁷⁰

There is a consensus among community stakeholders that CTC has helped improve the City's image not only among the CTC firms and graduates but the overall business community. Oakland has become a more attractive place to do business for high tech companies. The precipitous climb in real estate values and increased business investments is evidence of Oakland's business growth, McPherson notes that Oakland is beginning to experience some prosperity:

It used to be the perception that Oakland is "stagnant". Now Oakland can become the "mecca" for the future; the CTC helped bring recognition to the City and change the image of the City for the better. In the long run, this will help erase the negative publicity and image of Oakland. The City hit a homerun [CTC].⁷¹

Such "softer" effects of CTC like perceptions of an improved city image, while not quantifiable are nonetheless important impacts of incubators on local communities. A second real but less tangible impact of CTC has been the development of synergistic relationships between start-ups in the incubator. In essence, the incubator functions to provide additional opportunities for networking among incubator tenants as they confront the challenges facing them during the initial business development phase. Describing the business incubator setting, Smilor writes:

The entrepreneur is associated with other entrepreneurs who are facing similar difficulties, providing an association that should help solve problems and stimulate the entrepreneur's drive for success...⁷²

In fact, Joe Boedekker, Executive Director of The Enterprise Network (TEN), comments that the single fatal act for a start-up occurs when the entrepreneur "gives up". The ability to

⁷⁰ Interview with Councilman Ignacio De La Fuente, March 16, 2000

⁷¹ Interview with Michael McPherson, March 15, 2000

share war-stories with other entrepreneurs in the incubator encourages information sharing and relationship-building. Therefore there is a “psychological” advantage or “synergy” among firms in an incubator setting like CTC. Approximately 30% of all CTC graduates and current tenants believe CTC has helped foster relationships with other firms. Commenting on their decision to locate in CTC, Jim Pearson of Network by Design says “ we would’ve been in the office on the twelfth floor with a view of the lake all on our lonesome, without an mutual support network, without any contacts, hoping for a break.”⁷³

BUSINESS RETENTION OUTCOME

The final area of CTC's impact concerns the retention rates of CTC graduates. Business retention helps better capture the long term economic development impact of business incubators because the retention of businesses can lead to an expansion of the city's revenue base, as workers and firms expend money and cycle capital within the City. Over a three and a half year time period (June 1996- April 2000), CTC helped a total of 51 firms and 14 graduate which are still operating⁷⁴. 13 firms ceased operations for varying reasons. In terms of the retention rates, 50%⁷⁵ of the graduate firms in the study have remained in Oakland while 50% have relocated outside the City.

Relatively low rents, Oakland’s central location, and loyalty to the City influenced firm's decisions to remain in Oakland. The inability to recruit a skilled labor force and the lack of amenities, however, were the primary reasons cited for leaving Oakland. Location outside Oakland can also be attributable to the firm’s proximity to its workforce or venture capitalists as well as to other cluster high tech areas outside Oakland. One graduate firm in the semiconductor

⁷² Smilor, Raymond, and Michael D. Gill Jr, *The New Business Incubator: Linking Talent Technology, Capital, and Know-How*. Lexington: DC Heath and Company, 1986, p. 20

⁷³ Platoni, Kara, “Oakland is Wired”, *Express*, February 12, 1999, Volume n21, No. 19, p. 11

⁷⁴ This figure includes firms which graduated and are still in operation and those that merged or were acquired.

⁷⁵ There are a total of 14 graduate firms, 13 for which information was available.

industry noted, "the company needs to interface with different customers and vendors, it makes a big difference if we can just shoot 20 minutes away to bring a circuit board to our clients;" while a second stated, "the move to San Francisco has greatly enhanced our ability to recruit high qualified talent."

BUSINESS RETENTION FACTORS

Other issues related to business retention but external to CTC include Oakland's scarcity of downtown Class A office space, lack of an industry targeted workforce development strategy, and lack of a "soft infrastructure." Blakely defines "soft infrastructure" to include education and research systems, and business and environmental supports.⁷⁶ Innovative new ideas and entrepreneurs originate from educational institutions like universities and colleges. High tech firms focus on the availability of a talented workforce, and this workforce will choose to reside and work near places where there are attractive amenities, including cultural, commercial, and educational facilities⁷⁷. Oakland therefore needs to develop this soft infrastructure in order to attract high skilled workers in order to attract and retain high tech firms if skilled labor in Oakland cannot be found.

A study by the Initiative for a Competitive Inner City (ICIC) projects the high tech sector can generate an estimated 2,500 to 5,500 indirect jobs for unemployed inner city residents in the Oakland area.⁷⁸ Furthermore, "each high tech job is estimated to have a multiplier effect of three additional jobs, stemming from indirect spending by the company and by the employees on goods and services."⁷⁹ The ICIC report notes that Oakland given its relatively low real estate rents, transportation infrastructure, proximity to universities, and proximity to Silicon Valley,

⁷⁶ Blakely, Edward J., *Planning Local Economic Development*. Thousand Oaks: Sage Publications, 1994. p. 302

⁷⁷ *ibid*, 306

⁷⁸ ICIC & Boston Consulting Group, *Business Opportunities in Inner City Oakland*, 1998

⁷⁹ *ibid*, p. 15

Oakland is well positioned to "attract smaller firms seeking low-cost office space within proximity to downtown services like copying and printing and restaurants."⁸⁰ However, the report fails to underscore the lack of cluster activities and vibrancy in downtown inner cities like Oakland, when the sidewalks roll up at 5 p.m. It is for these reasons that small start-ups including CTC graduates have chosen to expand their businesses outside Oakland.

CONFRONTING OAKLAND'S LABOR FORCE DILEMMA

The majority of the firms' employees have a college degree or higher level of education. Moreover, they require a workforce with technical skills including computer software programming and electrical engineering. Unfortunately, the majority of the firms perceive Oakland as lacking a qualified talent pool to hire from. One firm which located outside Oakland remarks:

While we were in CTC in Oakland, we had such a difficult time attracting workers, but since moving out of Oakland [to San Francisco], the ability to attract employees has been simplified.⁸¹

The ability to identify individuals with a higher education degree and/or technical skills is one key challenge the City must address in order to meet the hiring needs of high tech firms. Given that Oakland public high schools have a ranking of two, or one of the lowest academic achievement levels in the state of California, this also raises the question of whether Oakland's public education system can adequately prepare students for future jobs in the high technology labor economy.

Positions where college degrees are not a requirement include those in web development and network administration as identified by CTC start-ups and high tech firms. This requires an

⁸⁰ ICIC & Boston Consulting Group, *Business Opportunities in Inner City Oakland*, 1998 p.15

examination of the City' existing job training programs to determine if they can teach these skills. A 1997 study of Oakland's job training programs, commissioned by Councilmember Jane Brunner, found over a hundred training programs in operation in Oakland, yet, none of the programs target the high tech sector. Instead the vast majority are focused on providing very basic skills to serve the less educated, disadvantaged population of Oakland. While this is undoubtedly an important issue and some of the federal Community Development Block Grants (CDBG) funds are targeted specifically at this population, with the exception of private training institutions, like Heald College, and the public Peralta Community Colleges, no public or public-private partnership programs exist to prepare Oakland residents for jobs in the high-tech sector which are in high demand.

The most logical connection for workforce development targeted at the high tech sector would appear to be the Oakland Higher Education Learning Center. Developed as a second tier of the Rotunda Technology Interchange in 1995 and it is today a part of OITD, like CTC, the Center sought to support the development of knowledge-based industries. According to Lillian Yeh, a former employee of the CEDA's Redevelopment Division, the Higher Ed Center was conceived as a training center for the technology, software programming, telecommunications, and business sectors. In addition, the City originally targeted the site to house Pacific Bell's Teleconferencing Center. This Center would provide a central location to bring together high schools, higher education institutions, high tech firms, and community organizations in Oakland to showcase innovative new technologies.

For various political reasons including the change in leadership and the lack of a unifying vision for the Center, some of the original goals were never realized. The courses presently offered at the center are not technology-based classes, but rather courses which individual

consortium member schools view as in demand by their students. Cal State Hayward, for example, use the Center's facility to offer short-term courses and workshops ranging from non-profit management, strategic marketing, business writing, to human resources management, to math and weekend yoga. The Center's eight member university/colleges pay an annual membership fee of \$1000 in addition to a monthly rental fee for the use of the Center's classroom space located in a Class A office building in the heart of Downtown Oakland.⁸²

As of March 2000, the Center had served 2500 students through its evening and weekend classes in a broad range of subjects. Approximately 30% of the enrollees in the courses were Oakland residents but the number of Oakland workers could not be determined. Because the Center's existing organizational structure is set up to meet the individual needs of the Consortium member schools rather than the overarching economic goals for Oakland, no sector focused training exists. This precludes the Center from becoming a job training resource to produce skilled workers that can feed into CTC firms or other technology/telecommunications businesses in Oakland.

Through the Center, the City sought a complementary strategy for the development of local and regional knowledge-based industries; but the existing program today may be too fragmented. A clear linkage between CTC and the Higher Education Learning Center does not exist. Former program manager, Cornelia Slyvester, did however, express strong interest in working more closely with CTC, and developing a center with computer rooms conducive for training in a few targeted high tech sectors. But the Center, like CTC is also a "lean" operation

⁸² Consortium members of the Center include California State University Hayward, Holy Names College, Patten College, Peralta Community College District, Samuel Merritt College, Saint Mary's College of California, UC Berkeley Extension, and University of San Francisco.

and lacks the necessary resources to develop itself into a full-fledged high-tech job training center.⁸³

THE REAL ESTATE CHALLENGE

In addition to the Oakland's workforce crisis, Oakland is confronting a real estate challenge. "Quality infrastructure is the stimulus for business location and formation,"⁸⁴ writes Blakely and Small. For the high tech business and in particular, internet start-ups, the "quality" infrastructure includes fast internet and T-1 lines. But there is a scarcity of office space in Oakland's downtown Central Business District. During third quarter 1999, the overall downtown office vacancy rate was 8%, with average annual rents of \$27.48.⁸⁵ Building owner and real estate broker, Larry Westland, reports that whereas the Class A office vacancy is normally 10-14%, the first quarter of 2000 has witnessed an all time low of 3% with Class B vacancy rate hovering at 6%. According to Westland, the price of real estate has risen precipitously within the last six months, and office space which on average is \$4 has reached \$6 per square foot. This net absorption of the downtown office space is partially the result of a strong economy and the growth of dot-com companies in the Bay Area.⁸⁶ Central Building owner, Neal Smither, testifies to this growth; noting that his building currently has a long waiting list of dot-com companies seeking to move to Oakland from San Francisco, where the exorbitant high rents have driven them across the bridge. The average annual rent for Class A office space in San Francisco is nearly double that in Oakland at \$48.26 and \$27.36, respectively.⁸⁷

⁸³ This is based on the author's understanding of the Center and its operations as of March 2000.

⁸⁴ Blakely, Edward and Leslie Small. "Michael Porter: New Gilder of Ghettoshe. Inner City, *The Inner City, Urban Poverty and Economic Development in the Next Century*. Ed. Thomas Boston and Catherine L. Ross. New Brunswick: Transaction Publishers, 1999 p. 176

⁸⁵ Oakland Metro Market Overview, Third Quarter 1999, Prentiss Properties; p. 4

⁸⁶ *ibid*, p.1

⁸⁷ Northern CA Commercial Real Estate, Market Outlook 2000, CB Richard Ellis, 1999. p. 6

The inability to identify "quality space" due to the scarcity of Class A office space in the downtown poses challenges for CTC graduates during their initial search for new office space. Therefore one challenge for providing high tech space is the limited availability of office space with the appropriate infrastructure for internet firms. While large developers including Shorenstein and Westmark have proposed to add four new office towers totaling 2.2 million sq. feet of office space to the real estate marketplace in Downtown Oakland, the development process for a new class A building requires on average three years. Such investments by reputable developers like Shorenstein buffered by a strong economy, are promising signs that more private investments in the downtown will likely follow.

High Initial Real Estate Investment Costs

Upgrading of the Class B and Class C properties can bring an additional stock of office space to the real estate market. However, some property owners are reluctant to upgrade their existing Class B and Class C buildings given the high initial investment costs. For example, it costs Smither \$20,000 per floor to lay the CAT 5 wire cables for telecom access; while these renovations and additions are eventually factored into the rents charged to tenants, the initial capital investments are high. In the long run such investments can however, be lucrative because a "smart" building like the Central Building is now valued four times its price three years ago. In fact, the upgrades have enabled Smither to increase rents by 200% over a three year time period. Moreover, Smither's tenant mix has changed considerably and he expects his building to house all high tech firms in the near future.

The final challenge confronting the start-up's ability to secure office space in Oakland rests on their perceptions that "real estate brokers in Oakland just don't get it," because brokers do not understand the needs of the high-tech start-up. These needs include access to the right

type of space and the ability to negotiate flexible shorter term leases for start-up firms. But the commission structure for brokers is not set up to accommodate these needs, and instead the broker's commission is heavily tied to the longevity of the lease. Therefore, there are few incentives for the broker to negotiate flexible, shorter lease terms with small firms like CTC's graduate start-ups.

LACK OF A "SOFT INFRASTRUCTURE"

The issue of business retention is related both to the downtown's hard and soft infrastructure. Blakely defines the soft infrastructure as being formed by the "information systems, education and research, and business and environmental supports." It is this soft infrastructure reflecting the lifestyle choices of the worker which attracts workers to live and work in one locality or another.⁸⁸ The presence of such soft infrastructure will typically attract a highly educated population, and therefore other firms will follow and cluster in one area, whereas communities lacking the soft infrastructure are at a disadvantage.

According to one internet-based start-up housed in the Berkeley Haas Incubator, the lack of amenities in Oakland influenced his decision to choose an incubator in Berkeley over CTC, commenting, "It's somewhat oppressive to be out there [streets of Oakland], especially at night...There's nothing going on, there is no vibe. It's like the whole life of that area got sucked out when the sun went down."⁸⁹ Moreover, the streets of Oakland were deemed unsafe at night by several CTC graduate and resident firm employees. The lack of security coupled with lack of parking nearby the CTC building creates a serious problem for employees who typically work late and several firms reported cases of vandalism and broken car windows. Therefore greater security along with a higher level of activity to generate more pedestrian traffic is necessary to

⁸⁸ Blakely, Edward J., *Planning Local Economic Development*. Thousand Oaks: Sage Publications, 1994. p. 306

⁸⁹ Platoni, Kara, Oakland is Wired, *Express*, February 12, 1999, Volume n21, No. 19

create a sense of security and vibrancy in the downtown. Finally, Blakely writes that "soft infrastructure" is particularly important for high tech firms looking for opportunities to network and cross-fertilize their ideas:

In order to facilitate the development process [of high tech business which requires regular feedback to research and development and marketing] a community has to provide "places to meet." These places range from convention centers to restaurants and theater areas—"soft infrastructure."⁹⁰

Unfortunately, these amenities including meeting places like 24-hour cafes are not available in Oakland. Such challenges including the soft infrastructure need to be addressed by the City as a whole.

KEY FINDINGS FROM CTC CLIENT SURVEY & INTERVIEWS

Through its provision of real estate and business services and networking opportunities, CTC promotes entrepreneurship among communications-related/internet firms. The success of these start-ups in turn generate benefits to the community in the form of new growth businesses, jobs, improved City image, and other ancillary benefits. In examining the impact of CTC on high tech start-ups and the Oakland community, several findings emerge on how well CTC is addressing the needs of start-up firms and the City's economic development objectives:

- CTC directly helped attract high tech start-ups to the City which otherwise would not have considered launching their businesses in Oakland;
- CTC helped create a substantial number of quality, well-paying jobs; however, only a small percentage of these jobs are benefiting Oakland residents;
- At the community level, CTC positively affected the image of Oakland as a business friendly location for communications and internet firms;
- Feedback from the firms indicate that CTC's service quality has been mediocre and this warrants improvement in several areas of its business service/assistance, including access to an entrepreneurial network and venture capital linkages;

⁹⁰ Blakely, Edward J., *Planning Local Economic Development*. Thousand Oaks: Sage Publications, 1994. p. 301

- The ability of CTC to retain a high percentage of its graduates has been limited. The 50% retention rate may be attributable in part to the firms' experiences at CTC, but it is more linked to a larger set of economic development challenges confronting Oakland. This includes a lack of access to the right type of real estate space and/or the limited availability of office space in the downtown, Oakland's skills deficit, and the lack of a "soft infrastructure" base.

These findings, indicate the strengths and weaknesses of CTC. From this analysis, there are essentially two levels of mismatch. First the top priorities of firms which include access to venture capital is not being met by the programs and services currently offered at CTC. CTC's lower than expected retention rate is exacerbated by several factors. Intrinsic to CTC is the lack of communication between the City and the incubator tenants when firms need new space and does not have contacts at the City.⁹¹ External to CTC is the mismatch between the skills in demand by the high tech sector and those that Oakland's existing job training programs are providing training for. To address these issues and some overarching challenges confronting CTC and the City, the next chapter lays forth "best practices" drawn from other incubators. Chapter 5 proposes final recommendations and action strategies for CTC and the City of Oakland to address the aforementioned issues.

⁹¹ This reflects the fact that firms are uncertain of the City's role and do not work directly with the City to locate new office space nor seek other business services like assistance with business tax filing which has been a cumbersome process for several firms setting up their businesses. With the City's hiring of a new Cluster Manager to work with CTC and better address the start-ups' needs, this can improve the firms' perceptions of the City's role.

CHAPTER 4: INCUBATOR BEST PRACTICES

Addressing some of the challenges confronting CTC requires an examination of best practices from other incubator models. Each of the incubators surveyed was established within a different economic context under a different set of priorities, and as such there are features which make each one unique and distinct. The for-profit incubators, given its priorities and goals may have a higher level of services which sets them apart from the non-profits. The constant, however, is that the needs of the high-tech (internet) start-ups and their ingredients for success typically do not change regardless of which incubator they choose to join. These success factors include access to venture capital financing, developing the proper set of services including access to the appropriate vendors as potential partners, and developing proper exit resources.

FOR-PROFIT INCUBATORS

Incubators which integrate a comprehensive set of services to address the multi-faceted needs of the high-tech start-up are undoubtedly the most successful. This however, requires an abundant infusion of capital and human resources in the incubator. Realistically, only private incubators like idealab! possess such resources. Focused on e-tailing firms, idealab! provides capital, office space, and management assistance. Idealab! has been touted as a highly successful incubator to jump-start new internet firms. According to Smilor, this notion of incubator success is established in the following way:

Essentially by inference (who is associated with the incubator), by reference (what others say about the incubator and its tenants), and ultimately by evidence (what the incubator actually produces). If the incubator can be perceived as successful, then it can attract resources more easily, get stronger start-up ventures to seek admission, and help tenant companies build credibility.⁹²

⁹² Tornatzky, Louis G., Yolanda Batts, Nancy E. McCrea, Marsha S. Lewis, and Louisa M. Quittman, *The Art and Craft of Technology Business Incubation*, Athens: Southern Technology Council and the National Business Incubation Association, 1996

As of May 2000, five of idealab!'s incubated firms are public. Such successes have helped idealab! secure one billion dollars in equity financing to invest in other internet start-ups.

Incubators which focus on providing an intensive level of services to link talent, technology, know-how, and capital include Camp Six and Cambridge Incubator. At the centerpiece of their model is the promise of an experienced management team for the start-up. For example, CampSix and Cambridge Incubators help fill management positions lacking in the start-ups management team, this runs the gamut from expertise in business development, engineering (IT technology), marketing, advertising, finance, and human resources, to legal counsel. In addition, they may provide the first seed round of funding for the firms. In return, the incubator takes a 20-50% equity share in the start-ups⁹³. Because CampSix and Cambridge Incubator are relatively new incubators established at the end of 1999 and beginning of 2000, respectively, it is too early to evaluate their level of success. An assessment of these incubators to determine whether their models are truly revolutionary or if it is a passing fad will require some time after the incubator has been in operation.⁹⁴

UNIVERSITY-AFFILIATED INCUBATOR

Highly touted as a successful incubator model by NBIA, the Austin Technology Incubator is a university affiliated incubator with over a ten year history. University affiliation helps the incubator access real estate space, funding, and human resources available from the university. For example, the incubator has created numerous opportunities for students to gain "hands on" work experience. In addition to internships, a team of MBA students from the University of Austin provide the initial screening for firms' admittance into ATI which receives

⁹³ Idealab! takes a 50-70% equity stake in its invested start-ups.

⁹⁴ Smilor, Raymond, and Michael D. Gill Jr, *The New Business Incubator: Linking Talent Technology, Capital, and Know-How*. Lexington: DC Heath and Company, 1986. p.127

on average 15 applicants per month. The incubator brokers needed services for its incubatees through its "Know-how network" which provides networking, financing, human resources development, business strategy and marketing. More importantly, ATI has developed a successful track record and this lends credibility to the start-up. A panel of industry experts and advisory members also meet regularly to assess the incubatees' business strategies.

Initially established to bring technology to Austin, ATI has produced measurable effects by graduating 56 firm, five of which have gone public, housing 15 tenants, and creating over 2000 jobs, a majority which remain in the local community. Given the growth of the high tech industry in this region, and the attractiveness of the location with the presence of a renown university and an educated labor force, it is not surprising that the majority of graduates seek to remain in the host community.⁹⁵

A smaller scale university incubator is the Haas Business Incubator located in Berkeley, California. Operated out of the basement of the Bancroft Hotel and located across the street from the business school, the real estate space is provided free of charge to graduate entrepreneurs of UC Berkeley's Haas Business School. John Freeman, CEO of the Berkeley Business Incubator comments:

Our incubator primarily has an educational purpose; its day-to-day operations are run as a student club... the idea is to provide office space near campus where students can turn study projects into businesses without using state-owned equipment.⁹⁶

Indeed, the firm has provided students, including, Christopher Yoo, Content Management and Operations Director of Bioprotocol, an opportunity to turn his science research into a business. Like other university-affiliated incubators, start-ups in the Haas Incubator can

⁹⁵ Interview with a Communications Intern at ATI, May 12, 2000

⁹⁶ <http://www.haas.berkeley.edu:80/calbusiness/f97/articles/f97.11.html>

take advantage of resources at the University including business seminars, access to interns and potential employees, and work closely with University research faculty interested in commercializing new technologies. Through Freeman and the advisory board members, firms including BioProtocol have received informal introductions to venture capitalists and direct connections to Silicon Valley's top law firm, Wilson, Sonsini, Goodrich & Rosati. An alumnus of UC Berkeley, Mario Rosati maintains close ties to the Haas community and is eager to provide firms with legal counsel in the Haas incubator.

Incubators with a university affiliations therefore provide real advantages for the high-tech start-up by providing low-cost or free real-estate, and access to a wide network of professionals and industry experts who are researching cutting edge technology. In turn the university community benefits from the work opportunities the incubator offers to both students and faculty.

NON-PROFIT INCUBATORS

The most comparable incubator to CTC is the Software Business Cluster (SBC), which CTC was initially modeled after. SBC and CTC share similar characteristics in that they have a technology-focused cluster model, and operate as public/non-profit entities charged with the goal of creating and retaining new start-ups which spin-off new jobs for its host city. SBC differentiates itself from CTC with its additional human and physical resources, including five full-time staff members and a large, attractive 34,000 square foot office located in a vibrant area of downtown San Jose. SBC houses approximately 20 firms and permits start-ups to expand up to 25 employees each. Initially focused on software firms, SBC tenants are now 100% internet-based firms. SBC has successfully bred 50 software and internet companies and retained 70% of the firms in the local community. Over a five year time span, SBC graduates and tenants have helped generate over 1000 jobs.

Between 1997 and 2000, SBC firms received venture capital investments in excess of \$300 million. Three graduates have gone public, with three more expected to issue initial public offerings (IPOs) in 2000. According to Robbins, 85% of the Software Cluster companies receive access to venture capital funding during their residence in the cluster, with one-third of the companies receiving funding through direct SBC referrals. The incubator's success is achieved in part through the Executive Associates Program which consists of 15 industry experts who are ex-CEOs and managers of high tech firms. An advisory board of industry experts also volunteer their time to mentor the resident firms. Approximately two years ago, SBC formally linked up with San Jose State University and SBC presently falls under the auspices of the university. Through this linkage with the university community, SBC can access additional resources, including business school interns and faculty members researching cutting edge technologies.

Of the incubators interviewed, perhaps the most innovative non-profit incubator is The Enterprise Network (TEN). Recognizing the resource constraints and the formidable task of providing tailored consultation and services to address the diverse needs of over two dozen companies during their different stages of development, TEN has established strong networks and put in place a process or programmed "events" which can benefit all resident firms. This process includes a strong advisor pool comprised of over 350 experienced Silicon Valley executives representing the venture capital and angel investor communities, government agencies, law firms, and financial institutions who volunteer to advise and/or mentor the start-ups.

Boedekker notes that for every one dollar expended on services, another \$2 worth of services comes from volunteer industry experts. TEN selects advisors customized to the start-

up's needs and the advisors provide important advice and contacts for the firms. Entrepreneurs with complementary technologies are typically matched up. TEN also has an Academic Bridge Program which provides linkages to the university and intern community.

Despite the fact that TEN has received positive feedback regarding its services from the start-ups, access to capital remains an imperative for the resident firms. TEN provides firms maximum exposure to the venture capital community through "events". To prepare entrepreneurs for these events, TEN draws upon the Harvard Business Panel, comprised of MBA alumni who critique the business plans and presentations of the start-ups during the monthly "Springboard Breakfasts." This coupled with the firms' affiliation with an incubator enhances the probability the firms will receive funding from venture capitalists. In fact, venture capitalists and angel investors are more apt to respond to business plans from the incubator firms because they have been pre-screened by an Advisory Board comprised of renown Silicon Valley venture capital groups including the Band of Angels, Woodside Fund, and Crosspoint Venture Partners. Compounded by the incubator's location in Silicon Valley, where 35% of the all venture capital in the U.S. is invested, TEN has competitive advantages over other incubators.⁹⁷

Because TEN has been able to draw from the resources provided by the federal government to subsidize the incubator's operation, it has the flexibility to charge tenants half the market rents in San Jose. The 30-35 firms in TEN generate between 200-250 jobs.⁹⁸ According to Boedekker, the start-ups who enter typically have one to two employees, and by the time they graduate, they have 10-25 employees. Once graduated, they can expand their employment base ten fold or more. Two graduates have gone public. In sum, TEN's success has been a function

⁹⁷ Interview with Joe Boedekker January 20, 2000

⁹⁸ Interview with Joe Boedekker, January 20, 2000

of both its network origins and the incubator director's foresight and flexibility to experiment with different program designs which link technology with talent, capital, and know-how.

Table 3 summarizes the characteristics of the incubators and their outcome measures.

Table 3: Select List of Incubators and Their Characteristics

	Type	Date Est.	Services/ Strengths	Tenants	Jobs Created
CTC	Non-profit	1996	Physical amenities, Resource sharing	12 graduates, 26 tenants	349
TEN	Non-profit	1996 ⁹⁹	Mentoring & Advising, Networking	20-25 tenants	200-250 ¹⁰⁰
San Jose Software Cluster	Non-profit	1995	Network of volunteers, interns, Introductions to business resources and the capital investment	24 tenants	1000+
Haas Incubator	University	1997	Free space, access univ. networks	6 tenants	N/A
Austin Technology Incubator	University	1989	Access to University entrepreneurial networks, physical amenities, business resources	56 graduates, 15 tenants	2000
Camp Six	Private, For-profit	Nov. 1999	Provides in-house professionals in nine disciplines to jump-start internet businesses	3 tenants ¹⁰¹	N/A
Cambridge Incubator	Private, For-Profit	Jan. 2000	Similar to Camp Six, guaranteed first seed round of funding	4 tenants ¹⁰²	N/A

The integration of the extensive set of services required by high tech start-ups enhances the success of both the incubator and the firms. The more developed and extensive the network of service professionals, advisors, and venture capitalists, the higher the probability that the specific needs of the high tech firm can be addressed. The analysis shows that physical

⁹⁹ TEN was established under Joint Venture Silicon Valley in 1993 as a networking organization and it became affiliated with the NASA/Ames Technology Commercialization Center (ATCC) in 1996. Although TEN notes on its website it is “not an incubator” given the definition of business incubators, TEN falls into this category and therefore is included in the study.

¹⁰⁰ Number refers to jobs generated by incubator tenants.

¹⁰¹ Figures are as of April 2000.

¹⁰² Reflects figures as of April 2000

amenities including real estate and shared equipment alone are insufficient success factors. Therefore, incubators like CTC which have developed the proper physical infrastructure must advance to the next level and explore new networks and partnership opportunities. It is important to note however, that if the start-ups are poorly managed or undercapitalized many will fail despite the best efforts of incubators.¹⁰³ The success of the incubator is thus dependent on the caliber or quality of firms the incubator admits into the program.

Consistently evaluating and finding ways to enhance the start-ups' experience in the incubator should be an important goal for the incubator director and the City. A high level of satisfaction with the incubator can engender firm loyalty to the incubator and the host City, and this ultimately can influence the firms' location decisions. This is particularly relevant for publicly funded incubators which have as an admittance criteria a clause that the start-up will make a "good faith" effort to stay in the community it was nurtured. Moreover, a positive experience in the incubator will encourage entrepreneurs and firms to "give back" to the incubator and the host community. For example, as a gesture of appreciation, CTC graduates like Cloud Source has voluntarily offered CTC 10,000 shares of stock options in the event the firm goes public. In addition, Xpede has agreed to explore job training issues with Oakland's community college. Tucker Technology is working with the Private Industry Council to identify qualified technicians for the firm, giving a preference to Oakland residents.

Most incubators can be classified into three primary types, each with the same objective to help firms develop and grow. However, they differ in their bottom line objectives. For the private incubator which has both human resources and capital, can effectively bolster the growth of a start-up in hopes of generating a return on their investment and taking an equity share in the

¹⁰³ Smilor, Raymond, and Michael D. Gill Jr, *The New Business Incubator: Linking Talent Technology, Capital, and Know-How*. Lexington: DC Heath and Company, 1986

company. University-based incubators focus on the needs of the school and its students; therefore they seek to generate opportunities for faculty and students. They have the added benefit of additional resources and technology know-how. Finally, non-profit, publicly-affiliated incubators seek to create new jobs and diversify the local economy. Given the diverse set of goals of the different incubator types, each is designed slightly differently with varying levels of services. Ultimately the incubators which succeed will be able to effectively integrate talent, technology, capital, and know-how.

Having conducted an analysis of CTC and examined other incubators for best practices, the next chapter lays forth a set of recommendations for the incubator and the City of Oakland. These recommendations seek to address the needs of CTC's start-up firms as well as the overall goals of the City of Oakland to create a high-tech hub.

CHAPTER 5: IMPLICATIONS AND RECOMMENDATIONS

The purpose of this thesis is to evaluate the impact of the incubator strategy on start-up firms and the City of Oakland. Based on the analysis of CTC's impacts, several implications for those interested in pursuing business incubators as economic development strategies emerge. First, the findings indicate that CTC effectively supports enterprise development by helping start-ups surmount barriers during the early development phase before they become viable businesses. However, CTC's services can be improved and broadened to increase the success rates of firms and to enhance the firms experiences in the incubator. Second, in terms of community benefits, only a small percentage the number of jobs are going to Oakland residents; this is due to the lack of an educated and skilled labor force in Oakland. This implies that the incubator and workforce development must be integrated into an economic development strategy and work in tandem if the goal to create quality jobs for Oakland residents is to be achieved. Finally, businesses nurtured in Oakland are not being retained, and this is related to both workforce development and the City's existing hard and "soft infrastructure." Without addressing these three issues, the incubator strategy will have limited success. The following section explores each of these factor implications in detail to arrive at set of action strategies for CTC and the City of Oakland.

CTC has successfully assisted start-ups and generated benefits to the host community in the form of new jobs and an improved City image. However, these benefits in large part have not accrued to Oakland residents. Blakely defines economic development goals to include the generation of benefits for the local residents:

The goal of economic development is to diversify the local economy in an effort to provide employment options and opportunities for the existing local human resource base....aimed at increasing the potential for the local population to have

secure jobs and income, which in turn stabilizes the community both economically and socially.¹⁰⁴

If one defines economic development in accordance with Blakely's definition, then the impacts of a high-tech incubator strategy may be limited if the three factors of workforce development and job training, business services, and a hard and soft infrastructure are not first addressed.

If Oakland aspires to be a multimedia and internet hub, Oakland must upgrade its labor force to remain competitive. Several reports highlight the importance of workforce development, including a study of the multimedia industry in San Francisco's South of Market Area (SOMA) district also known as the "multimedia gulch." Gene Park writes:

It is no coincidence that multimedia firms are so heavily concentrated in SOMA, the neighborhood most populated by artists... San Francisco's greatest competitive advantage may be its pool of talented labor¹⁰⁵.

This has broader implications for economic development policies and implementation strategies. According to CTC firms, Oakland's skills deficit is a primary concern for high tech firms seeking an educated and skilled labor pool; this induced several graduate firms to relocate outside the host city. Oakland, therefore, should implement job training programs to develop and upgrade the skills of the existing labor force. This will provide a better match between jobs available in the labor market and those that can be filled by local residents. The City, therefore, needs to decide on the appropriate mix between training for basic skills and that for the high tech sector. With these objectives and underlying assumptions in mind, the following sections lay forth a set of recommendations for the City of Oakland and for the business incubator.

WORKFORCE DEVELOPMENT

¹⁰⁴ Blakely, Edward J., *Planning Local Economic Development*. Thousand Oaks: Sage Publications, 1994. p. 81

¹⁰⁵ Park, Gene, *Multimedia Industry Report*, UC Berkeley 1997, p. 6

Human resources development is often framed as a social development issue rather than an economic development issue. However, workforce development is as much an economic development issue as a social issue, as Robinson-Barnes argues in the following:

The ability of the residents of a community to cultivate skills that enable them to be productive and to secure incomes that allow them to support themselves and their families is fundamentally an economic development issue.¹⁰⁶

Framed in this way, workforce development plays a key role in achieving local economic development. The analysis of CTC reveals that a small percentage of jobs are accrued to Oakland residents. This implies that despite achieving some economic benefits for the City in the form of new jobs and tax expansion, the benefits fail to trickle down to existing residents. Therefore, unless the current population can be trained and up-skilled for some of the jobs in demand in the high tech sector, a growing digital divide could be the symptom of the City's economic development efforts. Therefore workforce development needs to be viewed as a critical piece of helping the incubator achieve its economic development goals for the city.

Programs designed to bridge the workforce gap serve not only the interests of high-tech firms but also the socio-economic needs of Oakland's current residents. Two strategies in the form of targeted adult job training programs and improved public high school education can help bridge this skills gap. Targeted programs require, first and foremost, working with high-tech businesses as well as incubator firms to identify the skill set needs of its employees. Networking and internet web site designers were identified as positions which do not require college degrees. It is estimated that local area managers, telecommunication technicians, computer support specialists, internet web site designers, and network control technicians are expected to create

¹⁰⁶ Robinson-Barnes, Carla. "Promoting Economic Development in the Inner City: The Importance of Human Resources." *The Inner City, Urban Poverty and Economic Development in the Next Century*. Ed. Thomas Boston and Catherine L. Ross. New Brunswick: Transaction Publishers, 1999

nearly 1000 jobs between 1999 and 2002 for the East Bay.¹⁰⁷ Such jobs earn median wages between \$12 and \$34.52¹⁰⁸ per hour depending on work experience. These factors provide support for a targeted workforce strategy in the web development and network administration domain. Moreover, these jobs would not only feed into CTC firms, but also into other business service sectors, including telecommunications.

The following outlines a series of possible steps for the development of an industry responsive training program for the high tech sector in Oakland. Borrowing from the biotechnology “industry-responsive” training programs in Massachusetts, the City of Oakland can embark on the following strategy to establish a high tech workforce initiative:

- 1) Identify the skills and experience needs of Oakland’s high tech firms and determine all jobs which do not require a post-secondary education;
- 2) Work with the Higher Education Learning Center and/or the Peralta community colleges to develop a curriculum which meets the needs of the communications technology industry;
- 3) Develop and continually revise the training curriculum with input from the high tech industry. “Industry involvement can take many forms, ranging from membership on an advisory board to the offering of company tours for students and/or faculty, guest lectures, interview opportunities for students, job shadowing and/or internship experiences, and in some cases, to the donation of equipment by suppliers;”¹⁰⁹
- 4) In addition to training, the program can provide more comprehensive professional development. Through partnerships with the Private Industry Council (PIC), this can include assistance with resume-building, interviewing skills development, and developing good work ethics which will better prepare the workers for jobs in the industry.

The above process requires collaboration and resource sharing between several key players including industry representatives, universities/community colleges, community based

¹⁰⁷ EDAB, East Bay Telecommunications Industry, 1999. p. 68

¹⁰⁸ Occupational Outlook, Alameda County 1998/1999. California Cooperative Occupational Information System

¹⁰⁹ Massachusetts Biotechnology Report on Training

organizations. Training and career services can be provided by and housed through the Higher Ed Learning Center which is currently subsidized by the City of Oakland.¹¹⁰

By housing the high tech cluster training in the Center, it can serve as a resource for universities, CBO job trainers, high schools, Oakland residents, and high tech firms. Currently the Higher Education Center is located in the heart of downtown in a building with a telecommunications infrastructure; to take full advantage of the Center, the City can convert the Center into a full-fledged multi-media, state of the art training center. Computer equipment can come from donations from corporations and smaller local firms, with a memorandum of understanding that these sponsor companies will have priority access to the students trained at the Center. The City in turn can channel resources towards technical assistance to ensure the smooth operation of the Center.

Members of the Center's Higher Education Consortium currently pay \$1000 annually and \$250 per month including rents for the use of the facility. By entering into a joint partnership which does not charge the universities a steep membership fee, but instead involves the City in the profit sharing of the courses offered at the Higher Education Learning Center, the Center can become financially self-sufficient over time.

In addition, CBOs can receive reduced rates for training Oakland residents. Currently network administration (NT) classes are offered at Laney Community College for \$40 to \$50 per semester. However these courses are usually oversubscribed. Heald has a greater selection of Unix, Novell, and NT networking classes which are intended to be intensive three to four month long sessions, however, the institute charges between \$4000 to \$5000 per network operating system course. Since the cost of such training at these private institutions is unaffordable for the average low-income Oakland resident, the City can charge half the tuition and develop a loan

¹¹⁰ The City subsidizes the full rents of the Center's space and the salary of one manager.

fund pool which students can draw resources from. This revolving loan fund will help sustain the Center's operation costs while maintaining the affordability of these courses for Oakland residents.

CTC graduates including, Tucker Technologies are seeking technicians, and may be particularly interested in playing an active role in such job training programs. Laney College has already approached another CTC graduate, Xpede, about a developing a partnership to provide training. In addition, Don Vial, Chairman of the California Foundation on the Environment and the Economy (CIFFE) is currently working to develop a collaborative community-based program to provide technology- and information technology-focused training to Oakland residents.

By coordinating these job training programs through the Higher Ed Learning Center, the Center can achieve its original objectives of supporting knowledge-based high tech firms while helping to expand economic opportunities for Oakland's less educated residents. The Center needs leadership to re-articulate its original vision and support to implement a set of goals complementary to CTC and the City's overall business attraction and retention strategy.

High Schools and School-to-Work Opportunities

In instances where college degrees are required, a long-term sustainable strategy lies in the improvement of Oakland's public education system. Blakely supports investments in high schools as it pertains to high tech employment based training.

Although universities.... perform an important educational function in the process of technology development, strong support is also required at the secondary education level. Science students at high schools must be computer literate and have some knowledge and training in research methods to gain employment in technology-based enterprises.¹¹¹

¹¹¹ Blakely, Edward J., *Planning Local Economic Development*. Thousand Oaks: Sage Publications, 1994

32.9%¹¹² of all Oakland high school students in 1999 completed the requirement to make them eligible to apply for California State and UC schools. A vast majority however are ineligible for college. Fortunately, under California's Digital High School Initiative, public high school students will have greater access to computer technology and this has the potential to enhance school-to-career training for youths. In Oakland, magnet or academy programs including those in computer science and technology have been established at each of the City's six public high schools. Michael Moore who helps oversee Oakland's first digital high school notes that the engineering program at Oakland Tech is "technologically empowered" with partners like Bechtel. He adds that the magnet programs will help bridge school-to-career options for youths. By exposing youths to computer-based tools like computer-aided drafting using Auto-Cad in Skyline High School's Architecture and Graphic Arts Technology magnet program, youths are being taught the current tools used by practitioners in the field. With the proper training through in-class instruction and internship opportunities, such programs can provide youths with strong links to actual career opportunities upon high school graduation.

By implementing school-to-work programs through the Private Industry Council and the Mayor's Summer Youth Program (projects focused on youth summer employment), and attracting high tech firms including those in CTC to sponsor and/or work with schools to develop "apprenticeship-like" programs, this will expose youths to different careers options, and help them gain work skills. This creates a "ready" workforce of high school graduates.

CTC BUSINESS SERVICES

Having begun to address the workforce issues, improvements in CTC's program must simultaneously work to enhance the experience and success level and of its incubator clients

¹¹² <http://www.ed-data.k12.ca.us/dev/District.asp>

The needs of communications high tech firms in CTC run the gamut from capitalization to legal, financial, and marketing assistance. CTC must address these issues by developing an innovative and responsive incubator program. Such a program can include the following implementation steps:

1) Develop entrepreneurial network

To meet the needs of CTC's firm, it is important to recruit a strong pool of qualified industry experts, entrepreneurs, lay professionals, and venture capitalists to serve on the Advisory Board as well as to advise/mentor firms. In the ideal case scenario, CTC's Advisory Board would include at least one member from the venture capital community, technology law firm, an industry expert, and experienced entrepreneurs. This pool of experts in the high tech industry helps set CTC policies to pre-screen and admit fewer, but only the highest caliber firms whose business plans have a strong market and high growth potential; this can reduce the overall failure rates of CTC firms. The entrepreneurial network can involve CTC graduates who wish to "give back" to the incubator as well as Oakland Advisors, a network of business executives who currently target mentorship to the City's more mature stage firms. Moreover, the ability to attract experts in the field lends CTC credibility as these members advocate on CTC's behalf. To respond to the turbulent internet economy, this advisory team must meet on a regular basis to assess the firm's business plan.

Given that the top priority demand of CTC firms is access to venture capital financing, this issue can be addressed by first providing education to entrepreneurs on the venture capital financing process. Second, events like open houses and networking forums can provide opportunities to introduce start-ups to venture capitalists. Attracting venture capitalists to Oakland may initially require proactive efforts on the part of both the incubator director and the

Mayor. Moreover, a program manager who has started his/her own company and/or has network linkages to industry experts and venture capital groups should be hired. Because affiliation and networks play a critical role in influencing which business plans investors review¹¹³, the incubators needs both a strong entrepreneurial network as well as a superb track record of firms which can grow exponentially and go IPO.

2) Develop Business Plan Review Panel

In addition to networks, closing a venture capital financing deal depends on entrepreneur's ability to sell the business concept. In the event that an opportunity to seek venture capital financing presents itself, a well-crafted business plan and strong presentation can help a start-up raise from one to tens of millions of dollars in equity financing. Therefore a panel of business and industry experts should continually review and assess the start-ups' business plans to determine the viability of the business models. Based on feedback from this panel, the business plan can be tailored to fulfill the venture capitalist's criteria for funding. By leveraging the City's existing relationship with the universities through the Higher Ed Center and the University Consortium, linkages with neighboring universities like UC Berkeley, Cal State Hayward and Mills College can be strengthened. MBA and technology students and faculty can then be recruited to sit on the business review panel. To cultivate relationships with the schools, CTC should market student internship and work opportunities in its start-ups; this ensures a mutually beneficial relationship can exist for both parties.

3) Partner with appropriate vendors of legal, accounting, and marketing services

While the existing system through BARTA provides a source of executive mentoring and marketing services, the cost per company is \$500 and the quality of services firms can

¹¹³ Venture capitalists receive hundreds of business plans each month; while they are not capital constrained they are time constrained, therefore they must be selective about the business plans they review. Networks as well as the

expect to receive is uncertain since no firms surveyed have used the system. Therefore, CTC may reach greater economies of scale by building its own in-house programs. Vendors in the legal, accounting, and marketing fields should be invited to speak at CTC breakfast or lunch events and tenant firms should vote to determine which vendor provides the best fit for them. CTC should then approach these vendors to become strategic partners. These vendors can provide pro-bono services for a limited number of hours and CTC should seek group discounted rates for its firms.

4) Develop Exit Resources

The provision of real estate location tools to help graduates readily access the networks of real estate building owners and brokers can help increase the retention rate of CTC graduates. This issue can also be addressed in part by gauging the companies' plans to graduate and addressing the real estate issue before it becomes a problem. This entails both CTC and the City to broker services with real estate brokers, to help identify and secure relocation sites for CTC graduates. In the past, CTC has not marketed itself to the real estate brokers and building owners as a launch pad for new businesses. CTC only recently recruited the brokerage services of Danville-based Commercial Realty to address the issue of helping firms relocate in Oakland. CTC should host quarterly sessions focused on the theme "Preparing to Graduate—Finding New Space." Individual sessions can be scheduled with brokers three months in advance for firms considering graduation. A pamphlet containing a resource listing of brokers and/or properties and places to purchase/lease furniture, should also be readily available to the start-ups through CTC and the City.

5) Identify Sources of Funding for CTC

start-up's management team therefore play a big role in determining which plans receive attention and get funded.

The final recommendation for CTC involves the identification of a steady funding stream pool for CTC's operation as the City prepares to phase out the real estate subsidies to CTC over the next five years. CTC must find ways to achieve financial self-sufficiency. Since the value proposition of for-profit incubators like CampSix is the link to a talent pool (in return for a 25-35% equity share), CTC can channel energies to develop such networks with experts who understand the industry and can meet CTC clients' needs, and in return ask for a much smaller equity share of 1-2%. Opportunities may also exist to solicit large donations from more corporate donors or to tap into graduates of CTC who wish to become angel investors in the incubator.

CTC can also fold the provision of additional services into the higher rents it charges. These additional charges however must be justified on the basis of value-added services CTC can provide the firms. Such services will include additional networking opportunities and CTC brokerage services to supply start-ups with the necessary business development support systems (marketing, accounting, legal counsel, etc). Finally, to encourage firms which have prolonged their stay at CTC to leave, the incubator can develop a tiered rent structure which charges higher rents to firms extending their stay beyond one or years.

The above recommendations require additional human and capital resources to reach fruition. McPherson acknowledges that CTC is a "lean operation". But given the urgency of the issues discussed, in order to fulfill the above recommendations, a program manager should be hired immediately to assist the director in networking and building investor relations.

Linking to the City's Overall Economic Development Strategy

It appears the incubator strategy has been working in isolation from the other pieces of the City's economic development strategy. While it would be a mistake for the City to micro-manage the incubator, a stronger link between the City's other economic development strategies

and the incubator need to be established. One such process is the workforce development initiative. Second, given the lack of hard and soft infrastructure in Oakland firms have few incentives to locate in Oakland unless these two infrastructure components and the job training can be addressed simultaneously by the City as a whole.

ADDRESSING THE REAL ESTATE CHALLENGE

Enhancing the level of communication and coordination between CTC, real estate brokers, and the City can increase the response time by which CTC and the City can address the firms' real estate needs. A "smart" building inventory database which identifies buildings with fiber optic cables and T-1 lines should be accessible to CTC firms. CEDA is currently developing a GIS database system which will permit developers to search on-line for targeted real estate parcels. In addition, closer coordination between CTC, building owners, and the City can help identify appropriate "representatives" to help firms negotiate more flexible leases with real estate brokers and building owners. A final part of the solution pending the hot real estate market comes from educating building owners of Class B and Class C space about the potential high return on investments from building upgrades. Blakely also suggests a role for the government in upgrading older infrastructure:

We propose a New Community Development program for inner cities. This program would focus on the building of new technology infrastructure such as optic cable, telecommunications... Such improvements would be funded through capital infrastructure banks (underwritten by both government and interstate banks) that would issue community revitalization bonds designated for physical upgrading...¹¹⁴

To address the scarcity of class A office space, the City can help identify developable lands in the downtown. The City should not only attract more developers but also streamline the development process. Therefore, helping firms expand within Oakland requires both the

upgrading of existing office space and the addition of new office space in the downtown office market.

SOFT INFRASTRUCTURE

The provision of urban amenities including restaurants, cafes, and shops can increase the attractiveness of the downtown, and this in turn will help attract a technologically savvy labor pool. In places like Silicon Valley, opportunities to interact and socialize are important to a labor pool of single workers in their twenties and thirties. Moreover, despite the proliferation of internet e-mail, this does not obviate the need for face to face interaction, and word of mouth and networking are key for acquiring new customers, clients, and friends.

The City of Oakland can help facilitate social networking activities by creating regular events which provide social/networking opportunities in Oakland. In San Francisco social networking events occur on a daily or weekly basis. Oakland has sponsored two high tech "mixers" in the past year. With the involvement of the Metropolitan Chamber of Commerce and its TechNet program, networking events for the high tech community can occur frequently on a more regular basis. Oakland can also encourage developments such as cultural centers, retail shopping centers, and coffee shops which serve as meeting places for entrepreneurs.

Finally, both the City and the incubator should develop stronger linkages to neighboring colleges and universities and local public high school since "universities play a direct role in supporting high-tech research, they have a more vital role in providing a pool of fresh minds and ideas necessary for high-tech industries."¹¹⁵

SUMMARY OF RECOMMENDATIONS

¹¹⁴ Blakely Ed, and Leslie Small, *The Inner City, Urban Poverty and Economic Development in the Next Century*, New Brunswick: Transaction Publishers, 1999 p. 176

¹¹⁵ Blakely, Edward J., *Planning Local Economic Development*. Thousand Oaks: Sage Publications, 1994. p 305.

The recommended course of actions concerning CTC and the City of Oakland seek to address ways Oakland can achieve its economic development objectives to attract and retain businesses and create jobs for local residents. Several areas for improving CTC's operations were discussed including a stronger and more extensive network and access to service professionals and venture capitalists. Workforce development and training, an improved real estate tracking system and streamlined real estate development process, combined with the development of a soft infrastructure base are the focal points of the recommendations for the City.

CTC, alone, cannot help the City achieve all its economic development objectives. The issue therefore can be framed such that the City must address all the core challenges, and a by-product of that will be to make CTC more effective. The recommendations therefore suggest strengthening the connection between CTC and the City's overall economic development strategies. The CTC in combination with the future improved workforce, education, and infrastructure combined can increase Oakland's ability to attract, retain, and grow high tech firms. Integrated within the broader vision of the City, CTC has the potential to make a lasting difference on small businesses and the local community in Oakland.

CONCLUSION

Incubators help reduce the failure rates of start-ups and contribute to local economic development. Given that the small high tech industry creates the fastest growing number of quality, well-paying jobs and helps cities diversify their local economy, incubators focused on high tech development will become particularly attractive economic development tools for cities. To capture the benefits of the burgeoning high tech industry, the City of Oakland developed CTC to support home-grown, communications-related start-ups. The purpose of this thesis specifically was to examine CTC's impact and its ability to fulfill its objectives and more broadly, to consider the implications of the incubator strategy for Oakland and other local communities.

Chapter 2 introduced the idea of the high tech business incubator. Incubators can take many different forms, but the linking of talent, technology, capital, and know-how through the provision of real estate and shared equipment, business advice/assistance, and access to networks and venture capital financing are characteristics of incubators which address the needs of high tech start-ups. By defining the different types of incubators, and identifying the unique needs of high tech start-ups, the requirements for the development of high tech incubators are considered.

The case study of Oakland's incubator in **Chapter 3** is used to illustrate the multiple goals of non-profit, publicly-affiliated incubators and shows how and if the incubator fulfills these objectives. The evaluation of CTC reveals that it has produced mixed results. CTC has been successful at attracting communications and internet start-up firms to Oakland and improved the image of Oakland as a business-friendly location. In addition, CTC's firms created a significant number of new jobs. However, the incubator and the City have not been able to retain a large proportion of CTC's graduates nor generate a significant number of new jobs for Oakland residents. This chapters also examine the issues intrinsic and external to CTC which

attributable to such outcomes. For example, Oakland like many inner cities, is faced with a set of core challenges, including the lack of an educated and trained workforce, poor soft infrastructure, and a lack of quality downtown office space . These are location factors which have deterred high tech firms from locating in Oakland and are impediments to economic development for the city. In light of these challenges, it raises the question of how can CTC and Oakland achieve the following: 1) improve CTC services to better address the needs of the start-ups; 2) retain graduates in Oakland; and 3) generate more jobs for Oakland's residents.

In one attributes the failure of CTC to achieve all its intended goals to the incubator, then strategies for improving the incubator's operations should be considered. The purpose of Chapter 4 was then to examine the organization and features of other incubator models in order to draw best practices for improving the operation of CTC. Incubators that provide an extensive set of business services in addition to physical amenities were considered the most successful.

In the process of evaluating CTC and identifying incubator best practices several broader economic development challenges identified in Chapter 3 are revisited. Chapter 5 lays forth a set of recommendations to address these challenges for CTC and the City of Oakland. Since the primary factor cited for the relocation of CTC graduates outside Oakland was the lack of a educated and skilled workforce, the workforce element is considered first. The argument is made that programs designed to upgrade the existing human resource base of Oakland is key; and this involves the development of both targeted high tech job training programs and an improved public education system. Second, the incubator should improve its own service delivery to the firms by better linking the critical elements of high tech start-ups - technology, capital, and know-how. By being more responsive to the needs of the start-ups, arguably, CTC graduates may develop a sense of loyalty to the incubator and consider staying in the host city.

Finally recommendations for addressing the real estate challenge and the soft infrastructure are proposed as a complementary tier of the incubator strategy to promote economic development in Oakland.

In order for the City to achieve its economic development goals to attract, grow, and retain high tech businesses, CTC can improve its services. But in light of the fact that the benefits of the incubator strategy have not trickled down to Oakland residents, this raises the final question: Are CTC internet communications firms, or the other targeted high tech software and multi-media firms the appropriate type of firms the incubator should invest in? This thesis does not seek to answer this question, yet such questions are important ones to consider for future research as one looks at addressing the needs of the community via the business incubator by first examining the specific economic assets and conditions of that city.

In conclusion, the analysis of CTC indicates that it has and can continue to play an important role in economic development. Its overall impact have been significant, in light of the program's three and a half year life span. But assuming the incubator can operate at its highest level of success, it alone will not solve the core challenges of the City. Workforce development and other efforts can work in tandem with the incubator strategy to achieve the greatest benefit for the largest number of people in the local community. Addressing the workforce challenge for example, will require the City to undertake initiatives in conjunction with employers, community based and college-affiliated job trainers to retrain and upgrade the skills of Oakland residents so they can be matched with meaningful employment opportunities. By integrating the various components of the City's economic development areas into one cohesive strategy which includes the retention of CTC's start-ups, workforce development, marketing of the city, and new

developments in downtown, Oakland can build an economic base that's sustainable. This will ultimately lead to greater economic prosperity for the Oakland community.

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4. Eze, Ike, CEO and Founder, Q-Space, Personal Interview, 4 January 2000
5. Reif, Eldor, Project Manager Surf Communications, Personal Interview, 10 January 2000

6. Appel, Kamala, Founder, ReelRap, Personal Interview, 11 January 2000
7. Chatwani, Robert M., Monkey Bin Personal Interview, 12 January 2000
8. Daum, Kevin, Build Your Dream Home, Personal Interview, 12 January 2000
9. Wolfe, Ron, CEO Ascribe, Personal Interview, 10 January 2000
10. Roe, Emery, Instant Tvision, Personal Interview 14 January 2000
11. Zawadski, Rick, Senior Partner, RTZ Associates, Personal Interview, 14 January 2000
12. Pearson, Jim, Network By Design, Personal Interview, 14 January 2000
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37. Robbins, Jim, Executive Director, Software Business Cluster, Personal Interview, 23 March 2000

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40. Elaine, Intern, Austin Technology Incubator, Personal Interview, 12 May 2000

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41. Cole, Jeff, Founder, EvolveLiving , Personal Interview, 18 March 2000

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APPENDIX I

Communications Technology Cluster Impact Survey¹¹⁶

In order to assess the economic impact of the CTC incubator on start-up firms and help identify exit resources and ways to improve CTC's effectiveness, I am surveying companies that received assistance from CTC and would like to ask you several questions. Please return completed survey to Carolyn G. Lee, 143 Albany Street Apt. 136B Cambridge, MA 02139 in the stamped self-addressed envelope provided.

Name of Business _____
 Contact: _____ Title _____
 E-mail _____ Phone: _____
 Address: _____

1. When was your business established? _____
2. When did you move into CTC? _____(month/year)
3. Where did you operate before moving into CTC? At home Other

4. How did your company originally find out about or get referred to CTC?

5. Why did your company choose CTC? (Check all that apply and rank in order of importance (1 being the strongest).
 Location, accessibility by public and private transportation
 Real Estate: Relatively inexpensive office space and flexible lease arrangements (short-term, "easy-in, easy out")
 Availability of shared equipment and services
 Reputation of the incubator, ie. Availability of business assistance and non-profit structure
 Access to networks
 Communications sector model, opportunities for creation of synergistic relationships
6. How much office space does your firm occupy? _____sq. feet
7. Did you receive the following services?
 a) Check if yes, indicate if you received the services directly from CTC staff, partner, or sponsor, otherwise indicate if you were referred to services;
 b) Did you use these services frequently;
 c) Rate the quality of the services

¹¹⁶ Survey questions adapted from Karl Seidman's CBI survey and Impact of Incubator Investments, NBIA 1997

Range of Services	Direct	Indirect/ Referral	Frequently used	Outstanding	Satisfactory	Unsatisfactory	Other Comments
Shared adm. services							
Share Equipment							
Bus. seminar workshops							
Marketing Assistance							
Financial services, (where?)							
Financial Planning							
General legal service (where?)							
Technical Advice							
Assistance developing bus. plan							
Building a Mgt Team							
Networking with Sponsors							
Networking with VCs							
Access to resources JFK-ETP							

8. Did CTC help foster relationships in or outside the incubator with the following?

- Firms within CTC
- Venture capitalists
- Potential/existing customers

9. What might have happened to your business if the assistance provided by CTC had not been available.

- My business would have started without any change except not in Oakland.
- My business would have started but its start-up would have been delayed
- The business would have started but on a smaller scale
- The company's sales would have grown but at a slower rate
- Other _____

9b. If CTC helped the company grow, how did it help accelerate the growth of your company?

- allowing you to invest more funds in growing the business by reducing the overhead costs
- connecting you to additional customers
- helping you gain access to capital that financed faster growth,
- providing technical or management assistance that helped them achieve faster growth

10. Please make your best estimate of the following data for your business during calendar years 1997, 1998, and 1999. Data from individual firms will be confidential and used only in the aggregate to calculate overall average and changes.

	1997	1998	1999	2000 (Projected)
[A] Total Company Sales				
[C] Total Full-time Employees				

YOUR EMPLOYEES

11. What is the level of education needed by your employees?

- High school diploma 2 Year vocational degree 4 year BA/BS degree post-graduate/professional degree other

Please estimate of the percentage of your firm's current employees in the following categories:

- [A] Live in Oakland _____
- [B] Where do the majority live? _____
- [C] Are Black, Hispanic or Asian _____
- [D] What is the average salary (range)? _____
- [E] What types of benefits do you provide? _____
- [F] Types of jobs skills needed for these jobs? _____
-
- [G] How do you recruit for these jobs?
 Outside recruiting agency Word of mouth College recruiting On-line web sites other
- [H] What is the firm doing in terms of job training?
 Not doing any job training Yes, _____
- [I] What skills do you perceive as being in shortage in the fields you are working in?

12. How many other business ventures had the owner of this business started before starting or acquiring this business?

- none one two three or more

13. How many years of business experience did the owner of this firm have just prior to starting this business?

- none 1 -2 years 3 - 5 years 6-10 years 11 years or more,

14. Does your company have an ongoing plan to evaluate locations or sites for new or additional facilities?

- No Yes Working with realtors working with CTC staff Other

15. When does the firm anticipate on graduating from CTC?
16. Do you have plans to stay in Oakland? Yes No
17. Are you currently help from CTC and/or City of Oakland to make the transition out of the cluster?
18. How much of your location decision is a factor of the following: (Mark all that apply and rate your choices with number 1 indicating the most important factor, etc)
- Real estate / rents
 - Type of office space needed (warehouse lofts, fiber-optic cables ...)
 - Skilled labor availability, Workforce matters
 - Easy commute for workers, proximity to public transit or highways
 - Employee Parking
 - Additional amenities ie. entertainment, restaurants, arts
 - Perceptions of safety and security
 - Business tax incentives/ hiring tax credits
 - Loyalty to City
 - Other

19. Please list any specific amenities that your firm would like but may not be available at this location or in Oakland; in other words, what would make this a better location for your firm:

20. What is your overall image of Downtown Oakland?

21. Has this image been impacted by your residence at CTC; if yes, how?

22. On a scale with 1-5, 1 being the highest, how satisfied were you with your experience at CTC? _____
 If somewhat dissatisfied or very dissatisfied, explain why.

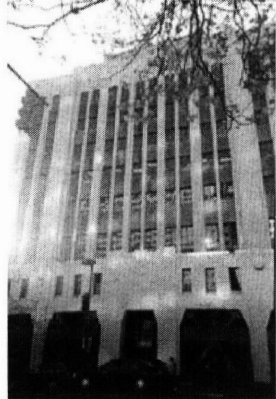
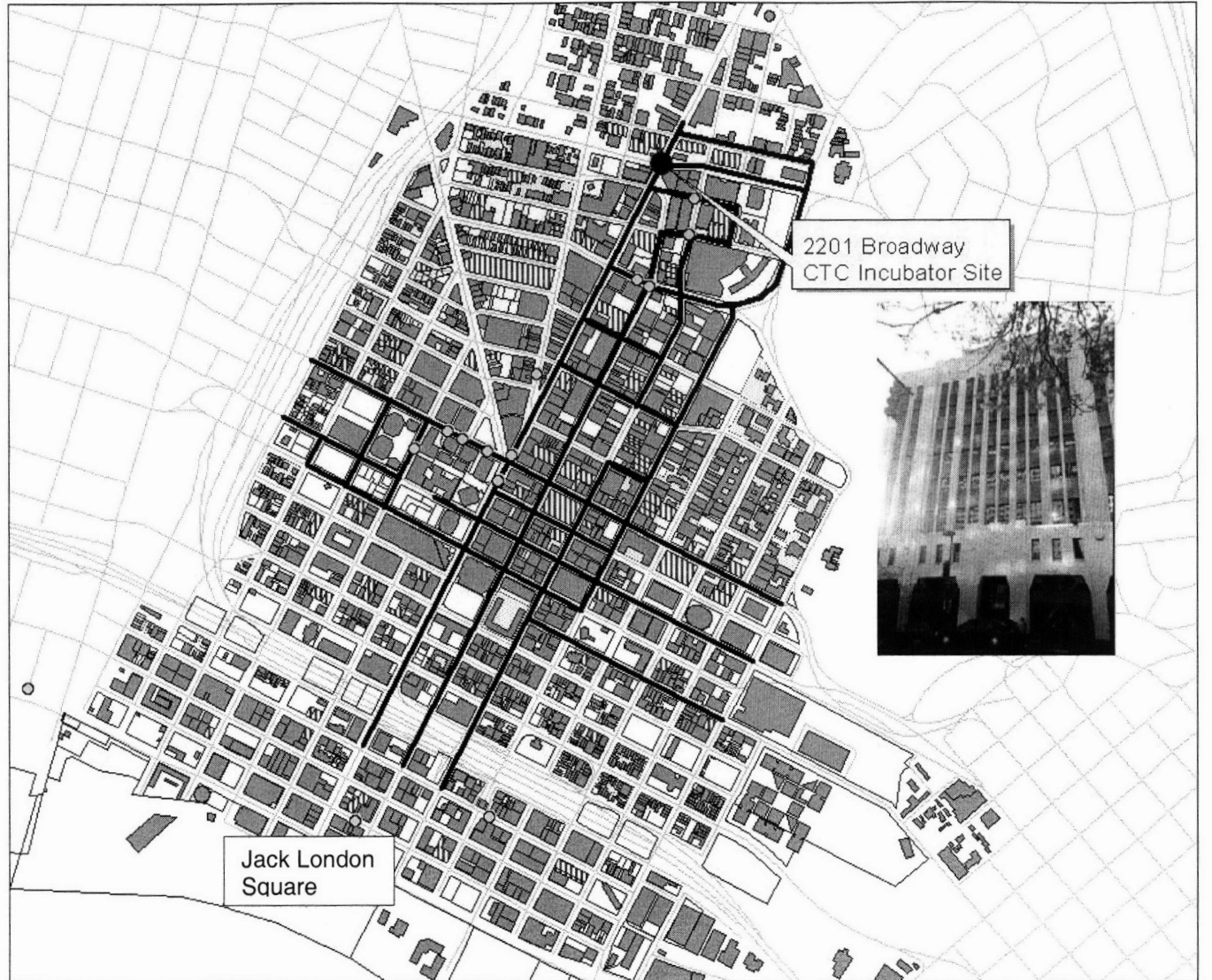
23. What exit resources do you think would be most helpful to your business?

24. What are some areas of improvement you would suggest for CTC to improve its effectiveness?

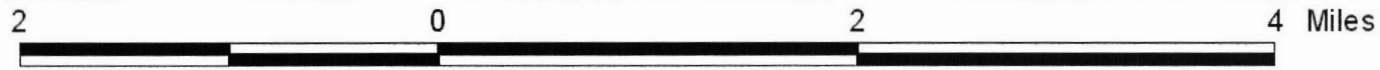
25. Do you have any additional comments on the assistance that your firm received from CTC?

THANK YOU FOR TAKING THE TIME TO ANSWER THIS SURVEY!

Downtown Oakland



- High Tech Business
- ▲ Fiber Optic Line
- ▨ Parking Lot
- Buildings
- Residential
- Alldtprcl.shp
- Street



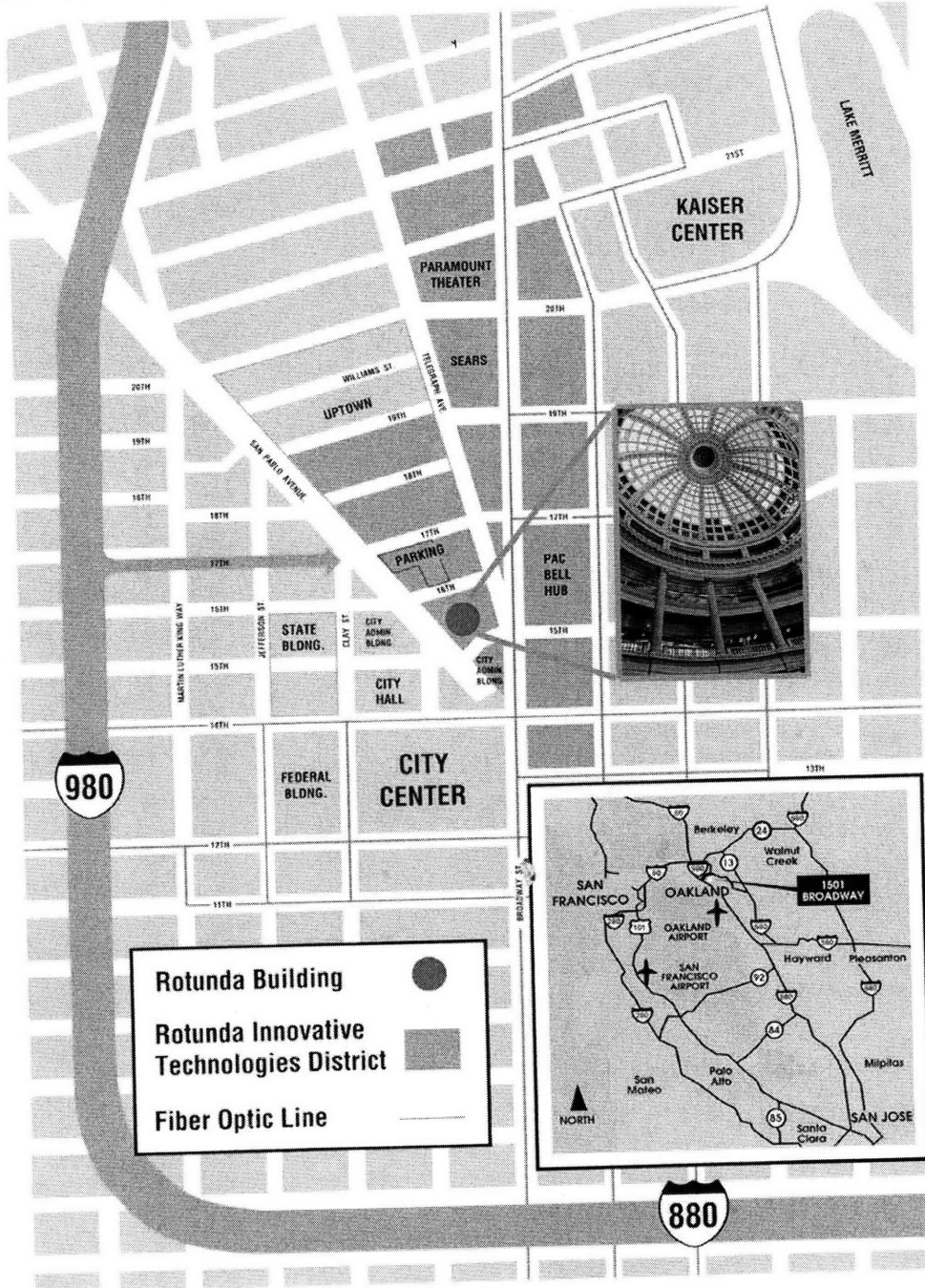
APPENDIX III: CTC CURRENT TENANTS

AdvisorTeam.com	AdvisorTeam's hub and portal use state-of-art communications technologies to deliver independent financial services to affluent employees through employers. We deliver one-to-one personal interface to clients using the Internet as a delivery mechanism. We link independent advisors, employers and employees through our financial service hub and deliver information products and services through our portal.
AllBlackBooks.com	AllBlackBooks.com is a book e-commerce site focused on providing and promoting books, audio books, and video by, for and about people of African descent to the African diasporan community of the world. Its sister e-commerce sites, AllCorpBooks.com, AllFedBooks.com, AllStateBooks.com, and AllCityBooks.com provide custom web-based B2B book procurement services to corporations, the federal government, state libraries and municipal libraries, respectively.
Ascribe	Ascribe is a public interest newswire for universities, medical research centers and other non-profits.
eSportNetwork.com	eSportNetwork is to build the Internet's premier streaming sports network. With the explosive growth of broadband, satellite and wireless technologies, eSportNetwork.com, and its innovative business models, will exploit and fill the growing hunger for compelling sports content.
GetCare.com	GetCare.com is an applications provider of software, Internet based data sets and information services to human services organizations
GlobalVue.com	GlobalVue.com seeks first mover advantage as a business-focused portal that is designed to appeal to a broad global audience. GlobalVue will deliver an extensive offering of aggregated new, editorial, web services, community forums and resources, all intended to maximize use by global professionals.
Ideal Logic, LLC	Ideal Logic is an applications software developer of Internet products for providing membership and financial information for large membership organizations. Ideal Logic's initial market is church based.
Innetix	Innetix is an Internet Service Provider for wireless and wired communication.
iPlay, Inc.	iPlay, Inc. creates innovative, fun multi-player games and immersive entertainment.
iSPIRITUS.com, Inc.	iSPIRITUS.com, Inc. is the dominant brand in the emerging Spiritually Inspired Lifestyle category. The Company is pursuing a multi-channel distribution strategy which link the Internet, Television and Retail entertainment venues together by crossing merchandising products, services and life event experiences to become a market leading public company.
Medicopia.com	Medicopia is an e-commerce company focused on delivering comprehensive purchasing and business solutions for physician practices.
The MusicBoxNetwork	The MusicBox Network (The MBX) consist primarily of music video programming, with special-interest and lifestyle segments, targeted at the boomer generation and its children, but overlapping to other demographics as well.
Network by Design	Network by Design is an information systems integrator relying on intelligent, purposeful planning to deliver cost-effective, exceptional business solutions: NBD will manage client-side hardware and software.
the NuReel.com	The NuReel.com is a revolutionary e-marketplace that is combination of e-trade and Fat Brain meet the motion picture industry. The NuReel.com will position itself as the leading vertical-focus e-market maker in the motion picture industry. The members of the NuReel.com-team strive to increase and improve reel representation for current and aspiring film professionals worldwide.
PlatinumStandard.com	Platinum Standard.com is the internet store "Where The Best Is Easy To Buy". Platinum Standard sells products and services that are highly rated by trusted third parties such as Consumer Reports.
ProjectXpress International	ProjectXpress International is a service and solutions company focused on becoming the leading ASP (Application Service Provider) for delivering Technology Projects in "internet time with internet tools". The company focuses on projects in the financial services, telecommunications and insurance sectors. It provides its hosted application

	service, ProjectXpressIT along with its top-quality project management consulting services to manage software development and installation projects.
Qtrademark.com	Qtrademark.com offers professional, low cost trademark search and registration services to web businesses using state-of-the-art technology.
SecurityPros	SecurityPros provides a value oriented, efficient, easy to use, highly resourceful secure service to organization needing information security professionals, while providing career opportunities, resources, training, tools, information, news, and real learning benefits to job seekers.
Snailgram.com	Snailgram.com is an online paper greeting card and gift certificate store. Snailgram provides a selection of a thousand greeting cards and gift certificates from popular national name brand stores. With an online reminder service, address book, and gift registry Snailgram hopes to become an Internet portal for all gift giving needs.
Ultimode	Ultimode develops software for automatically managing and targeting online content. Ultimode's software is based on state of the art machine learning technology. Our mission is to provide companies with the best solution to the challenges of managing online content and effectively targeting it to their users.
WomensRadio.com	WomensRadio.com was formed almost four years ago with the mission to open the board channel of communication for women. It is currently launching WomensRadio.com and is targeting one of the largest, richest and most undeserved groups on the Web Baby-Boomer women. The site will provide rich text and audio (both talk and music) interactivity, courses and e-commerce (both B2B and B2C). Its long-term goals are to produce quantities of effective audio programming that can be syndicated on the web, in terrestrial radio and soon digital radio, both nationally and internationally. The Founder and CEO is Pat Barrett.
WorldSkip.com	WorldSip.com is devoted to bringing the online consumer access to information, resources, products and services from any nation on this planet.
Xplica	Xplica.com is a collaborative internet communication connectivity service provider that enhances information exchange for corporate applications, distance education, and healthcare care-management. Our product enables web-based, real-time conferencing, interactive e-commerce, content management, event management and customer relationship management to provide effective business to business and business to consumer communication.
Zimba, Inc.	Zimba provides unique personalized and integrated mobile productivity solutions to carriers, portals, and communities looking to deliver location and relationship aware content, collaboration and commerce services to phones, wireless devices, and web browsers. Using Zimba's breakthrough mProductivity™ platform, users get just what they need, right where they need it. Whether it's turn-by-turn directions to your favorite restaurant delivered over the phone, flight updates and promotions delivered to a pager, or hotel reservation made wirelessly using a Palm Pilot, Zimba provides productivity solutions that are built around you. Zimba Inc., a privately held company, is based in Oakland, California. Founded in October of 1998 by former employees of Oracle Corporation, Andersen Consulting, and Informatica Corporation.
Bay Area Entrepreneur Association	Bay Area Entrepreneur Association is a non-profit organization providing resources and networking for self-employed entrepreneurs.
Diverse Strategies	Nancy Y. Lee Accounting provides bookkeeping and accounting services with a specialty in Quickbooks, for startup telecommunications companies and other small businesses.

Source: Extracted directly from incubator web-site - <http://www.ctcluster.com>

D O W N T O W N O A K L A N D



Source: City of Oakland, CEDA
California Commercial Investments, Rotunda