

Spin-offs, Startups and Fast Growth Firms in the Portland Regional Economy

Regional Connections
Working Paper 3

Joseph Cortright
Heike Mayer

February 2000

Regional Connections Project
Institute for Portland Metropolitan Studies
Portland State University

www.upa.pdx.edu/ims/regcon/regecon.html.



REGIONAL CONNECTIONS

Spin-offs, Startups and Fast Growth Firms in the Portland Regional Economy

By Joseph Cortright and Heike Mayer

The Silicon Forest renews itself and grows through the ongoing process of creating new businesses. The process of creating startup and spin-offs businesses builds on the knowledge base of the region's experienced workers and their personal and professional networks. Venture capitalists and a range of other professionals—attorneys, accountants, and real estate operators—provide cash and services to help new companies start and grow. This growth process is highly localized and path-dependent. New firms typically borrow and build on the technological strengths and managerial practices present in the local industrial base. Fast growing high tech businesses play a decisive role in driving the region's economic growth. Between 1992 and 1997, more than sixty percent of the jobs created in the Metro Portland's high wage, fast growth businesses range were in electronics and software. Most of the largest fast-growing technology businesses are descendants or close relatives of some of the region's largest high tech firms.

Economies renew themselves and grow by continually creating new business entities. This process is especially important to the development of the high technology industry. Businesses that create new ideas, capture market share, and grow rapidly can help drive the economic development of particular regions because they create new job opportunities. Economically successful regions like the Silicon Valley are characterized by high concentrations of these fast growing, well-paid firms.

Regional Connections is an ongoing effort to analyze and explain the structure and performance of the Portland Metropolitan Economy, sponsored by Portland State University's Institute for Metropolitan Studies. Funding for this project has been provided in part by lottery funds from the Regional Strategies program for Multnomah and Washington Counties, administered by the Portland Development Commission and the Oregon Economic and Community Development Department., and from the American Electronics Association and Portland State University.

Regional Connections work products include a technical report—Progress of a Region: The Metropolitan Portland Economy in the 1990's—briefings on the regional economy and a series of working papers summarizing the project's studies of the region's industry clusters, including high technology, metals, creative services and nursery products.

For more information about Regional Connections, contact Ethan Seltzer at 503-725-5170 or visit our website at www.upa.pdx.edu/ims/regcon/regecon.html.

Spin-offs, Startups and Fast Growth Firms in the Portland Regional Economy

The metropolitan Portland high technology sector has grown in recent years in large part because of the success of a number of newly established and rapidly growing businesses. Our interviews with firm executives and other industry observers highlighted several important aspects of this process:

- New firms are created by redeploying the intellectual and human capital that already exists in the region. The founders, managers and workers that form new companies are drawn overwhelmingly from the ranks of the region's current workforce. New firms inherit many of their technological predispositions and management practices from their predecessors, leading to a strongly path dependent development process.
- Venture capitalists play a crucial role in the establishment of new firms, providing not simply money to develop new products and build new enterprises, but as importantly, advice and connections. In addition to venture capitalists, a rich local infrastructure of knowledgeable attorneys, accountants and other professional support fledgling high tech firms.
- The region's quality of life and business culture set the context for new firm growth. The quality of life roots many people in the region who might otherwise seek opportunities elsewhere. Even so, Oregon's laid back lifestyle and suspiciousness of wealth are viewed by many as at odds with the ethic needed to create high-flying high tech firms.

An analysis of fast growth businesses in Oregon conducted for the Oregon Emerging Business Initiative provides data showing that fast growth businesses have played an important role in Portland's economic growth in the past five years. While the regional economy grew about 4.2 percent per year between 1992 and 1997, some 330 high wage firms that grew more than 15 percent per year added about one in five of the new jobs that paid over \$30,000 per year.

High tech is a leading source of these fast growth firms. Nearly two in five firms and three in five new jobs were in fast growing electronics and software firms. Metro Portland had more than 120 fast growing electronics and software firms that accounted for more than 11,000 new jobs between 1992 and 1997.

Another set of data on fast growth firms, the Oregon Technology Fast 50, shows that fast growing firms are concentrated in a few segments of high technology. There is a strong cumulative quality to fast growth businesses. Nearly all of the region's fastest growing electronics firms are descendants of or spin-offs from long-established regional firms, including Tektronix and Intel.

Introduction

The creation of new businesses plays a key role in the development of any economy. This is especially true in the case of high technology. One of the pivotal factors driving the emergence of the Silicon Forest has been the rapid growth of a relatively few businesses, most of them local start-ups. This paper explores the processes that lead to the creation of new firms and measures the contributions of rapidly growing firms to the regions economy.

Tales of new firm start-ups and spin-offs have a long and distinguished place in the creation myths of the high technology industry. The growth of the Silicon Valley's semiconductor cluster is invariably told in terms of the businesses that spun off firms from Shockley Semiconductor and then Fairchild to form world leaders like Intel (Rogers and Larson, 1984). The process continues to this day as new startup firms quickly grow to dominance of emerging Internet and e-commerce industries.

This working paper is divided into two parts. First, we look at the forces that influence the creation of new high tech business in the Portland metropolitan area. Second, we try to measure the influence of spin-offs and fast growth businesses on the region's employment, particularly the creation of high wage jobs.

Our analysis of the processes of new firm creation in metropolitan Portland is based on a series of detailed interviews with industry leaders and participants in closely related fields like law, venture capital and accounting. How do new firms get started? What are the region's relative advantages and disadvantages for starting successful new high technology businesses? How does metropolitan Portland compare to other places as an environment for startup business? We are especially grateful to the more than three dozen industry experts who shared so willingly of their knowledge and time to provide the information on which this section is based.

We complement our analysis of the process of new firm formation by looking at the recent historical record on the economic contribution of fast-growing businesses. Our work uses firm level data on employment to track how many of the new, well-paid jobs in the local economy are attributable to fast growth high tech firms.

I. Creating New Businesses in the Silicon Forest

One of the defining characteristics of the high technology industry is rapid change. Most obviously, technologies and markets seem to be in a constant state of flux. Engineers and managers frequently move from firm to firm. What is less obvious, though, is that a critical part of the high tech sector is the rapid waxing and waning of many high tech firms. A key factor driving metro Portland's high technology growth has been the creation and rapid growth of many new companies.

One estimate of the magnitude of the movement into and out of the industry can be gained from examining the membership of the American Electronics Association's Oregon Chapter. Half of the firms that were members in 1998 didn't exist in 1988, and half of the firms that were members in 1988 were no longer in business ten years later.

Our interviews with local high technology executives, venture capitalists and industry observers painted a clear picture of the processes that drive the continuing evolution of the Silicon Forest. First, the region's existing intellectual capital, the knowledge of the region's technologists and managers, forms the basis starting new firms. Personal networks among people who have worked in the local industry seed the process of forming new businesses. Second, local venture capitalists provide not just money, but contacts and coaching, to help new firms start and succeed. Beyond venture capital other professionals, like accountants and attorneys, specialize in providing services to new technology based firms. Third, the region's environment and culture influence the process of starting up new businesses.

Seed Trees in the Silicon Forest

The creation of new firms and the destruction of old ones is a central part of the continuing evolution of the high technology industry. The new businesses that are established in the region are staffed overwhelmingly by veterans of existing or previous high tech ventures. The industry's personal networks and a range of supporting institutions help facilitate this process. As one local attorney active in advising the industry observed, "ideas and intellectual capital drive the industry and the environment and institutions recycle talent in new ventures." (Personal Interview). In effect, people and ideas are the DNA of the high technology ecosystem, and they are continually being recombined to form new enterprises.

Personal contacts play a key role in the formation of new enterprises. New start-up high tech businesses are typically formed by a small cadre of technicians and managers who know each other from having worked together previously, often at the same firm. The networks of contacts of firm founders play a crucial role in determining what technical direction new businesses take and what business strategies they pursue. The heavy reliance on personal networks means that this is an intensely local process. Other studies have noted the strong propensity of new startups to be formed by people who previously worked in the region (Almeida and Kogut, 1997).

Spin-offs, Startups and Fast Growth Firms in the Portland Regional Economy

The tendency of new firms to draw heavily from persons with substantial prior experience in the local industry has two important implications for the region's economic development. The first is technological path dependence: because the specialized technical knowledge of a firm's founders is based on what they did and learned in previous firms in the region, their products and processes are often outgrowths, extensions or modifications of related technologies used by their previous employers. One interviewee, a long-time Tektronix-employee, recalled Tektronix involvement in the development of electronic design automation (EDA), the technology for using software to design electronic circuits. Tektronix spin-off Mentor Graphics built on (and greatly extended) Tektronix's early work in this area. (Personal Interview) Second, startups also inherit a good portion of their business culture and management practices from predecessor firms. One interviewee mentioned Sequent as a spin-off company from Intel. Sequent's founder Casey Powell employs a management style—highly focused, aggressive, and frequently confrontational—rooted in the experience with his former employer Intel (Personal Interview)

A number of institutions support the process of new business formation in the region. These include a small but growing base of venture capitalists, attorneys, accountants, marketing and financial specialists providing the critical intellectual resources needed to start new high tech firms. Nearly all of our interviewees identified a few prominent attorneys, accountants and bankers as key networking contacts that they and their peers turned to when looking to start a new business (or helping someone who was).

The local business culture, particularly attitudes about moving from firm-to-firm, starting one's own firm, and especially finding a new job after having worked for a failed enterprise—play a central role in determining the rate of startups (Saxenian, 1994). In some respects, Portland is very much like Silicon Valley. Many of the firms in the region are branch operations of offshoots of Silicon Valley firms. Many of the region's engineers or managers once worked there. Two of the region's oldest and most influential high technology employers modeled their corporate style and philosophy after Hewlett-Packard, the quintessential Silicon Valley firm (The founders of Tektronix Howard Vollum and Jack Murdock were acquaintances of Bill Hewlett and Dave Packard, as was Doug Strain, who founded ESI.).

The local business culture, descended in part from Tektronix, puts a premium on innovativeness and engineering excellence. Local business people have a small, but influential, number of role models (Sequent, Mentor Graphics, In-Focus) of local startups that have done well, even though not becoming the next Microsoft or Amazon. Many in the Silicon Forest have close personal and professional ties to Silicon Valley and draw on these in starting, financing and operating their firms. Other characteristics of previous employers shape their workers subsequent entrepreneurial efforts. Interviewees pointed to culture, leadership and role models. Some firms are more open and innovative than others, attributes essential to success in a startup. The ability to select and effectively lead a team with diverse skills (design, technical, production, marketing) are also crucial, and are often shaped by one's previous experience. Finally, simply knowing

Spin-offs, Startups and Fast Growth Firms in the Portland Regional Economy

peers who have started their own businesses (and succeeded) is a tremendous spur to entrepreneurialism—"I know Bob, if Bob can do it, so can I." (Personal Interview, Gerry)

While the region's existing base of firms plays a pivotal role in shaping the number and kinds of startups, there is a tension between the success of existing firms and fruitful entrepreneurialism. It's essential to have a base of strong technology related companies, that attract and talented people and imbue in them the skills and aptitudes to successfully run their own companies. But, as one interviewee noted, new firms are started not by people who are satisfied with their current employers, but who are dissatisfied (Personal Interview, Mohan Nair). Tektronix spawned relatively few startups when it prospered in the 1970s, but Tek alumni formed or staff dozens of new startups in the 1980s and 1990s when the company downsized. One former Tektronix employee who went on to start to other firms recounted: "Tektronix became too large, things didn't move fast and the company became indecisive . . . good minds aren't going to twiddle their thumbs."(Personal Interview, Gulick). To date, Intel, currently the region's largest high tech employer, has contributed relatively few startups to the local economy—notable examples are Sequent Computer and Radisys, both formed in the 1980s. The company's phenomenal success and the soaring stock price (coupled with generous options for professional and technical employees) have clamped golden handcuffs on many who might want to start their own firms—at least for the time being.

The competencies inherited from predecessor firms impart a definite technological spin to local startups. The metropolitan area has many startups in three industry specializations: display technologies, electronic design automaton software and semiconductors. The technologies underlying each of these specializations trace their roots to the technical strengths of some of the region's long-time high tech mainstays. Tektronix, for example, was a world leader in display technology, first building its own cathode ray tubes (CRTs) for oscilloscopes and in the 1970s, pioneering computer graphic display terminals. Startups in the other areas also built on the technological base established by Tektronix, Intel and other local companies.

The availability of venture capital is a critical element in the startup of new high tech firms. Contrary to common supposition, the most important element of successful venture capital is not the cash the venture capitalist brings to the deal, but the wealth of contacts and experience. Venture capital is seldom if ever a passive investment. Venture capitalists usually work with the firms they finance to improve their odds of success, most importantly by helping to recruit key managers, lining of strategic partnerships with customers and suppliers, and advising the firms on business strategy. Consequently, the major constraint on venture capital operations is often the limited time of the firms experienced managers. On paper, it may seem possible to easily invest in a far-flung firm, in practice, most venture capitalists invest very close to home. As a result, venture capital investment is much more highly concentrated in a few locations than other forms of capital. According to one study, more than 60 percent of all venture capital flowed to just five metropolitan areas—San Francisco, Boston, New York, Los Angeles and Washington D.C (Zook 1999).

Spin-offs, Startups and Fast Growth Firms in the Portland Regional Economy

A region's business culture plays a critical role in shaping startups. In the "go-go culture" of Silicon Valley, everyone, it seems is focused on startups, deal-making, IPOs (initial public offerings) and "the next big thing". By all accounts, this is not the attitude of those in metro Portland. To many, especially, in the venture capital community, Portland seems hamstrung by its laid back culture: entrepreneurs seem less willing to sacrifice everything to grow the next Microsoft, and the community places little value on being wealthy and creating wealth. As a result, Portland seems unlikely to challenge Silicon Valley as the nucleus of high tech entrepreneurialism. On the other hand, metro Portland is close enough, and many of those in the region have personal and business ties to Silicon Valley that enable the region to tap into the wellspring of talent and financial capital to support future growth.

There is a strongly path-dependent quality to the region's entrepreneurialism. The founders of new firms are almost always former employees (managers and engineers) in the region's existing high tech firms. They inherit from their previous experience key knowledge about technologies, business strategy and practices, and the culture of commerce. And the contacts they made in previous employment typically provide the short-list of candidates for first hires. Thus the network of contacts among workers at the region's existing firms powerfully shapes the environment for new startups. Consequently the technological and managerial habits, routines and practices of the current industry base limit and direct the possibilities for successive generations of business. The result is that growth tends to be an evolutionary process, a fact that becomes still more obvious when we consider the history of the Silicon Forest.

Venture Fuels the Growth of High Tech Companies

Venture capital firms play a crucial role in the formation of new high technology companies. Venture capital firms provide high risk, equity financing to support the costs of starting up new companies. Funding usually goes to firms with a strong business plan, a core of key managers and technology experts, and some good idea of the potential market for their product and some proprietary technology. Venture capital investing is high risk and high return. Many investments fail, and the venture capitalist loses everything, others succeed, either ending in an initial public offering (IPO) or sale to some other firm.

While the popular perception of venture capital focuses on the sheer scale of the financing (and the money is indeed important), the critical limiting factor in venture capital investment tends to be the time, energy and expertise of the venture capitalist. Because of the high-risk nature of their investments, venture capital firms carefully screen those firms they lend to, and also invest considerable energy in actively monitoring and coaching the firm's managers. Venture capital firms often concentrate on a few technology areas or markets in which they have personal expertise. They also help their client firms identify and hire key managers, make contacts with potential customers and distributors, and find further financing. Venture capitalists typically take seat on the board of firms they invest in and even sometimes, to the chagrin of a firm's founders,

Spin-offs, Startups and Fast Growth Firms in the Portland Regional Economy

force major changes in direction or staffing. This “hands-on” approach to managing their investment means that venture capital firms overwhelmingly focus on investing in firms that are close by.

Oregon has a small but growing concentration of local venture capital fund managers. A number of new funds have been established locally in the past three years, and national funds have shown an increased interest in Oregon investments. Oregon firms attracted more than \$80 million in reported venture capital investments in the first half of 1999 (Goldfield, 1999). Even so, Oregon remains a relative backwater of venture capital activity. Nationally, venture capital is highly concentrated in just a few areas, notably Silicon Valley. The San Francisco Bay area alone accounts for nearly 40 percent of all venture capital investments in the US.

Table 1: Venture Capital Firms Active in Metropolitan Portland

Fund	Location (Headquarters)
Efund	Portland (Seattle)
Endeavor Capital	Portland
Guide Ventures	Seattle
Intel	Hillsboro
Needham Capital	Portland (New York)
Olympic Venture Partners	Lake Oswego
Orca Capital	Portland
Oregon Life Science Partners	Portland
Orien Ventures	Lake Oswego
ORTDA	Salem
Pacific Horizon Ventures	Seattle
Shaw Venture Partners	Portland
SmartForest Ventures	Portland
T.H. Lee/Putnam	Boston
Timberline Venture Partners	Vancouver, WA
Utah Ventures	Portland

Source: Wayne Embree, Cascadia Pacific Management, LLC.; The Business Journal Book of Lists

Opinions differ sharply on whether metropolitan Portland is adequately served with venture capital. The general view (held especially by start-up companies and those searching for capital) is that Portland is capital poor, and that many potentially good deals go begging here that would be funded in Seattle or the Bay Area. Not surprisingly, venture capitalists tend to be more sanguine, arguing that few "good" deals go un-funded, and that many who seek investments lack good ideas, strong managers, a strong business plan or some other essential element of a promising start-up. The limiting factor in the view of many is the lack of local managerial talent, particularly aggressive corporate leaders with proven track records.

The dour view of local venture capitalists appears to be an occupational characteristic. Managers of venture capital funds are unapologetically focused on a single objective: making lots and lots of money. Ideally, they would like to finance the next Netscape, Amazon or America On-Line. An investment of millions today will result in a significant ownership share of a company with a market capitalization measured in the billions when it goes public in just a few years. Less ambitious business plans (and entrepreneurs) do

Spin-offs, Startups and Fast Growth Firms in the Portland Regional Economy

not generate much enthusiasm from venture capitalists. Venture capital firms want to hit home runs and Portland's lack of a home run company (coupled with the region's business culture) reinforces the perception that there are relatively few strong startup companies in the region.

Venture capitalists single-minded focus on early stage investment and growth opportunities means they have virtually no interest in most businesses. Firms that have already gone public, foreign-owned businesses, firms in established technologies and those with limited growth prospects generally don't appear on the venture capitalists radar screens, even though these businesses make up the bulk of the firms and employment in the region's high tech sector.

Still, one need not be as pessimistic as the venture capitalists when appraising Portland's strength as a startup community. While singles, doubles and triples do not satisfy venture capitalists, they do add significantly to the region's economy. Metro Portland's venture capital activity will never rival that of Silicon Valley (or possibly even Seattle) but it may be enough to continue to promote the growth of the region's economy.

Other Institutions Support Startup Firms

Other features of the local economy play important roles in creating the conditions for successful startup firms. There are many professional service providers who cater specifically to startups. The region's business culture shapes the management styles of local firms. The technology expertise of the region's workers strongly influences the kinds of businesses that startup here.

Venture capitalists are just the most prominent of an entire web of professional service providers who help new startup firms. Attorneys provide essential advice, not just on obvious contract and intellectual property issues, but also on structuring the business entity to create the needed incentives for owners and employees. A number of accounting, advertising and public relations firms specialize in understanding the needs of technology startups. Investment banks and capital leasing companies provide specialized financing to supplement venture capital. Executive staffing services—headhunters—help recruit key managers. Even the real estate sector is involved, providing flexible, easily and quickly expandable space to accommodate firms that may need to grow rapidly with little notice. Most, if not all of these professional services are provided by firms located close by the new startup.

The region's current network of venture capital firms and related professional service providers has co-evolved with the high technology industry. Lawyers and accountants gained valuable experience working with the region's fast growing high tech firms in the 1980s, and apply those lessons in helping newly established businesses today. Two of the region's most important high tech public relations firms, KVO and Waggener Edstrom, were started by professionals who had previously worked in the high technology cluster. Ziba Design, recognized as a world leader in industrial design, was

Spin-offs, Startups and Fast Growth Firms in the Portland Regional Economy

started by a former employee of Hewlett Packard, and now serves international clients as well as local firms.

Because the germination of high technology companies often relies on the informal professional contacts that people in the industry have with one another, industry associations also play an important role in the development of new startups. Today, the Oregon Chapter of the American Electronics Association and the Software Association of Oregon provide forums for people in the industry to get together to address common problems and also to form networks and rekindle old associations. These associations are the latest in a long tradition of industry cooperation. The region's earliest producers formed their own trade association in the 1940s, later merging it with other colleagues in the Northwest and then with others in California to form the Western Electronics Manufacturers Association, the forerunner of today's American Electronics Association.

Quality of Life Shapes the Environment For Startups

Quality of life plays an important role in shaping people's decisions to start firms in the Portland area. Nearly all of the high tech managers we interviewed stressed the importance of the region's quality of life to them personally and to their companies as a benefit for attracting workers. Metropolitan Portland is perceived as having a beautiful nature environment, a mild climate, extensive recreational opportunities, and a variety of public policies aimed at sustaining these qualities. The quality of life helps startup firms to have a richer supply of technically trained labor than they might otherwise enjoy. While technical challenges and career possibilities might be better somewhere else, many employers told us, "Our people were here because they wanted to live here." To some extent this reinforces entrepreneurialism, too. When senior managers move on or look to move up there are relatively few opportunities to advance locally because of the small number large high tech firms. This, and the fact that they, and frequently their spouses are unwilling to leave Portland, prompts many to join new startups or start their own company.

While Portland's laid-back atmosphere and quality of life are frequently perceived to be advantages, they are disadvantages as well. Unlike the Silicon Valley, where the lust to start and grow the next Netscape or 3Com is palpable and start-up CEOs are local lions, metro Portland's culture is perceived as at best indifferent to and at worst downright hostile to aspiring firms and their leaders. "Portland doesn't celebrate discontinuities in the wealth curve, complained one local CEO (Personal Interview). The relative importance Portland residents put on family, community and the environment leads some venture capitalists to question whether the local CEOs have the fire and ambition to lead their company to be the next Amazon or Microsoft. "Too many would settle for being a several hundred million dollar company rather than dreaming of being a multi-billion dollar company."(Personal interview)

II. Measuring the Contribution of Fast Growth Businesses to the Regional Economy

Our quantitative research follows on a long line of investigation of firm level data that traces its roots back to David Birch's 1979 study of the role of small businesses in the American economy. While some of Birch's specific findings have been contested, a considerable amount of scholarly research confirms an important point; variations in growth rates among cities or regions seems to depend very much on startups and expansions of fast growth firms, which Birch called "gazelles."

Most small businesses stay small; only a few businesses that grow rapidly account for a majority of the job growth attributable to small businesses. Empirical studies have found that the fastest growing five percent of all businesses account to anywhere from a majority to virtually all of the net job gains recorded by small business (Erickcek, 1997).

The role of start ups and expanding businesses is particularly important, because variations in overall growth rates between metropolitan areas seem to be driven mostly by differences in the rate of start-ups and expansions. Across regions, variations in job creation seem to be the dominant factor in explaining variations in overall growth rates (Eberts & Montgomery). Employment losses due to business contractions and closures are fairly uniform across metro areas (Erickcek, 1997).

A principal factor driving the expansion of fast growth businesses is high levels of innovation. Kirchoff's study of growth rates among Michigan firms showed that firms in high innovation industries grew 2.5 times faster than firms in low or moderate innovation industries (Kirchoff, 1995).

Methodology

Determining the contribution of fast growth firms to the regional economy requires tracking the employment or sales of individual firms over a number of years. This paper uses two independent and complementary sources of information. The first is tabulations of regional data for a study prepared for the Oregon Emerging Business Initiative (Impresa, 1999). The Impresa study analyzed the Oregon Employment Department's Covered Employment and Payrolls database (the ES 202 file) to measure firm level changes in employment over the five-year period 1992 to 1997. The Employment Department collects quarterly data on employment and payrolls for each firm in Oregon. This data allows us to classify firms according to their level of growth or expansion over these five years. The data cover all firms operating in the five Oregon counties of the Portland metropolitan statistical area (Columbia, Clackamas, Multnomah, Washington and Yamhill). The second data source used for this report was the "Fast 50" list of fast growing high tech firms in Oregon. This list, prepared by DeLoitte, Touche LLP and Danielle Birkin, ranks the fifty fastest growing firms in technology related businesses, based on sales growth from 1994 to 1998 (Business Journal, 1999). Data for Clark County, Washington were not available for this report.

Spin-offs, Startups and Fast Growth Firms in the Portland Regional Economy

Fast growing, high wage, traded sector business are a little more than one-half of one percent of all Portland area businesses. This report defines fast-growth businesses as those that had at least ten employees in 1997, had operated for at least five years, had employment growth of at least 15 percent per year between 1992 and 1997, and paid average wages of at least \$30,000 per year.

Fast Growth Business Definition

To qualify as a fast growth business, a firm had to meet all of the following tests:

- One or more employees in 1992, ten or more employees in 1997
- Employment grew at least 15 percent annually between 1992 and 1997
- Average wages greater than \$30,000 in 1997
- Sold goods or services in national or international markets

The data used in this study include only those firms that had average annual employment of one or more employees in both 1992 and 1997. Businesses in existence in 1992 that no longer had recorded employment in 1997, and businesses started after 1992 are not included in these computations.

We gratefully acknowledge the assistance of Ken Lux of the Oregon Employment Department in providing the data used in the analysis, and in offering helpful advice on preparing it for use in this report. Since data on individual firms is confidential, tabulations shown in this report are aggregated into categories including at least five firms.

The Setting: Growth in the Regional Economy, 1992 to 1997

The Portland metropolitan economy has been growing rapidly during the decade of the 1990s. Between 1992 and 1997, the region (defined as the five Oregon counties of the Portland metropolitan area), grew at an annual rate of more than 4.2% per year, expanding from 647,654 wage and salary jobs to 801,351 jobs in 1997. At the same time, average wages and per capita incomes in the metropolitan area have risen much faster than the rest of the nation. Today, per capita income, which had been just below the national average in 1988, is nearly 8 percent above the national average.

An important feature of the region's growth has been the expansion of higher paying firms and industries. This report focuses on higher wage firms; those paying annual wages about the same or higher than the regional average. Roughly speaking about a quarter of the region's firms employed slightly less than half of the region's workers paid average wages in excess of \$30,000 in 1997.

While this expansion has been reflected in the growth of many, if not most of the region's firms, a relatively small number of firms in a few industries account for a disproportionate share of the region's growth. The Portland economy consists of about 50,000 businesses with a payroll. These firms employed more than 800,000 workers, and had a total payroll of about \$25.6 billion in 1997. And because high wage jobs play an

Spin-offs, Startups and Fast Growth Firms in the Portland Regional Economy

important role in raising income and driving the economy, we focus on growth in firms that pay above average wages.

The Importance of High Wage Firms

While the region's average wage is about \$32,000 annually, there is considerable variation among industries and firms in wage levels. High wage industries and firms are particularly important to the regional economy for a variety of reasons. Their high wage levels help raise the standard of living, and produce a large multiplier effect that further stimulates the regional economy. High wage jobs are an important source of income for public services (a majority of state personal income taxes are paid by the 20% of households with incomes over \$60,000 per year). High wage jobs also tend to be in innovative firms and knowledge-creating industries which play an important role in the region's further growth and development.

About a quarter of the region's firms, (roughly 12,500 in all) pay an average wage of \$30,000 or more per year. These firms employed about half of the region's workers, some 392,000 in 1997. Even more importantly, firms with high average wages constituted the bulk of the region's wage base: just 25 percent of the firms pay more than 70 percent of all the wages in the region.

Table 2: Employment in Portland Area Firms Paying \$30,000 or more, 1992 to 1997

	1992	1997	Change 1992-97	Annual Growth Rate
Firms	12,477	12,477		
Employment	307,474	392,007	84,533	4.9%
Payroll	\$11,072,541,792	\$18,190,400,182	\$7,117,858,390	9.9%
Average Pay	\$36,011	\$46,403	\$10,392	5.1%

Source: Impresa calculations from Employment Department data. Note includes only firms and employment at firms that operated in the 5 Oregon counties of the Portland MSA in both 1992 and 1997.

The number of jobs in high wages firms in the Portland economy grew rapidly over the five year period 1992 to 1997. In 1992, about 307,500 people worked for high wage firms, by 1997, 392,000 worked for such firms, a growth of 84,500 jobs. Collectively, highly paid firms grew slightly faster than the overall regional economy during this time period.

Larger versus Smaller Firms

Like other regions, most of the businesses in the Portland metro area are quite small. This is also true of businesses with high average pay levels. In 1997, of those businesses with average wages in excess of \$30,000, about two thirds, or 8,250, had fewer than ten employees. However, the 4,250 high wage businesses with more than ten employees accounted for more than 90 percent (366,000 of 392,000) of the jobs in high wage businesses.

Table 2 shows the number of firms, employment and total payrolls for those high wage firms that had ten or more employees in 1997. Firms with ten or more employees and

Spin-offs, Startups and Fast Growth Firms in the Portland Regional Economy

average wages of more than \$30,000 per year account for nearly two-thirds of all the payrolls in the metropolitan area (\$16.8 billion of \$25.6 billion).

Table 3: Employment in Portland Area Firms with more than ten employees, paying \$30,000 or more, 1992 to 1997

	1992	1997	Change 1992-97	Annual Growth Rate
Firms	4,253	4,253		
Employment	286,992	365,873	78,881	4.9%
Payroll	10,224,893,556	16,786,034,156	6,561,140,600	9.9%
Average Pay	35,628	45,879	10,252	5.1%

Source: Impresa calculations from Employment Department data. Note includes only firms and employment at firms that operated in the 5 Oregon counties of the Portland MSA in both 1992 and 1997.

Fast Growth Firms

Growth and decline are continuous in the economy. Every year, new firms are born, old firms expire, and some businesses expand employment while other employers layoff workers. There are fast growing businesses even in declining regions, and declining businesses even in prosperous regions.

Not all firms in the Portland economy grew by the region-wide average of 4.2% between 1992 and 1997. For purposes of this analysis, we defined fast growth businesses as those firms that grew at more than 15 percent per year over the period 1992 to 1997. (Again, we are considering only those businesses with average wages of more than \$30,000 per year, and more than ten employees in 1997.)

Table 3 separates Portland area businesses into two groups based on their rate job growth between 1992 and 1997. Fast growth firms are those whose employment expanded at least 15% per year over the five years; slower growth firms are all other firms.

Roughly one-in-six high wage firms, slightly fewer than 700, grew at more than 15 percent per year over the five year period. Collectively these firms employed about 15,700 workers in 1992 and more than 50,000 in 1997. These fast growth firms thus added nearly 35,000 new workers to the regional economy over this time period. Average wages for fast growing firms were significantly higher than for slower growing firms: \$56,500 vs. \$44,200.

Table 4: Employment in Portland Area Firms with more than ten employees, paying \$30,000 or more, 1992 to 1997, by Growth Rate

	Employment				Payroll	Average Pay
	Firms	1992	1997	Growth 92-97		
Fast Growth	695	15,704	50,557	34,853	\$2,856,439,919	\$ 56,499
Slower Growth	3,558	271,288	315,316	44,028	13,929,594,237	\$ 44,177
All	4,253	286,992	365,873	78,881	16,786,034,156	\$ 45,879

Source: Impresa calculations from Employment Department data. Note includes only firms and employment at firms that operated in the 5 Oregon counties of the Portland MSA in both 1992 and 1997.

Spin-offs, Startups and Fast Growth Firms in the Portland Regional Economy

Traded Sector

Not all fast growing businesses are of equal importance in shaping the development of a regional economy. Many businesses compete largely or solely in a local marketplace. The market for restaurant meals, routine medical services, auto repair or haircuts, is a local market. While one firm may grow rapidly in a local market, it is often at the expense of other firms in the same sector. The growth of some firms often reflects a reorganization of ownership in an industry, rather than region-wide expansion, as when many of the doctors in a single town give up their separate practices and form a single group practice.

In contrast, businesses that export their goods and services outside the community grow not at the expense of their local competitors, but by capturing a larger share of national or global markets for their products. The net inflow of funds generated by such exporting is re-spent in the local community, driving regional economic expansion.

Table 3 classifies the employment of fast growing firms with ten or more employees and average wages of more than \$30,000 based on the markets served by the industry sector. Retailing, most service industries and construction, for example are treated as “local” industries, while most manufacturing, software, and some professional services are treated as “traded” or export industries. Industries that include firms that sell both in local and export markets are classified as “mixed.”

Table 5: Employment in Fast Growth Portland Area Firms with more than ten employees, paying \$30,000 or more, 1992 to 1997, by Traded Sector Status

Sector	Employment				Payroll	Avg. Pay
	Firms	1992	1997	Gain, 92-97		
Local	367	5,779	22,486	16,707	1,135,921,745	\$50,517
Mixed	136	1,884	6,205	4,321	306,705,499	\$49,429
Traded	192	8,041	21,866	13,825	1,413,812,675	\$64,658
Mixed/Traded	328	9,925	28,071	18,146	1,720,518,174	\$61,292
All Firms	695	15,704	50,557	34,853	2,856,439,919	\$56,499

Source: Impresa calculations from Employment Department data. Note includes only firms and employment at firms that operated in the 5 Oregon counties of the Portland MSA in both 1992 and 1997.

Fast growing, highly paid firms that sell their products and services in other states and nations In Portland, as elsewhere, those businesses that grow rapidly by exporting their goods and services to other states or nations, generate new income for the metropolitan area that is re-spent in the local economy and drives economic growth.

Industry Cluster

Our data show that fast growth, highly paid, traded sector businesses are not a random cross section of the Portland, or national economies. Those businesses that are growing rapidly in traded sector markets are highly concentrated in a few industry sectors, particularly electronics, software, metals and wholesaling.

Spin-offs, Startups and Fast Growth Firms in the Portland Regional Economy

Table 4 shows the distribution of employment of fast growing, traded and mixed sector firms. A majority of new jobs created by fast growth, high wage traded sector firms were created by high tech firms producing electronics products or software. Nearly all of the remaining employment among traded, fast growth firms is found in a handful of other industries that are important clusters in the Portland metropolitan area. The growth of wholesaling firms (a category that includes many of the region's sports apparel and footwear manufacturers) added more than 2,000 jobs. Firms producing primary and fabricated metals, industrial machinery, and transportation equipment (trucks, ships, aerospace) also added more than 2,000 jobs. Advertising, public relations and printing, all important components of the region's creative services industry cluster included 22 high growth firms that collectively added nearly 1,000 jobs. In addition, the growth of employment at engineering firms (that provide services to a variety of other industries, including high tech manufacturing, government and construction), also added nearly 900 jobs.

Table 6: Employment in Portland Area Firms Traded Sector Firms with more than ten employees, paying \$30,000 or more, 1992 to 1997, by Industry

Industry	Firms	1992	1997	Change
Electronics	72	5,897	14,870	8,973
Wholesale	69	712	2,872	2,160
Metals, Machinery	45	1,090	3,249	2,159
Transportation				
Software	52	720	2,798	2,078
Advertising/PR, Printing	22	527	1,507	980
Engineers	26	529	1,399	870
Manufacturing	16	191	483	292
All Other	26	259	893	634
Total	328	9,925	28,071	18,146

Source: Impresa calculations from Employment Department data. Note includes only firms and employment at firms that operated in the 5 Oregon counties of the Portland MSA in both 1992 and 1997.

It is striking that more than 90 percent of all of the job gains recorded by fast growth firms is in one of these several industry clusters. Less than ten percent of the growth (about 900 jobs in 42 firms) was in businesses not clearly part of an established industry cluster. This finding strongly underscores the importance of a thriving industry cluster in creating an environment in which fast growth firms can flourish.

Characteristics of Fast Growth Firms

Employment Department data provide a comprehensive picture of the role of industry clusters, especially high technology, in driving the region's growth. Due to confidentiality restrictions it is not possible to use the Employment Department data to identify individual fast growth firms. An alternative (and slightly different source) of information about fast growing firms is the "Oregon Technology Fast 50" list compiled by DeLoitte, Touche LLP and Danielle Birkin of the Business Journal. This list ranks the 50 fastest technology companies in Oregon according to change in total sales between 1994 and 1998. Table 6 shows Portland area high tech firms with more than \$10 million in 1998 sales who were included on the "Fast 50" list. The bulk of fast growing firms are

Spin-offs, Startups and Fast Growth Firms in the Portland Regional Economy

found in a few specializations within the electronics industry: displays and imaging technology, semiconductors, semiconductor manufacturing equipment and software.

Table 7: Portland Area “Fast 50” Firms, Ranked by Sales, 1998

Firm	City	Product	Employees	Sales (Millions)
InFocus Systems	Wilsonville	Displays	532	306.7
Lattice Semiconductor	Hillsboro	Semiconductors	540	245.9
Electro Scientific Industries	Beaverton	SME Equipment	902	229.6
FEI Co.	Hillsboro	SME Equipment	1,022	178.7
FLIR Systems	Tigard	Imaging Technology	662	154.8
Planar Systems	Beaverton	Displays	900	129.0
TriQuint Semiconductor	Hillsboro	Semiconductors	679	111.6
RadiSys	Hillsboro	Computers	400	108.2
CFI ProServices	Portland	Software	650	85.6
OrCAD	Beaverton	EDA Software	261	47.6
Timberline Software	Beaverton	Software	367	44.3
Cascade Microtech	Beaverton	SME Equipment	200	41.6
Laughlin Wilt	Beaverton	Electronic Manufacturing	325	34.6
Huntair	Tigard	Cleanroom Equipment	206	30.9
ABC Technologies	Beaverton	Software	140	17.7
Medicalogic	Hillsboro	Medical Software	150	16.9
Vernier Software	Portland	Software	37	16.5
Extensis	Portland	Software	95	15.5
800 Support	Lake Oswego	Tech Support	473	10.5

Source: Oregon Technology Fast 50, Portland Business Journal, May 14, 1999. Portland area high technology firms with sales of \$10 million or more. **Note: The data contained in this table is not taken from Employment Department records:** the firms listed in this table are selected based on sales growth, not employment growth, and consequently, may or may not be counted among the fast growth firms analyzed in the other data in this report.

Spin-offs, Startups and Fast Growth Firms in the Portland Regional Economy

If we look closely at the Fast 50 electronics firms, it is apparent that today's fast growing firms have extensive roots in the Silicon Forest. Table 7 shows the year founded and predecessor firm for each of the Portland area Fast 50 electronics makers with sales of \$10 million or more in 1998. The bulk of these firms were started during the 1980s, with only one firm, Huntair (a maker of cleanroom equipment) having started during this decade. A majority of the businesses (six of 11) trace their roots to Tektronix. (Predecessors were determined by identifying the prior places of employment of the firm's initial founders). Two more are related to Intel. ESI is one of the region's oldest high tech firms, and FEI has been in the region for nearly 30 years.

The data in Table 7 clearly illustrate the cumulative nature of growth in the high technology industry. New fast growing firms are most often spin-offs or outgrowths of the technological and managerial expertise that was grown locally in existing high tech firms. The data also suggest the persistent, long term quality of growth in the industry: a majority of the region's fast growing electronics firms are related to firms established two and four decades ago.

Table 8: Portland Area "Fast 50" Electronics Firms, with Predecessors, Ranked by Sales, 1998.

Firm	Founded	Predecessor(s)	Employees
InFocus Systems	1986	Tektronix (1946)	532
Lattice Semiconductor	1983	Tektronix (1946)	540
Electro Scientific Industries	1953	Brown Engineering (1944)	902
FEI Co.	1971	Startup	1,022
FLIR Systems	1978	Floating Point Systems	662
Planar Systems	1983	Tektronix (1946)	900
TriQuint Semiconductor	1985	Tektronix (1946)	679
RadiSys	1987	Intel (1976)	400
Cascade Microtech	1983	Tektronix (1946)	200
Laughlin Wilt	1988	Tektronix (1946)	325
Huntair	1993	Intel (1976)	206

Source: Oregon Technology Fast 50, Portland Business Journal, May 14, 1999. Portland area high technology firms with sales of \$10 million or more. Predecessor information compiled by Regional Connections project from interviews, Quanix Directory and other published sources. **Note: The data contained in this table is not taken from Employment Department records:** the firms listed in this table are selected based on sales growth, not employment growth, and consequently, may or may not be counted among the fast growth firms analyzed in the other data in this report.

Spin-offs, Startups and Fast Growth Firms in the Portland Regional Economy

References

Almeida, Paul and Bruce Kogut. 1997. "The Exploration of Technological Diversity and the Geographic Localization of Innovation," *Small Business Economics*, 9:21-31

Birch, David L., 1979, *The Job Creation Process*, unpublished report, MIT Program on Neighborhood and Regional Change, prepared for the Economic Development Administration, U.S. Department of Commerce, Washington, DC.

Cortright, Joseph. 1988. *Small is Bountiful: Manufacturing, Small Business, and Oregon's Economy*, Staff Report to the Oregon Joint Legislative Committee on Trade & Economic Development, January, 1988.

Eberts, Randall W. and Edward B. Montgomery, 1995. "Employment Creation and Destruction: An Analytical Review," Federal Reserve Bank of Cleveland, 1995.

Erickcek, George A. 1997. "The Role of Small Business, A Tale of Two Cities," *Upjohn Institute Employment Research*, Fall, 1997.

Goldfield, Robert. 1996. "New venture capital funds take root." *The Business Journal*, (Portland, Oregon), June 17, 1996.

Goldfield, Robert. 1999. "VC pace slow in Oregon, but gets feverish in U.S.," *The Business Journal*, (Portland, Oregon), November 22, 1999.

Impresa, Inc. 1999. *Emerging Growth Businesses in the Oregon Economy: The Contributions of Fast-Growing Firms*, July, 1999.

Kirchoff, Bruce A. 1995. "Twenty Years of Job Creation Research: What have we learned?" (Manuscript: New Jersey Institute of Technology) 1995.

"Oregon Technology Fast 50," *The Business Journal*, (Portland, Oregon), May 14, 1999.

Rogers, E. M. and J. K. Larsen. 1984. *Silicon Valley Fever: Growth of High Technology Culture*. New York, Basic Books

Saxenian, A. 1994. *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*. Cambridge, Harvard University Press.

Zook, M. (1999). *The Impact of Venture Capital on the Emerging Internet Content and Commerce Industry in the United States*. Association of Collegiate Schools of Planning 1999 Conference, Chicago, IL

Personal Interviews