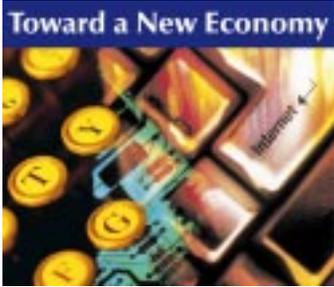


Vision - The Voice of the Entrepreneurs

Section IV

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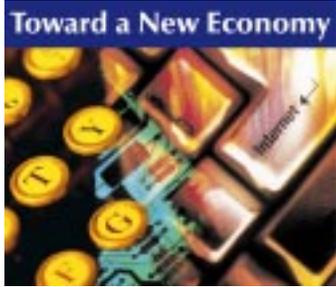


An 'Emerging Companies' roundtable discussion and selected personal interviews with industry leaders identified key success factors for companies in the InfoComm Cluster.

- Seventeen companies based in the Greater Washington Region who are emerging as significant players in the InfoComm industry participated in the roundtable discussion (See Appendix I for a list and description of these companies).
 - Geographic distribution of participants:
 - 10 companies from Virginia
 - 4 companies from Maryland
 - 3 companies from Washington D.C.
- Individual interviews were conducted with key executives of companies that are shaping the future of the InfoComm Cluster in the region.

INTERVIEW PARTICIPANTS

| | | | | | |
|-----------------------|-----------------|-----------------------|---------------------|----------------|-----------|
| Arlen Communications | Gary Arlen | President | NASDAQ | Al Berkeley | President |
| Comtex | Charlie Terry | President & CEO | National Geographic | Mitch Praver | Senior VP |
| CyberCash | Bill Melton | CEO | Network Solution | Gabe Battista | President |
| Disclosure/PriMark | Cheryl Gustitus | Director of Marketing | Proxicom | Raul Fernandez | CEO |
| Discovery Enterprises | Michela English | President | SAIC | Mike Daniels | Sector VP |
| Landmark | Kathy Clark | CEO & Co-founder | UUNET | John Sidgemore | CEO |



Discussions with key industry participants identified the critical success factors for a region to be competitive in the InfoComm industry in the future.

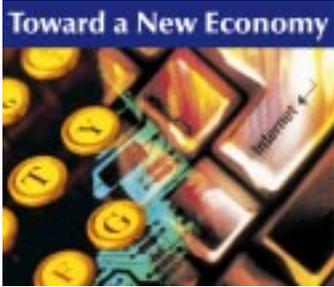
Both primary and secondary factors identified in the discussion focused on infrastructure issues:

PRIMARY SUCCESS FACTORS:

- Access to capital
- Availability of a pool of qualified employees
- High-quality educational resources
- Marketing-image of region
- Access to strategic partners
- Access to entrepreneurial mentors

SECONDARY SUCCESS FACTORS:

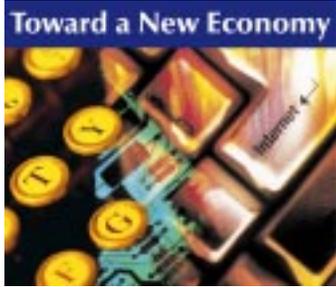
- Availability of start-up support services such as accounting, legal, marketing, and financial services
- Adequate transportation
- Access to affordable commercial space
- Strong collaboration between local organizations and agencies within the region



The Greater Washington Region faces many typical and a few unique challenges and needs to take action to eliminate key weaknesses.

Critical Success Factors for regional competitiveness

| Greater Washington Region Competitiveness | Primary Success Factor | Secondary Success Factor |
|--|--|--|
| <p>Regional Strengths</p> <p style="text-align: center;">+</p> | <ul style="list-style-type: none"> • Entrepreneurial culture and access to strategic partners • Opportunities to build relationships with entrepreneur-mentors | <ul style="list-style-type: none"> • Availability of affordable office space • Adequate airports and Metro |
| <p>Regional Weaknesses</p> <p style="text-align: center;">-</p> | <div style="border: 1px solid black; padding: 5px; display: inline-block; transform: rotate(-15deg);"> <p>Action Required</p> </div> <ul style="list-style-type: none"> • Availability of skilled employees • Collaboration between D.C., VA and MD to improve support environment and infrastructure • Marketing the image of the region as a hub for the InfoComm Industries | <ul style="list-style-type: none"> • Access to capital • Transportation (Va, Md) • Perception lingers that there is an absence of a top-notch technology university |



The visionary aspect of the InfoComm Cluster is starting to take shape -- successes are starting to happen and an entrepreneurial culture is beginning to evolve.

- A collaborative atmosphere and new regional networking opportunities with strategic partners and angel-mentors provide a competitive advantage to the Greater Washington Region which more established high-tech centers may have outgrown
- **Recent successes fuel regional investment from newly cashed-out entrepreneurs as well as from industry- knowledgeable venture capitalists who invest not only on future promise, but also on past performance.**
 - “There’s more entrepreneurs out there who have sold out and they’re mentoring angel networks.”(from the roundtable discussion)
- **Recent successes of local entrepreneurs are beginning to create excitement and a new culture of entrepreneurship, complete with the dreams of reward and willingness to accept risk that are essential to a vibrant New Economy.**
 - “I’ve been in the area for 20 years, and there’s no question in my mind that the attractiveness of the area is that if somebody comes to work for one company and it doesn’t work out they can go down the street and work for Bill Melton, Gabe Battista, or John Sidgemore. . . The big attraction is there’s lots of things and lots of opportunities. . . we have enough of a critical mass to attract more.” Gabe Battista, Network Solutions
- **Regional Networking** is starting to enhance the entrepreneurial culture and create a community of entrepreneurs.

Ciena Corporation

- **Founded in 1992** as a fiber-optic network solutions manufacturer.
- Went public in 1997, selling shares for \$23 in the biggest IPO of a start-up in history.
- **Being Sold** to Tellabs in 1998 for **\$4.1 billion**, representing a 14 percent premium on the company’s shares.

Legent Corporation

- **Morino Associates merged with Dusquesne Systems Inc. in 1989** to form Legent Corp.
- **Acquired** in 1995 by Computer Associates for **\$1.8 billion**.
- Sold at \$47.96 per share, a more than 50 percent premium over the stock’s market price.

Yurie Systems

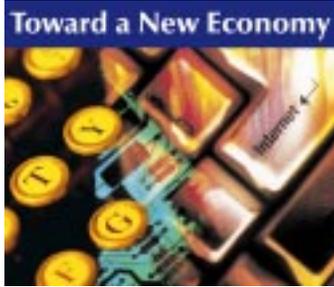
- **Founded in 1992** as a telecommunications consulting firm serving various U.S. government agencies.
- Went public in February 1997 and was recognized as America’s Number One Hot Growth Company by Business Week in May 1997.
- **Being acquired** by Lucent Technologies for about **\$1 billion** (June 1998).

Computer Data Systems, Inc.

- **Founded in 1968** as a **systems integrator and developer**
- Acquired in September 1997, a total transaction value of **\$373 million**.

Trusted Information Systems

- **Founded in 1983**, is now a global provider of **multidimensional security solutions for enterprise networks**.
- Acquired in 1998 by Network Associates, Inc. in a stock-for-stock pooling of interest merger valued at over **\$300 million**.



Access to capital, ranked the single most significant success factor by the interviewees, is perceived as improving in terms of both quantity and quality of investments.

Venture capital companies investing more than \$5 million in 1st Quarter 1998 include:

| | |
|----------------------------|----|
| HarbourVest Partners | MA |
| Alta Communications | CA |
| BancBoston Capital | MA |
| Chase Capital | NY |
| Cognizant Enterprises Inc. | CT |
| HealthCare Ventures | NJ |
| Norwest Venture Capital | MN |
| Trident Capital | CA |

Top 10 venture capital “investee” companies in the GWR in 1st Quarter 1998 received:

| | |
|--------------------------------|---------------------|
| WNP Communications | \$32,979,000 |
| Pathnet Inc. | \$30,000,000 |
| Comm Site International | \$21,877,000 |
| TeleCorp PCS Inc. | \$16,755,000 |
| PNE Media LLC | \$12,400,000 |
| HealthScribe Inc. | \$11,000,000 |
| Argonex Inc. | \$7,400,000 |
| Diginet Americas Inc. | \$6,857,000 |
| The Compucare Company | \$6,500,000 |
| Oncology Affiliates Inc. | \$6,000,000 |

InfoComm investors in bold.

Source: Price Waterhouse National Venture Capital Survey, 1998

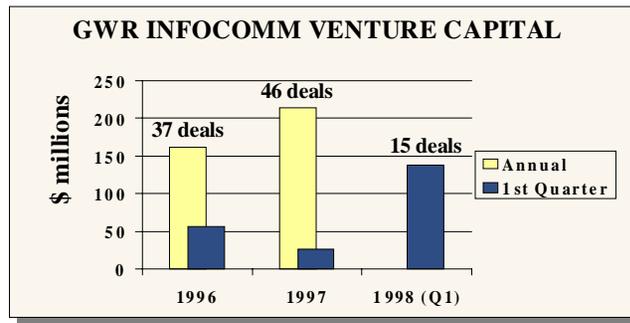
- ***More venture capital is finally moving into the region.***
 - “We are starting to see the critical mass of VC’s moving into this area.” (See below)
 - “When we were looking (for venture capital) unfortunately it wasn’t there. But it’s there now. Now you go to a restaurant and every once in a while you hear some deals or you hear people talking about technology.” (roundtable discussion)
- ***Not only more money, but more knowledgeable money.***
 - “In the last year and a half there’s more money, it’s smarter money. They are certainly willing to listen. And there’s more entrepreneurs out there who have sold out.”
 - “From our experience what we found is that VCs are definitely knowledgeable and are focused on seed kind of funding. . . And they were savvy enough to invest in seed companies. We found very good quality capital.”
 - “Last year we had the MidAtlantic Venture Fair, you see the quality that came (from) outside to look at companies over here. That’s testimony to the fact that these people recognize that this region is something they cannot ignore.” (Roundtable discussion)



The entrepreneurial backbone of the InfoComm industries has driven the pool of venture capital being invested in the Greater Washington Region to more than double -- from \$68 million in 1st quarter 1997 to \$181 million in 1st Quarter 1998.

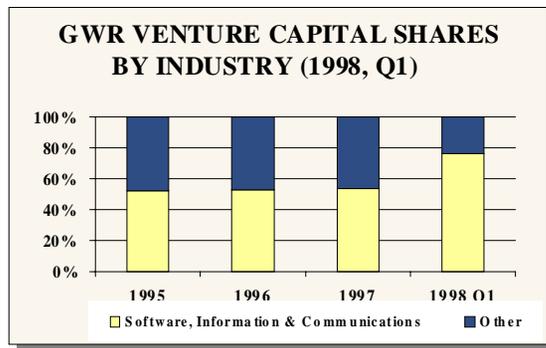
Software & Information and Communications venture capital in 1st Quarter 1998 is more than half of 1997 annual venture capital investment in those industries.

The number of InfoComm deals has increased from 37 in 1996 to 46 in 1997, and with 15 deals, 1st quarter 98 is on pace to surpass 1997.



Source: Price Waterhouse National Venture Capital Survey

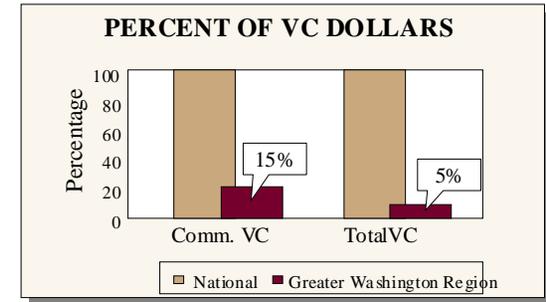
Software & Information and Communications firms attracted more than two-thirds of venture capital investment in the region, absorbing about \$126 million in 1st Quarter 1998. All of Washington D.C.'s \$27 million in venture capital investment was invested in communications firms.



Source: Price Waterhouse National Venture Capital Survey

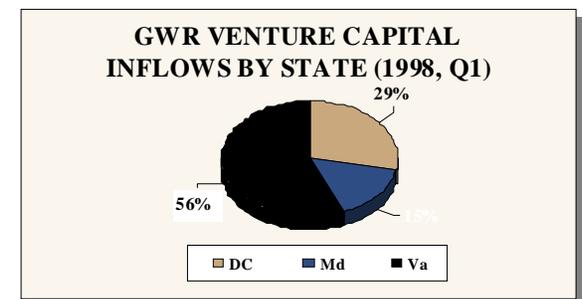
The Greater Washington Region accounts for more than 15% of communications venture capital nationally.

By contrast, total regional venture capital attracts only 5% of venture capital investment nationally.

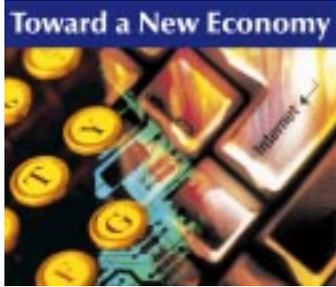


Source: Price Waterhouse National Venture Capital Survey

Venture capital inflows to Virginia dominated the region with \$102 million in 1st quarter 1998, reflecting the concentration of communications firms located in the state.

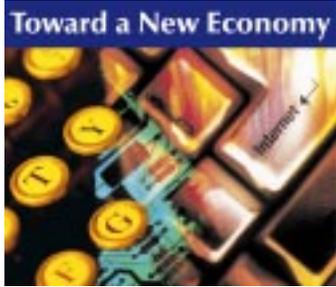


Source: Price Waterhouse National Venture Capital Survey



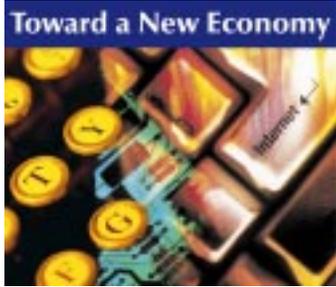
For the Communications and Information industries to expand successfully, availability of high-tech labor in the region must increase, say entrepreneurs.

- The demand is acute, and is leading to strong wage pressures. . . in Northern Virginia alone, 19,000 unfilled technology jobs represent nearly \$1 billion in unearned wages and 10% of the unfilled technology jobs in the U.S. (Lawmakers Push to Fill Tech Jobs, WashPost 2/22/98)
 - “It is impossible to hire good (technology workers), unless you are willing to pay huge amounts of money. For an entrepreneurial company that is not well funded. . . technical people are very difficult to find.” Charlie Terry, Comtex
- Not just more labor, but better-skilled labor is essential . . . from K-12 basic education to mid-career job training, the whole system of academic and career development needs to be reassessed.
 - “I think (it) is critical (to) integrate technology training and assessment in the K-12 and higher education. To build the future technology-focused work force, (we should) start at the beginning of the educational chain.”
 - “We don’t need more tech workers, we need tech workers that can produce and get it. . .”
(roundtable discussion)
- Attracting tech workers from outside the region may alleviate some of the pressures in the short term, but training and education solutions in the region are needed for the long term. . . Creative solutions are needed to open the doors to tech workers from other regions and countries to migrate here.
 - “Some kind of (PR) package that could be given to HR people that (we) could give to candidates to get them excited about the region would be great.”
 - “You can’t get any new H1-Bs until October, the new fiscal year. They are only letting 30,000 of those every year . . . I think that we need to take a look at (the visa issue) in terms of getting more qualified workers in the area.”
 - “Colleges (are) a long-term solution. A short-term solution is importation of the right people, both Americans and non-Americans. I think it’s very important to allow skilled foreigners into this country . . . they will create more wealth by coming here than trying to retrain somebody. . . that’s not a social desire, that’s just a businessman thing. How long will it take to make (skilled workers)? So I think we need to do both.”



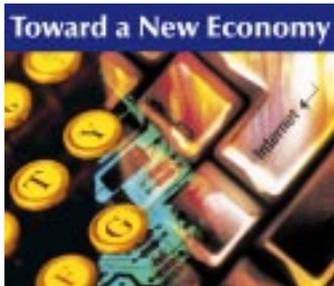
Educational links to the commercial sector should be a high priority--both in terms of quick and easy technology training and of top-notch, prestigious university programs that produce the new generation of industry leaders.

- Immediate needs are demanding creative solutions that can produce capable workers in record time.
 - \$2.4 million in state funds is being administered by the Northern Virginia Regional Partnership, a coalition of local governments, businesses and colleges. The funds are slated to fund programs that will establish six training centers at local colleges and universities that will change in response to the technical needs of local businesses. (College Center Aims to Close High-Tech Gap, Washington Post 4/26/98)
 - An innovative pilot program run by the Northern Virginia Community College in cooperation with eight Washington Region employers expects to train non-traditional recruits such as English majors and retirees into becoming computer programmers and network technicians in a six-month crash course.
- But it's not just more minds, it's the best and the brightest minds that are needed. Encouraging technological development and thought leadership depends on the support of regional research facilities and the prestige of local universities. Stanford University's primary role in Silicon Valley's successful development as well as MIT's link to New England's technology industry are obvious. But no such industry-university connection supports the Washington Region's bid to be a national center of technology. (Finding Links that Click Between Area Univ., Tech Firms, Washington Post 2/24/98)
 - “. . . We don't have. . . a major technology university. . . Whereas in Boston and Silicon Valley a lot of the research and new companies have come out of the universities, we don't have that.”
 - “We need the best and the brightest, and a great university attracts the best and the brightest from around the country.”
 - “If you think about it, you get educated, you go to a university. If you go to an MIT, or a Stanford, or a Harvard. . . I think, a very high percentage of people stay in the area where they get educated. And that's something we can't do.”(roundtable discussion)
- Though the region does not have an MIT or Stanford, in some respects federally funded research and projects fulfill this role.
 - “We do have the Federal Government. Just look at the Internet. That is bigger than anything any university has ever done and that directly came out of the government. That's why all these Internet companies are located here... They've been our MIT.” Kathy Clark, Landmark Systems
 - “The example of ARPA; there has never been anything like that in the federal or commercial sector. That is a unique creature which has spawned everything from the video conferencing industry to high-speed computing, high-performance computing to the Internet.” Mike Daniels, SAIC



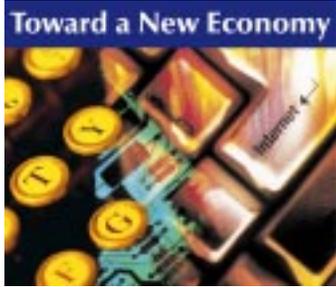
A collaborative atmosphere and new regional networking opportunities with strategic partners and angel-mentors provide a competitive advantage to the Greater Washington Region.

- Networking in the Greater Washington Region is still an open and manageable process
 - “More than anything else, (‘social glue’) is where I think the biggest (strength) still exists in the region-- people’s sense of knowing each other on a tighter basis.” Mario Morino
 - “(But what is good) about being small and growing is the collaborative opportunities that occur. We’re (also) in Silicon Valley right now. I feel like it’s too big. It’s closed, it would be harder to do some (of) the deals and collaborative partnerships that we’re able to do here because of the networking like this and what the KnowledgeWay has done, and the introductions to some of the larger companies. I don’t know whether that would (happen) in Silicon Valley now.” Roundtable participant
 - “When I started the business back in ’91, ’92, I was just looking for a book on how to do some of the basics. Today you’ve got more than a book; you’ve got a whole community, an interactive group of people at any given time you can get access to knowledge, to experience, to capital through this network” Raul Fernandez, Proxicom
 - “Around here, at least from my experience with Mindshare and with the other organizations, people are anxious to work together. We do spend the time working together as opposed to viewing everybody as a competitor.” Roundtable participant
 - One example of networking is the Netpreneur program. It is an Information-age networking forum where local Internet entrepreneurs (netpreneurs) are given access to a world of networking opportunities, from on-line discussions with other netpreneurs and CEO forums to monthly coffee meetings, seminars, and conferences.
- The first generation of successful entrepreneurs is already moving to pass their invaluable know-how onto less-experienced counterparts.
 - “(We need) access to find people who had been there and done that. . . someone who understands what is involved with creating a business..” Roundtable participant
 - “I think from my experience with this organization (KnowledgeWay) that we have to become leaders, like the next generation of Mario Morino.” Roundtable participant
 - “I think the building of that social glue around the new players, the emerging players, is really critical. I guess you can just further that example -- we’re putting together an angels group, and to date, at every dinner we’ve had, we are introducing very successful people for the first time.” Mario Morino
 - New investments and opportunities are created by executives who have cashed out. For example, U.S. Internetworking, an Annapolis, Md.-based holding company, was started by ex-Digex executive Christopher McCleary in 1997.



For emerging companies, access to support services that are familiar with small, fast-growing businesses is essential.

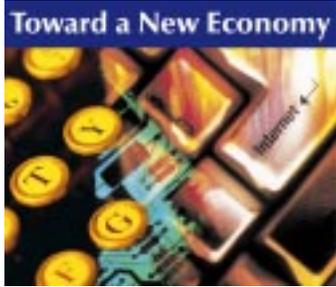
- For start-ups, entering an incubator can be financially and strategically advantageous. Low-cost space and services such as phone/Internet access, copying, and supplies alleviate cash-flow pressures, and a constant stream of advice ranging from accounting to legal, keeps entrepreneurs on track.
 - Digex founder Doug Humphrey bought a Laurel office building that he's turning into an incubator for Internet start-ups where he hopes to plow his profit and experience back into the region while guiding start-up companies to make a profit. "When Digex was getting started, what we needed was supplies and advice -- not checks." (Article, Washington Post, 11/21/98)
 - "Within two weeks of coming here (to Humphrey's incubator) we had all of our books done, we reincorporated, and we got stock created." (quote of Digital Addiction founder, Washington Post, 11/21/98)
 - Montgomery County's high-technology incubator has been credited for successes such as Visual Networks, which recently raised \$46 million in an initial public offering.
- "(A critical success factor is) an infrastructure of support personnel. In other words, you can walk down the street most places in California and find 15 lawyers that know how to write up a partnership deal for a start-up company. . . It has only been recently here in Washington that we had many lawyers that know how to put that sort of a deal together." Bill Melton, CyberCash
- The Netpreneur Program, started in 1997, was created to ensure the success of the fast-growing community of netpreneurs -- entrepreneurs who are creating Internet-based products and services -- in the Greater Washington Region. The program provides a forum for networking activities and seminars focused on Internet business with an ongoing calendar of activities.
 - "Netpreneurs are the economic drivers of the New Economy. The entrepreneurial environment that exists in this region is often overlooked, but cultivating that spirit and helping to grow these companies is the key to our future success in the New Economy." Mario Morino, The Morino Institute



InfoComm industry representatives believe that branding and promoting the Greater Washington Region's strength as a primary hub for these industries will boost the region's performance in many other critical success factors.

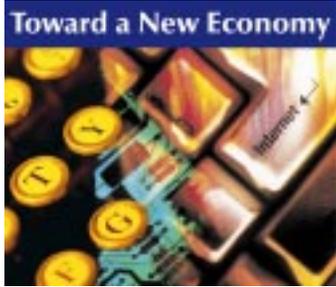
- The image of the Greater Washington Region as a center for the InfoComm industries must be strengthened through an organized public relations strategy to encourage more venture capital investment and increase the willingness of entrepreneurs and skilled employees to stay in and/or locate to the region, ultimately leading to a New Economy in the region.
 - “We need those people (venture capitalists) to move here and to want to invest here because there is a track record that says that money can be produced here. And right now we don't (promote) that track record [they are convinced that] it is a PR problem.”
 - “The reality is that we really don't go out to the guys in San Francisco and the guys in Boston and promote the area.”
 - “Branding this region as the destination for the New Economy is . . . critical (to) attracting the entrepreneurs and the workforce.”
 - “There's a tremendous opportunity (with branding this region) . . . to get people excited about coming here.”
 - “There is success in that company (in the Greater Washington Region) and they've (venture capitalists) heard about it and come to the table (the next time) not having to do due diligence about something from scratch but having an inclination of what (it is) about because of the culture of success around it.”

(roundtable discussion)



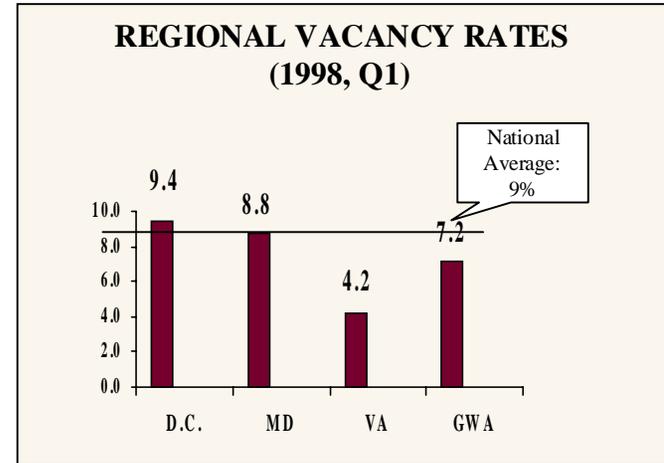
An integrated Greater Washington Region approach requiring close coordination and teamwork between D.C., Virginia, and Maryland is a critical condition for the success of the region.

- A collaborative effort is needed to improve the supporting environment and infrastructure.
 - “This region has suffered because of the competition between the various state and local economies. I think we need to start to work to eliminate those boundaries so that the region operates as a single entity.”
 - “We’ve got to get the Senators and Congressmen to start focusing and saying, ‘Let’s work together and boost the entire area.’ I don’t think that we, as entrepreneurs, have gone to our politicians to do that.”
(roundtable discussion)
- This is a unique problem for the Greater Washington Region and puts it at a disadvantage relative to other technology centers, such as Silicon Valley and Boston, which are each under one state jurisdiction.
 - “If you look at all the other regions that we compete against, if you’re talking San Francisco, you’ve got one San Francisco political machine to deal with. Boston, you’ve got Boston. New York, you’ve got New York. In Greater Washington you have three political machines to deal with.”

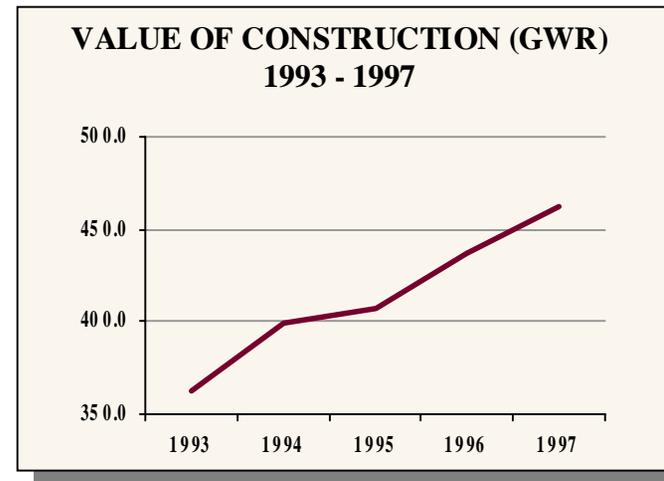


Emerging companies see record-low vacancy rates as a potential threat to start-up companies with limited funding.

- Overall, office space is still available and affordable.
 - “For my first year as a start-up, I don’t think I could afford \$22 per square foot. But in our third year I was trying to go public, \$22 per square foot for a four-year lease is not bad. And there’s plenty of it. In San Francisco we’re talking \$40-50 a square foot.” Roundtable participant
 - The average rental rate for the 1st quarter in 1998 was \$29.31 per square foot in Washington D.C. (Cushman & Wakefield).
- But rising prices may hinder future start ups.
 - Vacancy rates are at record lows in 1st quarter 1998.
 - Washington D.C. was at 9.4%, the lowest rate since first quarter 1990.
 - Suburban Maryland had a vacancy rate of 8.8%.
 - All but one of Northern Virginia’s 14 markets had a single-digit vacancy rate. The overall Northern Virginia vacancy rate is 4.2%.
 - The national vacancy rate was 9.0%.
- Increased construction is expected to alleviate some of the pressure.
 - In 1st Quarter 1998, 1.6 million square feet of new office space in Washington D.C. was under construction, 47% of which was pre-leased. (Grubb and Ellis)
- Build-to-suit (flex) building as well as office parks (campuses) have become increasingly popular.
 - UUNET is building a 1-million-square-foot facility in Northern Virginia, complete with playing fields and other amenities, to attract a young and dynamic workforce. “We’ll have 500 acres and we’ll build baseball fields and soccer fields, . . . and the average age of (our employees) is around 24, (so) that stuff is important.”
 - BAAN, a major software company, is relocating its U.S. headquarters to Northern Virginia, building a 2.5 million square foot campus.
 - Discovery is planning to construct a large office space in the Silver Spring or Bethesda area.



Source: Grubb & Ellis



Source: Dept. of Commerce