
Knowledge, Learning and Innovation in Ontario's ICT Clusters

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Workshop Questions

- Cluster strengths
 - What is working well in the cluster?
- Cluster challenges
 - What challenges do they face?
- Policy implications
 - What can be done to address the challenges?



Ontario's ICT Clusters I

- GTA
 - 3362 firms across every 11 different segments of the sector
 - Employed 148,000 at end of 2003, down 20% from 2000
 - Key firms include headquarters of most major MNCs
 - Bell Canada, IBM, Rogers, Nortel, Celestica, Xerox, HP, EDS, AT&T, Motorola, Clearnet, SGI, Microsoft, Siebel, ATI, Gennum
 - 500 firms are active R&D performers – 6,600 researchers
 - IBM Software Solutions Lab – 2500 employees
 - Xerox Research Centre in Sheridan Park
 - Cluster is geographically dispersed
 - From Markham to Oakville
 - Multiple, competing industry associations,
 - representing different segments and interests
 - Large MNC presence means it is less domestically focused than Ottawa or Waterloo clusters



Ontario's ICT Clusters II

- Ottawa
 - 1400 firms across four major segments
 - Origins linked to NRC labs and CRC
 - Fateful decision to locate BNR labs in 1958
 - Differentiated by strong research focus
 - 90 % of R&D in industrial telecommunications
 - Major firms
 - Newbridge (Alcatel), Nortel, Cisco, JDS, Corel, Mitel, Zarlink, Tundra, Mosaid
 - Supported by strategic federal policy – MSD program 1989
 - Dynamic photonics cluster
 - Strong links to PRO and NRC's Photonics Fabrication Facility
 - Recent formation of Ottawa Photonics Research Alliance
 - 52% of \$900 m in VC investment in Ottawa in 2001



Ontario's ICT Clusters III

- Waterloo
 - 400 high tech firms employing 16,000
 - Second highest location quotient in Canada for employment in computer and electronic product manufacturing
 - Lead firms are largely indigenous offshoots
 - RIM, Open Text, Descartes, Mortice Kern Systems, ComDev
 - Dynamic role of U. of Waterloo
 - Entrepreneurial culture
 - Encourages spinoffs
 - Starting to emerge on VC's map
 - Reinvestment in research infrastructure
 - Perimeter Institute – theoretical physics



Firm Capabilities I

- GTA
 - Strengths
 - Management experience
 - Access to outside markets
 - Diversifying product base
 - Weaknesses
 - Cooperation with public R&D and educational institutions
 - Limited local production activity – outside of software development
 - Cooperation with local firms to influence public policy



Firm Capabilities II

- Ottawa

- Strengths

- R&D capabilities (Nortel, IBM CAS, etc.)
 - Management capabilities – trained by anchor firms
 - Monitoring of customers and competitors for innovative ideas
 - Firm creation – serial entrepreneurs acting like angels e.g. Denzil Doyle (Digital Canada), Terry Matthews (Newbridge affiliates program).
 - Cooperation with public R&D and educational institutions
 - Cooperation with local firms to influence public policy

- Weaknesses

- Diversity of customer base
 - Diversity of product offering
 - Impact of technology cycles



Firm Capabilities III

- Waterloo
 - Strengths
 - Monitoring of market trends
 - Monitoring of technology trends
 - Product development
 - Product differentiation and customization
 - Strong local talent pool
 - Global market access
 - Weaknesses
 - Management experience and talent
 - Lack of new firm formation
 - More restricted access to capital



Finance

- GTA
 - Strengths
 - Attracted second most VC (after Ottawa)
 - Weaknesses
 - Limited links of MNC's to local firms
- Ottawa
 - Strengths
 - Funding for firm start-up and early stage growth (VC funding, local angel investors, firm programs)
 - Attracted most VC among CMAs between 1998-2003
 - Weaknesses
 - Funding for later stage firm growth
 - Over concentration of VC funding
- Waterloo
 - Strengths ?
 - Emerging local angels and VC's
 - Weaknesses
 - Limited seed funding for new firms
 - Restricted access to VC funding for firm growth



Talent I

- GTA
 - Strengths
 - Large diverse labour pool
 - Broad range of ICT-related higher education
 - 44 university-level ICT-related program in GTA
 - 39 college-level ICT-related programs in GTA
 - 76 private schools offering ICT training in the GTA
 - Weaknesses
 - Little strategic cooperation between firms and educational institutes to plan for future talent requirements
 - Labour shortages expected after 2008



Talent II

- Ottawa
 - Strengths
 - Highly educated labor pool
 - Skilled people are attracted to the region for job opportunities
 - Local universities have recently coordinated efforts to supply needed talent
 - Weaknesses
 - Region's vulnerability to specific market shocks could lead to dispersion of talent
 - Lack of diverse employment opportunities
- Waterloo
 - Strengths
 - Thick labour market with an experienced work force and a robust supply of talent from the university.
 - Co-op program at U of W builds important connections between students and local industry
 - Weakness
 - Lack of managerial talent at the top level
 - Over reliance on local graduates – difficult to attract outsiders to the region

Knowledge Generation I

- GTA
 - Strengths
 - Strong full-time R&D employment, most in development
 - Strong public R&D institutes – over 100 ICT-related research groups, centres and universities chairs in post-secondary institutions in the GTA
 - Weakness
 - Ability to commercialize new knowledge through firm creation or licensing
 - Limited collaboration between firms and public R&D institutes
 - Limited joint monitoring of the knowledge frontier



Knowledge Generation II

- Ottawa
 - Strengths
 - Private R&D capabilities – Nortel IBM Ottawa CAS
 - Strong public R&D presence – NRC, University of Ottawa, Carleton University, CITO, CANARIE
 - Strong history of commercialization through firm creation – 60 firms can be traced back to the NRC
 - Weaknesses
 - Collaboration between firms and local universities has been relatively weaker until recently
- Waterloo
 - Strengths
 - Strong public R&D capabilities (U of W, Perimeter Institute)
 - Commercialization through the creation of university spin-offs
 - Weaknesses
 - Few persistent knowledge transfer relationships between firms and local research institutes, including U of W
 - Limited ongoing interaction between firm and universities



Institutions of Collaboration I

- GTA
 - Weak social capital
 - Business class is national and continental in orientation
 - Domination by financial services sector
 - ICT cluster is geographically dispersed and socially fragmented
 - Lack of strong associational voice
 - Weak collaborative institutions
 - Toronto cluster study was politically led
 - Little community involvement
 - Lack of 'civic entrepreneurs'



Institutions of Collaboration II

- Ottawa
 - Strength of local institutions of collaboration
 - OCRI – founded in 1983
 - 700 members, \$4.5 million budget
 - Sponsors 120 events annually
 - Absorbed economic development function of the City of Ottawa
 - Dense network of partnerships with federal and provincial agencies
 - Works closely with NRC's Regional Innovation Centre
 - Economic Generators Initiative, 1999-2000
 - The Ottawa Partnership (TOP)
 - 300 individuals participated
 - Formulated 33 specific goals for 7 clusters
 - 'flagship' initiatives to strengthen the whole region
 - SmartGrowth, Talentworks, Starting Startups
 - 10 of 33 goals have achieved tangible results



Institutions of Collaboration III

- Waterloo
 - Close collaboration across region, despite political fragmentation
 - Formation of Canada's Technology Triangle in 1987
 - Joint marketing initiative
 - Led to CTT Accelerator Network to help early stage firms become investment ready
 - Communitech founded in 1997
 - Lead role played by core group of CEO's
 - Currently has 240 members, half in legal and accounting firms
 - Runs array of programs similar to OCRI
 - Peer to peer groups
 - Mentoring
 - Business Accelerator Program (CTTAN)
 - Continuing links with the university



Policy Support for Cluster Development

- Networking Institutions for Collaboration
 - Promote cluster awareness
 - Engage in dialogue of cluster's competitive position
 - Monitor and communicate market and technology trends
 - Develop training and management programs
 - Develop mentoring programs for new firms/business people
 - Participate with government in recruitment efforts
 - Expand cluster to include all constituents
 - Link common assets across clusters
 - Nurture cluster leaders at regional and national level
 - civic entrepreneurs/social animators
 - OCRI in Ottawa, Communtech in KW



Drivers of Cluster Initiative Success

- **Setting**
 - Strong business environment
 - Trust in government
 - Strong regional government
 - Cluster strength
- **Objectives**
 - Broad range of objectives
 - Objectives selected based on cluster's specific needs
 - No significant effect of special objectives
- **Process**
 - CI Facilitator with cluster insight
 - CI has office and significant budget
 - CI has clear strategy and measurable goals
 - No negative effect of government financing
 - Negative effect of limiting participation
 - Source: TCI Greenbook, 2003



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Magic Bullets ?

- Business led
 - sustain leadership
 - Identify champions
- Clustering is a process not a goal
- Promote networking and interaction
 - Build common vision
- Focus on achievable steps
 - Revise, refocus
- Align institutions and resources
 - Across three levels of government
 - Clusters focus federal/provincial initiatives
 - Clusters lead workforce development
 - Educational institutions target critical areas

