The Structural Evolution of Ottawa's Digital Technology Sector: Understanding the Opportunities

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Local Context for Global Networks

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Ottawa ICT has experienced major internal & external shocks

- 'Dot com' collapse (2001)

- Demise of Nortel as anchor (2001-2009)

- Financial crisis (2008)

- Major transformative and disruptive digital change
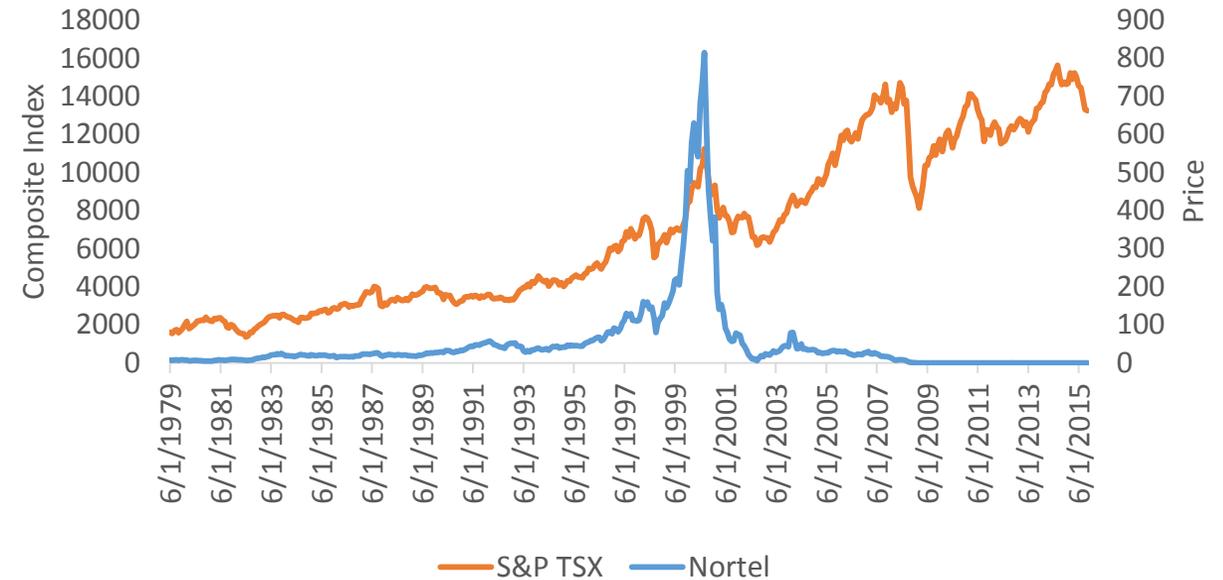
How Ottawa's tech sector lost its edge

POSTMEDIA NEWS | December 27, 2011 11:10 AM ET
More from Postmedia News

"Even in the event the sector regains momentum, its highly unlikely it can create jobs in the same fashion as before"

Yet Ottawa remains a vibrant digital economy

- 47 000 employed in ICT (2016 Est.)

- ~1000 companies

- Many new companies in leading subsectors

Chart legend:
- Kanata Business Real Estate Occupation Rate
- Ottawa ICT Employment
- CANADA ICT Employment
- TSX S&P

Y-axis (left): % Change [1996=100]
Y-axis (right): Composite Index (Adjusted Close)
X-axis: 1996 through 2016
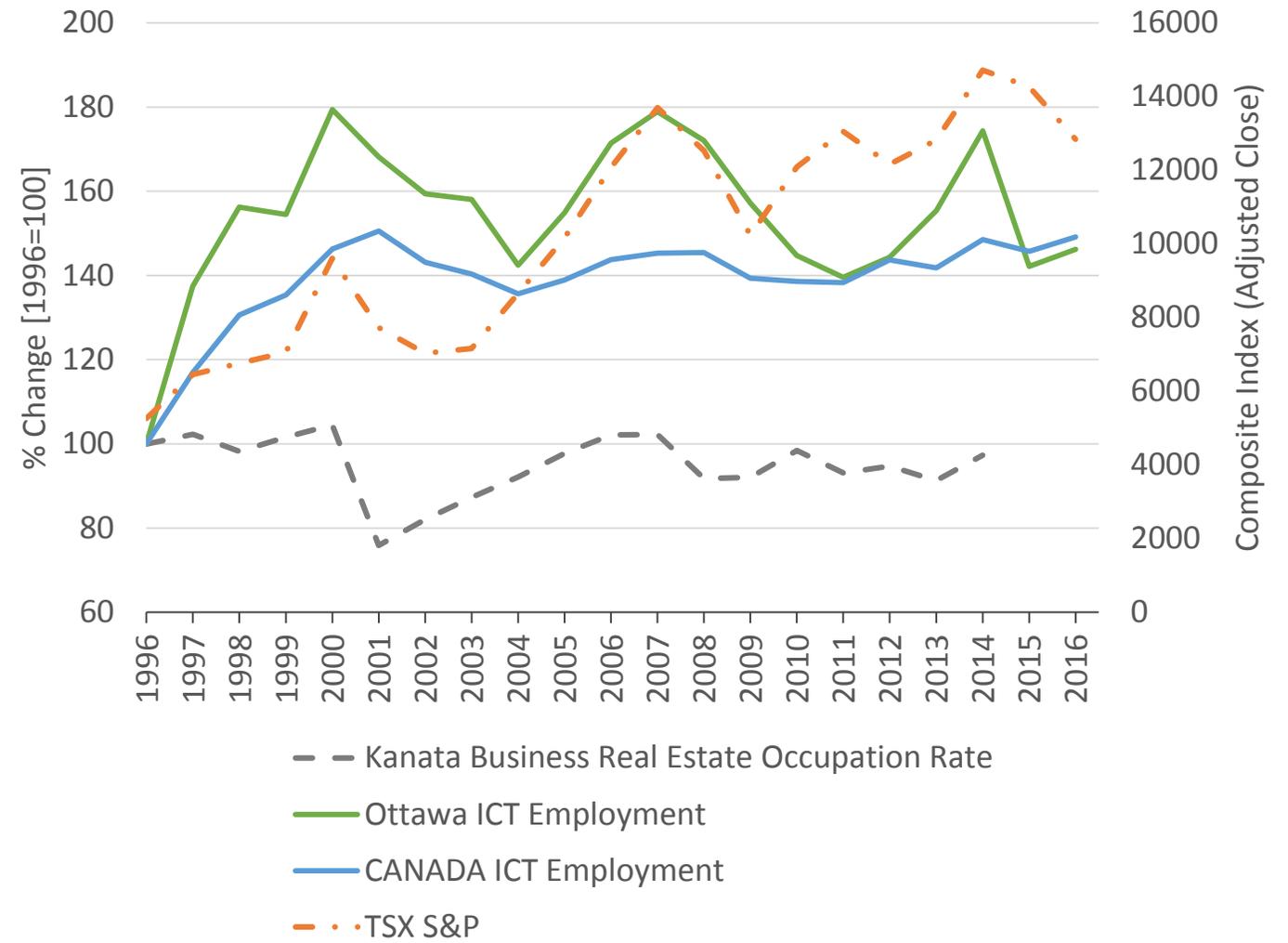
Need to grasp technology to understand Ottawa's transition and digital opportunities
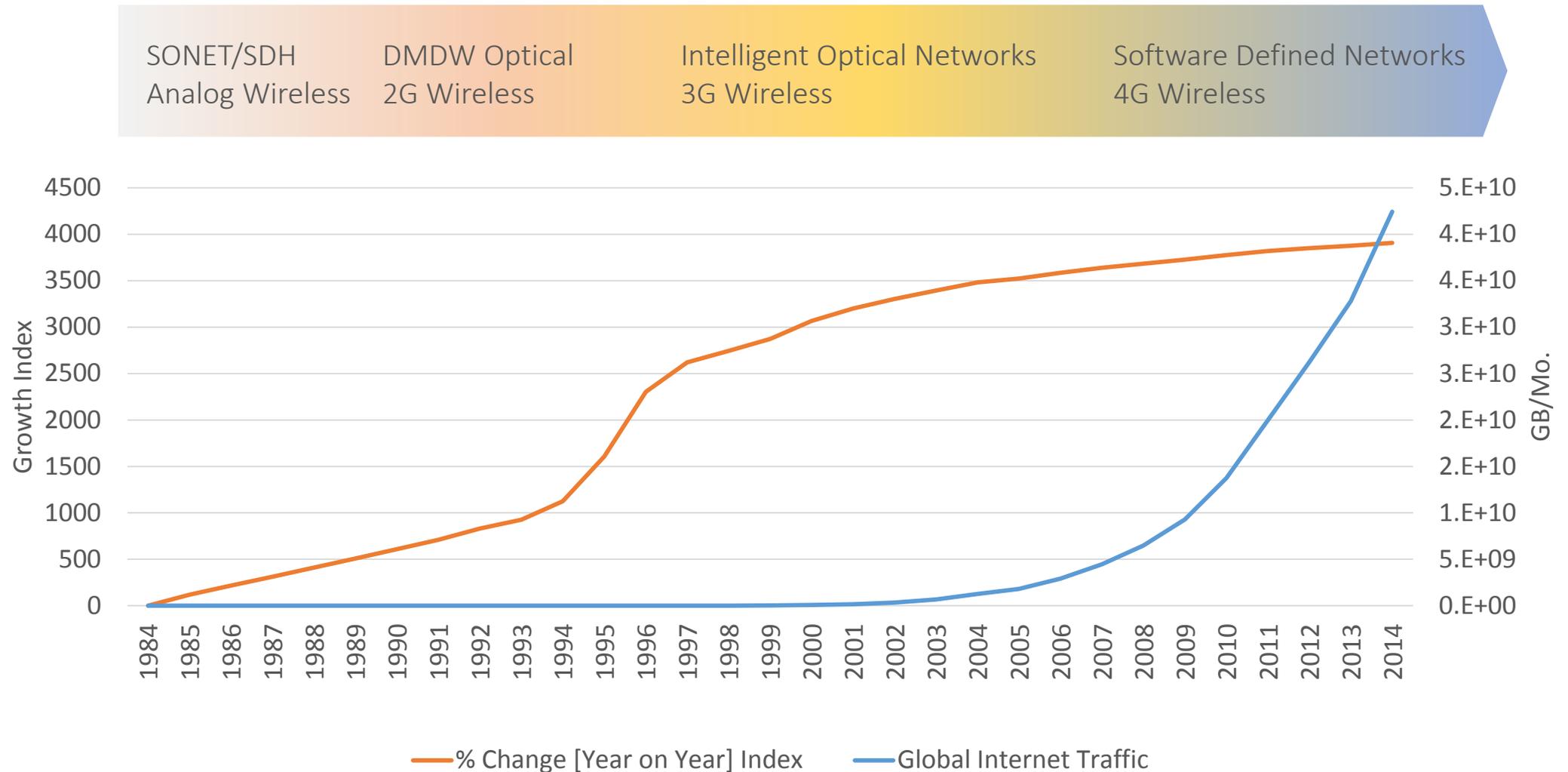
Need to grasp technology to understand Ottawa's transition and digital opportunities

- Evolution of networking technology

Telephony	Networks for Internet	Networks for Cloud	Networks for IoE
• 1950s-	• 1990s-2000s	• ~2010->	• ~2015 - >

- Evolution is key part of Ottawa ICT story

Northern Electric / Northern Telecom
- Satellite and antennas
- Digital switches

→

Nortel Networks
- Optical networks
- IP networking
- Wireless

→

New & Established Ottawa firms
- Software Defined Networks (SDN)
- 4G wireless

→

Ottawa Role?
- SDN?
- 5G Wireless?
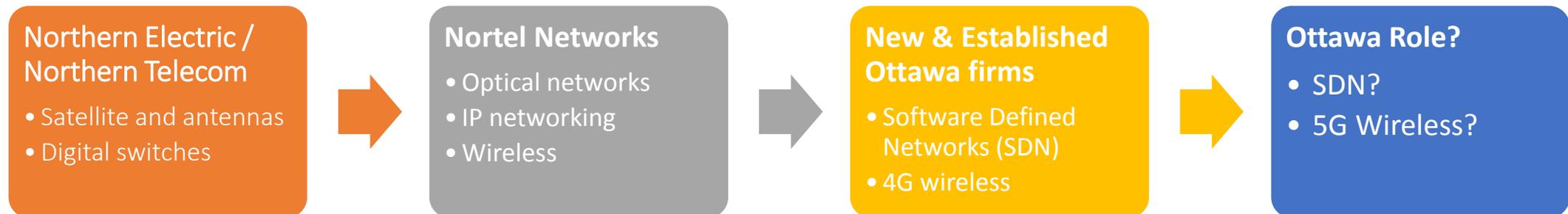
Software Defined Networking – A foundation for Ottawa's digital opportunities
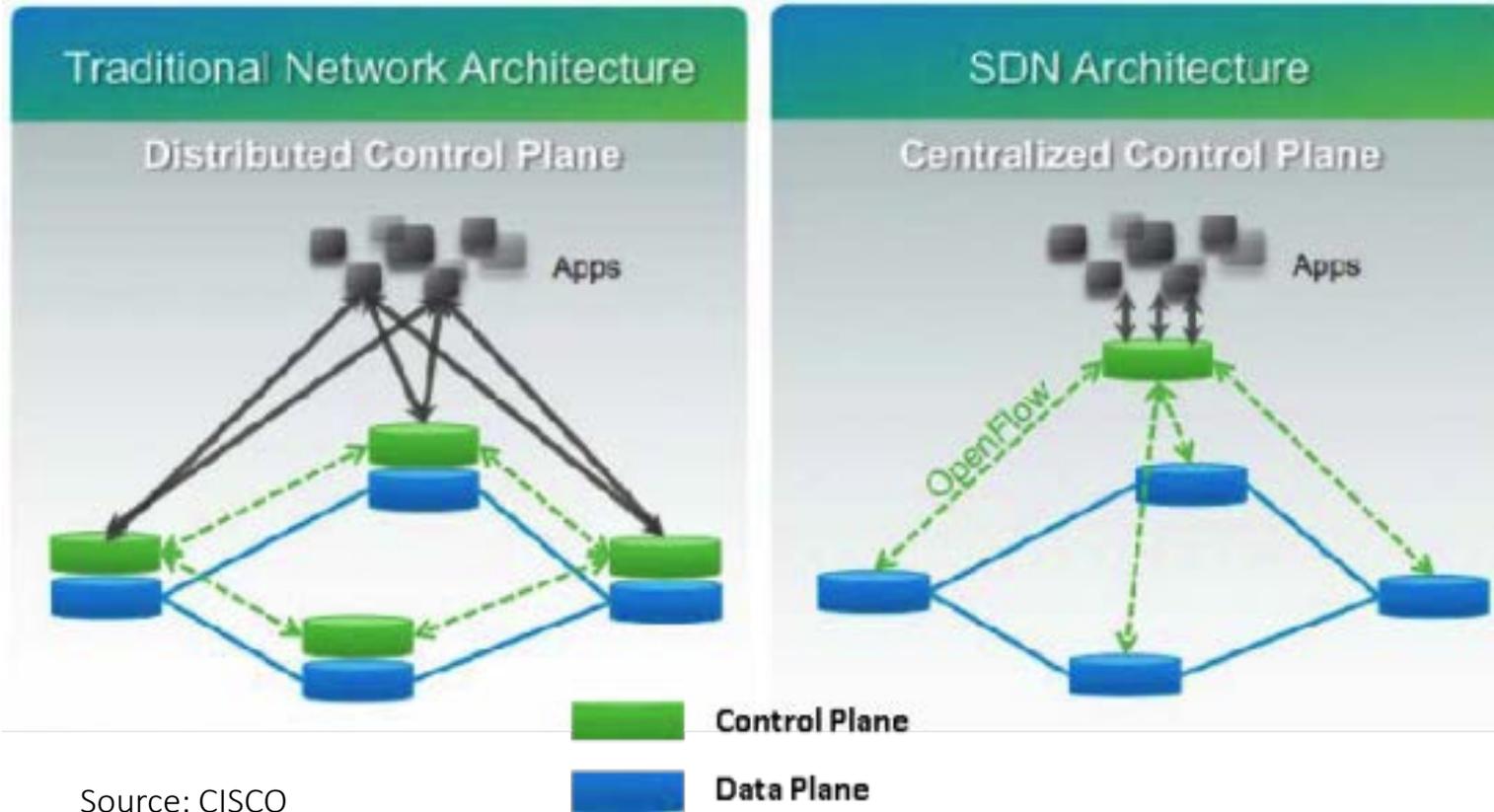


Source: CISCO

Apps
- Cloud based applications
- Software as a service
- Apps program own network

Control Place
- Interface software
  - network control
  - data switching
  - traffic management,
- Network security

- **Data Plane**
- Hardware layer – dedicated ASICS
- Commodification of physical infrastructure

Industry structure reflects a transitioning to opportunities of advanced networks & cloud computing

- Characterized by:
  - Absence of a major anchor firm
  - Growth in cloud, network software
  - More MNC R&D activity
  - Decline in hardware / manufacturing (-50% 2001-2011)
- Innovation system in state of flux:
  - New associative structures and organizations (e.g. CENGN, KNBIA)
  - Re-focusing of existing organizations (e.g. NRC, CRC, Invest Ottawa)
  - Lacking cohesion

No. of Companies: 930
Total employees 2016 est. : 47,000

Categories (top to bottom): Wireless & Telecom; Software, Cloud and SaaS; IT Consultants and Software Services; Defence ICT & Security; Photonics, Optics and Semiconductor; Digital gaming & animation; Data Centre ISPs & Database Management; Mobile Technology

Legend: ■ Employment [% of Total]   ■ Companies [% of Total]
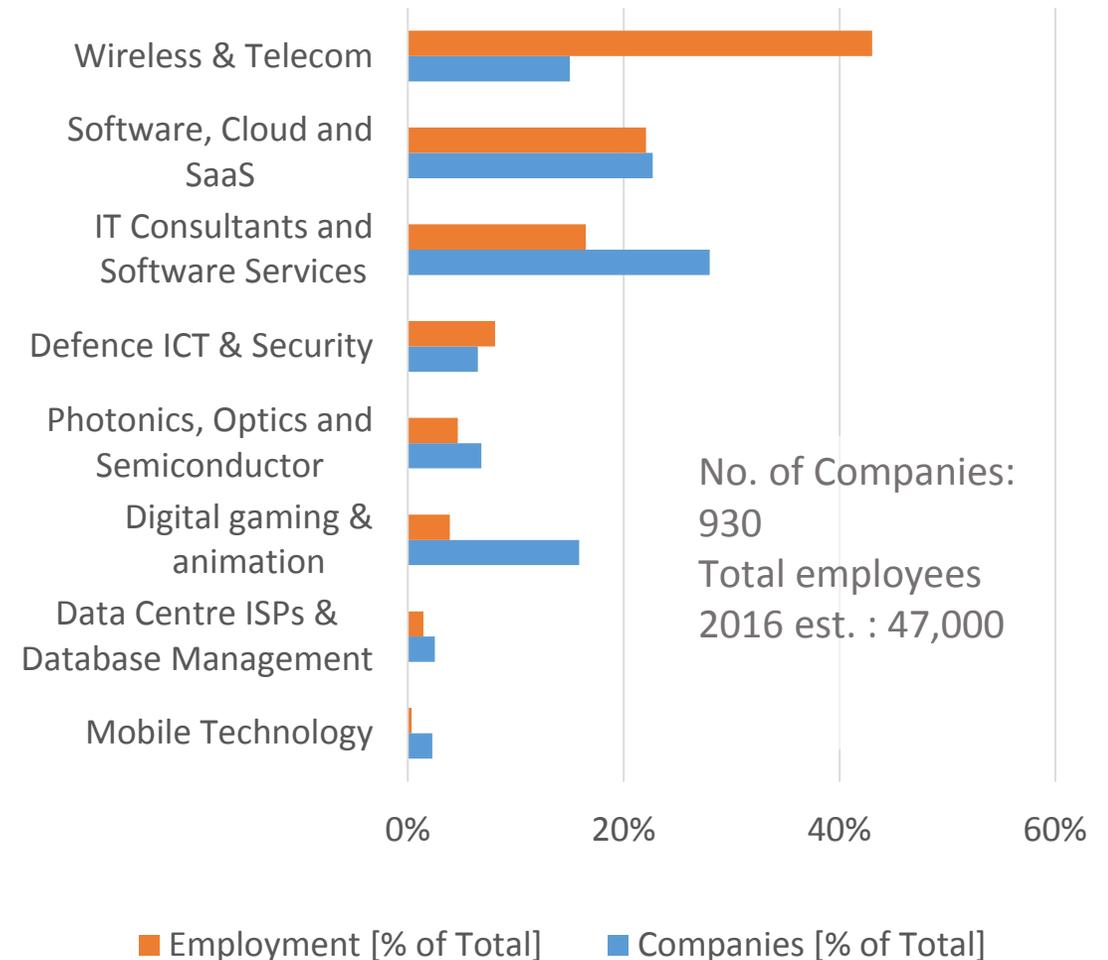
Three factors enabling transition: Nortel

- Seeded capabilities for next generation networking shift

Change in Nortel Patenting, 1975-2012
(Kogler & Spencer 2015)

709 Multicomputer data transferring

370 Multiplex communications
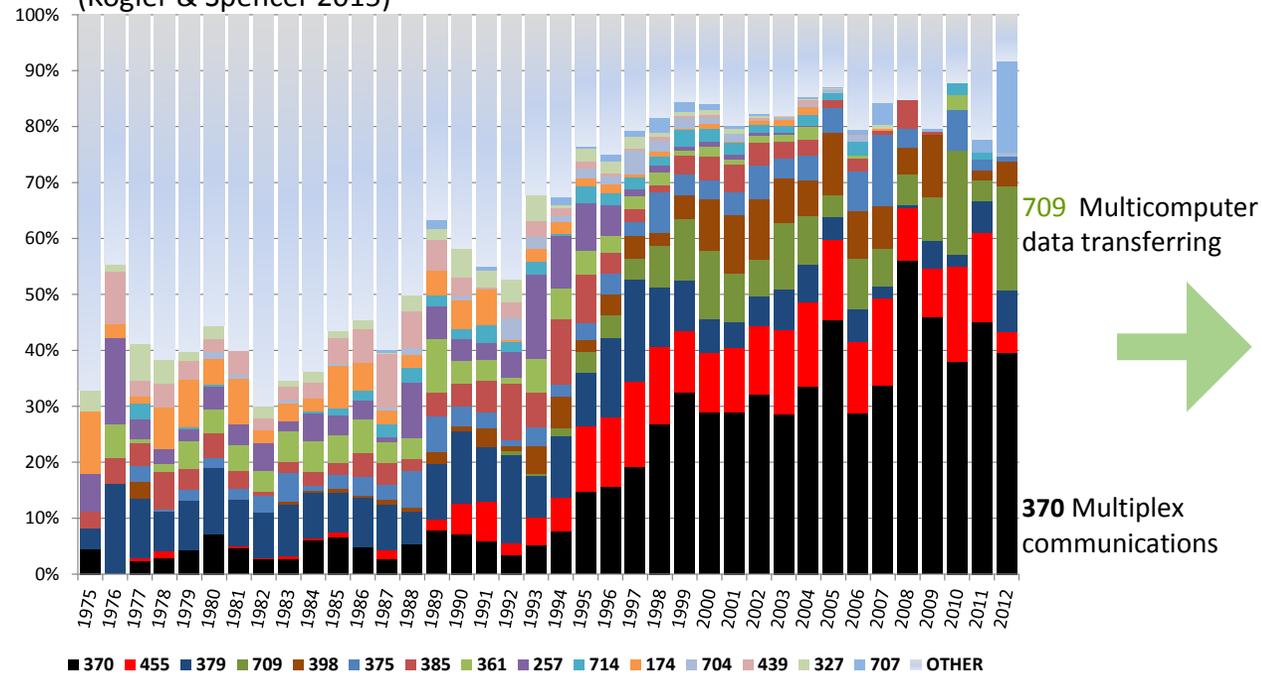
SDN relevant patent classes

Level 1	Level 2	Level 3	Patents
Controller	Data Switching	Multiplexing	140
		Packet Switching	347
		Circuit Switching	435
	Resource Management	Memory Management	384
		Traffic Management	592
		Connection Management	33

Source: LexInnova, 2014

Three factors enabling transition: Skills

- Relevant to major digital trends
  - Mix of network hardware/software
  - Wireless
- Role of marquis firms
- Social media enabled communities of practice & meetups
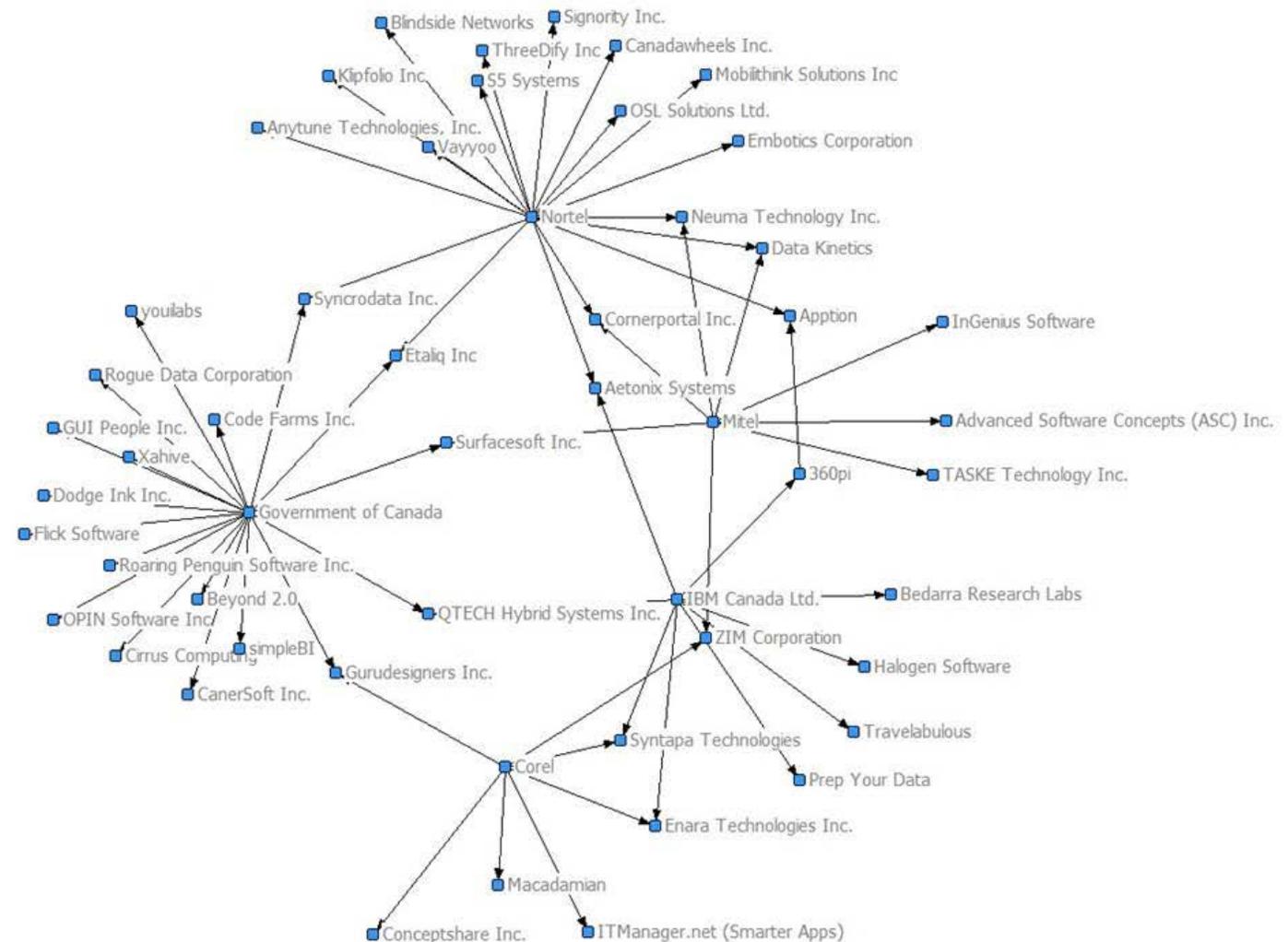
Three factors enabling transition: MNCs

- Strengthening next generation technology R&D capabilities
- Nortel capabilities reorganized within Ottawa by MNC investment
- MNCs global production networks are being leveraged locally
  - Centre of Excellent for Next Generation Networks (CENGN)
  - Wesley Clover

2009
- Eriksson acquires Nortel wireless
- Avaya acquires Nortel enterprise assets

2010
- CIENA acquires Nortel Ethernet
- Huawei sets up R&D facilities with key Nortel empl.

2013
Cisco systems expands R&D Centre

2014
ZTE Ottawa R&D Centre, designs new smartphone in Ottawa

2015
Nokia acquires Alcatel – Lucent, establishing Ottawa presence

2016
Apple (vs. Blackberry 2.0)
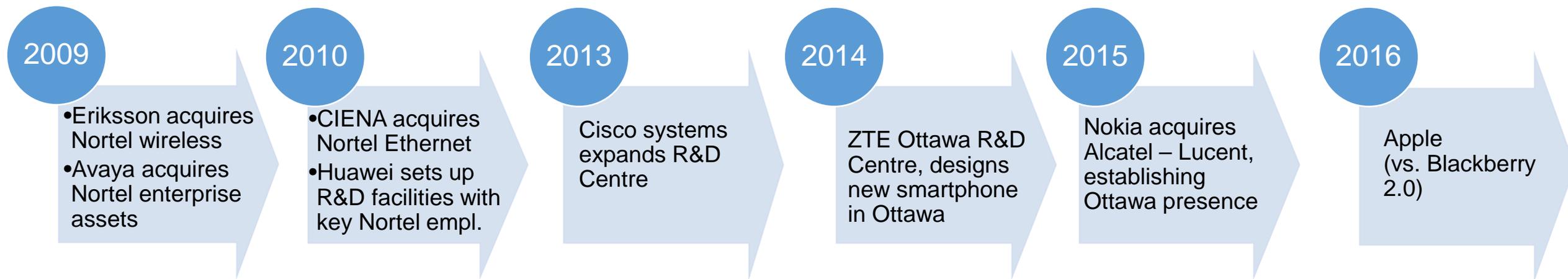
Three questions

- **Which policies have had impact?**
  - Ottawa continues to benefit from government investments from 50 years ago era in radio and microwave
  - CENGN
  - Ontario support / investment attraction (e.g. CISCO, Huawei, Avaya)
- **To what extent is Ottawa capturing value from its success?**
  - Branch plant economy 2.0 (R&D)
  - Difficulty with scaling up
- **Is Ottawa better off because of Nortel's collapse?**
  - Panarchy model – collapse and recombination?