

# Labour supply/demand dynamics of Canada's ICT sector and beyond

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- Quality technical grads, but shortages
- Insufficient business skills & seasoning

# ICT skills context (Statscan)

- 811,000 ICT professionals
- 56% outside ICT sector
- 24% women
- 36% immigrants
- 48% in Ontario, 25% in Quebec
- Unemployment typically 2.5-3.5%

# Nordicity 2012-13 for Industry Canada

- Focus: R&D intensive part of ICT sector
  - Mainly (a) manufacturers & (b) associations, incubators, etc.
- Mandate:
  - Assess unmet demand and recruiting challenges for talent and skills
  - Recommend approaches for addressing these challenges
- 6 technical occupations
  - Electrical/electronics, computer & software engineers (3)
  - Computer systems analysts
  - Database administrators & developers
  - Computer programmers & media developers
- Lit review, interviews (30+), online survey (110 completions), roundtable

# Nordicity findings: demand pressures

## Challenges

- **Specialized skills needs change frequently.** Emerging technologies create new needs across broad range of ICT products and services.

- **Communication, project management, business and entrepreneurial, and 'real world' skill gaps are universal**

## Potential Causes

- Absence of frequent, granular labour market information.
- Limited NOC codes.

- PSI ICT programs focus on technical education not 'soft' skills
- Many ICT PSI students are first generation immigrants with limited English/French language skills, sometimes cultural differences



# Nordicity findings: skills gaps

## Challenges

- Recruiting **specialized, hybrid and/or line-of-business** specific technical skillsets.
- Recruiting combined **biz/tech skill sets** for marketing, sales and management



## Potential Causes

- Lack of stakeholder awareness (students, career influencers, PSIs) about changing skillset profiles
- Canadian LOB clusters lack critical mass



- Recruiting **experienced** sales, marketing, entrepreneurial, product development mgt with **global capabilities**
- Recruiting **senior technical** professionals

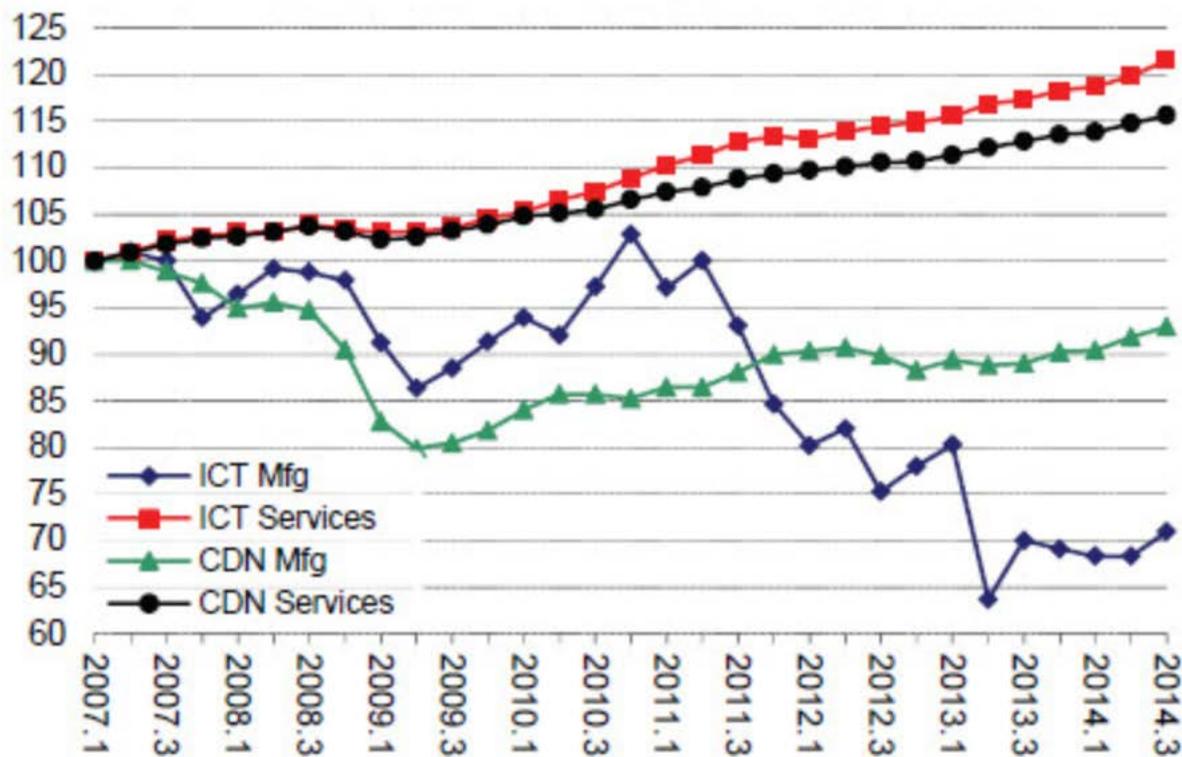
- Insufficient venture capital equity with knowledge how to finance global roll-out
- Mid-stage firms often sell to foreign purchasers before developing these skills

- Quality technical grads, but shortages
- Insufficient business skills & seasoning
- ICT manufacturing down, telecom & wholesaling flat
- Up: software, systems design/data processing

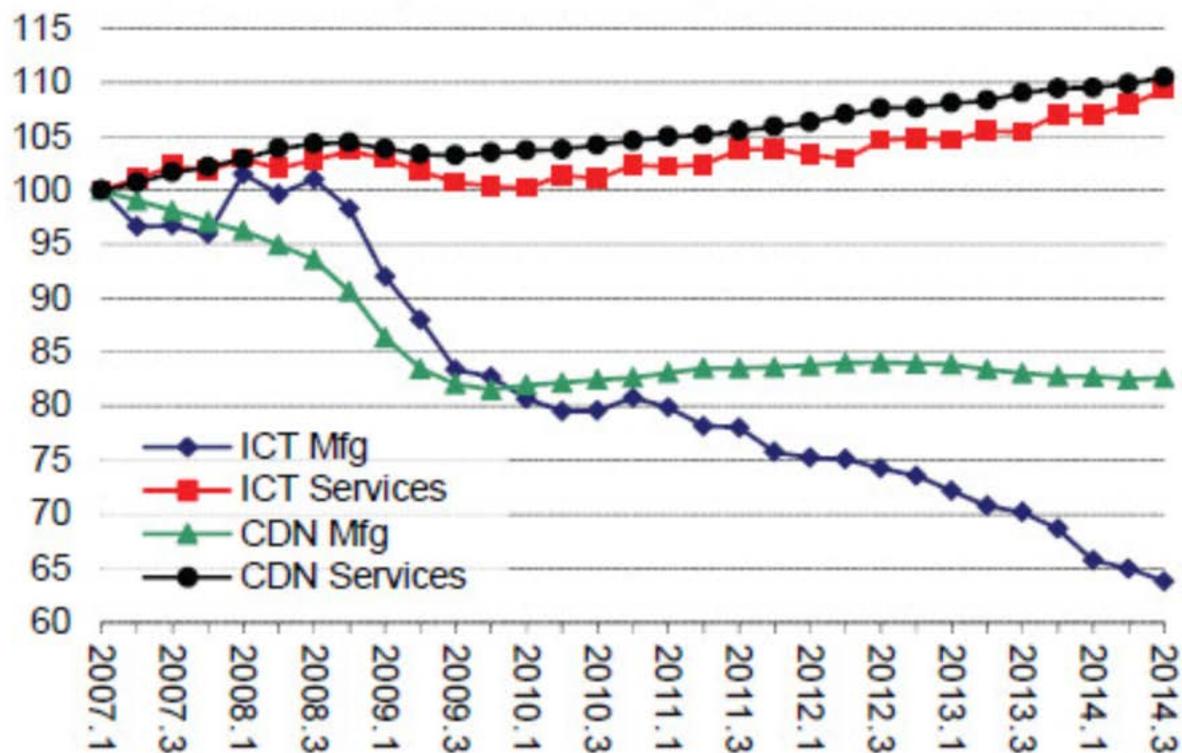
## R&D vs GDP 2013 (Industry Canada)

	R&D	GDP
Software/svcs	2.0B\$	27.4B\$
Manufacturing	2.0	4.0
Comms Svcs	0.5	32.5
Wholesalers	0.5	5.6

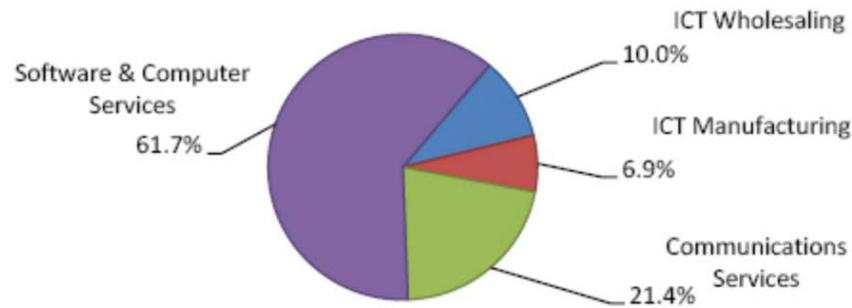
**Figure 2: Real GDP:  
ICT & CDN Manufacturing & Services Industries,  
Indexed Growth, 2007Q1 = 100**



**Figure 8: Employment: ICT & CDN Manufacturing & Services Industries, Indexed Growth, 2007Q1 =100**

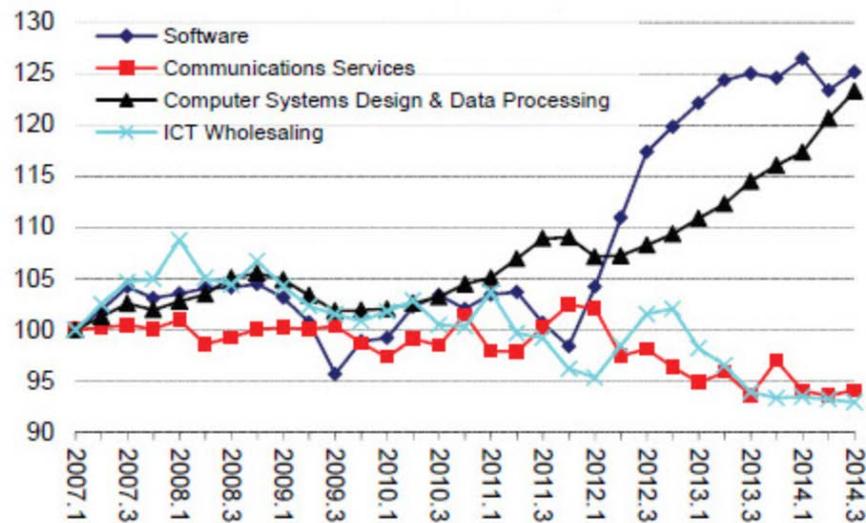


**Figure 8: Employment by ICT Sub-sector, 2013**  
 (Total: 530,957 Workers)



Source: Industry Canada, Canadian ICT Statistical Overview

**Figure 10: Employment: Selected ICT Services Industries, Indexed Growth, 2007Q1 = 100**



# ICTC's 2015 forecast reflects a business & software oriented labour market

- Net hiring requirements, all sectors, to 2019: 183,000
- Key gaps:
  - **Leaders:**
    - IS analysts & consultants
    - Computer & IS managers
  - **Innovators**
    - Software engineers
  - **Builders**
    - Programmers & IM developers
    - Graphic designers & illustrators
    - DB analysts
  - Support professionals
    - Computer/network operators & web technicians
    - Data administrators

## Net...

- Canada's platform champions have fallen
- ICT manufacturing in decline
- Software activity in 4 areas:
  - Standalone applications (Desire2Learn, Shopify)
  - Platform apps (Ubisoft, Wave, G&M)
  - Business application development/customization both in-house and client-oriented (CGI, IBM, Accenture)
  - R&D centers of excellence (IBM, Microsoft, Google)

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- **Context: Silicon Valley platform conglomerates**

# Platform-based digital conglomerates

- GAFA, Alibaba and aspirants
- Network effects, nonrivalry, incomplete excludability, digital speed → monopoly
- Near zero transaction costs, media socialization → free/precariat labour
- Silicon Valley advantages: intellectual & \$\$\$ capital, people networks, fast innovation, culture, ideology
- Assets: big data, advanced algorithms, lock-in/addictiveness
- Constrains growth of Canadian ICT sector and the seasoning of its talent
- In practice, Canada's ICT sector is now mainly about:
  - Content provision to the platform economy
  - Niche applications
  - Applications & customization for domestic and international business clients
  - R&D by US firms

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- Context: Silicon Valley platform conglomerates
- **New platforms aim to monopolize the physical**

# Future case: Autonomous Vehicles

- Multiple scenarios
- Full adoption case (2025-35?)
  - Mobility as a service, integrated with mass transit
  - Automation of commercial transportation & deliveries
- Benefits
  - 90% reduction in vehicles on the roads
  - 90%+ reduction in accidents
  - Much less street & lot parking
  - Lower energy costs & environmental impacts
  - Time savings
  - Lower costs, better management of human travel & goods distribution
  - Travel time is productive/social/play time

# Winners & losers

- Industries at risk or facing reinvention: car manufacturing, insurance, retail, distribution, transit
- Jobs at risk: commercial drivers (taxi, bus, delivery, truck), trauma healthcare
- Privacy
- Who will lead & reap the benefits?
  - Digital conglomerates?
  - Auto industry?
  - Cities & communities?
- European & US cities, OECD, EU, various researchers tackling the policy, jobs & competitiveness issues
- Niche application positioning of Canada's ICT sector leaves us ill prepared for this next wave

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- Context: Silicon Valley platform conglomerates
- New platforms aim to monopolize the physical
- **Policy agenda for digital platforms?**

There is growing evidence that platforms' role in shaping Internet market and collecting data will grow further as they will increasingly play a central role in the digital ecosystem. Platforms are understood here as being two (or multi)-sided markets or "gateways" for publishing/accessing content or information or goods and services and for organising the relationship between the publisher and the recipient of the information<sup>1</sup>.

While recognising the rich diversity of the platform ecosystem, it is also apparent that

- This intermediary role as gatekeeper enables them to exert an economic and filtering power that is likely to expand exponentially with network effects.
- Their role in producing and managing data is increasing and they will become crucial in the future economy. In 2013, 90% of all data have been generated in the preceding 2 years. With more than one trillion webpages on the Internet, platforms are an important means on which consumers find online information. Platforms are among the most structuring actors on the Internet.
- As a consequence, some platforms, because of their size, business model and connection capacity play a pivotal role in the digital ecosystem: only a very limited part of the economy will not depend on them in the near future (*systemic actors?*)
- The EU lags behind: while EU app developers account for 42% of the global consumer app revenue, the overall EU trade balance of the app economy is negative (-€128 million), mostly due to the app platform fees that EU developers pay on revenue earned to North American platform owners
- One of the singular aspects of the rise of platform is the lack of evidence of job creation by platform themselves (contrary to the retail sector representing 14% of jobs).

- 2) Platforms seem to have a net beneficial impact on the whole economy. But evidence of negative effects in B2B relations and in particular on SMEs, is also growing.
- a. Problems linked to B2B access 2 (see annex): Platforms have sole discretion as to when and how to grant or withdraw access (Amazon and Etsy reserve the right to exclude any company, without warning); Platforms are market players, at the same time service providers and competitors (Amazon has access to data about all transactions taking place on their marketplace and full discretion as to how to use this data). Non transparent pricing. When a platform dominates the market it becomes the main entry point to that market (e.g. Tripadvisor, booking.com) and is able to charge its fees with full discretion: such referral fees can vary from 5 to 20% of the final selling price.
  - b. Problem of lack of transparency both vis-à-vis consumer and business. The issue here is not about revealing business secret such as algorithms, but ensuring that the consumer/business has minimum information on data gathering and on the output of the platform, e.g. organic or paid-for-search results (in 2011 Google charged 54\$ per click for the word "insurance"<sup>3</sup>). Consumers are also not aware that the ranking of search results may be influenced by their location, search history or the type of device (mobile or not): travel / car rental sites change their prices according to user behaviour or to the type of mobile phones they use. Consumers are also not aware of what data are collected and how they are used.
  - c. Lock-in of data between clouds and similar systems affecting the fluidity of data flows<sup>4</sup>. Cloud computing is a catalyst for economic growth, investment and innovation. Potential benefits of cloud computing to the EU have been estimated to add €450bn to the EU GDP between 2015 and 2020, as well as to create an additional 1.6 million of jobs from 2008 to 2020, of which almost 1 million in the period 2015-2020. But interoperability and data portability is an important condition to achieve these benefits. In fact, according to the latest Eurostat data, almost 30% of European enterprises and SMEs using cloud services find that difficulties in unsubscribing or changing cloud service provider are a major limiting factor to the use of cloud services.

## Policy options

Possible approaches to addressing the issues identified in this paper are outlined below. They present measures ranging from the "zero option" through to ex ante regulation. Deciding on the most appropriate option will depend upon the level of ambition the Commission wishes to pursue.

### A) "Do nothing "

Despite pressure from some stakeholders and Member States, the Commission may consider that the situation does not warrant intervention, or that existing legislation is fit for purpose.

### B) Principle-based regulation

General principles could be established to ensure that trading practices and contract terms as regards online platforms are subject to a minimum level of transparency (without forcing them to reveal their business secrets), proportionality, non-discrimination and fairness. Moreover, the revision of the ePrivacy Directive could address some issues regarding gathering data.

A principle of interoperability could be defined in some areas (e.g. cloud) requiring online businesses to make systems, technologies and services interoperable, on the basis of common standards, enabling their customers to switch to a different service provider without further technical or administrative restriction.

*These principles would only apply to platforms meeting a defined threshold of size, therefore exempting the smaller and non-relevant platforms (industrial platforms e.g. smart grids).*

A power to request information and, possibly, intervention in dispute resolution between private companies could also be envisaged, by way of an adjudication mechanism. An EU-level structure could be designed to accompany this.

A lighter touch alternative would be to launch a co-regulation process.

### C) Updating and making better use of available tools

In the medium to longer term, a three-pronged approach could be envisaged, including:

- More stringent competition law enforcement;
- Widening the scope of the telecoms regime;
- Extending the application of rules on unfair commercial practices in B2B relations, including backlisting of abusive practices

### D) Public consultation

In the immediate term, a **thorough investigation of potential problems** could be launched, for example by way of a **public consultation**, in order to substantiate the current evidence base.