Creating Value with Software

Small Business Digitization Initiative (SBDI) - Day 3

By Marc Lijour

March 22, 2017

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- late 1950's – academic field of *Computer Science*
- 1968 – the term *Software Engineering* is coined, and another academic discipline is born

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- 2010's – IoT, AI, VR, AR...

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The birth of UNIX (Pic by Peter Hamer [CC BY-SA 2.0], via Wikimedia Commons)

Figure: Ken Thompson (sitting) and Dennis Ritchie at PDP-11

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- Also the rule of secrecy (NDA) violates *hacker ethics* and the *Golden Rule* (once bound to secrecy, one can't help his/her next of kind)

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4. You have the freedom to distribute modified versions of the program, so that the community can benefit from your improvements.

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Short History of Software

An introduction to Free/Libre Open Source Software (Intel, 2014)

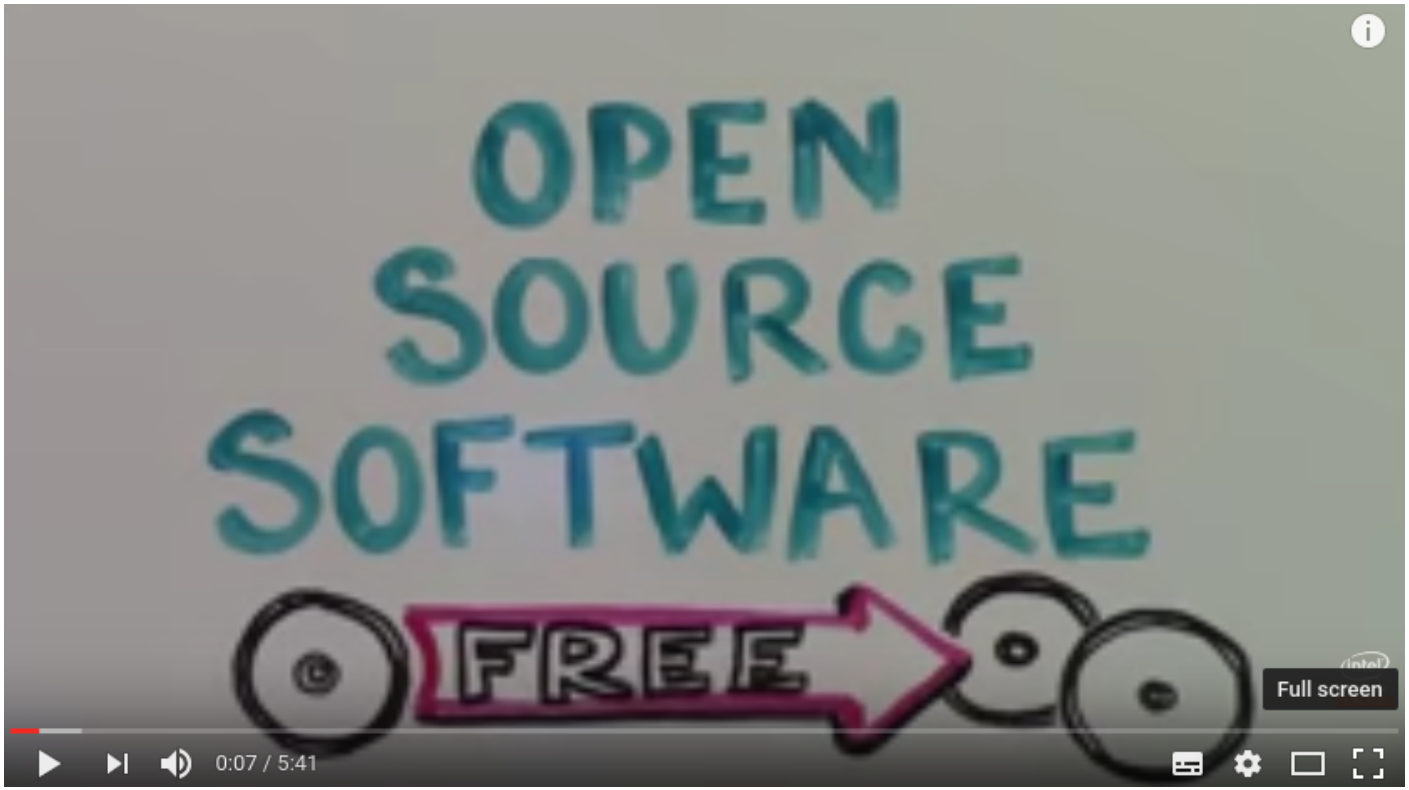

Figure: Credit: Intel Software (2014)
https://www.youtube.com/watch?v=Tyd0FO0tko8

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- Free Software makes an ethical statement about user freedom and *rights*
- Free/Libre Open Source Software (FLOSS) to (over)simplify

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Software Licensing

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- Derived works and the chain of title (Rosen, 2005)
- Mixing licenses –the question of license compatibility

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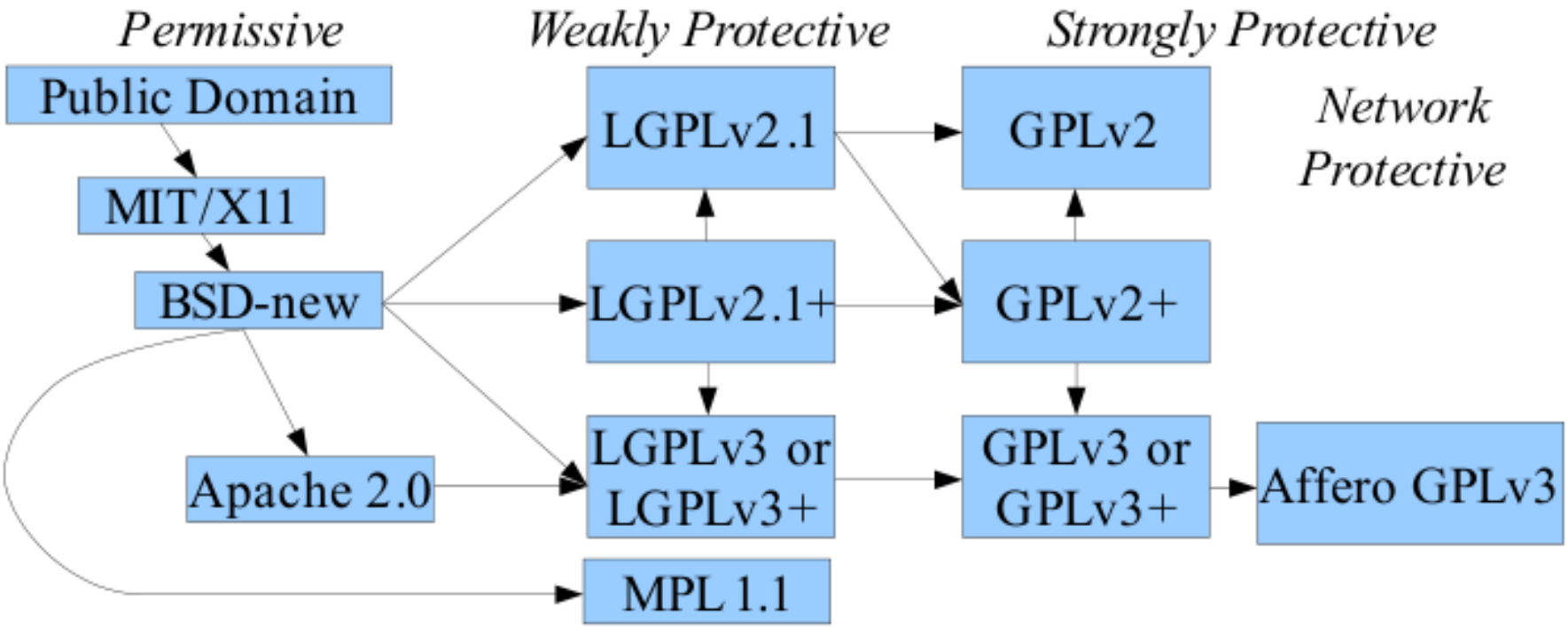
FLOSS License Compatibility (Picture by David A. Wheeler [CC BY-SA 3.0], via Wikimedia Commons)



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  - LGPL favours the individual developers and the growth of an App Store
- What are the implication of switching to another license?

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- Industry Consortiums (e.g. Eclipse, Linux Foundation and its many projects)

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The consumer perspective: how to take advantage of FLOSS

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- Sovereign Strategy: maintain and nurture core competencies to secure a competitive advantage
- Creates and strengthens a local labour market and healthy competition (same as the ability to choose between a car agency and the neighbourhood mechanic)

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Individuals benefit the most from *user rights* and *Freedoms*

- Privacy vs. Proprietary software "spying" (e.g. always-on systems like Amazon Alexa pose a real threat to privacy)

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FLOSS and Business Strategy

Individuals benefit the most from *user rights* and *Freedoms*

- Privacy vs. Proprietary software "spying" (e.g. always-on systems like Amazon Alexa pose a real threat to privacy)
- Ability to use one's own media vs. DRM and other blocking mechanisms (see https://www.defectivebydesign.org)
- Software benefits flow down to end-users vs. Tivoization
- Equal and fair access to Internet and Computing Resources (e.g. Net Neutrality)
- Keeping democracies honest and incentivizing civic engagement (e.g. voting machines, Code.org)

FLOSS and Business Strategy

The drawback of FLOSS (Eghbal, 2016)

- Key infrastructure projects lack funding (Eghbal, 2016)

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- Is FLOSS dying from its success (like smartphones are now called phones)? (see Nadia Eghbal)

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FLOSS and Business Strategy

Make the world a better place: examples from the FSF High Priority List

- Real-time voice and video chat – try Ring beta2 lead by Savoir-faire Linux

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Acquiring an IT Solutions

Consider the pros &cons of the main options

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Acquiring an IT Solutions

Best choice will depend on the situation

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- Do you want support locally or are you fine with off-shore support?

Acquiring an IT Solutions

Comparing Apples to Apples

Comparing purchase price of FLOSS vs. Proprietary Solutions

FLOSS can be downloaded for free, while proprietary software requires a payment. Their cost structure differs. How do we compare apples to apples?

Acquiring an IT Solutions

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- Other costs (see https://www.business-case-analysis.com/total-cost-of-ownership.html)

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- Have a back-up plan in case the solution goes bust

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Acquiring an IT Solutions

Implementing the Solution

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- Example: opening an e-commerce service

Creating Value with Software

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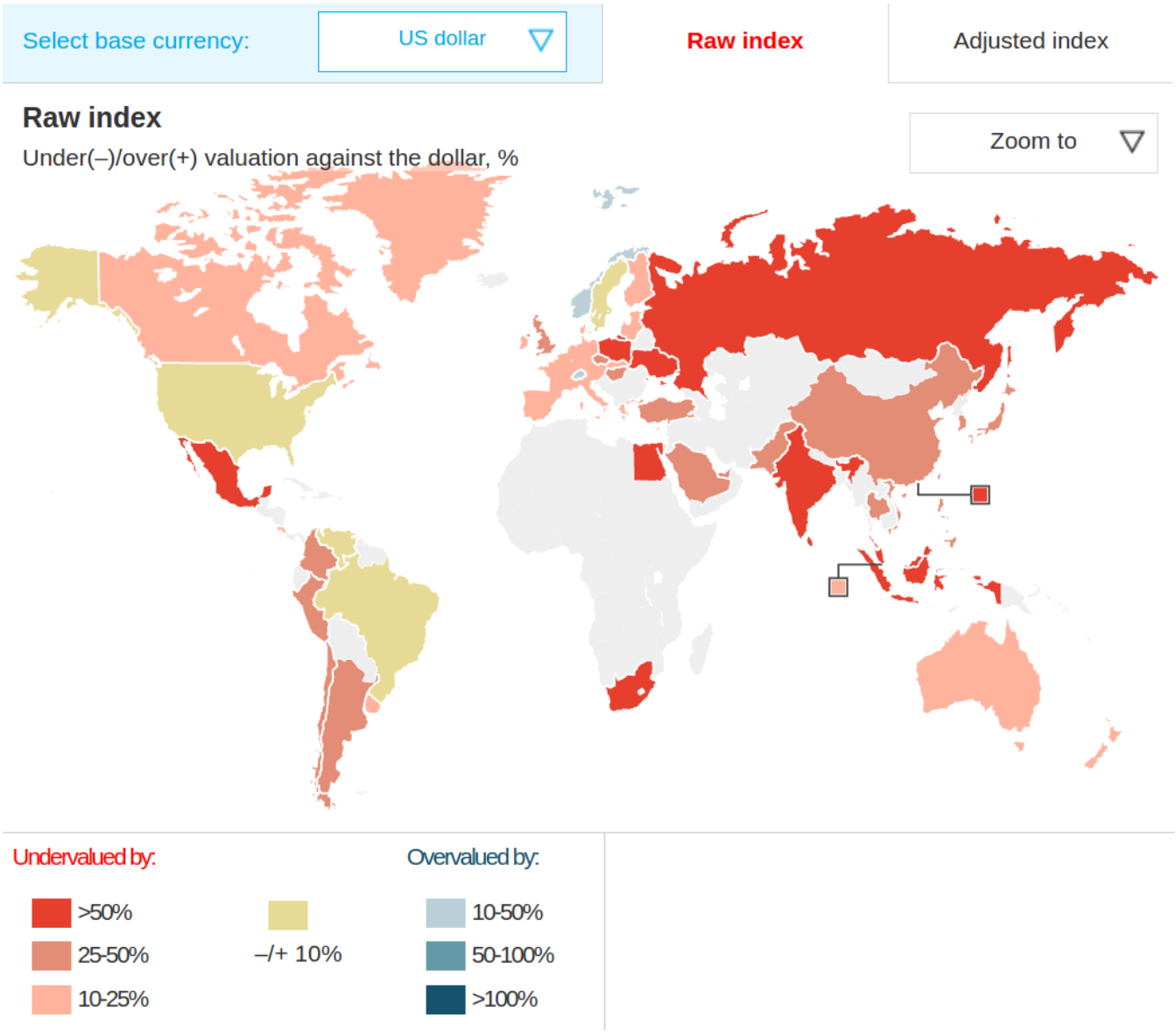
  - Policies such as currency fluctuation and trade barriers

Global Competition

Currency Valuation: The Big Mac Index (The Economist, 2017)



Global Competition

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- Impact on the Manufacturing Industry, Global Supply Chain, Foreign Investment, Currencies...

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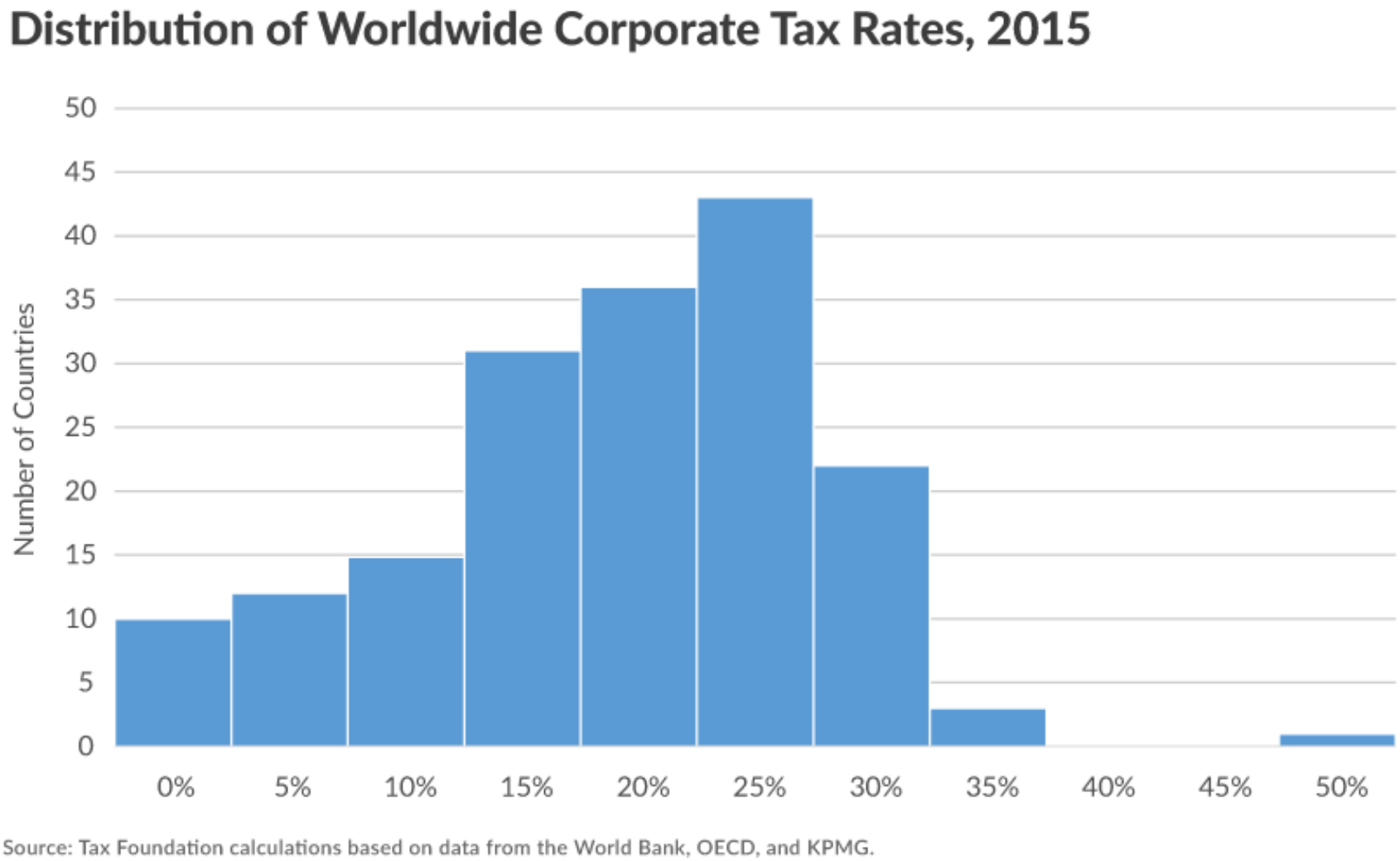
- Protected Designation of Origin (e.g. Champagne, Feta cheese)

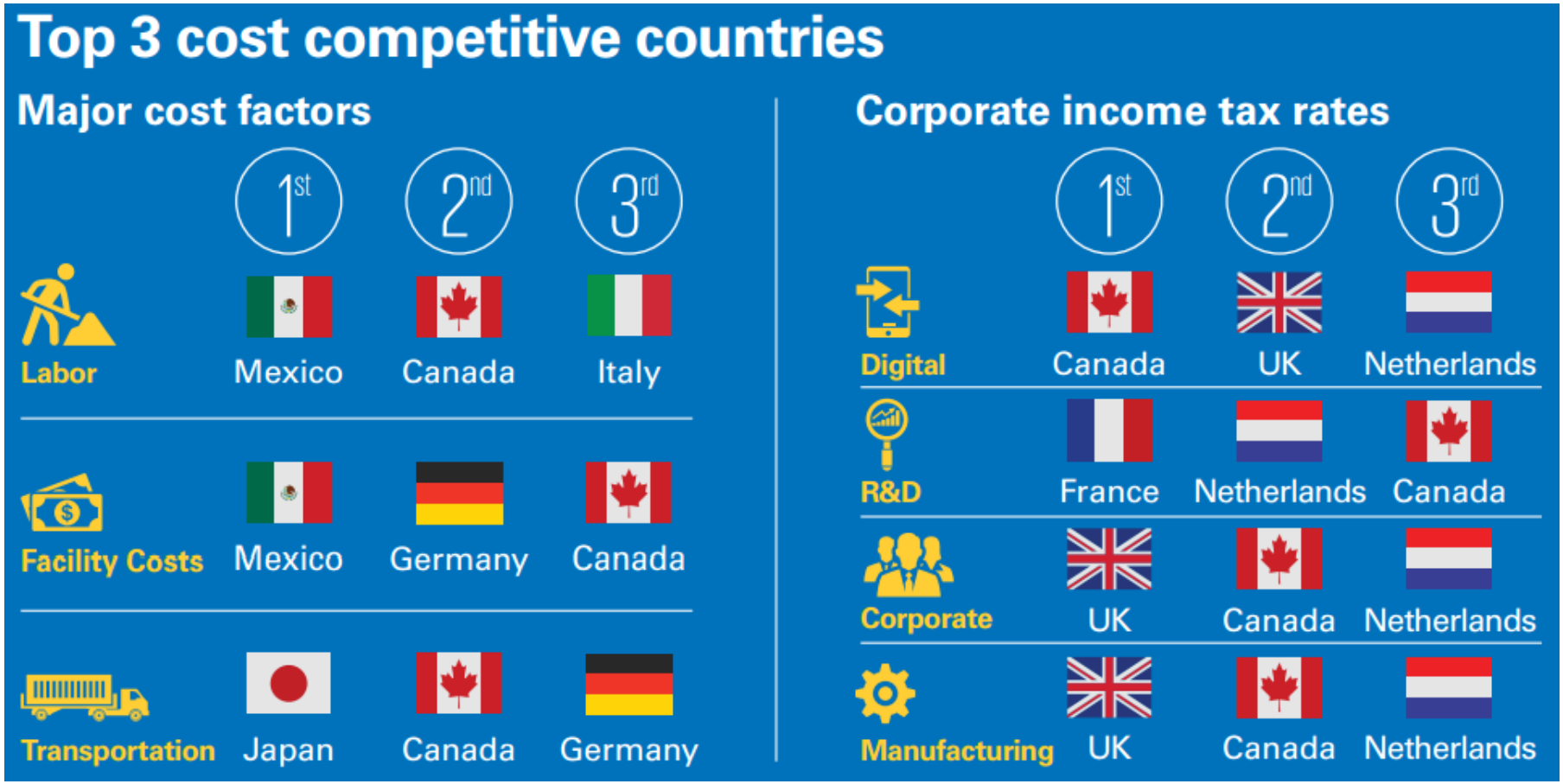
Global Competition

Corporate Tax Rates



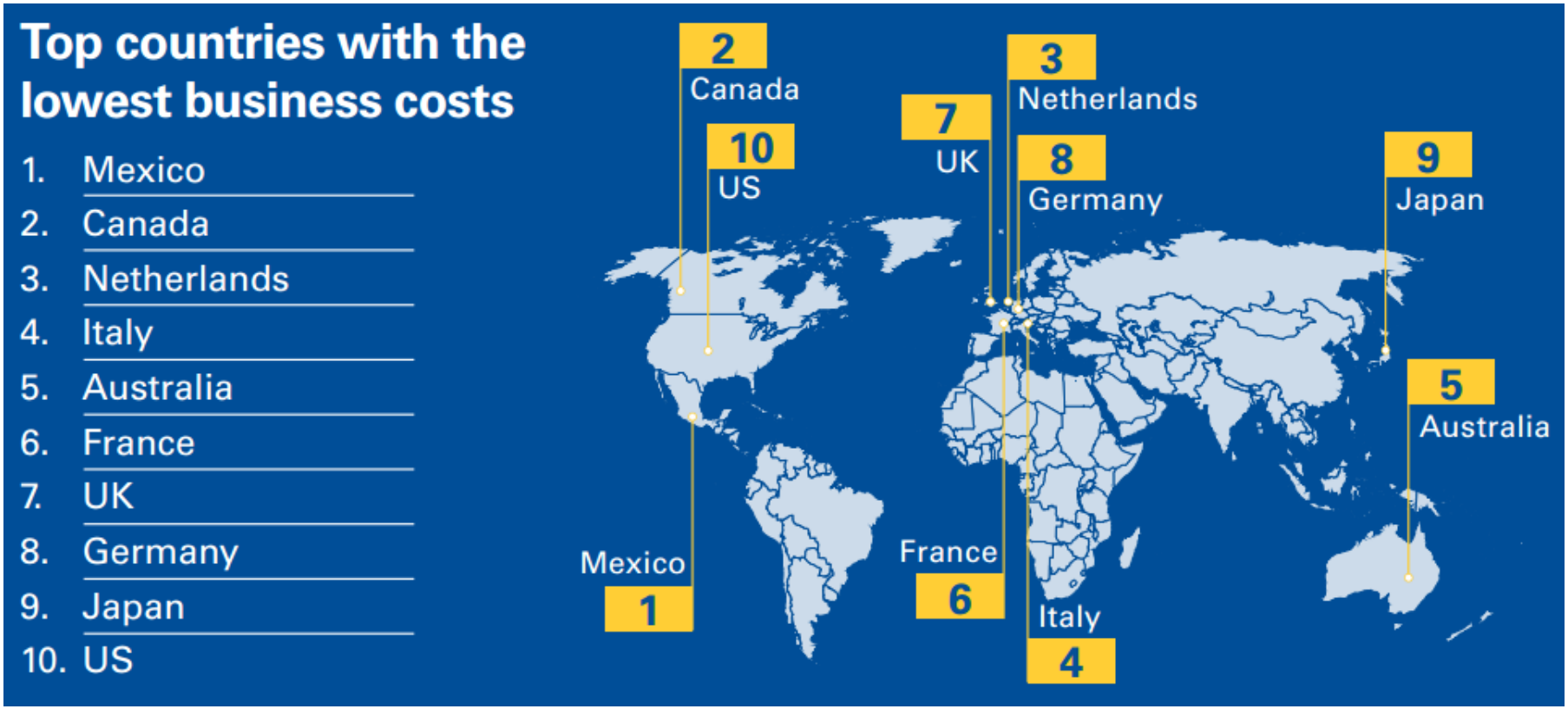
Global Competition

Corporate Income Tax Rates Competition (G7 Top 3 from KPMG, 2016)



Global Competition

Countries with the lowest business cost (G7 Top 10 from KPMG, 2016)



Global Competition

Business Cost Advantage: Greater Toronto vs USA (York Region, 2016)

- 13% lower Corporate Income Tax than U.S. avg. (State-Fed)
- 50% lower employer healthcare costs
- Lower salary costs (up to 45% in Tech) and employee attrition in tech/management roles than in the U.S.
- 40%-60% R&D cost reduction via SR&ED incentive program

Metro Toronto business cost advantage vs. U.S. metro areas

Source: KPMG Competitive Alternatives 2014

Metro Area	Software Development / Digital Media	Electronic Systems Development & Testing	Financial Services
vs. New York City	21%	19%	20%
vs. Los Angeles	17%	15%	10%
vs. San Francisco	21%	21%	18%
vs. Denver	12%	7%	2%
vs. Chicago	16%	11%	9%
vs. Boston	18%	13%	14%
vs. Raleigh	11%	14%	-1%
vs. Austin	11%	7%	1%
vs. U.S. average	16%	13%	10%

Global Competition

Manufacturing Competitiveness (Global Top 10 from Deloitte, 2016)

2016 (Current)		
Rank	Country	Index score (100=High) (10 = Low)
1	China	100.0
2	United States	99.5
3	Germany	93.9
4	Japan	80.4
5	South Korea	76.7
6	United Kingdom	75.8
7	Taiwan	72.9
8	Mexico	69.5
9	Canada	68.7
10	Singapore	68.4

Global Competition

Global Competitiveness Index (Global Top 15 from World Economic Forum, 2016)

	Economy	Score[1]	Prev.[2]	Trend[3]
1	Switzerland	5.76	1	
2	Singapore	5.68	2	
3	United States	5.61	3	
4	Germany	5.53	5	
5	Netherlands	5.50	8	
6	Japan	5.47	6	
7	Hong Kong SAR	5.46	7	
8	Finland	5.45	4	
9	Sweden	5.43	10	
10	United Kingdom	5.43	9	
11	Norway	5.41	11	
12	Denmark	5.33	13	
13	Canada	5.31	15	
14	Qatar	5.30	16	
15	Taiwan, China	5.28	14	

Global Competition

VC Money Invested in North American Cities (Thomson Reuters, 2016)

Metro Region	First 3Q 2016 Rank	2015 Rank	First 3Q 2016 VC Invested (CAD $ Millions)	First 3Q 2016 North American Market Share	Change in Rank From 2015
San Francisco	1	1	$15,981	28.3%	-
San Jose	2	2	$7,829	13.9%	-
New York City	3	3	$6,126	10.9%	-
Boston	4	4	$5,280	9.4%	-
Los Angeles	5	5	$3,267	5.8%	-
Washington D.C.	6	6	$1,154	2.0%	-
San Diego	7	8	$1,066	1.9%	+1 ▲
Chicago	8	9	$915	1.6%	+1 ▲
Orange County	9	10	$888	1.6%	+1 ▲
Seattle	10	7	$795	1.4%	-3 ▼
Montreal	11	16	$736	1.3%	+5 ▲
Philadelphia	12	15	$651	1.2%	+3 ▲
Toronto	13	14	$645	1.1%	+1 ▲
Austin	14	13	$552	1.0%	-1 ▼
Houston	15	24	$523	0.9%	+9 ▲
Vancouver	20	19	$315	0.6%	+1 ▲
Kitchener-Waterloo	21	26	$295	0.5%	+5 ▲

THOMSON REUTERS

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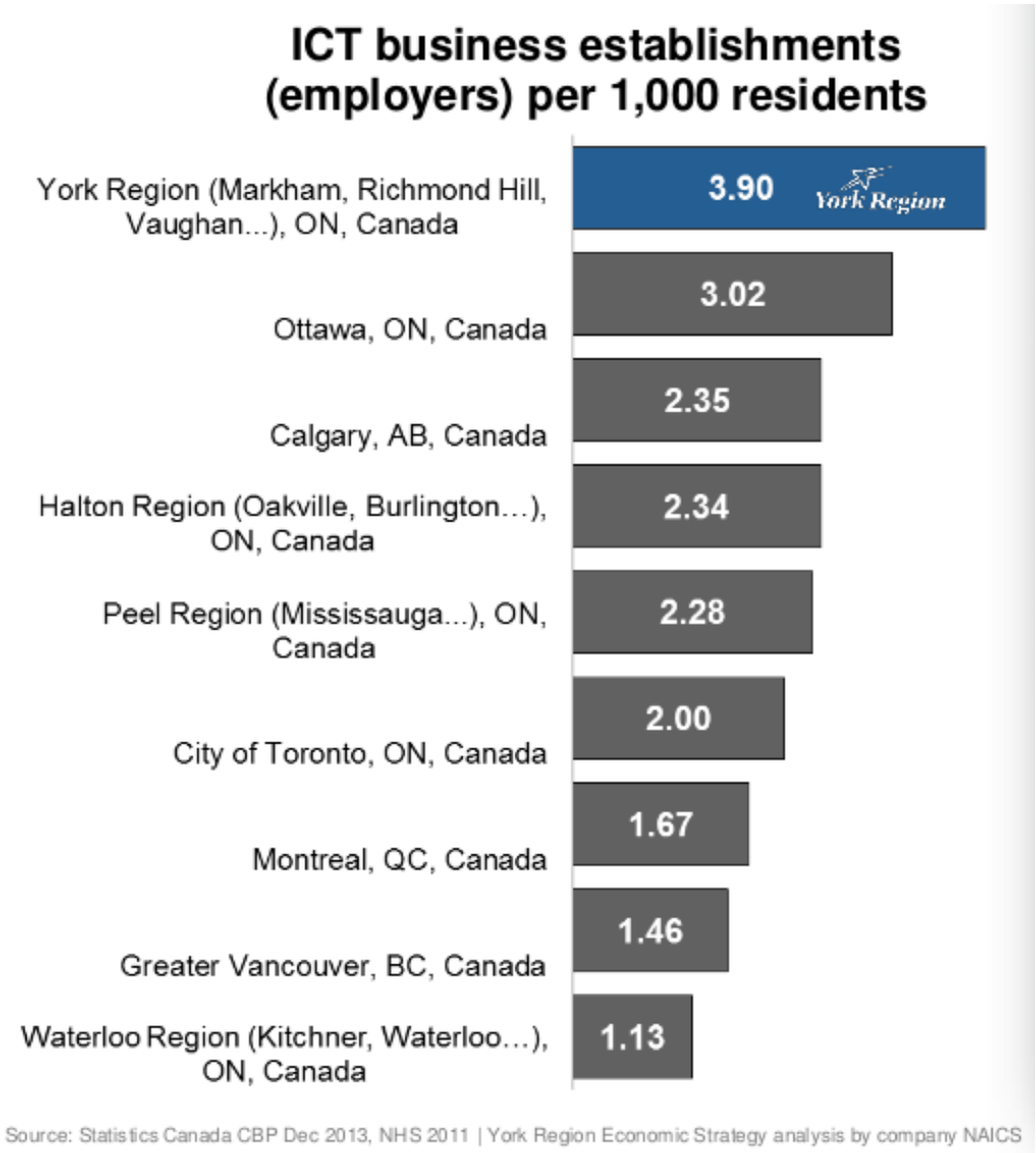
Contributors to our venture capital & private equity analyses are entitled to packages of additional data. Please contact us to participate.

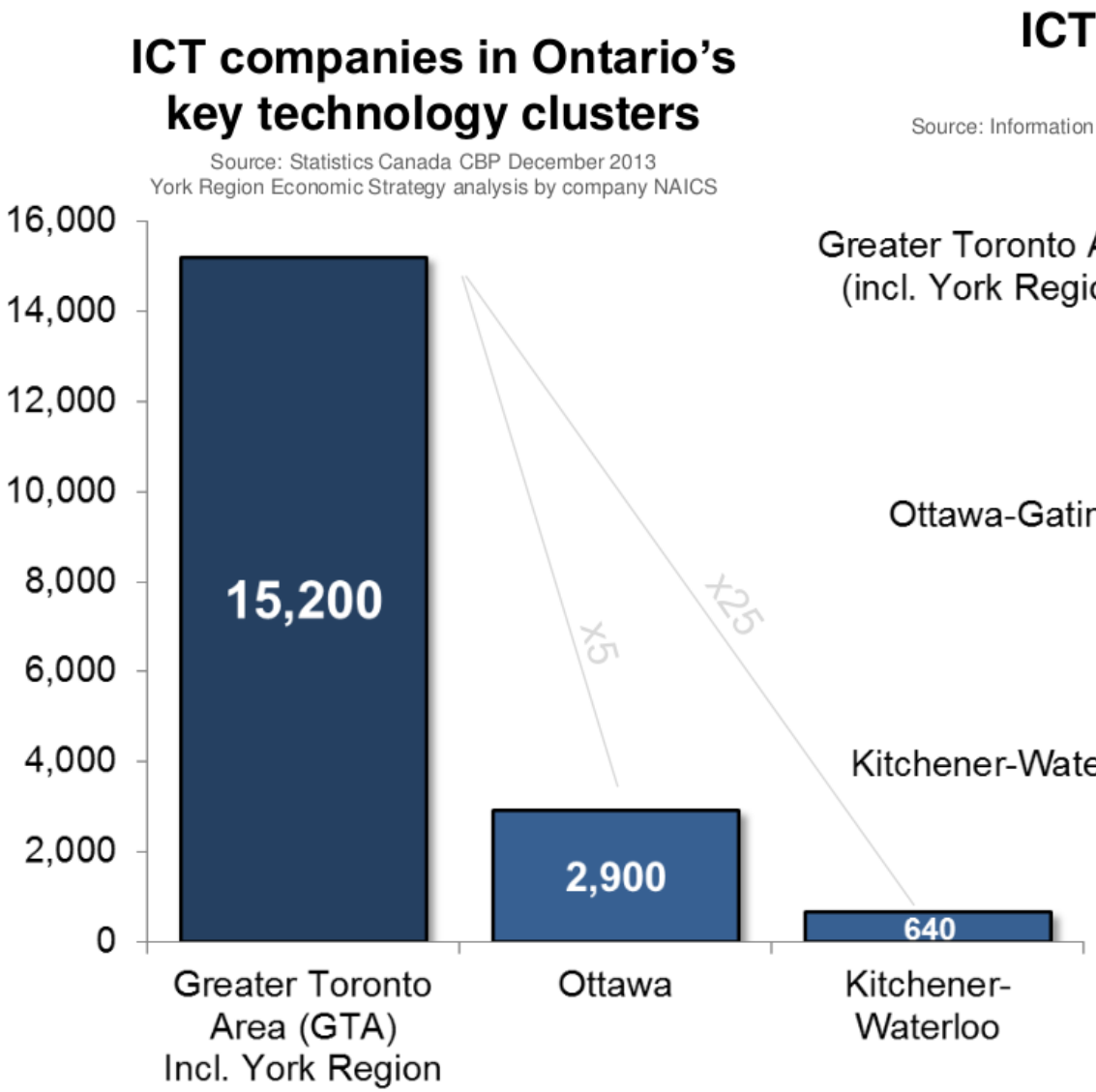
Global Competition

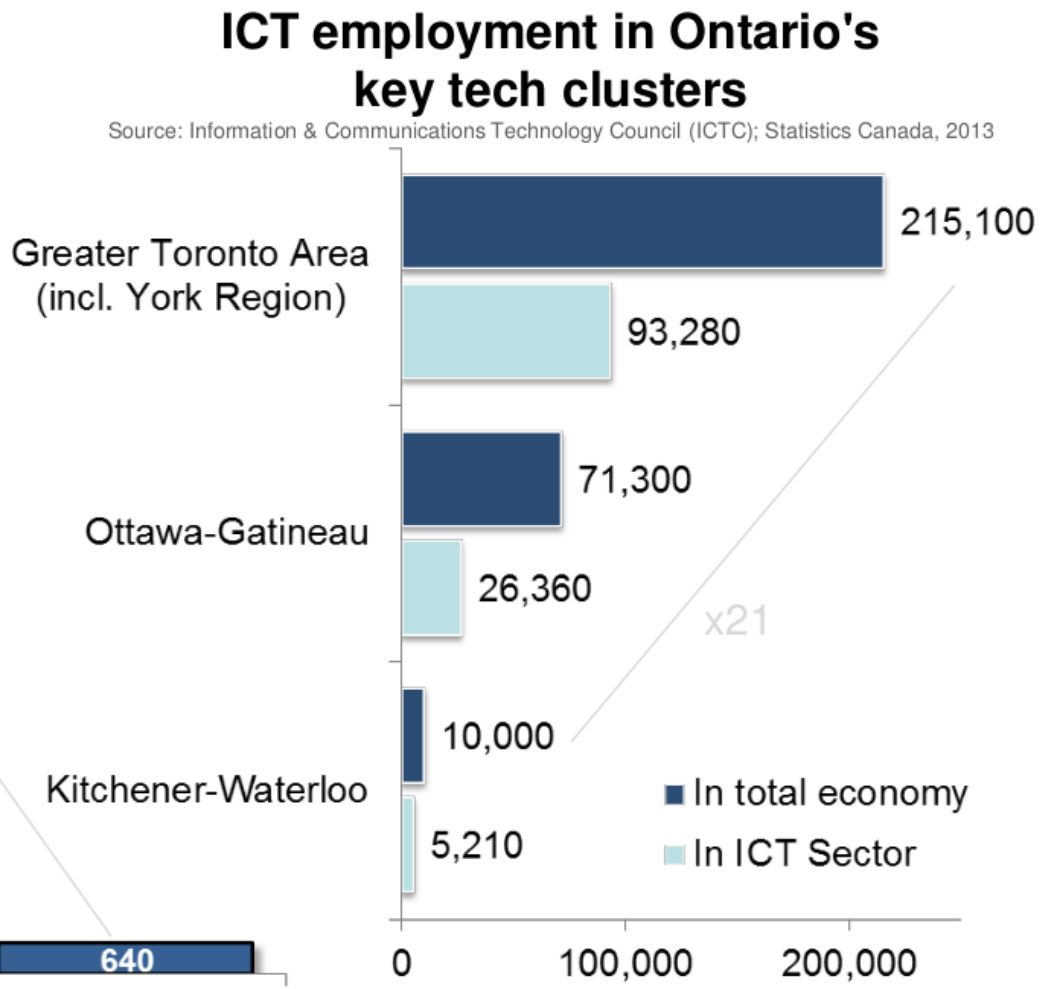
ICT Cluster Density across Canada (York Region, 2016)



Global Competition

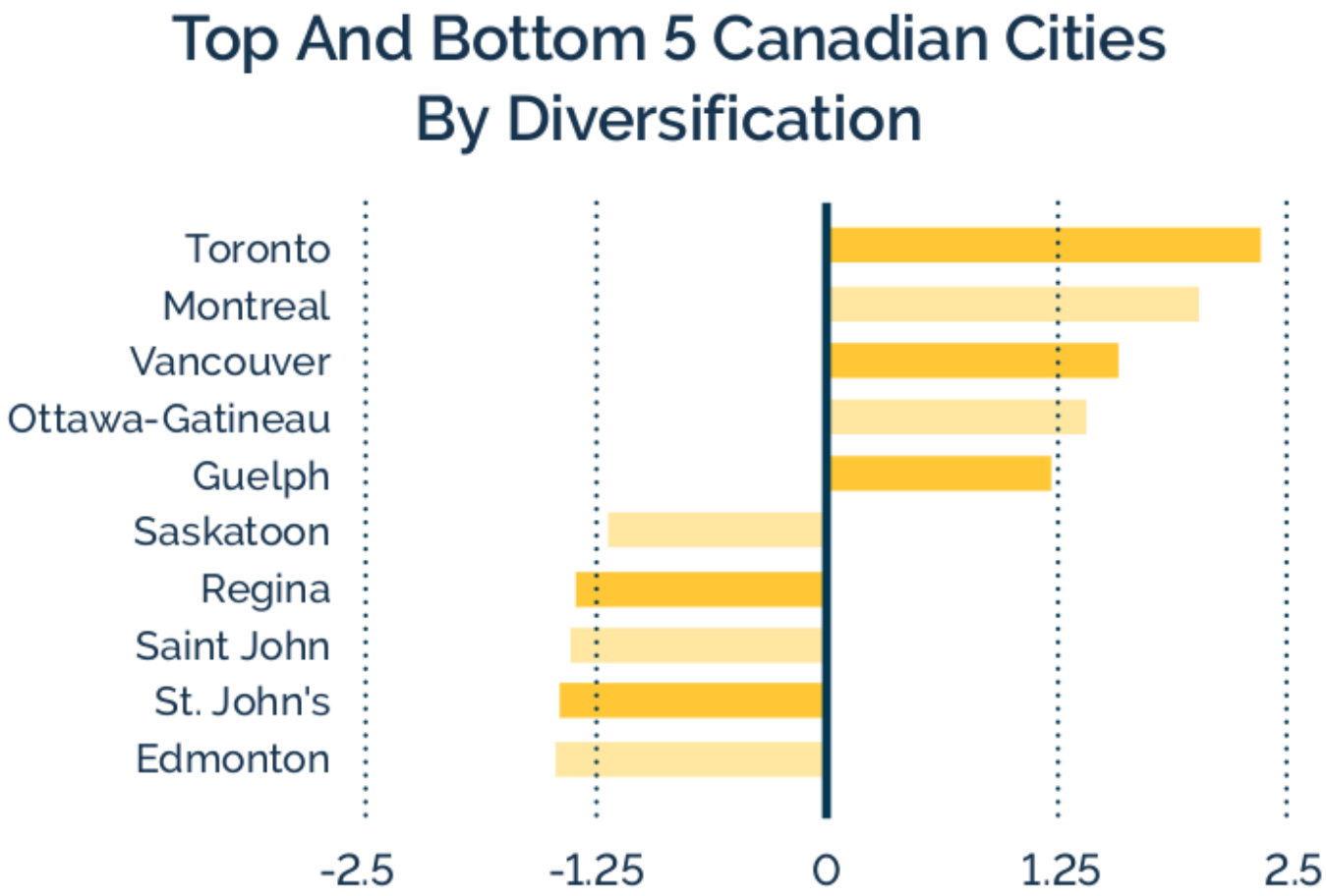
Size of Ontario ICT Clusters (York Region, 2016)





Global Competition

Top Canadian Cities by Diversification (TechTO, 2016)



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