# The Tortoise AI Index

Québec AI Dashboard Results

Where does Québec rank?

Québec holds a very impressive lead against many countries - including ones double its size. With a thriving AI ecosystem evolving in Québec's biggest cities, the province ranks in the top 10 of our Index, and has an opportunity to match or even excel beyond notable AI nations, from South Korea to Germany.
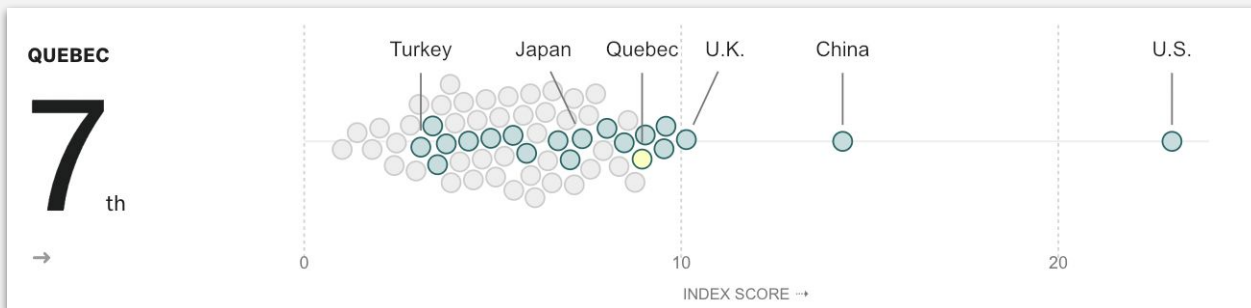
→	1.	United States of America
→	2.	China
→	3.	United Kingdom
→	4.	Canada
↗	5.	South Korea
↘	6.	Germany
→	7.	Quebec
↘	8.	Israel
↘	9.	The Netherlands
↘	10.	France
↗	11.	Singapore
↗	12.	Australia
↘	13.	Ireland
↘	14.	Finland
↘	15.	Luxembourg

QUEBEC

7th

→

Turkey   Japan   Quebec   U.K.   China   U.S.

0   10   20

INDEX SCORE →

Index Methodology

How does the AI Index work?

The Dashboard is powered by the Global AI Index, the most **comprehensive dataset** on national and regional AI performance to date.

It tracks **143 unique indicators**, that reflect the level of AI capacity and activity in **63 regions**. These indicators are organised into **7 pillars**, each highlighting a significant force in a region's AI ecosystem:

| Talent | Infrastructure | Operating Environment | Research | Development | Government Strategy | Commercial |

How does the AI Index work?

When it comes to metrics like the number of AI companies or the number of skilled practitioners, countries (or indeed Provinces) are are awarded points for both "intensity" and "absolute capacity".

AI Index Score

| Intensity | Absolute capacity |
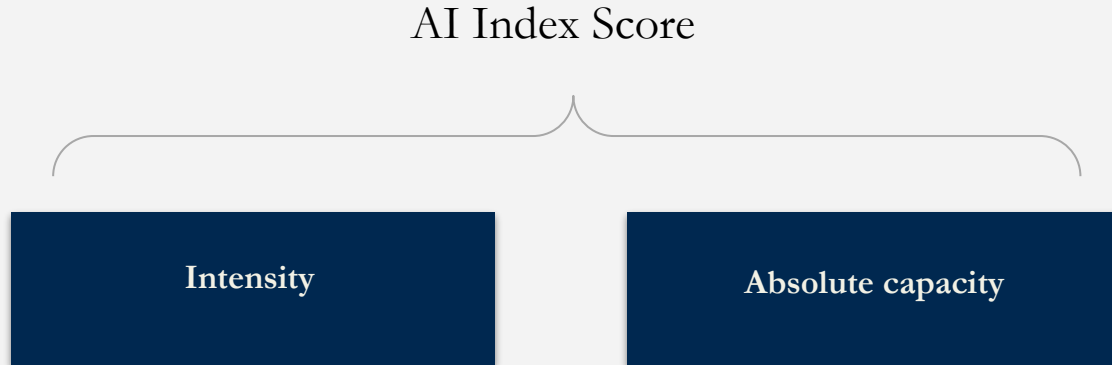
Absolute vs Intensity

- Absolute metrics capture the scale of a company's output in a certain field. These metrics are typically dominated by larger countries. For AI Startups, the US ranks 1st with over 1,000.
- Intensity metrics (eg. number of AI startups per capita) capture more information about the environment surrounding AI in a given country. When we look at the number of startups as a proportion of population, smaller regions like Estonia and Israel leap to the top of the pile.
- Our overall rankings use a combination of absolute and intensity metrics. Due to its size, Québec naturally does less well on absolute metrics, whereas it performs better on those related to intensity.

Pillar Findings & Notable Indicators

COUNTRY	TALENT		INFRA-STRUCTURE		OPERATING ENVIRONMENT		RESEARCH		DEVELOPMENT		GOVERNMENT STRATEGY		COMMERCIAL		SCORE
→ 1. United States of America		100		99		66		100		100		71		100	23
→ 2. China		16		100		91		61		81		86		46	14
→ 3. United Kingdom		35		77		87		39		25		64		18	10
→ 4. Canada		26		81		77		34		25		91		14	9
↗ 5. South Korea		12		91		53		25		82		75		6	9
↘ 6. Germany		24		82		82		37		24		74		7	9
→ 7. Quebec		22		71		84		35		24		84		12	9
↘ 8. Israel		32		75		73		30		23		7		22	9
↘ 9. The Netherlands		29		87		87		25		28		52		5	9
↘ 10. France		24		82		89		25		21		81		8	9
↗ 11. Singapore		30		95		39		23		20		63		13	8
↗ 12. Australia		21		72		75		27		36		63		6	8
↘ 13. Ireland		24		92		99		11		26		16		4	8
↘ 14. Finland		16		76		85		21		17		87		4	7
↘ 15. Japan		9		90		55		22		34		57		9	7
↘ 16. Luxembourg		16		99		85		12		19		51		5	7
↗ 17. Sweden		18		82		84		24		17		34		4	7
↗ 18. Switzerland		25		83		48		30		21		2		8	7
↘ 19. Denmark		19		79		92		19		9		60		3	7
↗ 20. Spain		11		77		91		19		11		66		3	7

① Talent - 12th

The talent pillar focuses on the numbers of skilled workers, students studying relevant topics and coding activity.

For Talent, Québec comes in at **12th** position. In Talent, Québec ranks ahead of similarly-sized nations, including Sweden, Norway and Denmark. Québec has a robust AI talent pool in respect to its size.

- **LinkedIn**: When it comes to the combined numbers of Data Scientists, Data Engineers, AI Engineers and Machine Learning engineers (AI workers), Québec places between the UK and Finland for AI workers per capita. The vast majority of AI engineers in Canada are concentrated in Québec, accounting for 95% of the Canadian population.

- **Github**: 29.7% of all Canadian code uploads ("commits") to AI projects on the code sharing platform Github were from users in Quebec.
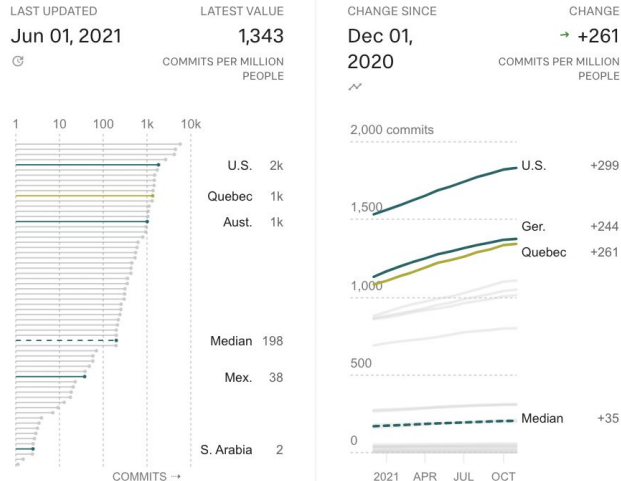
Recommendations: While Québec ranks well in Talent, our analysis of jobs provides food for thought. Although Québec has a particularly high number of AI Engineers, on total AI workers Québec performs below its broader index position. We also see Québec performing less well on MOOC (Massively Open Online Courses) and Meetups attendance per capita. Taken alongside lower than expected Github activity and fewer Python/R package downloads, these indicators may suggest that Québec, despite a strong professional presence, could do more to foster local talent and networks to support the funding flowing into the province.

1 Talent - 12th
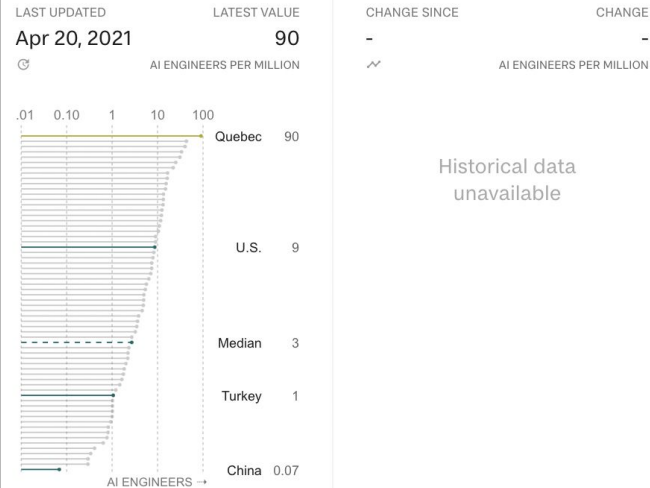
Number of GitHub Commits per capita

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This is the total number of commits to around 7000 of the top 'AI', 'Machine Learning' and 'Data Science' repositories on GitHub. Québec ranks 11th, with 1343 commits per million population, while Canada ranks 15th, with 1048 commits per million population. In comparison to Canada, the population of Québec seems to engage more with open-source AI repositories on GitHub, which could show increasing community engagement and recognition of AI.

LAST UPDATED	LATEST VALUE
Jun 01, 2021	1,343
	COMMITS PER MILLION PEOPLE

CHANGE SINCE	CHANGE
Dec 01, 2020	→ +261
	COMMITS PER MILLION PEOPLE

1   10   100   1k   10k

U.S.	2k
Quebec	1k
Aust.	1k
Median	198
Mex.	38
S. Arabia	2

COMMITS →

2,000 commits

1,500

1,000

500

0

U.S.	+299
Ger.	+244
Quebec	+261
Median	+35

2021   APR   JUL   OCT

Existing number of 'Artificial Intelligence Engineers' on Social Media per capita

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Québec ranks 1st in this indicator with a total of 90 AI Engineers per million population. Sweden, which ranks 2nd, has less than half (48%) of the AI Engineers per million. Most notably, Canada ranks 7th with a total of 22 AI Engineers per million population, signaling the presence of a central hub of AI talent in Québec.
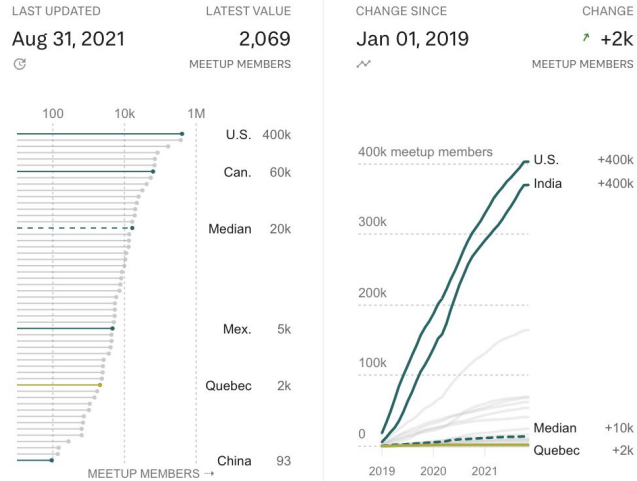
LAST UPDATED	LATEST VALUE
Apr 20, 2021	90
	AI ENGINEERS PER MILLION

CHANGE SINCE	CHANGE
-	-
	AI ENGINEERS PER MILLION

.01   0.10   1   10   100

Quebec	90
U.S.	9
Median	3
Turkey	1
China	0.07

AI ENGINEERS →

Historical data unavailable

1 Talent - 12th

Number of 'Artificial Intelligence' Meetup Members

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As of November 2021, Québec is ranked 40th with a total of 2,069 meetup historic members. Pre-pandemic, numbers grew 15x from 2019-2020, versus a national rise of 6.6x over the same period. Since the outbreak however, meetup activity in Québec has stagnated, with no new events recorded since March of 2020. Facilitating local events may be an item of interest as the province seeks to rejuvenate local community and talent networks while emerging from the pandemic.

LAST UPDATED	LATEST VALUE	CHANGE SINCE	CHANGE
Aug 31, 2021	2,069	Jan 01, 2019	↗ +2k
	MEETUP MEMBERS		MEETUP MEMBERS

100   10k   1M
U.S. 400k
Can. 60k
Median 20k
Mex. 5k
Quebec 2k
China 93
MEETUP MEMBERS →

400k meetup members
U.S. +400k
India +400k
300k
200k
100k
0
Median +10k
Quebec +2k
2019   2020   2021

Proportion of Country who've graduated from a Natural Sciences, Mathematics, and Statistics Undergraduate Programme

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Scaled using Québec's share of Bachelor's graduates in Canada, Québec has around 638 Bachelor graduates in science-related fields, placing the province ahead of the United States, France, and South Korea. With a high proportion of its student population gaining degrees in the sciences, maths, and statistics, Québec contains a great talent pool to contribute to AI development.

LAST UPDATED	LATEST VALUE	CHANGE SINCE	CHANGE
Dec 09, 2020	638	-	-

0   500   1k
U.K. 1k
Quebec 638
Median 284
Russia 145
Brazil 71

Historical data unavailable

2 Infrastructure – 34th

The infrastructure pillar focuses on the reliability and scale of access infrastructure, from electricity and internet, to super computing capabilities.

For infrastructure, Québec comes in at **34th** position. With slower download speeds and a relatively low mobile penetration rate, Québec falls behind some of its usual counterparts in Infrastructure.

Québec is home to two of the 500 most powerful non-distributed computer systems in the world, according to data from top500.org combined with broader research. This is a somewhat low share of the nine that are identified in Canada. On an absolute basis, Québec ranks at 21st position on this indicator, but on a per capita basis, it comes in at 11th place.

Recommendations: **Although these indicators are less relevant to AI specifically, an improvement in internet download speeds, mobile penetration rate, and supercomputing capabilities may help build a stronger foundation for AI development.**

2 Infrastructure – 34th
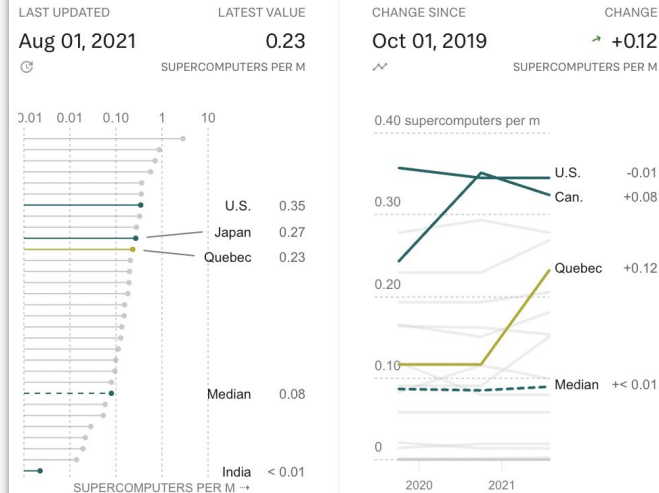
Proportion of Population using Internet

Québec ranks 9th, with a score of 96%, and Canada ranks 15th, with a score of 92.7%. In comparison to countries with similar, if not smaller populations, Bahrain, Qatar, and the UAE rank 1st, 2nd and 3rd respectively.

LAST UPDATED	LATEST VALUE	CHANGE SINCE	CHANGE
Dec 09, 2020	96	-	-
⟳	%	⤳	%

	%
S. Korea	96.16
Quebec	96
Japan	91.28
Median	82.64
Brazil	70.43
India	20.08

PROPORTION (%) →

Historical data unavailable
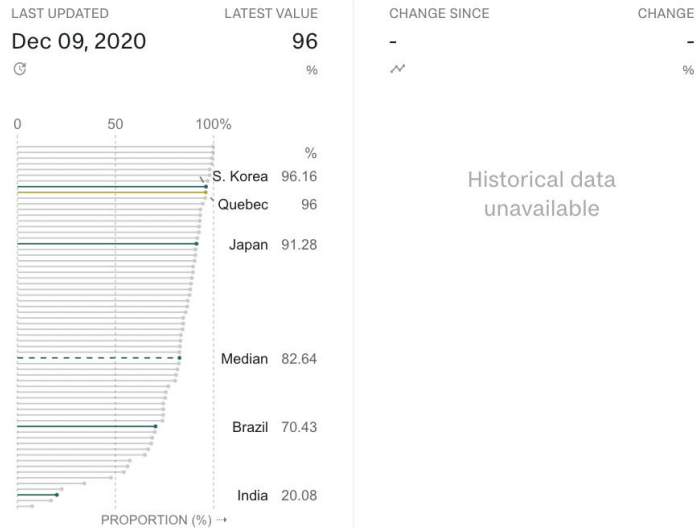
Number of Top500 Non-Distributed Super Computers per capita

As of August 2021, Québec had a total of 0.23 Supercomputers per million people, placing it in 11th place ahead of Austria, South Korea, and Spain. Canada ranks higher in 8th place, with a total of 0.32 Supercomputers per million people.

LAST UPDATED	LATEST VALUE	CHANGE SINCE	CHANGE
Aug 01, 2021	0.23	Oct 01, 2019	↗ +0.12
⟳	SUPERCOMPUTERS PER M	⤳	SUPERCOMPUTERS PER M

	SUPERCOMPUTERS PER M
U.S.	0.35
Japan	0.27
Quebec	0.23
Median	0.08
India	< 0.01

SUPERCOMPUTERS PER M →

0.40 supercomputers per m

U.S.	-0.01
Can.	+0.08
Quebec	+0.12
Median	+< 0.01

2020   2021

2 Infrastructure – 34th

Average Download Speed

As of July 2021, the average download speed for Québec was 76.74Mbps, placing it in 44th place overall. In comparison, Canada has an average speed of 174.53Mbps, placing it in 14th place. The average speed for Québec has dropped 42Mbps since July 2020, from an average speed of 118.75Mbps - this has likely contributed to its lower placement in this indicator ranking.
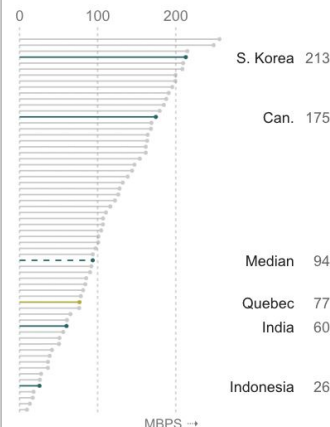
LAST UPDATED	LATEST VALUE	CHANGE SINCE	CHANGE
Aug 31, 2021	77 MBPS	Jul 01, 2020	→ −42 MBPS

0   100   200

S. Korea 213
Can. 175
Median 94
Quebec 77
India 60
Indonesia 26

MBPS →

250 mbps

200

150

100

50

JUL   OCT   2021   APR   JUL

S. Korea +43
France +46
Median +23
Quebec −42
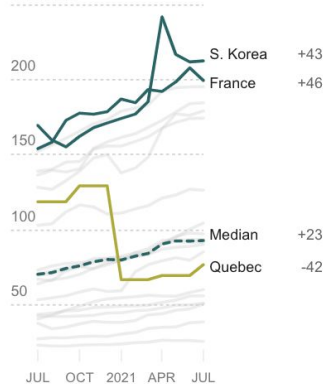
Mobile Penetration Rate per 100 Persons

Compared to most countries of similar size and development, Québec and Canada hold a much smaller mobile penetration rate, with only 93 mobile subscriptions per 100 people. Although not directly related to AI, mobile penetration rate provides a helpful proxy of digital technology adoption. With a low number, this may be a signal of a generally low digital adoption rate across Canada, which may in turn hamper the spread and development of AI.

LAST UPDATED	LATEST VALUE	CHANGE SINCE	CHANGE
Dec 09, 2020	93 SUBSCRIPTIONS PER 100 PEOPLE	Oct 01, 2019	→ +4 SUBSCRIPTIONS PER 100 PEOPLE

100   200   300

S. Africa 166
Argen. 131
Median 121
Brazil 99
Quebec 93
India 84

SUBSCRIPTIONS →

160 subscriptions

140

120

100

80

OCT   2020   APR   JUL   OCT

S. Africa +13
Russia +7
Median +2
Quebec +4
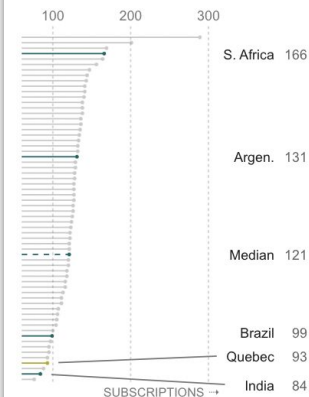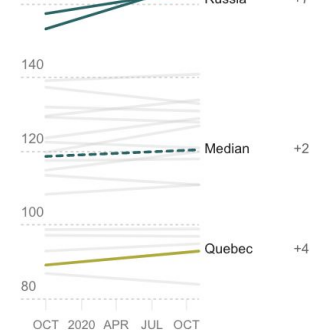
3 | Operating Environment – 17th

The operating environment pillar focuses on the regulatory context, visa attractiveness and public opinion surrounding artificial intelligence.

Québec ranks at **17th** place for Operating Environment. Although Canada and Québec suffer from a low level of public trust in AI, Québec scores ahead of the US, South Korea, Germany, Canada and other Index leaders.

With the approval of Bill 64 earlier this year, Québec leads against the US, South Korea, Hong Kong, and other high-ranking nations by supporting the right to explanation in automated modelling and processing decisions.
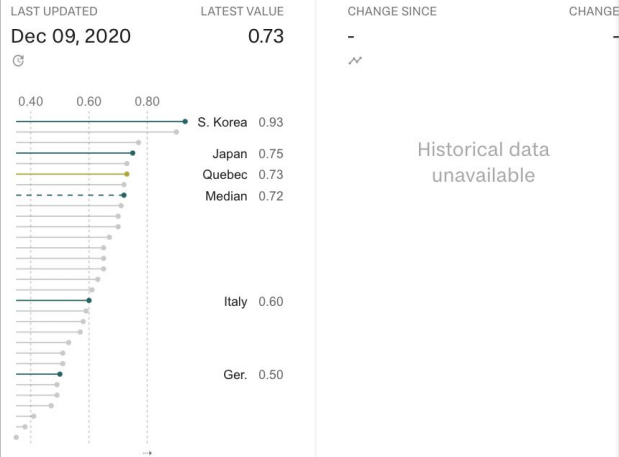
Recommendations: Québec is starting to take the steps forward to improve their operating environment through new regulations and a strong visa regime, but should continue to reflect and improve on their policies to ensure they're building public trust in AI within the province.

3 Operating Environment - 17th

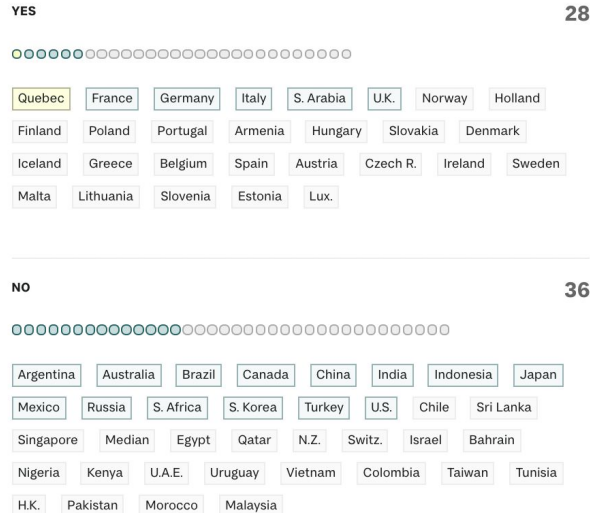## OURdata Index Global Score

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This indicator is the total score of a given country on the OECD OURdata index, ranking the degree of usefulness, reusability and openness of data in a given country. As of the most recent data, Canada ranks highly here, reflecting a high measure of transparency and accessibility of data within Québec.

LAST UPDATED	LATEST VALUE	CHANGE SINCE	CHANGE
Dec 09, 2020	0.73	-	-

0.40   0.60   0.80

S. Korea 0.93

Japan 0.75
Quebec 0.73
Median 0.72

Italy 0.60

Ger. 0.50

Historical data unavailable

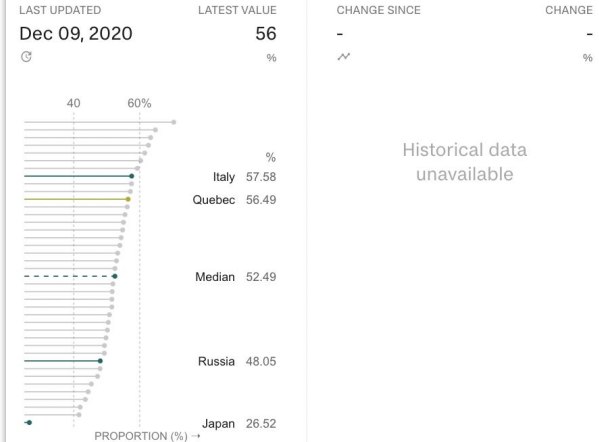## Presence of Right to Explanation

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With the approval of Bill 64 earlier this year, Québec leads against Canada, the US, South Korea, and other high-ranking nations by supporting the right to explanation. In general, there is a strong geographic focus for the countries with this right in Europe. There is one exception to this pattern, which is Saudi Arabia who have stipulated of the right to an explanation of modelling decisions.

YES   **28**

○○○○○○○○○○○○○○○○○○○○○○○○○○○○○

Quebec	France	Germany	Italy	S. Arabia	U.K.	Norway	Holland
Finland	Poland	Portugal	Armenia	Hungary	Slovakia	Denmark
Iceland	Greece	Belgium	Spain	Austria	Czech R.	Ireland	Sweden
Malta	Lithuania	Slovenia	Estonia	Lux.

NO   **36**

○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○

Argentina	Australia	Brazil	Canada	China	India	Indonesia	Japan
Mexico	Russia	S. Africa	S. Korea	Turkey	U.S.	Chile	Sri Lanka
Singapore	Median	Egypt	Qatar	N.Z.	Switz.	Israel	Bahrain
Nigeria	Kenya	U.A.E.	Uruguay	Vietnam	Colombia	Taiwan	Tunisia
H.K.	Pakistan	Morocco	Malaysia

Gender Diversity of Natural Sciences, Mathematics, and Statistics Graduates

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Scaling based on Québec's proportion of female graduates in Canada, the province ranks ahead of US, Denmark, and Canada as a whole. The countries with the highest level of gender diversity amongst their science graduates are Poland, Slovakia and Estonia.

LAST UPDATED	LATEST VALUE	CHANGE SINCE	CHANGE
Dec 09, 2020	56 %	- %	- %

40   60%

Italy 57.58
Quebec 56.49

Median 52.49

Russia 48.05

Japan 26.52

PROPORTION (%) →

Historical data unavailable

④ Research – 5th

The research pillar focuses on the extent of specialist research and researchers; investigating the amount of publications and citations in academic journals.

Québec is a clear leader in Research, ranking in **5th position** ahead of Canada, behind Germany and the UK. Québec ranks first in the average number of academic citations, meaning some of its top academics are extremely influential. It is home to the academic with the 2nd highest H-index of all AI researchers in Computer Sciences (Yoshua Bengio).

This pillar also looks at the number of publications accepted by top conferences. 38% of those from Canada were identified as being from within Québec.

For number of top 100 computer science universities, Québec is home to 2 of Canada's 5 top-tier universities: University of Montréal and McGill University.

Recommendations: Already a clear leader in research, Québec should continue to develop its research prowess to stay up to speed with other rising research hubs in Israel and Singapore, for example. Supporting university spin-out companies could be an opportunity to help harness this research talent beyond the sphere of academia.

4 Research – 5th

Number of Universities in Times Higher Education Top 100 Computer Science Universities
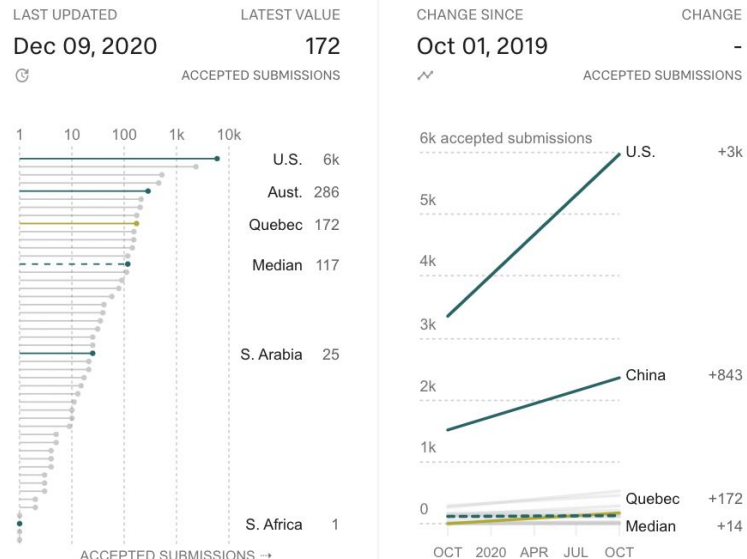
MORE →

Canada ranks 6th on this indicator, joint with Hong Kong, with a total of 5 Universities in the Times Higher Education rankings. Québec ranks 14th, home to a total of 2 top-ranking universities in Canada. The USA, Germany and China lead this ranking, with 34, 8 and 7 universities respectively, placing them in the top 3. The USA has 4.25 times the number of top universities than it's runner up.

LAST UPDATED	LATEST VALUE	CHANGE SINCE	CHANGE
Dec 09, 2020	2	-	-
	UNIVERSITIES		UNIVERSITIES

U.S. 34
U.K. 7
Quebec 2
Median 1

Historical data unavailable

UNIVERSITIES →

Number of Submissions to 'AI Conferences'

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Although this indicator is dominated by the US and China, Québec ranks above the median with 172 accepted submissions. This is about 38% of Canada's submissions, which ranks 4th with a total of 457 papers.

LAST UPDATED	LATEST VALUE	CHANGE SINCE	CHANGE
Dec 09, 2020	172	Oct 01, 2019	-
	ACCEPTED SUBMISSIONS		ACCEPTED SUBMISSIONS

U.S. 6k
Aust. 286
Quebec 172
Median 117
S. Arabia 25
S. Africa 1

ACCEPTED SUBMISSIONS →

6k accepted submissions

U.S. +3k
China +843
Quebec +172
Median +14

OCT 2020 APR JUL OCT

4 Research – 5th

Average Number of Citations on Academic Publications
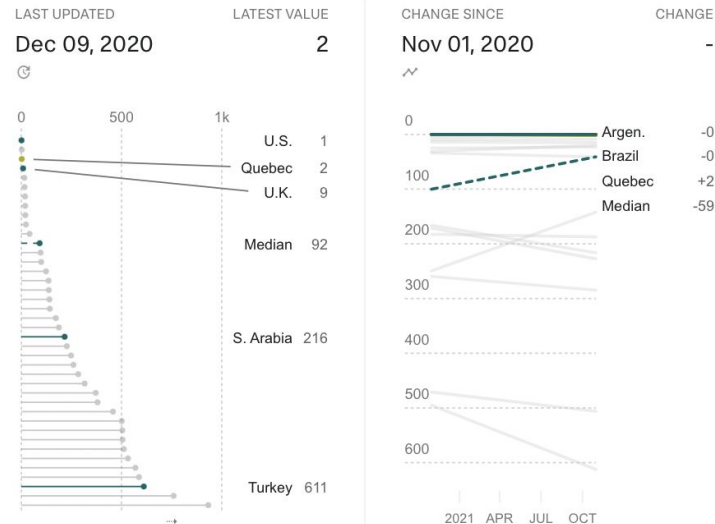
MORE →

Québec excels strongly in average number of paper citations, with 129,313 citations as of November 2021. New Zealand follows closely behind, with the Canada, US, and Germany multiple ranks lower. This indicator showcases the caliber of AI research talent in Québec, with top researchers having a very high average number of citations.

LAST UPDATED	LATEST VALUE	CHANGE SINCE	CHANGE
Dec 09, 2020	129,313 CITATIONS	Nov 01, 2020	- CITATIONS

0k   100k   1M
Quebec 100k
France 50k
Median 40k
Turkey 20k

CITATIONS →

120,000 citations
100,000
80,000
60,000
40,000
20,000
0

Quebec +100k
Can. +4k
S. Arabia -10k
Median +7k

2021 APR JUL OCT
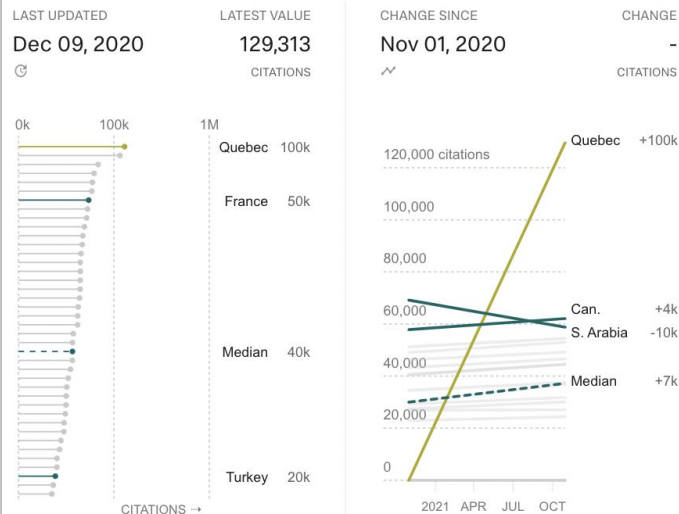
Highest Rank on H-Index

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This indicator measures the highest rank reached by a contributor from a given country on the h-index. Canada and Québec are joint 2nd place for this indicator, just behind the USA, which ranks 1st. Québec performs notably well here, ranking ahead of the UK and Germany. As a result, Canada and Québec display strong academic research capabilities and future potential for innovation in AI.

LAST UPDATED	LATEST VALUE	CHANGE SINCE	CHANGE
Dec 09, 2020	2	Nov 01, 2020	-

0   500   1k
U.S. 1
Quebec 2
U.K. 9
Median 92
S. Arabia 216
Turkey 611

0
100
200
300
400
500
600

Argen. -0
Brazil -0
Quebec +2
Median -59

2021 APR JUL OCT

5 Development – 12th

The development pillar focuses on the development of fundamental platforms and algorithms upon which innovative artificial intelligence projects rely.

Québec ranks at **12th** position for Development. With a strong contributor presence on the coding platform Github, Québec performs well in our development pillar, ranking behind Ireland and The Netherlands, but ahead of France, Israel, Singapore and Germany. Although Canada has a better overall rank, Québec holds a higher concentration of granted and filed patents based on our researcher submissions scale, revealing a notable hub of AI development in the province.

Via a series of indicators based on data from Github, the international code repository platform, we also track contributions to ten large, freely-available code libraries including 'Spark', 'Scikit-Learn, 'Pytorch' and 'Tensorflow', tools that underpin some of the most widely-used AI systems. Tesla's autopilot feature, for instance, is based around Pytorch, an open source machine learning library that is often used for deploying computer vision.

Those that contribute the most code "commits" to these open source code libraries are known as "top contributors." We counted 62 located in Québec, putting it in 9th position for number of contributors. This compares to 123 in Canada, which comes in at 6th position in our Index.

Recommendations: Québec excels in development and should continue to create paths to translate research expertise into AI innovation by supporting the concentration of patent applicants and code contributors in the province.
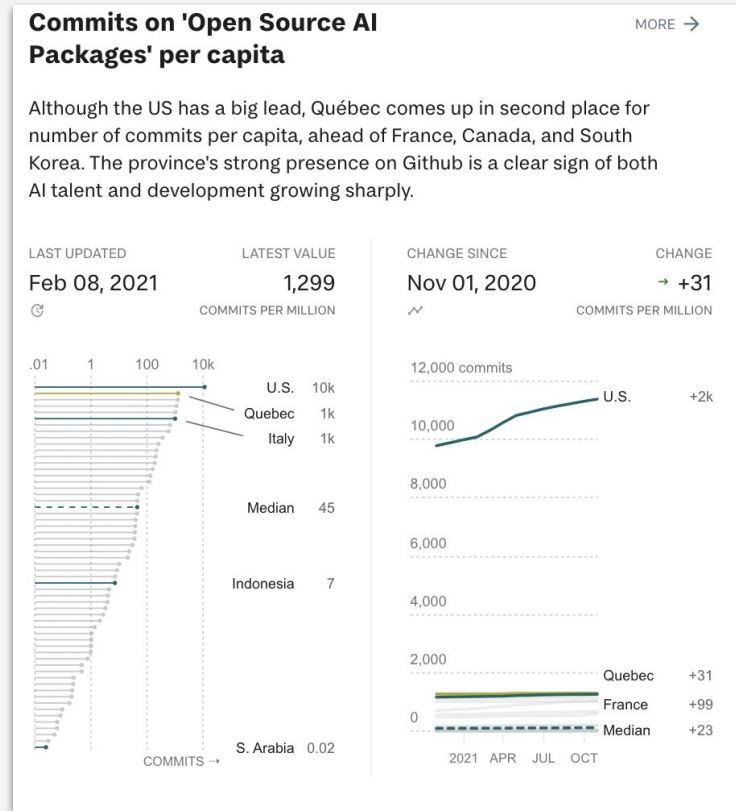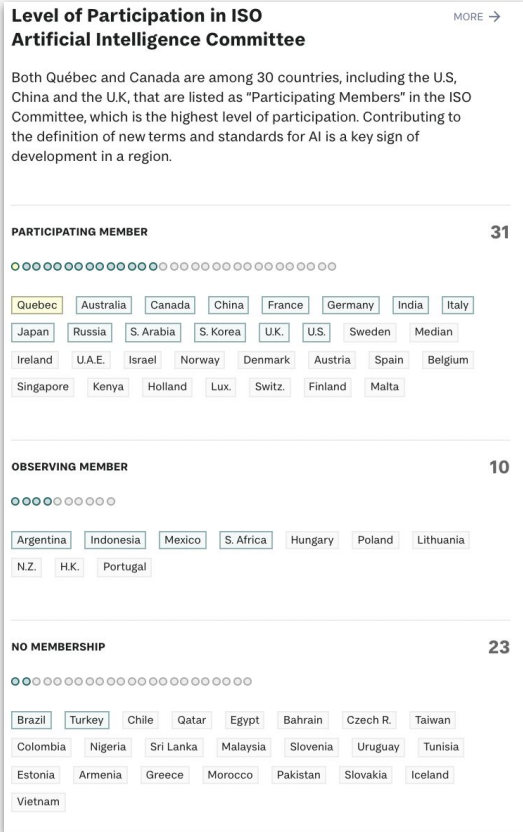
5 Development – 12th

Number of Filed 'AI Patents' by inventor per capita

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Scaled by their share of research submissions in Canada, Québec ranks 8th, with an estimated total of 7.12 patents per million people. In comparison, Canada ranks slightly below this in 10th place, with a total of 5.03 patents per million people.
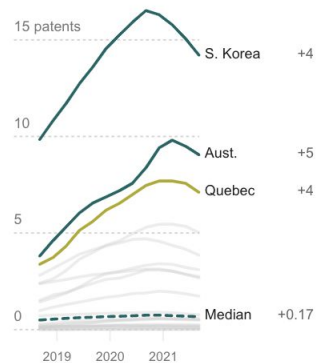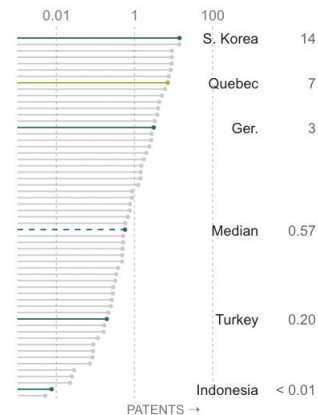
LAST UPDATED
Jan 21, 2021

LATEST VALUE
7
PATENTS PER MILLION PEOPLE

CHANGE SINCE
Sep 01, 2018

CHANGE
↗ +4
PATENTS PER MILLION PEOPLE

	0.01	1	100		
				S. Korea	14
				Quebec	7
				Ger.	3
				Median	0.57
				Turkey	0.20
				Indonesia	< 0.01

PATENTS →

15 patents

S. Korea +4
10
Aust. +5
Quebec +4
5
0 Median +0.17

2019 2020 2021

Number of Contributors on 'Open Source AI Packages'

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Ranking 9th in this indicator, Québec has a high number of core Github contributors on AI packages, highlighting the relative influence and impact the province has on AI development. Although there was a slight decrease since 2020, Québec still holds a notable, 47% share of Canada's contributors on Github.
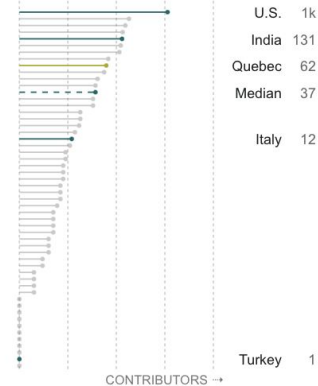
LAST UPDATED
Feb 08, 2021

LATEST VALUE
62
CONTRIBUTORS

CHANGE SINCE
Nov 01, 2020

CHANGE
→ −4
CONTRIBUTORS

	1	10	100	1k	10k		
						U.S.	1k
						India	131
						Quebec	62
						Median	37
						Italy	12
						Turkey	1

CONTRIBUTORS →

1,200 contributors
U.S. -106
1,000
800
600
400
200 China +19
Quebec -4
0 Median -2

2021 APR JUL OCT

6 Government Strategy – 6th

This pillar focuses on the depth of commitment from national government to artificial intelligence; investigating spending commitments and national strategies.

Québec leads ahead of many prominent AI nations in Government Strategy, ranking above the US, UK, South Korea and Germany. The government's support and investment in AI is clear, especially with a very large proportion of Québec's GDP dedicated to AI spending.

Canada was the world's first country to make a government AI strategy, setting a trend that would soon be followed by many. Soon after, Québec released its provincial strategy, coming 6th on our Index for this indicator thanks to a significant budget for AI and a clear set of targets for development in this area.

Recommendations: Québec has a strong national AI strategy and commitment to government spending on AI, but could benefit from the release of a new strategy update or progress report, while increased earmarked spending for AI would also push it up.
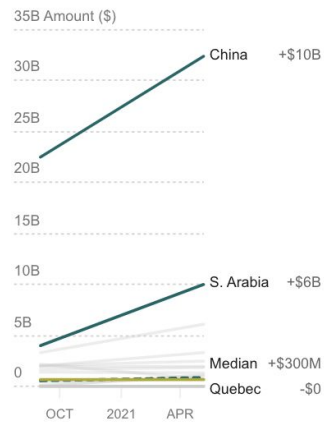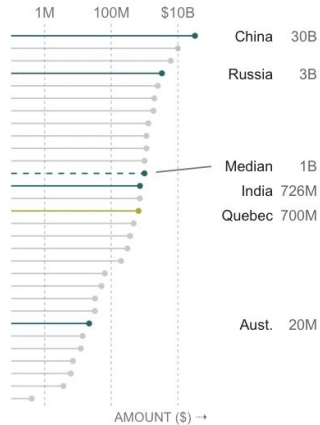
6 Government Strategy – 6th

Dedicated Spending on Artificial Intelligence

MORE →

As of December 2020, the total dedicated government spending on AI was $658,494,497 in Québec, placing it's rank on this indicator at 14th overall. This puts Québec ahead of Poland, Singapore, and Taiwan.

LAST UPDATED
Dec 09, 2020

LATEST VALUE
658,494,497

CHANGE SINCE
Sep 01, 2020

CHANGE
-

China 30B
Russia 3B
Median 1B
India 726M
Quebec 700M
Aust. 20M

China +$10B
S. Arabia +$6B
Median +$300M
Quebec -$0

AMOUNT ($) →

OCT 2021 APR

Government has Measurable AI Targets

MORE →

Québec shows a clear vision and measurable targets in its provincial strategy, placing it in line with the majority of leading AI nations. Most notably, this province seems to show a clearer long-term vision and plan in comparison to Israel and Ireland who are currently ahead of Québec in the overall Index.

MEASURABLE TARGETS 40

Quebec Australia Brazil Canada China France Germany Indonesia Japan Mexico Russia S. Arabia S. Korea U.K. U.S. Czech R. Lithuania Singapore Poland Qatar Lux. Spain Taiwan Median Sweden Holland Denmark Norway Austria Colombia Malta Finland N.Z. Slovakia Estonia Portugal Sri Lanka Uruguay U.A.E. Belgium
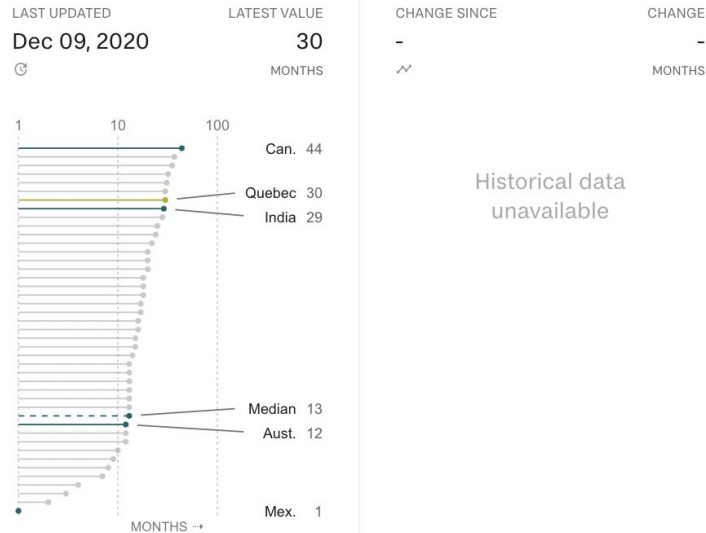
NO MEASURABLE TARGETS 24

Argentina India Italy S. Africa Turkey Malaysia Tunisia Hungary Vietnam Pakistan Iceland Israel Slovenia Morocco H.K. Kenya Chile Ireland Switz. Bahrain Nigeria Greece Egypt Armenia

6 Government Strategy – 6th

Number of Months since Release of National AI Strategy

MORE →

Similar to Canada, Québec's early release of an AI strategy reveals its long-term commitment to AI. Québec especially has been at the forefront globally, releasing their provincial strategy before many other larger nations including China, Germany, and the US.

LAST UPDATED	LATEST VALUE	CHANGE SINCE	CHANGE
Dec 09, 2020	30	-	-
	MONTHS		MONTHS

Historical data unavailable

Can. 44
Quebec 30
India 29
Median 13
Aust. 12
Mex. 1

MONTHS →

Dedicated Spending on Artificial Intelligence Proportional to GDP

MORE →

Ranking 3rd, Québec's dedication to AI development is striking. The amount invested by the government into AI was 0.19% of GDP in Québec, whereas in Canada it was < 0.01%. Québec is also nipping at the heels of Hong Kong, with a .01% difference in proportion.

LAST UPDATED	LATEST VALUE	CHANGE SINCE	CHANGE
Dec 09, 2020	0.19	-	-
	%		%

Historical data unavailable

S. Arabia 0.5
Quebec 0.19
Ger. 0.09
Median 0.01
Brazil 0
Turkey 0

PROPORTION (%) →

7 **Commercial – 7th**

This pillar focuses on the level of startup activity, investment and business initiatives based on artificial intelligence.

Québec falls slightly ahead of the bulk of the countries for commercial indicators, ranking above France, India, and Japan but behind Singapore, Canada and the UK. While it leads in average funding to established AI companies, the province falls behind in funding for startups.

For example, Québec punches above its weight when it comes to total AI funding to companies, pulling in more private investment than nations such as Spain and the Netherlands — from analysis of the international company and startup database Crunchbase.

Québec has brought in about a third of Canada's AI funding to date. Since 2007, $5.3bn in funding has been channeled into Canadian companies dealing with AI. This compares to $1.6bn that has flowed into Québec's AI companies over the same period. These funding figures include all funding rounds logged by Crunchbase (including everything from seed rounds to corporate rounds) to companies that have been tagged with "Artificial Intelligence" or other keywords relating to AI.

Recommendations: Québec is home to a robust commercial ecosystem, but could continue to improve on its support and funding to startups and scaleups. While it comes 7th in the Index overall, it comes 11th for the amount of historic funding to AI companies to date – a key indicator in this pillar. Given high rates of growth elsewhere, it is not enough to sustain growth in funding to avoid falling behind. While funding to startups and scaleups in Québec is rising, funding to the US is rising much faster.
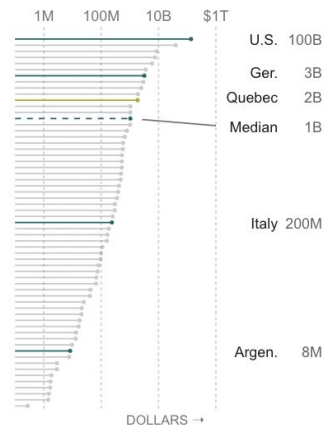
7 Commercial – 7th

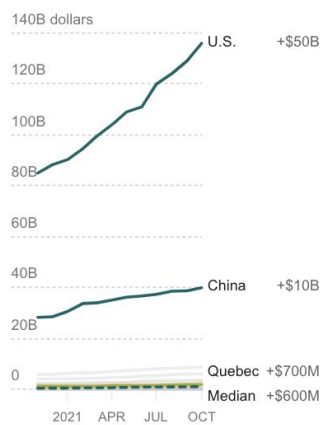## Total Funding of 'AI Companies'

MORE →

Québec ranks 11th in total funding, ahead of South Korea, Switzerland, and Australia. While Canada reasonably has a higher funding level overall, Québec has seen a larger increase over the past year, with a 61% change in value versus 51% in Canada. This change in the indicator signals growing activity in Québec's commercial AI ecosystem.

LAST UPDATED	LATEST VALUE	CHANGE SINCE	CHANGE
Aug 30, 2021	1,860,383,716 DOLLARS	Nov 01, 2020	→ +700M DOLLARS

1M   100M   10B $1T

U.S. 100B
Ger. 3B
Quebec 2B
Median 1B

Italy 200M

Argen. 8M

DOLLARS →

140B dollars

120B
100B
80B

U.S. +$50B

60B

40B
20B

China +$10B

0

Quebec +$700M
Median +$600M

2021   APR   JUL   OCT

COMMERCIAL

Number of AI Startups per capita

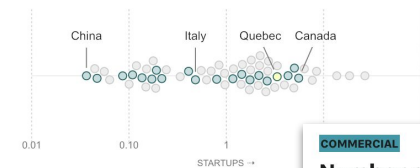| WEIGHTING	
Share of pillar	17.9%
Index weight	3.8%

How countries compare?

The number of AI startups per capita reflects an unusual leaderboard. Estonia places first, followed by Luxembourg in 4th; two countries that rarely appear as top performers in the global AI race. However, their high density of AI startups demonstrates a future capacity to climb to index ranks. Québec also comes up in the top 15, one rank ahead of Ireland.
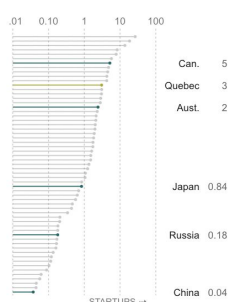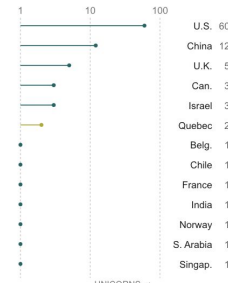
STARTUPS BY COUNTRY — AUGUST 2021

China   Italy   Quebec   Canada

0.01   0.10   1

STARTUPS →

COUNTRIES RANKED

.01   0.10   1   10   100

Can.   5
Quebec   3
Aust.   2

Japan   0.84

Russia   0.18

China   0.04

STARTUPS →

COMMERCIAL

Number of AI Unicorns

WEIGHTING	
Share of pillar	7.9%
Index weight	1.7%

How countries compare?

There appears only one real competitor in the race for the country with the highest number of AI companies valued at over 1 billion (USD$). The US has 60, whereas China (in second place), only has 12. Although the US has a far lead with 60 unicorns in 2021, Québec falls in 6th place just behind Israel and ahead of many of its competitors in the Index.

NUMBER OF UNICORNS BY COUNTRY — AUGUST 2021

S. Arabia   Quebec   U.S.

1   10   100

UNICORNS →

COUNTRIES RANKED

1   10   100

U.S.   60
China   12
U.K.   5
Can.   3
Israel   3
Quebec   3
Belg.   1
Chile   1
France   1
India   1
Norway   1
S. Arabia   1
Singap.   1

UNICORNS →

Tortoise is a new media organisation, one that is focused on slow news and opening up journalism.

Tortoise was founded by James Harding, former Editor of The Times of London and Director of News at the BBC; Katie Vanneck-Smith, former President of Dow Jones, the publisher of the Wall Street Journal; and Matthew Barzun, President Obama's Ambassador to the UK and Sweden.

Tortoise specialises in data collection, analysis and visualisation. The National AI Dashboard is a customisable tool for organisations, policy-maker researchers and government departments who need to tap into relevant and comprehensive data on the development of artificial intelligence around the world. Tortoise will continue to develop the framework and scope of the Global AI Index, and with it expand the selection of data-points available through the National AI Dashboard. We are interested in discovering the forces that are driving the news, and the most important trends and changes taking place around the world.

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