



Tholons Global Innovation Index™ 2021

INNOVATION AT SCALE

Digital Nations & Super Cities

TOP 100 SUPER CITIES

TOP 50 DIGITAL NATIONS



Avinash Vashistha Chairman Tholons Inc. USA



"Disruptive innovation will drive growth in this decade. The impact of Innovation at scale is evident across internet, technology, 5G, renewable energy, cyber security and across all sectors."

Fabrizio Opertti Chief Trade & Investment Div – IDB Latin America



"The global crisis of the pandemic has accelerated the efforts of Latin America and the Caribbean's (LAC) countries towards digital transformation in order to adopt measures for cybersecurity, privacy and cross-border e-commerce and data flows."

Michael Barrett Professor IT & Innovation University of Cambridge UK



"Every leader must engage with visionary businesses to deploy an innovative AI driven intelligent automation solutions. It is the fiduciary responsibility to your employees, customers, families and your business to act NOW."



"As a description of our current times, 'extraordinary' seems an understatement. Never has iA, Intelligent Automation's, speed to value been more important. Reducing cycle time, increasing certainty of outcome and controlling risk are the universal goals now. By sector, just about everyone will need to pivot into the new world and perhaps, amazingly, health will burst through into the top tier of iA. Finding the capability and capacity to travel this journey is where this report brings critical insight."

Debjani Ghosh President NASSCOM India



"It has been a challenge for the entire industry. Employee safety, client business and well-being are utmost important. As India strives to carry on 'business as usual' while battling the devastating global outbreak as well as its economic fallout, the IT sector is leading the way with solutions for remote innovation and collaboration. Easing of compliance norms for 'work from home' for IT sector, innovation in the times of self-isolation, fears of large-scale job losses in the impending recession and India Inc.'s efforts to support the war on Covid-19."

Ankita Vashistha Director Investments & Innovation Tholons Inc. UK



"Artificial intelligence, innovation, digital marketing and tech-based entrepreneurship will fuel the economies in this decade. Untapped power of women entrepreneurship, engagement and empowerment is leading the way like never before."



Ankita Vashistha is the CEO of Tholons Capital, MyStepUp Foundation & Managing Partner at StrongHer Capital, with over 12 years of experience in private equity, consulting, venture capital and innovation across UK, US and Asia. She founded and launched India's first venture capital fund, Saha Fund, to promote and invest in women entrepreneurship and technology. She is an engineering graduate and masters from Cranfield school of management, UK. Ankita works very actively in the startup ecosystem globally across US, UK, India, Singapore and Japan, to source, evaluate, mentor and invest in tech companies. She also works with portfolio companies to help them create value, scale and expand, leveraging technology.



Strategies and Actions of Visionary and Innovative Companies

ANKITA VASHISTHA AVINASH VASHISTHA (Best Selling Author of THE OFFSHORE NATION)

THOLONS



Avinash (Avi) Vashistha is the Chairman of Tholons Inc., All Broad Sports and MyStepUp Foundation. He is the former Chairman and CEO of Accenture (India) and ran a multibillion global delivery with a workforce of over 150,000. Avi is a highly accomplished, results oriented Chief Executive (CEO) and Venture Capitalist (VC) with 30+ years of experience in large global projects, CEO/board level strategy consulting, venture capital, digital transformation, and innovation.





Tholons Global Innovation Index - 2021

Tholons Global Innovation Index is the leading touchstone to benchmark the accelerated digital transformation of industries and services globally. The index evaluates ranks and provides location strategies to multinational corporations, countries, governments, multi-lateral agencies, analysts and investors. Digital is a critical element in transforming industries globally. Digital innovation in emerging technologies, such as cloud, AI, big data and analytics, which saw unprecedented demand during the pandemic, will sustain even in the coming decade.

There is a need for enterprises to re-imagine new model for personalization, that emphasizes customer agency. Organizations will need more active engagement strategies, if they want to thrive and succeed. Leading businesses are adopting "human-AI" collaboration. As social distancing becomes the norm, in many industries, robots are transitioning faster than expected from regulated environments to unregulated environments. Corporations and governments are looking for more and newer "contact-less" solutions.

Al driven intelligent automation solutions, available from Tholons (www.tholons.com), and the world's leading consulting and technology companies are being deployed by world's visionary businesses. You, as a leader have the fiduciary responsibility to your employees, customers, families and your business to act NOW! We are living in a very dynamic and exciting world, where the challenges and opportunities are immense. Let's go out there and re-design the experience, embrace innovators and drive change for success of enterprises.

Tholons introduced innovation, startup ecosystem and digital transformation as key components to define its index for **Top 50 Digital Nations** and **Top 100 Super Cities** in 2017. The current index for 2021 has a much higher emphasis on digital innovation, re-imagining of consumer experience, transcendental knowledge, future readiness, digital competitiveness and diversity & inclusion.



The Business of Consumer Experiences

The pandemic has reshaped industries and the world. Retailers are reshaping their businesses in real-time, to survive, re-align and grow. Companies are enabling employees to work from home / remotely by providing assets, technology enabled collaboration and productivity tools. Datadriven recruitment by use of AI, is making traditional hiring process seamless through intelligent automation, from employee interviewing to onboarding. Let's look at how consumer experiences are being collated and transformed by disruptive innovation:

Shopping

Today's shoppers opt for an array of options; shopping in a store, shopping online, getting product reviews, friend's opinion and opting for product comparisons. New and improved technology seem to be a step behind always. Companies need to think much ahead to retain customers. They can do this by harnessing big data wherever available—be it through social media, surveys or just a plain old feedback. According to Statista, in 2019, retail e-commerce sales worldwide amounted to 3.53 trillion US dollars which is projected to grow to 6.54 trillion US dollars by 2022. One of the most common online activities worldwide is online shopping. Having developed into a full-fledged online store with a variety of products, Amazon is a highly data-driven analytics adopter. In order to come up with new, better goods and services, the company collects crucial data and analyzes them deeply.

Learning

Educational institutions sticking with traditional methodologies have been experiencing a decline in revenues. These institutions must implement digital learning that exceeds a set of new expectations. The demand for knowledge continues to be outpacing supply. In 1995, only 4% of the American Corporations used online learning vs 77% now. In order to educate the students, CX analytics should be used to understand student's perspectives. Leading companies are making the most of the latest digital tools to propagate, share and acquire knowledge. Their innovative methods include cloud-based gamification, interactive videos, social and mobile learning.

Staying Healthy

Everything to do with health - food, exercise, diagnostics, hospitals is to stay healthy and enjoy quality life. In today's world, the therapists, yoga teachers, doctors are all consulting online through video calls. People are conscious of what they buy - the medicine prescribed by doctors are being searched on internet to get more information before consuming. Online search attracts 3 times more visitors to hospital sites. Searching is by far the preferred way to locate healthcare providers online for patients. Al algorithms, like any medical practitioner, are able to design treatment plans and mine medical records faster than any existing player in the healthcare ecosystem. Integrated information from wearable tracking systems based on applications allows for personalized medical monitoring and treatment. A Harvard Business Review study found that, relative to their historically trained counterparts, VR-trained surgeons had a 230% increase in their overall results. Bio issues, artificial organs, pills, blood vessels can now be printed in 3D



printing and the list goes on. Data, AI and VR based tools are giving the doctors and surgeons 10 times the power and knowledge than what they had earlier.

Entertainment

Customers pay for the value and experience that they want and get in the entertainment industry. Brands need to know exactly where their target audience spends their time and why. For both music and video, streaming has become the main revenue engine, transforming how the industry and artists distribute media to audiences. AI, AR, VR, blockchain, high internet speed and other such technologies and solutions have further helped improve content delivery, leading to an explosion in the growth of streaming services. Media companies are now able to analyze customer and behavioral data and recommend content in real time. My Disney Experience enables customers to thoroughly plan their vacations online; make dinner reservations, accommodations, explore the park using an interactive map and filter activities. Adaptive bitrate streaming technology is used by Netflix, streaming films and TV shows over the Internet to change the video and audio quality to fit the broadband connection speed and real-time network conditions of a consumer.

Travelling

Consumers are drifting to online marketplaces to thoroughly review and compare their options. In today's world, all it takes is a minute for travellers to tell hundreds of people how exactly their trip went, either on social media or on online review sites. Online feedback is the digital version of word of mouth and can make/break a company. Mobile phone has become our travel agency, best restaurant locator, tour guide, map navigator, and more. According to TripAdvisor, 45% of users use their smartphone for everything having to do with their vacations. It's possible to "teleport" ourselves to the most distant corners of the globe without getting off the couch with AR/VR having joined the travel universe.

Hiring

Organizations are now looking forward to the 'New Normal' being adopted. It is bound to place pressure on talent management teams and recruiting agencies as the market for talent gathers traction again. Many companies have achieved greater productivity and performance with remote work, and many workers appreciate the flexibility of time and do not have to fly to work on a regular basis. By using AI, data-driven recruitment renders the conventional recruiting process seamless through full automation, from employee verification to onboarding. Technology is powering payrolls, performance, and video interviews. 2021 will see an increase in the implementation of paperless and contactless onboarding technologies, including employee authentication. Since work from home is the new normal, businesses can shift towards project-based or freelance recruiting, and employers are free to recruit the best talent worldwide. In addition, this would also offer domain experts opportunities to take up projects on a short-term basis.



Paying

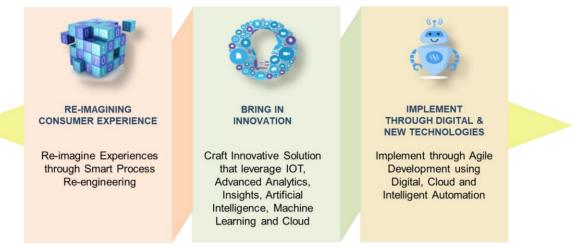
The digital mastery of players already dealing with change has been checked by the pandemic. Non-cash transactions are on a rapid growth path, accelerated during COVID-19 by enhanced adoption. In the midst of unparalleled growth, regulators seek to instil confidence and resolve the risk of non-cash payments as players cooperate to quench uncertainty. Emerging technologies are seen as an elixir for fraud prevention, data-driven offers are seen for value-added proposals, and distributed ledger technology focuses on digital currency solutions, enhancement of performance, and cost gains. New players are incorporating payments into their value chains, such as retailers/merchants, while technology companies are upgrading their financial services game as a central stage by weaving deals around payments. Constrained by budgets, business models such as Platform-as-a-Service (PaaS) are considered by businesses to provide cost-effective and superior customer experience. Payment market leaders work with companies outside their industry to obtain the opportunity to enhance the consumer experience. American Express customers can use their loyalty points to pay for taxi rides in New York.

Businesses who have embraced innovative technologies have done extremely well. Numerous examples of winners should give us the motivation and sense of aggression for action. We all wish, we would have been more prepared earlier. The good news is that each and every one of us in our respective businesses can still leverage numerous innovations and the new technology, to get our businesses on track in a fairly short period. We need to prepare for growth acceleration. Here is a list of few solutions that are being deployed by clients across the globe to manage and grow through the global crisis (www.tholons.com):

- 1. Digital Omni-channel Contact Centers with Conversational AI
- 2. Cloud Migration, DevOps, SecOps & WFH
- 3. AI Driven Finance and Banking Solutions and Intelligent Automation
- 4. AI Driven Healthcare Intelligent Automation Solutions
- 5. Intelligent Supply Chain
- 6. Automated SAP Migration and Operation
- 7. Intelligent Online Product Posting and HR-Employee Onboarding
- 8. Monetizing Intelligent Process Automation

Innovation at Scale for Enterprises

Innovation at scale for enterprises is a digital transformation process/function which brings three key elements to deliver sustainable impact:



Design, Deploy, Manage new process taxonomies using new technologies

Innovation at scale for enterprises

- 1. Re-imagine Consumer Experience—Enterprises are working with creative design studios to re-imagine consumer experience through a process of "dreaming." The idea is to take clients and consumers to a state of levitation that can enable them to dream the impossible. It is important to ensure that the dreamers are free from the shackles of technology, practicality and implementation realities. This creates a sweet but near impossible dream. How do we make the impossible, possible!
- 2. Bring in Innovation—The world is full of innovators, who have re-imagined, re-designed and implemented amazing innovative solutions to deliver snippets of near impossible dreams. It is possible to explore, discover and bring in these innovations to make the impossible dreams, near possible. The solution design through innovation in most cases delivers the wow consumer/client experience. The innovative solution includes data and intelligent automation strategy, cloud, mobility, blockchain, AI, social media, IoT, machine learning and cybersecurity with advanced analytics to unlock new intelligence. The solutioning augments the power of humans with artificial intelligence, leverage AI and advanced analytics algorithms to sense, comprehend, act and learn across value chain at an unprecedented speed and scale.
- 3. Implement through Intelligent Automation—Todays implementation is agile, powered by artificial intelligence, digital technology and machine learning. Today's workforce consists of digital workers. A combination of all these elements is what we call intelligent automation. The operations at workplace is set to have both human and digital workers, becoming an intelligent workforce completing the task/set of tasks with the power of intelligent automation, analytics and decision-making capabilities while increasing the productivity and quality and cutting down the cost. In the process of intelligent workforce operations, cognitive technologies play an important role, learning from the best.

Tholons Global Innovation COUNTRY INDEX - 2021

TOP 50 DIGITAL NATIONS

RANK 2021	RANK 2020	DIGITAL NATION	1.00	2.00	3.00	4.00	5.00	6.00	7.00
1	3	United States 1.04		3	3.00	0.34		2.17	
2	1	India 0.99		1.38	0.58		2.00		
3	4	Canada 1.08	0.69	0.10		2.32			
4	35	Germany 0.59	1.08	0.07		2.36			
5	9	Singapore 1.79		0 <mark>.0</mark> 8 0.03		2.17			
6	16	Australia 1.31	0.3	8 0.09		2.19			
7	14	Ireland 1.37	0.15	0.01		2.39			
8	6	United Kingdom 0.78	0.69	0.09		2.30			
9	-	Norway ^{0.90}	0.31 0.01			2.53			
10	-	Sweden 0.92	0.31 0.01		2	2.46			
11	38	Spain 0.72	0.54 0.06		2	2.39			
12	-	Finland 0.95	0.23 0.01		2	.50			
13	8	Mexico 0.94	0.38 0.0		2.	.26			
14	15	Poland ^{1.13}	0.31			.21			
15	2	Brazil 0.89). <mark>1</mark> 6		07			
16	39	Estonia ^{1.31}	0.08 0.			25			
17	24	South Korea 1.13	0.38	0.12		02			
18	5	Philippines 0.65	0.62 0.04		2.3				
19	-	France 0.83	0.38 0.09		2.3				
20	17	South Africa 1.03	0.23 0.03		2.3		n & Digital		
21	7	Russia ^{1.05}	0.31 0.:		2.12	2	-		
22	18	Uruguay ^{1.28}	0.08 0.0	01	2.21		ies		
23	-	Denmark 1.06	<mark>0.15</mark> 0.01		2.35	Populatio	n		
24	19	Czech Republic 1.29	0.15		2.12	- D' ''			
25	13	Vietnam ^{1.14}	0.23 0.	09	2.10	■ Diversity			

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TOP 50 DIGITAL NATIONS

RANK 2021	RANK 2020)	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00
2021	2020		, 	0.50	1.00	1.50	2.00	2.50	5.00	5.50	4.00
26	11	Colombia	0.89		0.31	<mark>0</mark> .08				2.27	
27	-	Japan	0.92		0.31	0.35				1.96	
28	-	New Zealand	1.04		0.08 0.0	1				2.40	
29	28	Costa Rica			0.08 0					2.35	
30	-	Latvia			0.08 0.	00				2.36	
31	-	Netherlands			0.31	0.01				2.21	
32	-	Iceland		(0.08 0.00					2.63	
33	26	Malaysia				0.15 0.02				2.03	
34	25	Romania			0.15	0.01				2.17	
35	27	Thailand				8 0.05				2.12	
36	-	Switzerland			0.15 0.00					2.34	
37	22	Hungary				0.08 0.01				2.03	
38	10	Argentina			0.15 0.0					2.24	
39	48	Slovenia	1.07		0.08 0.					2.23	
40	41	Israel				0.01				15	
41	30	Bulgaria			0.08 0	0.01				18	
42	-	Lithuania			0.08 0.00				2.24		
43	12	Chile			0.23 0.04	l .			2.17		
44	-	Belgium			0.15 0.01				2.25	_ Inc	0 Distin
45	-	Austria			0.08 0.01				2.23	Innovation	& Digital
46	23	United Arab Emirates			0.15	0.03			1.97	Super Citie	es
47	-	Nicaragua	0.70	0.0	8 0.01				2.41	Population	
48	34	Sri Lanka			0.08 0	.00			2.04	-	
49	43	Serbia			0.08 0.01				2.21	■Diversity &	Inclusion
50	20	Indonesia	0.86		0.15 0.07				2.10		

Tholons Global Innovation CITY INDEX - 2021

TOP 100 SUPER CITIES

RANK 2021	RANK 2020	SUPER CITIES	.00 1.	00	2.00	3.00	4.00	5.00	6.00	7.00	8.00
1	6	Toronto	1.25	0.9	3	1.18	1.28		2.13		
2	9	Singapore	1.11	0.68	0.98	1.1	2	2.12			
3	1	Bangalore	1.05	0.69	0.66	1.39		2.16			
4	30	San Francisco	1.12	0.93		1.10	1.04	1.72			
5	5	Dublin	0.52 0.64	0.70	1	.34	2.12				
6	3	Sao Paulo	1.05	0.80	1.00	0.79	1.	56			
7	27	London	0.54 0.52	0.71	1.20		2.19				
8	2	Manila	0.38 0.26 0.41	0.80		:	3.16				
9	4	Mumbai	0.46 0.24 0	.63 0.8	0		2.84				
10	29	New York	0.53 0.26 0.	41 0.58		3.	.19				
11	24	Sydney	-	0.80	1.09	0.66	1.40				
12	7	Delhi (NCR)	0.59 0.31	0.51	1.13		2.11				
13	-	Melbourne	0.85	0.59	0.94	0.82	1.35				
14	-	Tokyo	-	0.55	1.22		1.91				
15	70	Seoul	-	0.76	0.83	0.88	1.26				
16	35	Belfast	-	0.98	0.80		1.67				
17	18	Kuala Lumpur	0.50 0.27 0.4	40 0.70		2.46					
18	-	Amsterdam	-		0.97		1.53				
19	34	San Antonio, Texas	-	0.83	0.87		1.60	■ Talent, S	kill & Quality		
20	11	Kraków	-	58 0.9	6	0.91	1.20	Business	Catalyst		
21	61	Los Angeles	-	45 0.76	0.81		1.49		frastructure		
22	19	Prague	-	0.50	1.05	0.66	1.07				
23	-	Stockholm	-	0.66	1.15		1.50	■Risk & Q	uality of Life		
24	26	Dubai	-	0.59	0.93	0.80	1.12	Innovatio	n / Digital		
25	66	Taipei	0.75	0.75	0.81	1.14	0.82				

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TOP 100 SUPER CITIES

RANK	RANK	SUPER CITIES	20	0.50	1.00	~	4.50	2.00	2.50	2.00	2.50	4.00	4.54
2021	2020		00	0.50	1.00	J	1.50	2.00	2.50	3.00	3.50	4.00	4.50
26	60	Vancouver	0.61		0.45	0.5	1	1.16	;		1.52		
27	28	Birmingham, Alabama	0.58		0.60		0.94		1.07		1.0)4	
28	55	Tallinn	0.64		0.36	0.43		0.97			1.82		
29	59	Perth	0.46	0.5	7		0.90		1.15		1.13		
30	-	Raleigh-Durham	0.65	().31		0.89		1.11		1.24		
31	22	Budapest	0.66		0.56		0.80		0.98		1.19		
32	15	Santiago	0.60	0.2	7	0.58		0.80		1.9	94		
33	65	Chicago	0.49	0.22	0).76		1.4	2		1.27		
34	14	Montevideo	0.53	0.35	(0.45	().92		1.9	90		
35	21	Warsaw	0.45	0.27	0.42		0.63			2.38			1
36	36	Calgary	0.63		0.42	().72		1.05		1.33		1
37	64	Washington	0.57		0.50		0.81		1.06		1.16		
38	16	Pune	0.53	0.27	0.42	2	0.66			2.22			
39	13	Chennai	0.45	0.48		0.48		1.17			1.52		
40	71	Tel Aviv	0.25 0.20		0.93			0.90		1.8	0		
41	98	Barcelona	0.35	0.26 ().40	0	.75			2.31			
42	8	Hyderabad	0.64		0.52		0.78		0.97		1.15		
43	23	Moscow	0.32 0	.22	0.72		0.74			1.98			- T - I - u +
44	78	Boston	0.47	0.25	0.53		0.9	1		1.83			■Talent,
45	54	Glasgow City	0.53	0.17	0.6	7	0	.81		1.80			Busine
46	40	Brno	0.63	0.15		0.84		1.05			1.28		Cost &
47	10	Buenos Aires	0.7	'8	0.26		0.93		0.74		1.25		
48	76	Austin	0.46	0.27	0.41		0.75			2.05			■Risk &
49	-	Paris	0.73	3	0.51		0.91		0.87		0.89		Innova
50	31	Hanoi	0.56	0.19		0.95		0.85		1.	36		

- rastructure
- ality of Life
- ı / Digital

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TOP 100 SUPER CITIES

RANK	RANK	SUPER CITIES										
2021	2020		.00 0	.50 1	.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50
51	79	Bangkok	0.75	0.3	7	0.80		0.98		0.97		
52	12	Cebu City	-	0.	40	0.89		0.93		0.85		
53	72	Atlanta	1	0.36		0.82		1.02		1.04		
54	-	Copenhagen	0.65	0.18	0.61		0.96		1.44			
55	49	Halifax	0.34 0.2	1 ().91		0.73		1.62			
56	62	Cork	0.49	0.22 0.40		0.77			1.92			
57	32	St. Petersburg	0.42	0.31 0.4	47	0.66			1.92			
58	39	Ho Chi Minh City	0.32 0.2	27	0.83		1.04		1.30			
59	-	Busan	0.59	0.39		0.62	1.0	5	1	.11		
60	69	Dallas-Fort Worth	0.40	0.27 0.42		0.76			1.92			
61	20	Mexico City		08 0.41	0.54	1		2.30				
62	86	San Diego	-	0.31	0.79		0.96		1.25			
63	-	Incheon	-	0.30	0.50	0.62			1.83			
64	38	Bucharest	-	0.31	0.57		1.14		1.12	-		
65	17	Johannesburg	1	0.30	0.34	0.70			1.80			
66	-	Helsinki		0.19		0.86	0.53		1.44			
67	-	Tampa		0.27 0.4		0.68		1.	86			
68	-	Berlin	-	0.40	0.42		1.06	0.00	1.22		■Talent Sk	kill & Quality
69	85	Leeds (Yorkshire & Humber)		.26 0.43		0.58		2.02				
70	-	Brisbane		0.55		0.83		0.96		.86	Business	Catalyst
71	84	Miami	-	0.45		0.88		0.99		0.76	Cost & In	frastructure
72	46	St. Louis, Missouri	-	0.38		0.75		0.76	1.00		■Risk & Ou	uality of Life
73	25	San José	-	0.26 0.41		0.77		0.80	0.	50		•
74	47	Sofia			_	0.66		1.84			Innovation	n / Digital
75	63	Montreal	0.45	0.24 0.43		0.64		1.82				

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TOP 100 SUPER CITIES

RANK	RANK	SUPER CITIES								
2021	2020	.(00	0.50	1.00	1.50	2.00	2.50	3.00	3.50 4.00
76	45	Colombo	0.52	0.32	I	0.99		1.08	0.67	
77	88	Penang	0.51	0.26	0	.87	0.9	92	1.01	
78	-	Riga	0.36	0.28 0.4	43	0.58		1.9	2	
79	82	Ljubljana	0.39	0 <mark>.0</mark> 6 0.33	0.43			2.34		
80	87	Seattle	0.49	0.63	3	0.92		0.94	0.5	8
81	90	Cairo	0.52	0.37		0.96		0.80	0.90	
82	73	Istanbul	0.	70 0.14		0.91	0.59		1.19	
83	93	Philadelphia	0.39	0.35	0.59		0.95		1.24	
84	74	Cluj-Napoca	0.53	0.36		0.98		1.07	0.55	
85	52	Jakarta		0.89	0.32	0.70		0.50	1.06	
86	-	Auckland		0.99	0.16	0.89		0.67	0.74	
87	67	Indianapolis, Indiana	0.45	0.22	0.72		0.95		1.10	
88	96	Denver	0.47	0.36	0.57		1.17		0.85	
89	43	Cape Town	0.45	0.27	0.73		0.72		1.23	
90	50	Jaipur	0.49	0.40		0.85	0).79	0.86	
91	-	Adelaide	0.45	0.43		0.99		1.05	0.47	
92	33	Curitiba	0.6	0.4	1	0.81		0.79	0.71	
93	44	Chandigarh	0	.72 0.2	0	0.85		0.79	0.78	
94	37	Bogotá			0.26	0.96		0.65	0.66	Talent, Skill & Quality
95	56	Ahmedabad	0.32	0.25	0.83		0.97		0.88	Business Catalyst
96	42	Rio de Janeiro	0.6	0.33		0.85	0.	66	0.75	-
97	-	Rotterdam	0.57			0.78	0.8	3	0.68	Cost & Infrastructure
98	-	Vilnius	0.42	0.18	0.93		0.73		0.92	Risk & Quality of Life
99	92	Wroclaw	0.40	0.27	0.76		1.02		0.70	Innovation / Digital
100	-	Oslo	0.34	0.20	0.75		0.98		0.85	



Tholons Research Methodology

Methodology

Tholons Global Innovation Index is the leading touchstone to benchmark the accelerated digital transformation of industries and services globally. The index evaluates, ranks and provides location strategies to multinational corporations, countries, governments, multi-lateral agencies, analysts and investors. Digital is now a critical element in disrupting and transforming industries globally. Technology, Business process management companies and multinational corporations need to align with the stark reality of digital innovation and transformation.

Tholons location assessment methodology integrates both primary and secondary research.

- Primary Research: Tholons utilizes surveys and interviews with service providers and buyers. These surveys are used to determine delivery and consumption trends for globalization services in specific destinations. Primary data gathering interviews were used to determine market and labor sizes as well as expansion strategies of leading service providers. Tholons utilizes its extensive network of industry stakeholders including buyers and suppliers of services, governments, trade bodies and associations to collect and validate data and analysis.
- Secondary Research: Tholons utilizes secondary research methodologies to gather volumes of historical data and various statistics and economic related data from governments, global institutions & agencies, and monetary bodies.
- Quantitative & Qualitative Analysis: Tholons employs a combination of quantitative and qualitative analysis in developing the weighted rankings. Our proprietary ranking framework continues to evolve to align with most of the current market realities and demand. Further, qualitative analysis was implemented to provide perspective to the quantitative results of the report. Tholons carefully considered numerous variables when providing final rankings, validated by senior thought leaders from Tholons and industry leaders globally.

Following are the metrics used to evaluate location attractiveness. The relative weights of each metric are based on their importance to the location decision, again derived from client experience and industry surveys. TGII's 2017 ranking was published with traditional factors having 80% weightage and digital with 20% weightage. TGII's 2018, 2019 and 2020 ranking attributed traditional with 75% weightage and digital with 25% weightage. The current **TGII 2021 Report** attributes traditional with 60% weightage and digital with 40% weightage. In addition, the report also covers "Diversity and Inclusion" measuring women's equality - pay gap, women in leadership role and funding made available to them as part of Digital Nations ranking.



TGII Super Cities Attributes and Weight

Talent Skills & Quality	Business Catalyst	Cost & Infrastructure	Risk & Quality of Life	Digital & Innovation
 Labor Pool Skills Availability Graduates Output Digital Skills, Scale & Intelligence Digital Workers 	 Government Benefits/ Incentives Competitive Landscape Currently Employed and Employers Digital Adoption 	 Cost of Operation, Real Estate, Living, Bandwidth Connectivity Transportation IT/Economic Zones Cyber Security 	 Risk - Socio Economical, Political, Natural & Commercial Social Infrastructure - Educational Institutions, Hospitals. 	 Open Innovation Ecosystem Startups, Diversity, Maturity and Unicorns Innovative Policies & Incentives Digital Competitiveness
WELLER REAL	d all			
15% Skill & Scalability	15% Ease of Doing Business	15% Operational Cost & Business Environment	15% Risk to Business & Quality of Life	40% Digital Transformation

TGII Digital Nations Attributes and Weight

Innovation & Digital	Super Cities	Population	Diversity & Inclusion
 Talent Skills & Quality Business Catalyst Cost & Infrastructure Risk & Quality of Life Digital & Innovation 	• Super Cities in Top 100 refers to the number of cities from a given country that are ranked in TGII Super Cities extensive list.	• Workforce is a measure of the size of the workforce population in a given country and is an indicator of a talent pool available for skilling/up-skilling.	• Diversity and Inclusion measures the women's equality, pay gap, women in leadership role and funding made available to women entrepreneurs.
30%	30%	10%	30%

Talent, Skills and Quality

Refers to the overall talent pool availability in a particular location and in relation to the capability of the labor pool to meet staffing demands and fulfil outsourced services from both scale and quality perspectives. Total population, demography, labor pool size, annual tertiary graduate output, both in technical and non-technical background and skills proficiencies were among the host of related components considered when generating the Talent, Skills and Quality Score.

Scoring: 10 = High scale and quality 1 = Low scale and quality



Business Catalyst

Business Catalyst measures industry-related activity as well as the degree of organizational support present in a location, which is geared to develop the services outsourcing industry and support the development of digital technology, innovation and entrepreneurship. Current industry performance including the top service providers and captives, location's headcount and revenues, etc. Number of Employees in ITO & BPO, Number of ITO & BPO Providers and ease of doing business and Policies and incentives for FDI are among the critical sub-components.

Scoring: 10 = Strong business catalyst 1 = Weak business catalyst

Cost & Infrastructure

Cost includes relevant payroll and non-payroll costs in a location. Real Estate cost, basic outsourcing industry salary costs are among the factors considered to generate the Cost Score. With the internet now being indispensable, the bandwidth cost has also been included. Infrastructure refers to the availability of physical and technological platforms/systems, which are required to host outsourcing operations from a location. This considers the availability of office space, number of special economic zones or IT parks, mass transports systems, number of leased line providers, Number of Hospitals, Number of Educational Institutes and airport Connectivity.

Scoring: 10 = Low cost and Capable infrastructure available 1 = High cost & Inadequate infrastructure

Risk & Quality of Life

Risk encapsulates the qualitative perceptions and measurable occurrences of natural and sociopolitical risks which in turn affect the quality of Life, where quality of life refers to non-operational considerations and ecosystem components that may affect living and working conditions. Risk is quantified according to the propensity of events to impact personal safety and the overall stability of a location to hosting business operations. The overall Risk and Quality of Life Score is generated from the identification of social infrastructure, non-work culture, and availability of leisure and recreational facilities, among others and from the identification of factors such as economic, political, natural, social and also cyber and digital risks in a location.

Scoring: 10 = Low risk& High quality of life 1 = High risk & low quality of life



Digital & Innovation

Digital and Innovation is the lifeline of today's businesses. Businesses must embrace digital technologies and platforms like social media, mobile technology, cognitive computing, cloud and artificial intelligence to cater to the changing demands. Following are the parameters considered for Digital and Innovation: Open innovation ecosystem, number of startups, startup diversity and maturity, innovative policies and incentives, unicorns, cyber security, global digital competitiveness, digital literacy rate i.e. the number of people using internet, digital evolution, digital talent and high tech patent grants, business agility, usage of RPA/AI/cloud, investors.

Scoring: 10 = High digital and innovation 1 = Low digital and innovation

Super Cities in Top 100

Super Cities in Top 100 refers to the number of cities from a given country that are ranked in TGII Super Cities extensive list.

Scoring: Number of cities in TGII Super Cities Index.

10 = High Super Cities 1 = Low Super Cities

Workforce/Total Population

Workforce is a measure of the size of the workforce population in a given country and is an indicator of a talent pool available that can be skilled/re-skilled to serve cross industries in services.

Scoring: The total population of the country that is derived from the population of the cities present in top 100 list for a given country.

10 = High workforce 1 = Low workforce

Diversity and Inclusion

Diversity and Inclusion measures the women's equality, pay gap, women in leadership role and funding made available to women entrepreneurs. **Scoring:** The score derives from metrics for pay gaps, women in leadership roles and funding for women entrepreneurs along with data and ranking from World Economic Forum, Global Gender Gap Index – 2020.

10 = High Diversity & Inclusion 1 = Low Diversity & Inclusion



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About Tholons

THOLONS is a Global Strategic Consulting, Digital Innovation and Investment Advisory group serving Fortune 500 / Global 2000 clients, multi-lateral / development agencies and countries. Tholons has over two decades of experience and an unparalled network of clients, mentors, startups, system integrators, technology partners and venture funds.

Tholons helps clients maximize returns on their innovation, digital transformation, business growth and global expansion. MY SPACES, the Enterprise Innovation global network, powered by THOLONS is the global leader and platform in collaborative ecosystem of Co-work | Co-innovate | Co-invest.

Tholons advisors engage with senior management of client organizations to develop strategies for global expansion. We have deep understanding of key industries like Financial Services, Banking, Healthcare, Insurance, Media and Entertainment, Manufacturing, Retail, Telecom, Education, Utility, Oil and Gas and Technology.

Tholons draws upon the considerable experience of a handpicked team, which has successfully formulated and executed globalization and digital strategies to unlock value. Service providers leverage Tholons expertise to optimize their global delivery model. Tholons advisors engage with government bodies to build compelling strategies for making countries attractive destination for technology, digital, innovation and business process management.

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