# Cybersecurity Innovation Ecosystems

A Global Comparative Study

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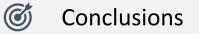
## Outline

MIT Methodology

Cyber Innovation Ecosystems

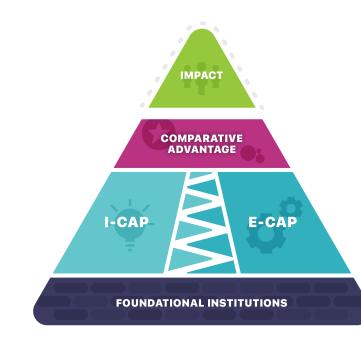
**Summary of Global EPIC** 

- Results of Indexes applied to Global EPIC
- Q Next Steps: a new Global EPIC Index

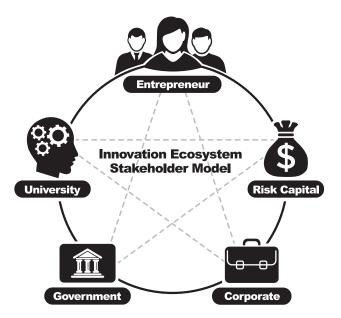


MIT systematically assesses general iEcosystems, based on 5 key <u>Stakeholders</u>\* and their <u>System</u>...

(\*This MIT approach goes beyond the usual stakeholders of the 'triple helix' (ie Government, Industry and Academia) to add two other key players.)



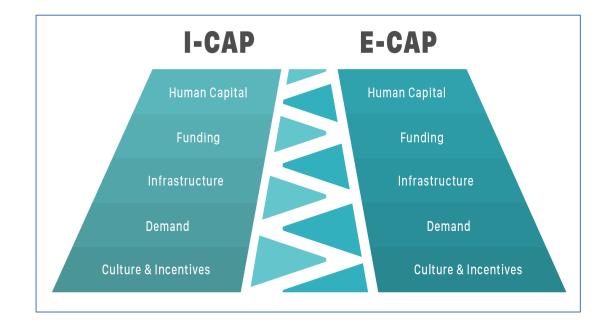
https://innovation.mit.edu/assets/ Assessing-iEcosystems-V2-Final.pdf



https://innovation.mit.edu/assets/MIT-Stakeholder-Framework\_Innovation-Ecosystems.pdf

# ...separating out inputs (which most Indexes mix) into Innovation & Entrepreneurship Capacities.

(This MIT research approach allows a new assessment of iEcosystems which complements existing general Indexes like GEM, GEDI and Bloomberg.)





#### Welcome to Innovation Ecosystems at MIT

Our work on innovation ecosystems is part of an on-going project through the MIT Lab for Innovation Science and Policy project to build a deeper understanding of the system and dynamics of innovation and the ecosystems in which it seems best to thrive.

Learn More

WebApp: <u>https://innovationecosystems.mit.edu</u>

https://innovation.mit.edu/assets/ Assessing-iEcosystems-V2-Final.pdf MIT Innovation-Driven Entrepreneurship (IDE) as an economic driver – but also for cyber?

- MIT has studied 'innovationdriven entrepreneurship' for several years, and why it tends to cluster in certain places which are identifiable as 'innovation ecosystems' (iEcosystems), implying the world of innovation is not flat.
- In 2019, MIT's Innovation Initiative (MITii) co-hosted a seminar to explore whether the general phenomenon of such clustering (in multistakeholder ecosystems) also applied to cybersecurity...

 ...in the summary report (link below), the seminar participants concluded:-

"Innovation ecosystems ... provide an important lens to understand the specific case of innovation in cybersecurity..."

 hence the start of this new joint work with Global EPIC.

https://innovation.mit.edu/assets/Enhancing-Cybersecurity-The-Role-of-Innovation-Ecosystems.pdf

Cybersecurity and Economic Development Every country must demonstrate to the world that it is a trusted participant in the digital economy.

Digital security must be a measure of economic strength and not just military readiness.

### Global EPIC

Founded in 2017 by cybersecurity innovation ecosystem leaders in Israel, UK, US, and Canada.

Mission: Create a network of cybersecurity ecosystems that creates a benefit to the global economy, while adding value to local economies.

#### Specifically, Global EPIC organized to:

Provide transparent comparative ecosystem **data**;

Create a **community** of peer mentors advancing their own ecosystem;

Develop and advance the **methodologies** associated with the growth of the cyber digital ecosystem.

| Brussels,<br>Belgium        | Bengaluru, India      | The Hague,<br>Netherlands | Ankara, Turkey               | Maryland, US                   |
|-----------------------------|-----------------------|---------------------------|------------------------------|--------------------------------|
| Ottawa,<br>Canada           | Dublin, Ireland       | Lagos, Nigeria            | Belfast, UK                  | Boston, US                     |
| New<br>Brunswick,<br>Canada | Beer Sheva,<br>Israel | Krakow, Poland            | London, UK                   | Tallinn, Estonia               |
| Surrey,<br>Canada           | Torino, Italy         | Bilbao, Spain             | Wales, UK                    | Helsinki,<br>Finland           |
| San Jose,<br>Costa Rica     | Tokyo, Japan          | Copenhagen,<br>Denmark    | San Diego,<br>California, US | New York City,<br>New York, US |
| Alps Region,<br>France      | Nairobi, Kenya        | Taipei, Taiwan            | Indiana, US                  | Canberra,<br>Australia         |

### GLOBAL EPIC MEMBERS

| GLOBAL EPIC |
|-------------|
| BY THE      |
| NUMBERS     |

| Regional or National Hub                                   | Regional: 16           | National: 14  |                  |
|--|------------------------|---------------|------------------|
| Fiscal Agent   | Government: 5          | Academia: 8   | Industry: 10     |
| Startup/Scaleup Program                                    | Yes: 13                | No: 7         |                  |
| Year Organized (speaks to maturity of the ecosystem)       | 2018-2020: 8           | 2016-2017: 10 | 2015/earlier: 12 |
| International Corporate<br>Business Partners (named)       | 0-5: 16<br>(9/15 None) | 6-10: 6       | 10+: 8           |
| Primary Funding Source<br>(financial sustainability model) | Government: 16         | Grants: 9     | Dues: 5          |
| International Conferences                                  | Yes: 17                | No: 13        |                  |
| Government to Government<br>Agreements                     | Yes: 9                 | None: 21      |                  |

# GE Members' "Tech Thrust" Areas

| ACADEMIA  | GOVERNMENT   | INDUSTRY  |
|---|--|---|
| <ul> <li>Connected devices</li> <li>Training</li> <li>Threat sharing</li> <li>Network security</li> <li>Finance</li> <li>Smart cities</li> <li>Healthcare</li> <li>Transportation</li> <li>Data privacy</li> <li>Cryptography</li> <li>Industrial controls</li> <li>Security intelligence</li> <li>Secure mobility</li> <li>Critical infrastructure</li> <li>Public safety</li> <li>Secure by design software/<br/>Embedded security</li> </ul> | <ul> <li>Public Safety</li> <li>Training/ Talent</li> <li>Compliance/ Policy</li> <li>Advanced manufacturing</li> <li>Smart energy</li> <li>Digital health</li> <li>Food tech</li> </ul> | <ul> <li>IoT - Connected Devices</li> <li>Application Security</li> <li>Embedded Security</li> <li>Security Management</li> <li>Robotics</li> <li>Microelectronics</li> <li>Al/ Big Data</li> <li>Smart mobility</li> <li>Compliance and risk</li> <li>Critical infrastructure</li> <li>Advanced manufacturing</li> <li>Fintech</li> <li>Public safety</li> <li>Smart Cities</li> <li>Forensics</li> <li>National Security</li> <li>Digital DNA</li> <li>5G</li> <li>Quantum technologies</li> <li>Smart home security</li> <li>Maritime</li> <li>Space, aerospace</li> </ul> |

10 INTERNATIONAL INDEXES: 7 FROM MITII ASSESSMENT, 3 ADDED FOR GLOBAL EPIC'S EVALUATION Innovation-focused Indexes (from MITii assessment)

- Global Competitiveness Index (GCI)
- Bloomberg Innovation Index
- Global Innovation Index (GII)
- European Innovation Scoreboard

Entrepreneurship-focused Indexes (from MITii assessment)

- Global Entrepreneurship Monitor (GEM)
- Global Entrepreneurship & Development Institute
- Startup Genome

Cybersecurity Indexes (accounts for 3 categories in ranking)

- Stockholm International Peace Research Institute (SIPRI) Military Spending: % GDP
- Global Cybersecurity Index (GCI)
- UNESCO: R&D professionals % population

## GE Survey using 10 Indexes: Initial Results

| (in any Index) + | Top 10 ranked<br>(in any Index) +<br>all 5 categories<br>ranked | (in any Index) + | • • •   | (in any Index) + | -      | All 5 categories<br>ranked (not top<br>10) |            |
|------------------|---|------------------|---------|------------------|--------|--|------------|
| US               | Canada  |                  | Ireland | Estonia          | Taiwan | Italy                                      | Costa Rica |
| UK               | Australia   |                  | Belgium | Finland          |        | Poland                                     | Kenya      |
| Israel           | Spain   |                  |         |                  |        | Turkey                                     | Nigeria    |
| France           | Japan   |                  |         |                  |        |  |            |
| Netherlands      | India   |                  |         |                  |        |  |            |
| Denmark          |   |                  |         |                  |        |  |            |

# WHO IS MISSING?

| Potential GE ecosystems,<br>according to Index Survey |                  |
|---|------------------|
| S. Korea  | I, E, \$, C, R&D |
| Singapore   | I, \$, C, R&D    |
| Norway  | I, E, C, R&D     |
| Luxembourg  | I, E, C, R&D     |
| Switzerland   | I, E, R&D        |
| Germany   | I, E, R&D        |
| Sweden  | I, E, R&D        |
| Austria   | I, E, R&D        |

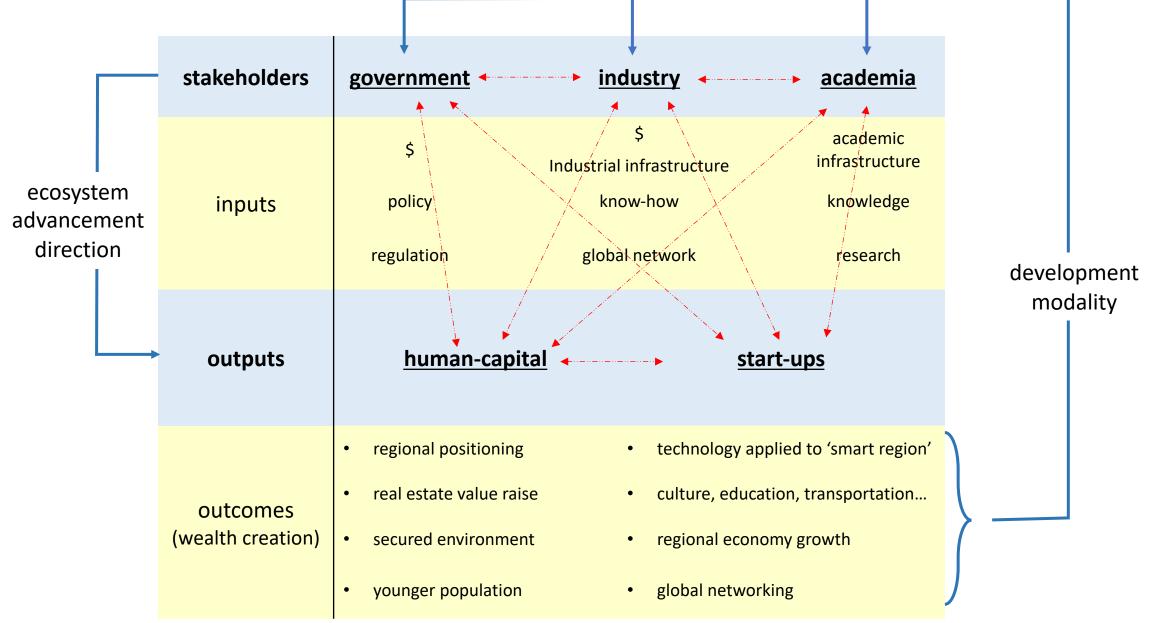
Going Further: Global EPIC Index

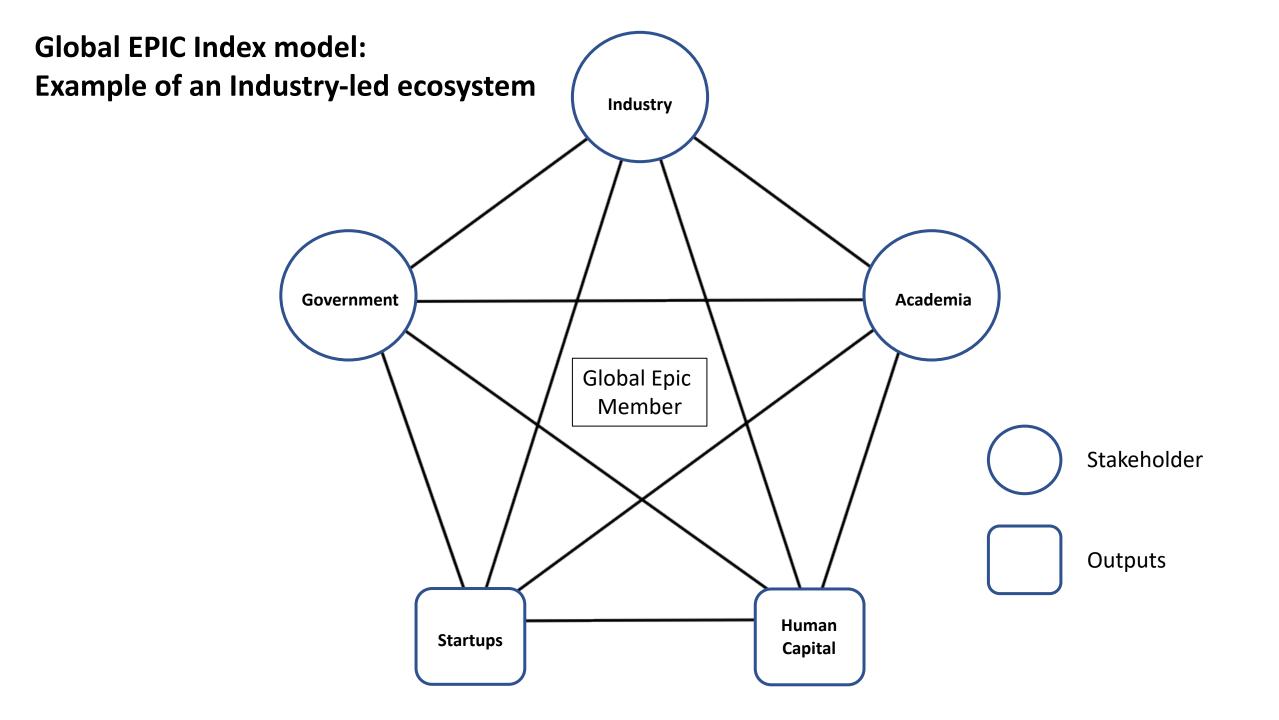
- Building on this initial evaluation of cyber ecosystems (based on MIT's general ecosystem approach), Global EPIC will develop an index for cybersecurity ecosystems, which will be a new evaluation and strategic planning tool.
- Based on its evaluation model, Global EPIC will identify the strengths of, and the opportunities for, the key players in cyber ecosystems.

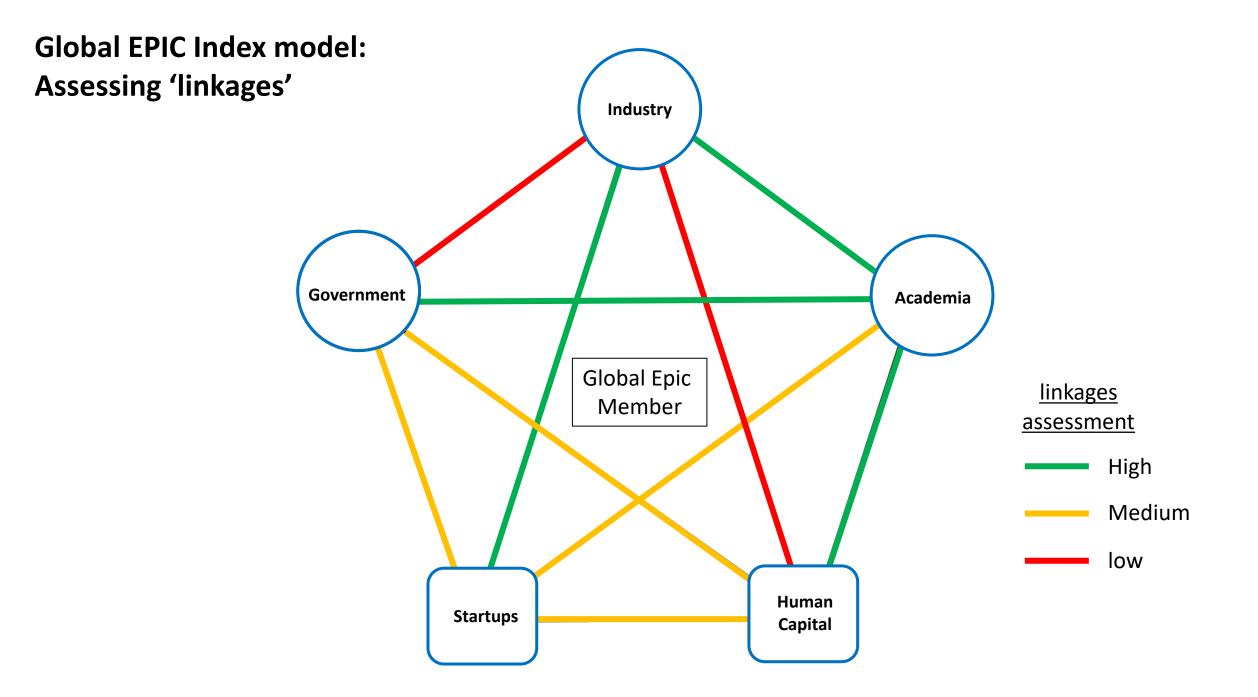
| Academia   |
|--|
| <ul> <li># Startups from<br/>University</li> <li># Students enrolled in<br/>cyber degree programs</li> <li># Graduates from cyber<br/>degree programs</li> <li># Events</li> <li>\$ Corporate/industry<br/>sponsorships for R&amp;D</li> <li>\$ Research dollars<br/>secured from all sources</li> </ul> |

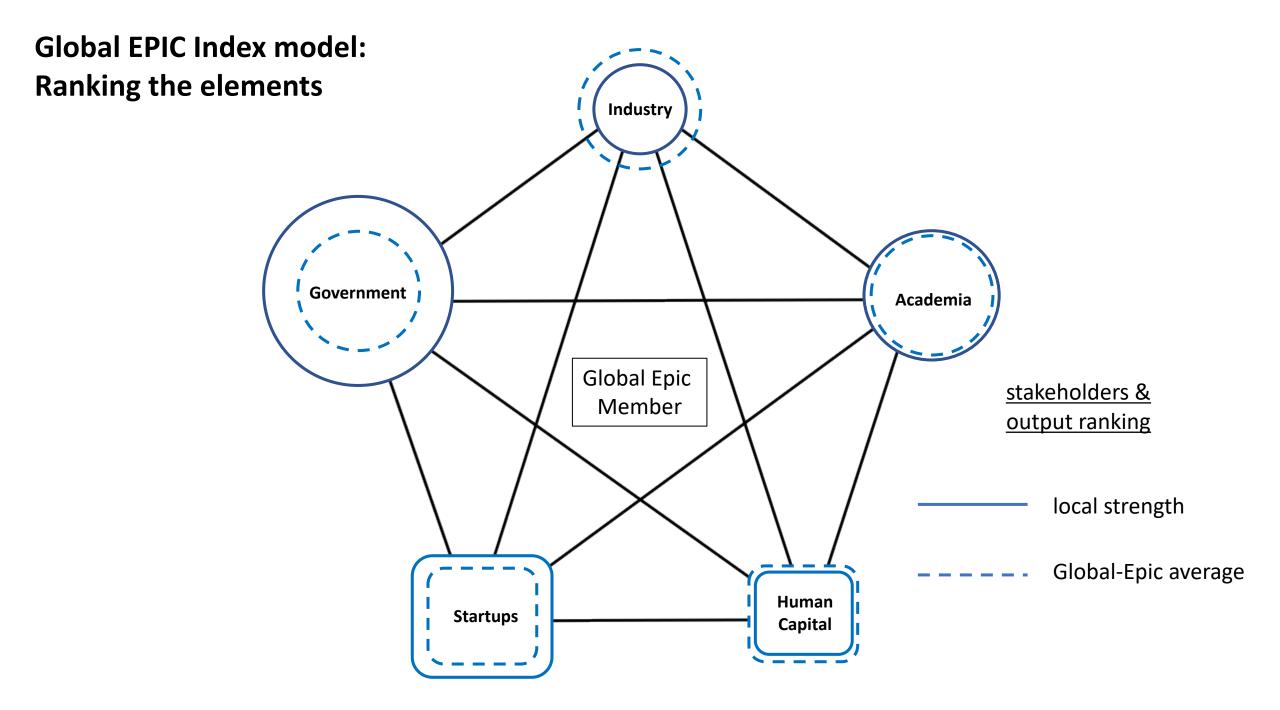
KEY PERFORMANCE INDICATORS (KPI) FOR CYBER-FOCUSED ECOSYSTEMS

### **Global EPIC Model**



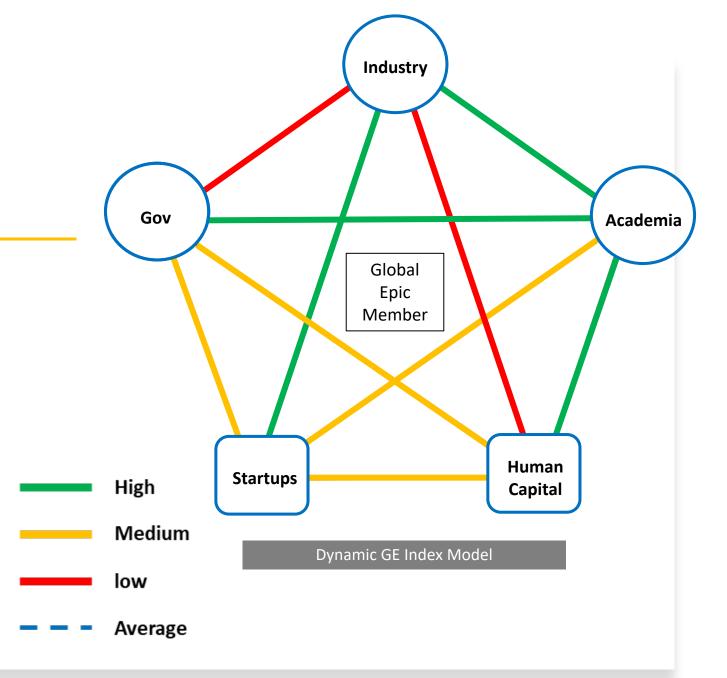






## GLOBAL EPIC INDEX

- Holistic quantitative assessment
- Experience based questionnaire
- Apples to Apples reference
- Sustainability and Scalability scale
- Self diagnostic tool
- Driven enhancement-workplan
- Complementary to existing indexes



### Conclusions

- Globally recognized indexes can be a roadmap to building a network of ecosystems.
- Human leadership is critical to building a global network of ecosystems.
- Each ecosystem is built on a solid foundation of local subject matter experts. This can be indexed by specialty.
- Investments must be made in human capital and innovation, at all levels, in order to secure a robust digital economy:
  - Israel's global leadership demonstrates this quite effectively.
- Developing countries can strategically benchmark their own growth against KPI's from more developed countries with similar characteristics.