The National Academies of SCIENCES ENGINEERING MEDICINE

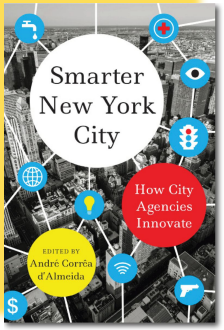
GFG Global Futures Group

Supply Chain Resilience and Urban Technology

Global Futures Group, LLC - Jerry MacArthur Hultin

Global Futures Group

- Leaders and advisers in urban innovation, technology, policy and finance
- Insight, research and projects globally
  - Smart cities
  - ESG and SDGs
  - Smart villages
  - Smart senior housing
  - Artificial intelligence
- North America's premier smart cities exposition
- Chair of the New York Academy of Sciences
- Former NYC university president and under secretary of the US Navy and Marine Corps



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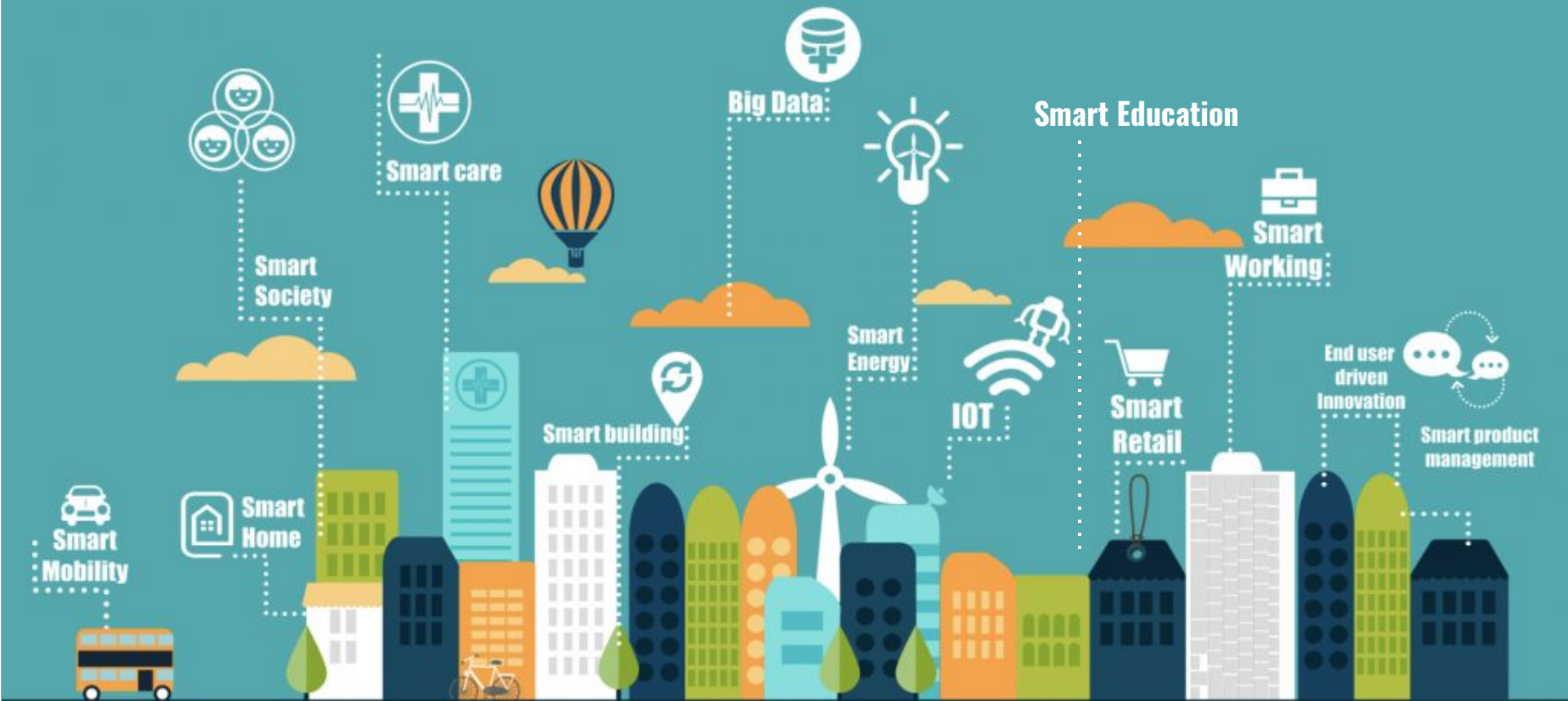
SMART CITIES NEW YORK
POWERED BY PEOPLE

The New York Academy of Sciences™

DEPARTMENT OF THE NAVY
UNITED STATES OF AMERICA

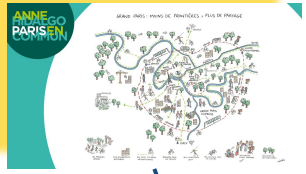
Technology and design is impacting all urban sectors



Smart Cities - a short history since 1850

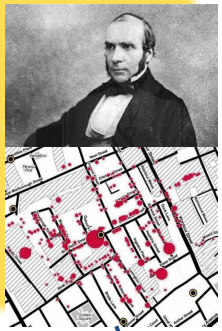
NYC - PlaNYC

Paris - 15 minute city



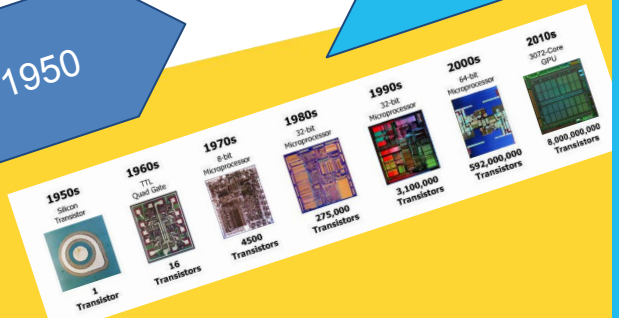
Barcelona - Decidim

Helsinki -Most functional city



1854

1950



2010

2020

Update as of 2021

- Quality of life as the outcome
- Concerns are mounting about privacy, security and coercion
- A fully functional model of a smart city is missing

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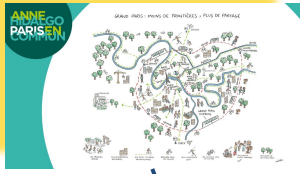

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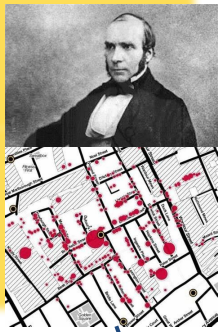

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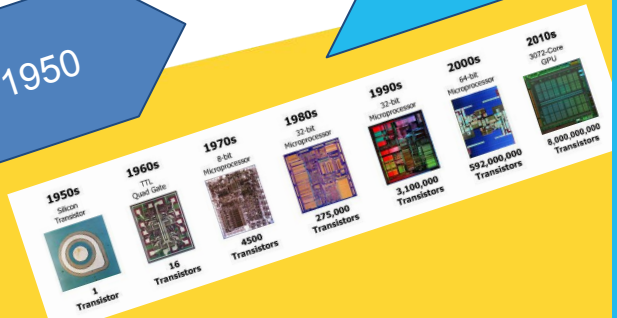

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Key technologies and systems that are shaping cities and improving supply chain resilience

Technologies

- Fiber
- Cloud
- Broadband
- 5-G
- Satellite arrays
- Sensors
- Smart phones
- vehicles
- Autonomous passenger vehicles
- GPS
- AR/VR
- Artificial intelligence
- Machine learning
- Bio-genetics and CRISPR
- Crypto-currencies
- Quantum computing

Services

- Mobility
- Logistics
- Travel
- Health
  - Telemedicine
  - Monitoring & diagnosis
- Retail, especially online
- Emergency response
- Weather forecasting
- Meetings
- Consulting
- Professional services
- Gambling
- Cyber-crime
- Traditional crime
- Safety and security
- Criminal justice

Production

- Industry 4.0
- Robots and automation
- Data and analytics
- 3D printing
  - human organs
  - auto and aircraft parts
- Medical procedures
- Energy
  - Solar
  - Wind
  - Geothermal
  - Hydrogen
  - Nuclear
- Content
- Entertainment & culture
- Sports (e-gaming)

Technologies

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Services

- **Mobility**
- **Logistics**
- **Travel**
- **Health**
  - **Telemedicine**
  - **Monitoring & diagnosis**
  - **Treatment**
- **Education, learning and skills**
- **Government**
- **Citizen participation**
- **Retail, especially online**
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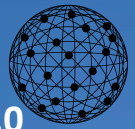

- **Industry 4.0**
- **Robots and automation**
- **Data and analytics**
- **3D printing**
  - **human organs**
  - **auto and aircraft parts**
  - **housing**
- **Urban farming**
- **Synthetic food**
- **Wood buildings**
- **Modular housing**
- **Medical procedures**
- **Energy / Microgrids**
  - **Solar**
  - **Wind**
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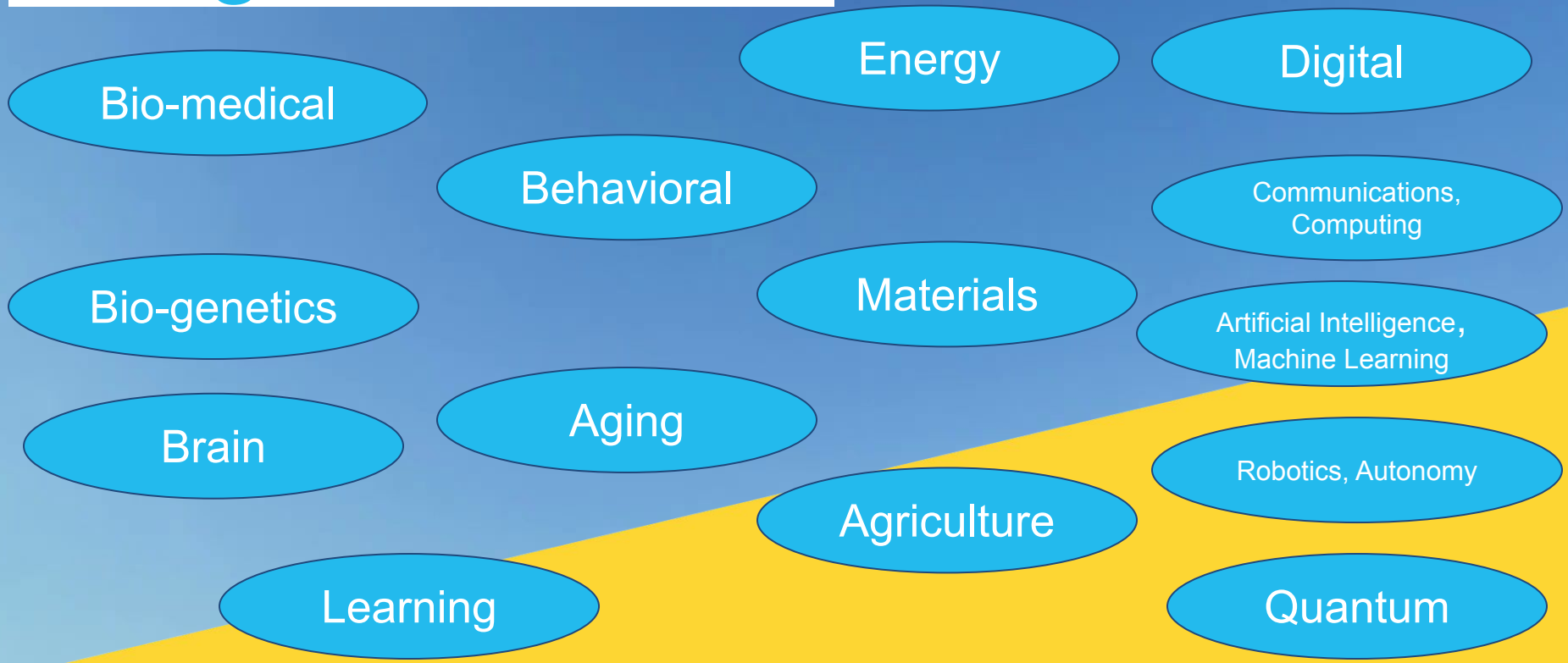
Future progress depends on strong scientific R&D



Building the future - some good news

- **Digital backbone is essential** - Advances in connectivity, sensors, cloud storage, smart phones, satellites, autonomy, and artificial intelligence will transform our infrastructure
  - While much of the world is lagging, technology is rapidly advancing and costs are continuing to drop, thus allowing universal access in the coming years
- **More than technology is changing** - Design, architecture, and economic systems are also transforming as they employ new technologies
  - This transition will be slow and expensive since so much of the world's infrastructure is already built but increasingly obsolete. This means the developing world could have an advantage.
- **Quality of life / climate change** - More and more, leaders in government, business, and society are focusing urban technology on delivering a higher quality of life and solutions to climate change
  - GDP is a poor measure of quality of life, resilience and sustainability; new indices are needed

Building the future - major challenges

- **Fragmentation** - Likely outcomes of the current drive to supply chain resilience are incompatible systems and Balkanization of nations

  - *Made in China 2025, Buy American, Make in India* are policies to promote national self-sufficiency and resiliency. They are likely to increase global fragmentation.

- **Decline of labor arbitrage** - In coming decades, due to AI and automation, the traditional “low-wage manufacturing” strategy will no longer be a bridge to being a “developed country”

  - What worked for Japan, South Korea, Taiwan and China in the past is likely to fall short for India, Indonesia, and Africa

  - Malaysia saw this risk to its economy and developed an Industry 4.0 policy and strategy in 2018.

Building the future - major challenges

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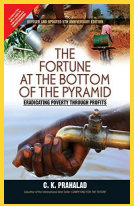
- **Bottom of the pyramid is ignored** - More innovation is needed to create products and services that match low-income citizens pocketbooks. This is true in developed, developing and emerging economies.



  - There is a huge underserved market, perhaps 60% of all consumers world-wide, with substantial opportunity for growth. CK Prahalad identified this opportunity in 2002.
  - An index of “developmental readiness” is needed to tailor solutions.

- **Skills and jobs** - The skills needed to succeed will become more difficult to teach and learn. Job loss is likely to exceed job gain, at least for the next 20 years.
  - The cost-reduction appeal of digital production, robots, and autonomous vehicles is nearly unstoppable. A new economic model for workers and consumers is needed.

Building the future - major challenges

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- **Education and training** - Being “smarter than a robot” and “working alongside robots” are what will give resiliency to humans.
    - Today’s education and training are under pressure to change, yet currently both fail to deliver what is needed for nearly 80% of the world’s population.
- **Crime and security** - The risk of harm to people, systems, and economies is increasingly apparent.
    - Like other means of production, crime is easier and more rewarding in the digital world ... if you have the skills
    - New regulations require careful design, since new laws may unintentionally reduce innovation and access.

What Matters

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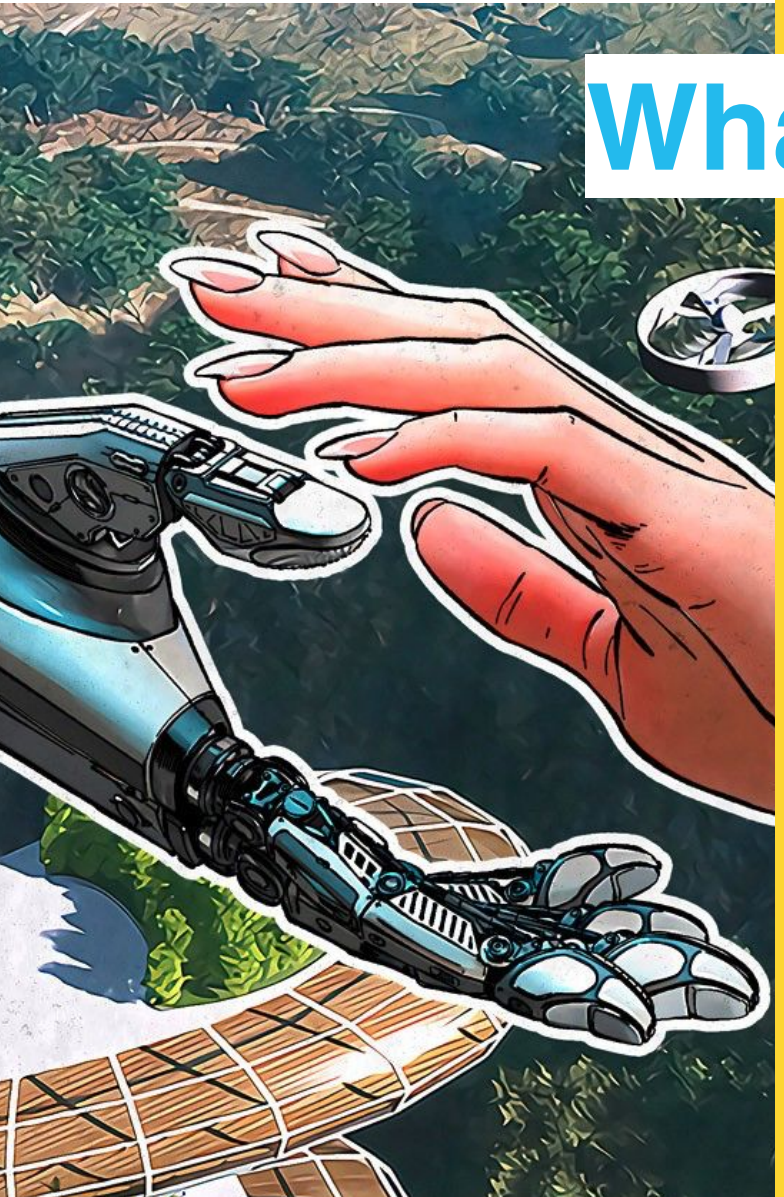
- **North/South differences**
  - Major differences exist between the urban technology needed to provide resiliency for developed economies contrasted with what the emerging and developing economies need.
- **The “drag” of sunk costs**
  - Design, architecture, and systems are beginning to adapt to new urban technology, but progress will be slow due to sunk costs in existing infrastructure.



What Matters

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- **Short-term pluses, longer-term risks**
  - The short-term benefits of urban technology to improve supply chain resiliency look good, but longer-term benefits are murky
  - Ranking the benefit/harm of using technology to provide supply chain resiliency
    - natural disasters
    - pandemics
    - massive cyber-attack
    - daily life / “new normal” after COVID
    - 2030 to 2050: a tough transition
    - 2050 to 2100: a better world, but major change required

A better world, if we avoid traps

Robust Technology

Individual Agency

Nirvana

Creative, open societies world-wide with easy access to technology

Mindless but pampered

Passively accepting a full array of technology

Survival of the fittest

Freedom to choose with few resources and little access to technology

Forgotten

Shunted aside to vegetate with little access to technology

For further detail, see the following: *The Future of Ageing in Smart Environments: Scenarios of 2050*, Arizona State University, 2020; *Delivering Tomorrow: Logistics 2050, A Scenario Study,* DHL, Deutsche Post AG, Headquarters, 2012

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Future foresight

For more information

Jerry Hultin

Global Futures Group, LLC

335 Madison Avenue, 4th Floor, New York, NY 10017

jerry@globalfuturesgroup.co Mobile: +1 (347) 407-0300