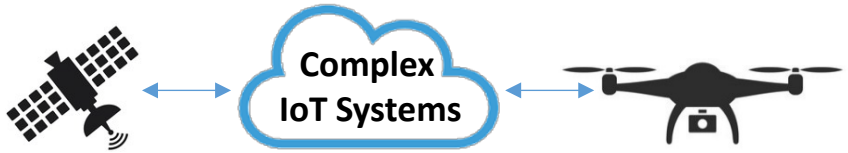
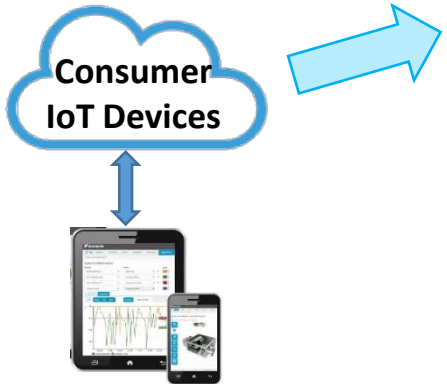
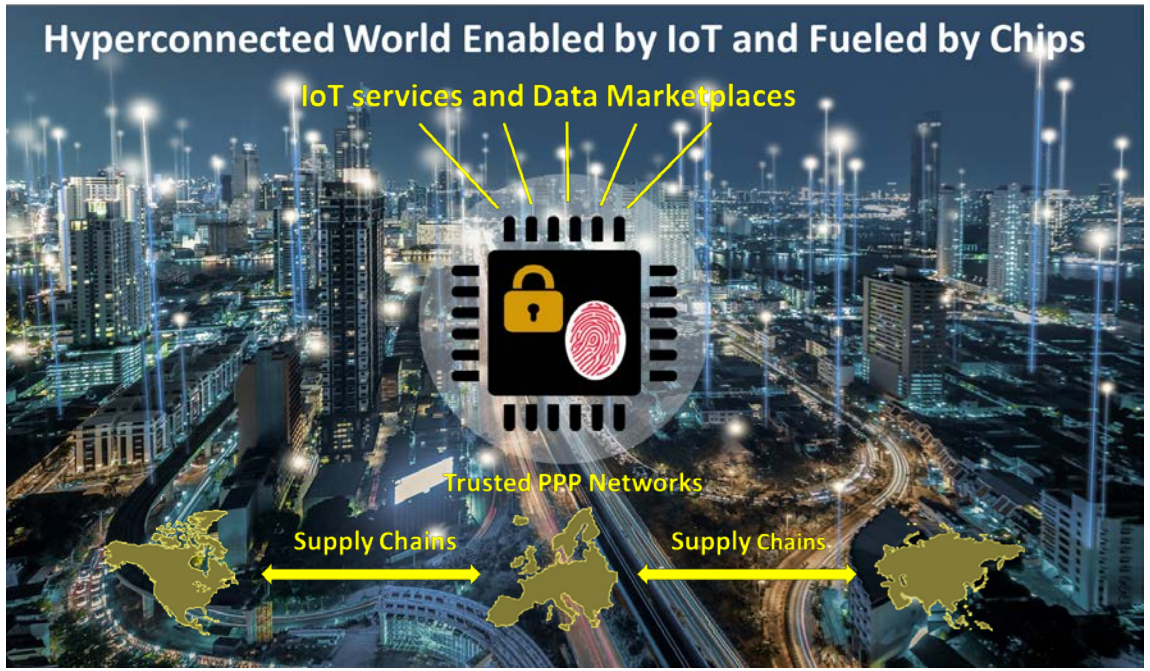
Platform Based Business Ecosystems and Connected Value Chains to Scale Adoption of IoT and Ensure Economic Prosperity and National Security

Tom Katsioulas
IoT Advisory Board Member
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January 18th, 2023



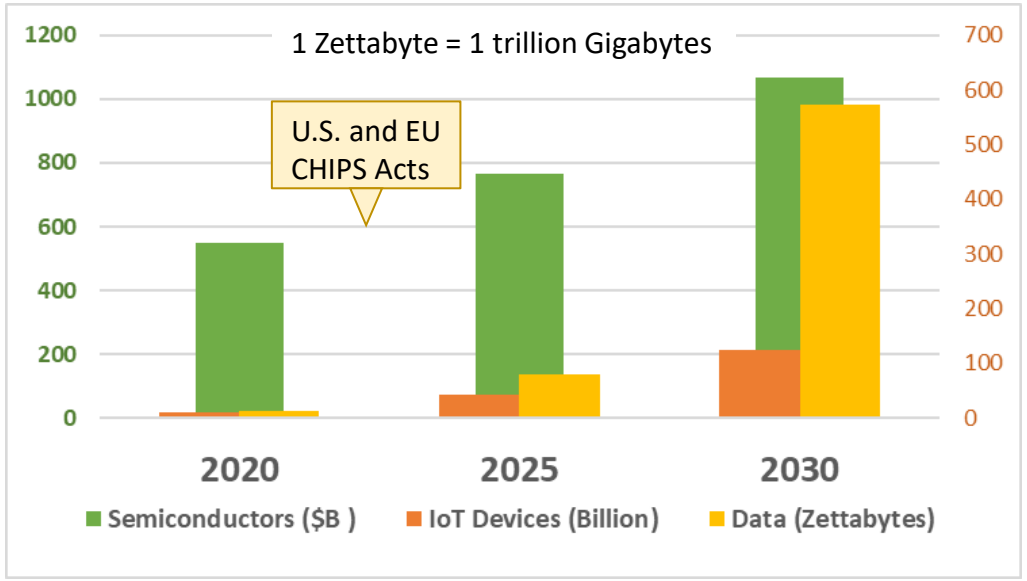




U.S. Department of Commerce Internet of Things Advisory Board (IoTAB)

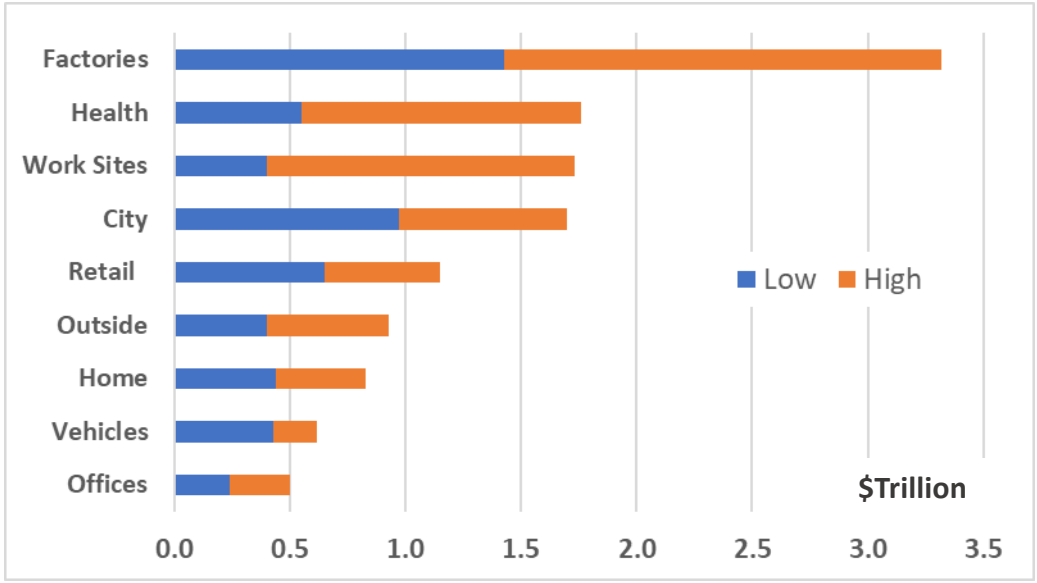
Internet of Things Drivers for the Global Economy

Semiconductor Enabled IoT Devices & Data by 2030



Sources: Congress DIGIT Act, Sven Balnojan The Future of Good Data

IoT Economic Value range $5.5-12.6 Trillion by 2030



Sources: 2014 World Economic Forum*, 2021 McKinsey & Company

- IoT devices projected to grow to 125 Billion and data (the new gold) to 570 Zettabytes
- The semiconductor industry that enables IoT is projected to exceed $1 trillion in revenues

Source: 2022 The semiconductor decade: A trillion-dollar industry

- Revised projection* on IoT economy min-max ranges factor adoption rates, impact and scale
- Ranges factor opportunities & risks mainly related to cybersecurity and supply chain issues

*In 2014 WEF & McKinsey projected $9.6 to $21.6 trillion for the global economy

How IoT Connectivity is Changing Our Environment



Smart Home
Smart consumer devices gather data to simplify and improve our lives



Smart Transportation
Connected EVs becoming Autonomous integrated with city infrastructure



Smart Manufacturing
Factories using sensor data are improving efficiency, automation and quality



Smart Healthcare
Wearables collect health data, send analytics to prevent emergencies



Smart Buildings
Sensors monitor activity and manage power, or find doctors in hospitals



Smart Cities
IoT systems collecting data on traffic, pollution, etc. to improve city lifestyle



Smart Energy
Utility companies use smart meter analytics o balance energy supply & demand



Smart Hospitality
Connected door locks and room devices and beacons improve visitor experience



Smart Retail
Beacons with mobile apps, are used to monitor visitor behavior and push ads



Smart Supply Chain
Tracking sensors on parcels, containers reduce costs and improve supply chain resilience



Smart Agriculture
Sensors and drones help increase crop yield and reduce spoilage in storage



Smart Food Services
IoT Devices in agricultural sites help manage global food supply and demand

Analyze IoT connectivity, complexity, and distributed nature that affect opportunities and risks

How IoT is Changing Products and Business Models

Product





Smart Product







Connected Product







Product System



Planters Tillers

Farm Equipment

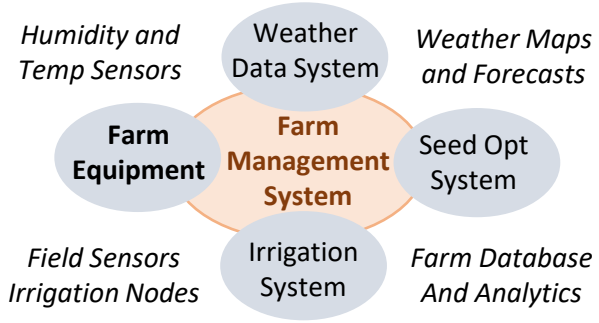
Aircraft System

Navigation, Fuel



System of Systems → Platforms → Markets

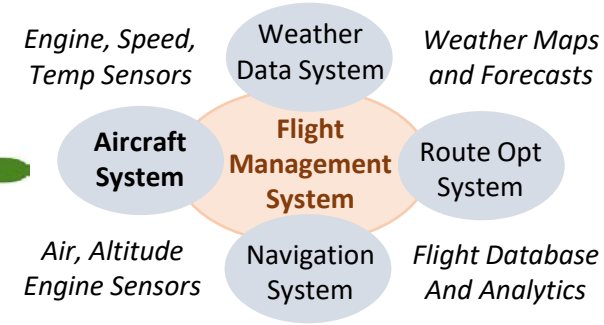




Systems connect to other systems and fuel ecosystems*





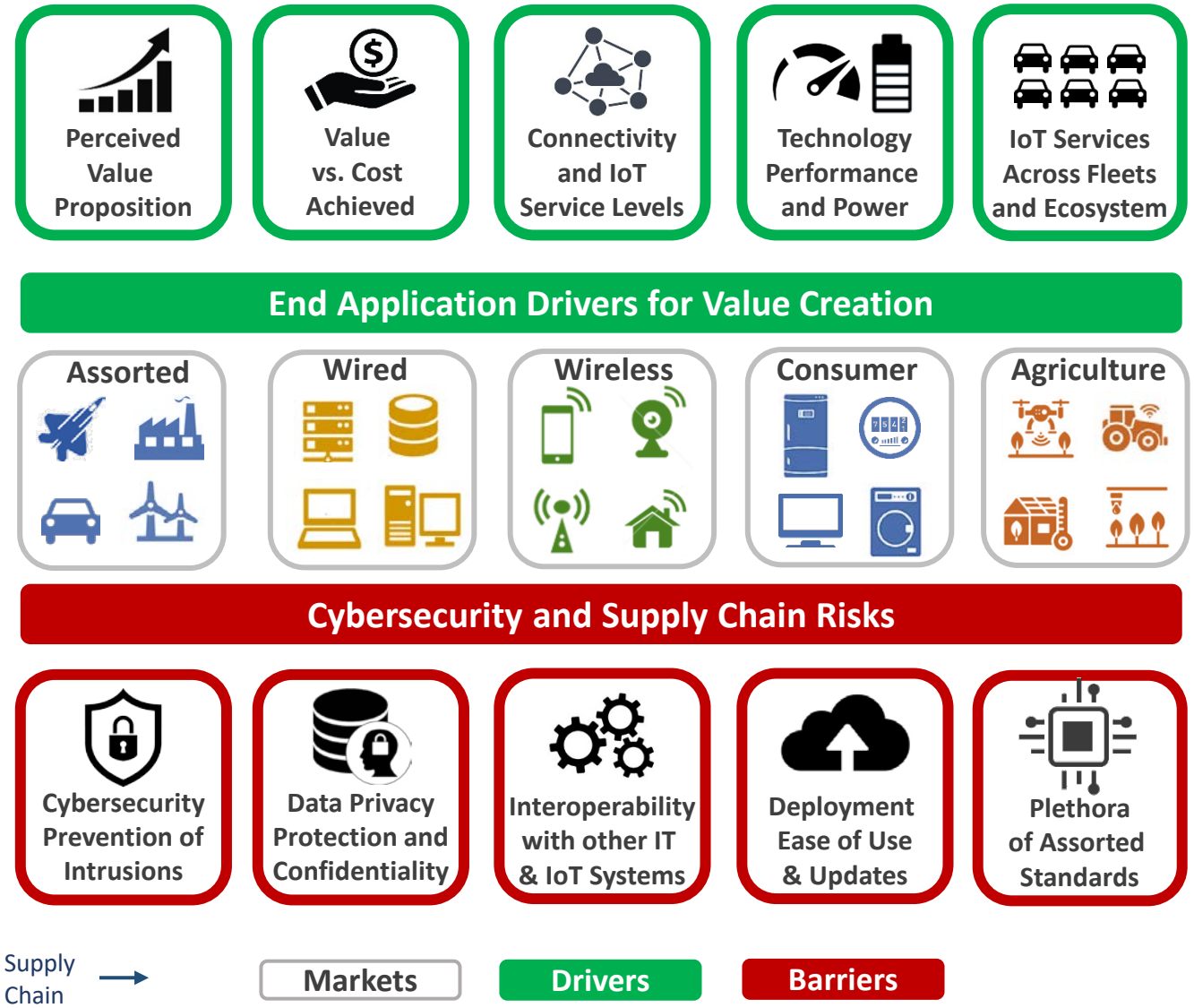


Business Evolution → Customer, Benefits, Retention, Differentiation, Complexity, Partners, Costs

Source: HBR How Smart Connected Products Are Transforming Competition

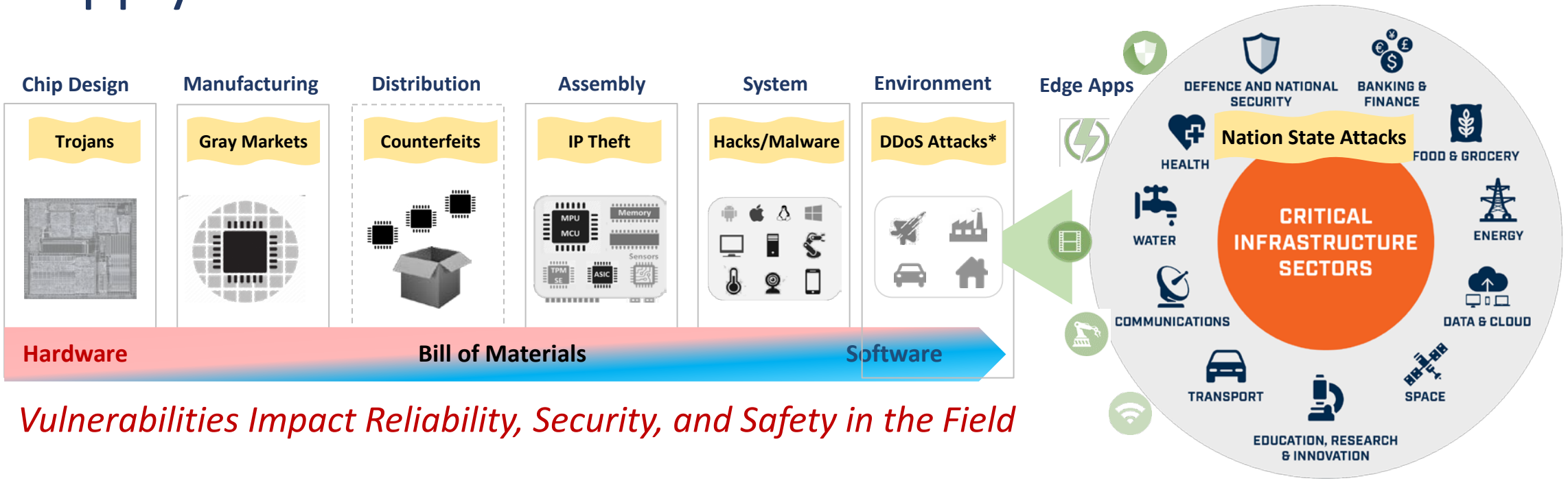
***Green Transportation and Supply Chain Logistics**

Several Factors Influence IoT Adoption & Growth At-scale



- For each sector consider how IoT technology changes our environment
- Analyze market barriers & drivers to evaluate opportunities and risks
- Assess how collaboration can enable innovation and scalable businesses
- Plan to protect innovation, talent IQ and value creation from adversaries
- Orchestrate trusted networks and platform-based business ecosystems

Supply Chain Risks and Critical Infrastructure Vulnerabilities



Vulnerabilities Impact Reliability, Security, and Safety in the Field

- Disaggregated electronics supply chain
- Over 65% of electronics assembled in Asia
- Ineffective sanctions and Customs controls
- **Costly support, liabilities, loss of value**

- No policy* for IIoT Systems & Process Sensors
- Silos and no visibility in IT/OT connectivity
- Limited real time visibility & control of security
- **Compromised equipment and human safety**

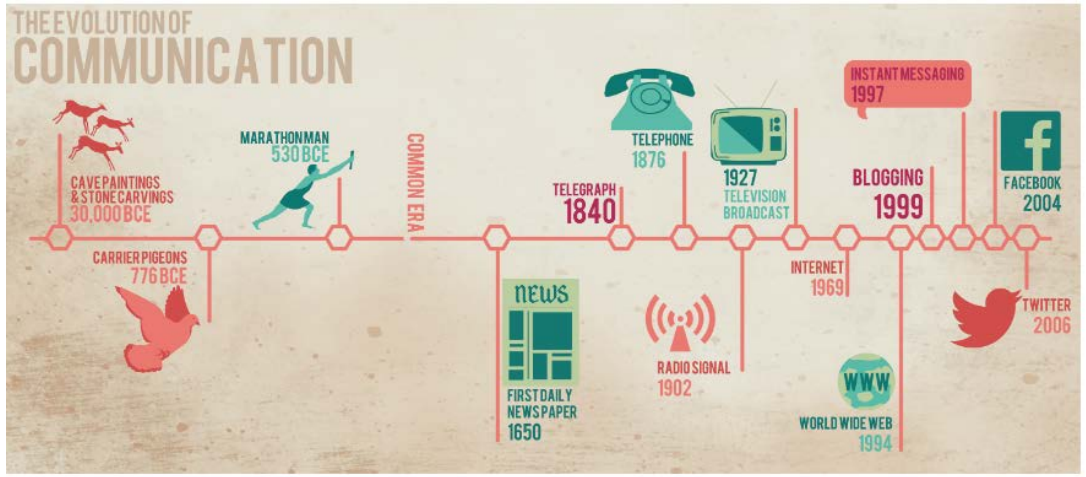
Lack of supply chain traceability threatens national security and economic prosperity

Source* https://cybersecuritynews.com/ddos-attacks-use-iot-devices/

*Source: https://www.gao.gov/products/gao-23-105327

Evolution of Connectivity Drives New Business Models

Scalable Growth & Value



Vertically Integrated Suppliers of HW + SW

- Complete Product
- Sales Channels
- Customer Support

Disaggregation of the Electronics Value Chain

- Product from Parts
- Web Config Portal
- Complex Support

Enterprise Automation & Open Source Models

- Internet Commerce
- SaaS / PaaS / IaaS
- Platform Strategies

Virtual Re-aggregation & Digital Transformation

- IoT Value Chains
- Digital Data Thread
- Data Marketplaces

Collaboration Platforms
Connecting IoT Value Chains

Transaction Platforms
Uber, Airbnb, Amazon Mkt

Innovation Platforms
Apple, Google, AWS

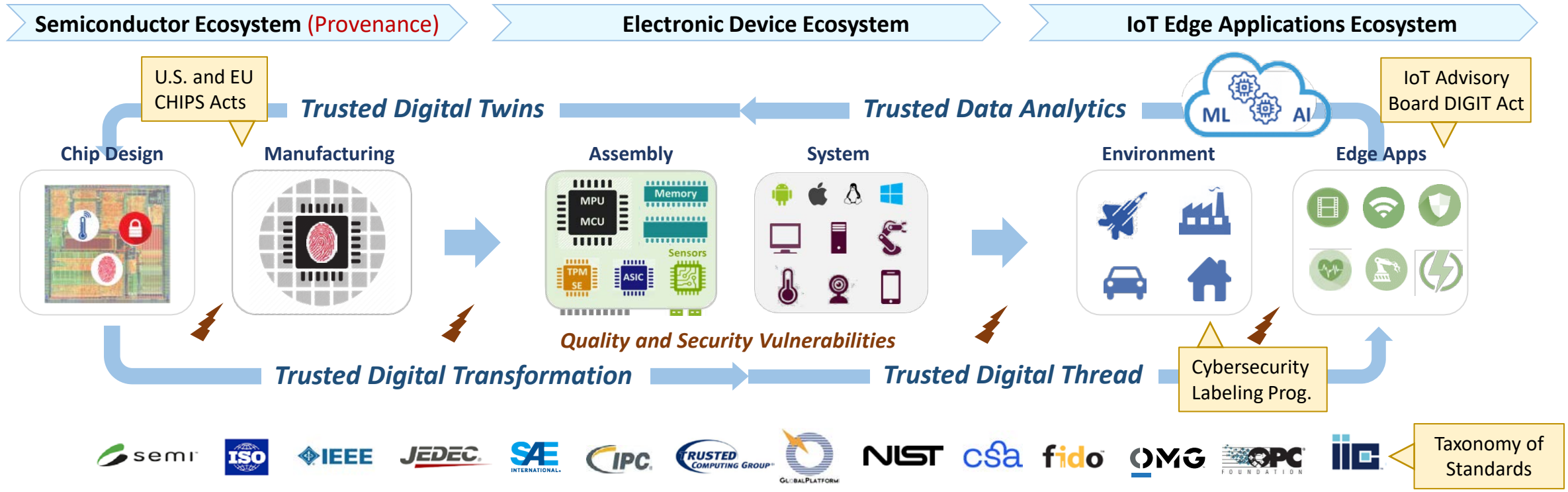
Platform-based Business Ecosystems

1990 **2000** **2010** **2020**

*Sources: The Evolution of Communications, MIT Sloan platform-strategy-and-the-internet-of-things/, MIT Sloan The-future-of-platforms/

Platform-based Business Ecosystem for IoT Value Chains

Source: [GSA Trusted IoT Ecosystem Security (TIES)]



Connected Value Creation

- **Collaboration** - Unified Operating Model
- **Governance** - Rules for Shared Success
- **Interactions** - Network Effects Broaden IQ

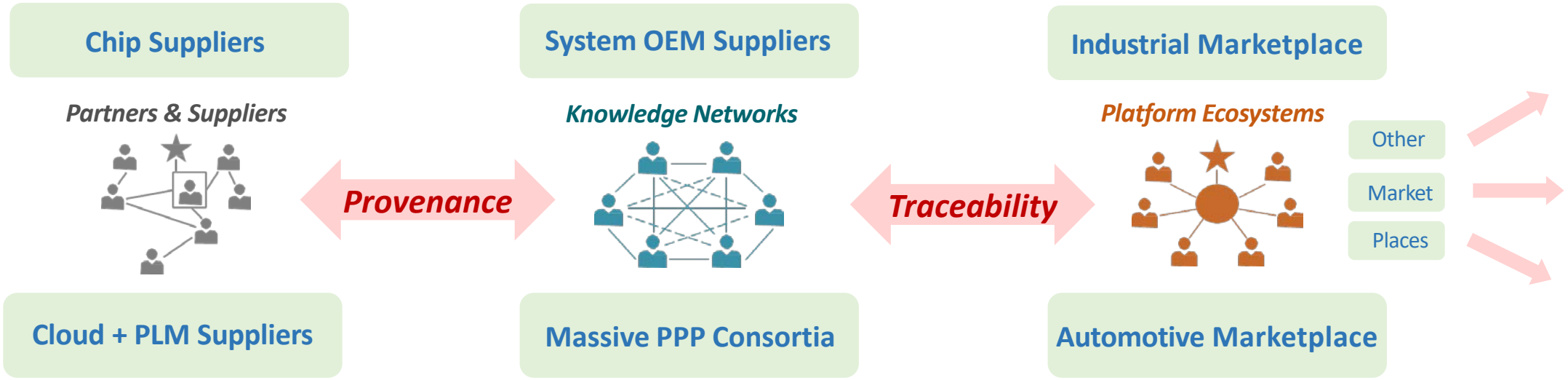
Massive Value Scaling

- **Digital Thread** - Enable Data Marketplaces
- **Traceability** - Establish market preference
- **Acceleration -** Align incentives with PPPs*

*Drive behaviors with Regulations & Standards

Multi Platform Ecosystems Will Fuel Economic Growth

Collaboration → Innovation → Transformation → Platformation → Ecosystem Scaling



Smart-Connected Market Ecosystems



- Top-5 platform companies value declined to $6.7 trillion in 2022, still major portion GDP*
- Platformation of enterprises in the IoT value chain will multiply revenues and fuel ecosystems
- Supply chain traceability across connected marketplaces can fuel growth with measurable ROI
  - **Metrics:** growth in manufacturing supply and businesses offering IoT services and data-enabled ML/AI apps

Orchestration & Regulation of Massively Parallel PPPs Can Enable $21+ Trillion in value

*Source: https://www.pcmag.com/news/2022-is-battering-the-market-value-of-the-top-tech-companies (Apple, Microsoft, Google, Amazon, Tesla)