Industrial Internet: Standards & Disruptions

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"A fundamental new rule for business is that the Internet changes everything."

-Bill Gates, 1999

Or has it?

Where We've Been

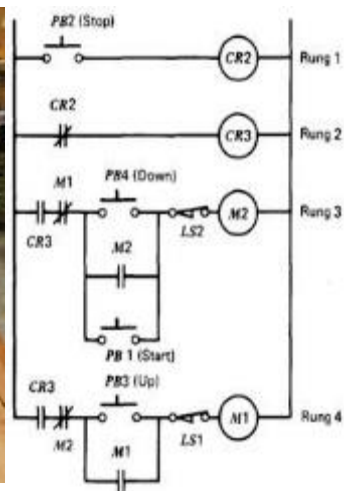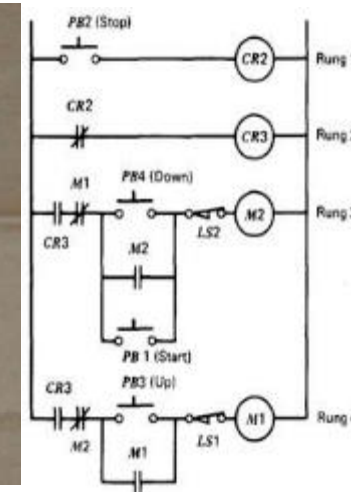|	15 Years ago	Today
Listening to music		
Watching a movie		
Contacting people		
Reading the news		
Making music		

Discrete Manufacturing

1980

Programming a 584
Programmable Controller

2015

Programming a 984
Programmable Controller
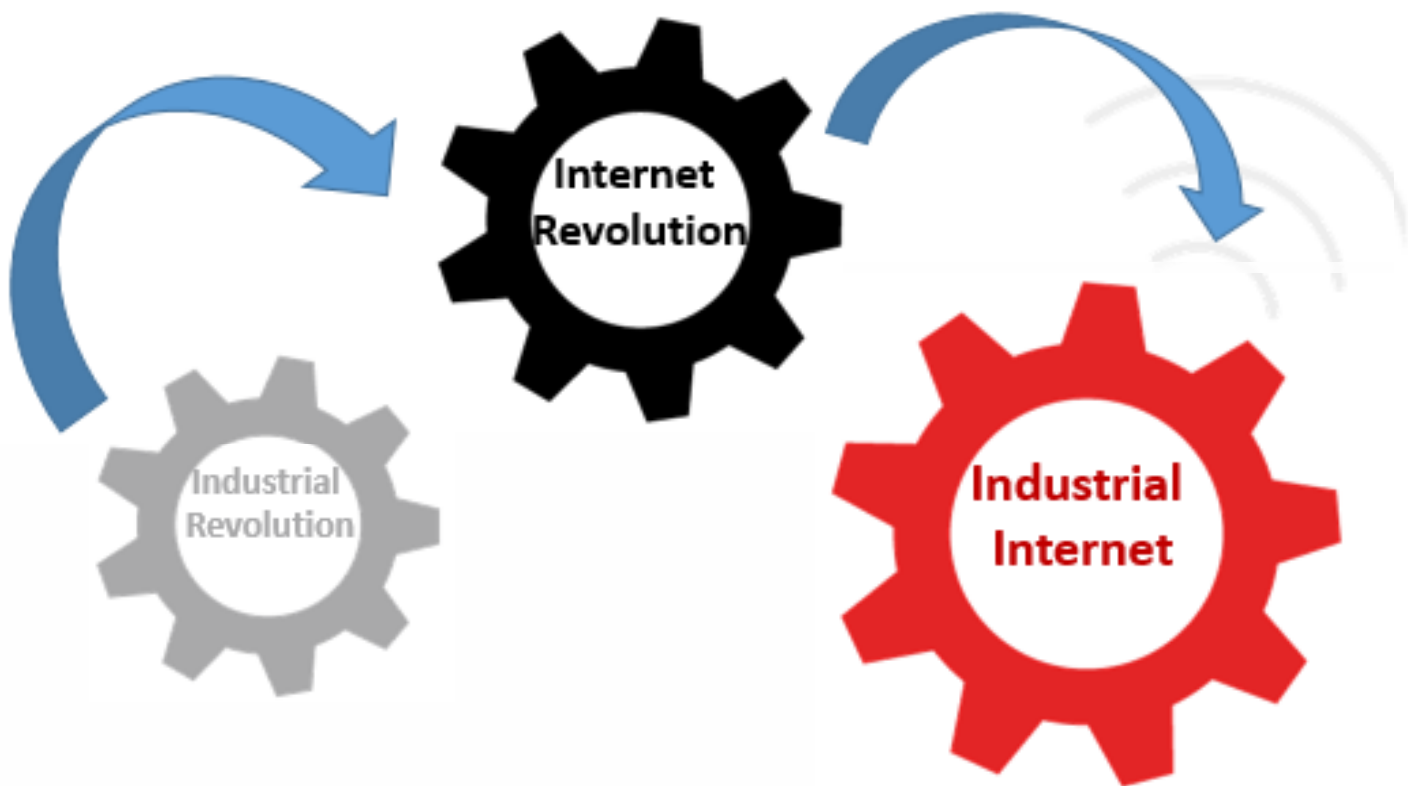
No, the Internet Didn't Change Everything

There is much more to be done:

- Oil & Gas Exploration
  - Geological data integration from multiple sensing sources
- Rail & other transportation
  - Failure sensing and automatic rerouting of multimodal systems, far more extensive than JapanRail automatic stop
- Smart homes & smart energy usage
- And on… and on… and on…

- *"Internet Thinking" is key to Smart Manufacturing, Smart Connected Products, and Smart Product Data*

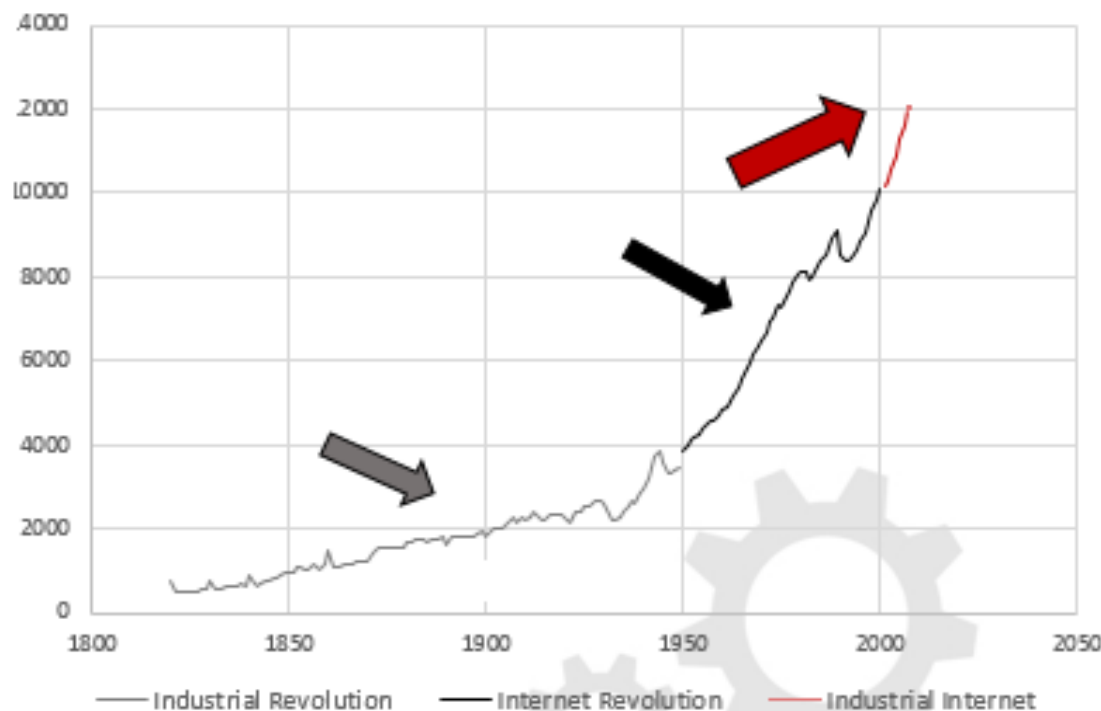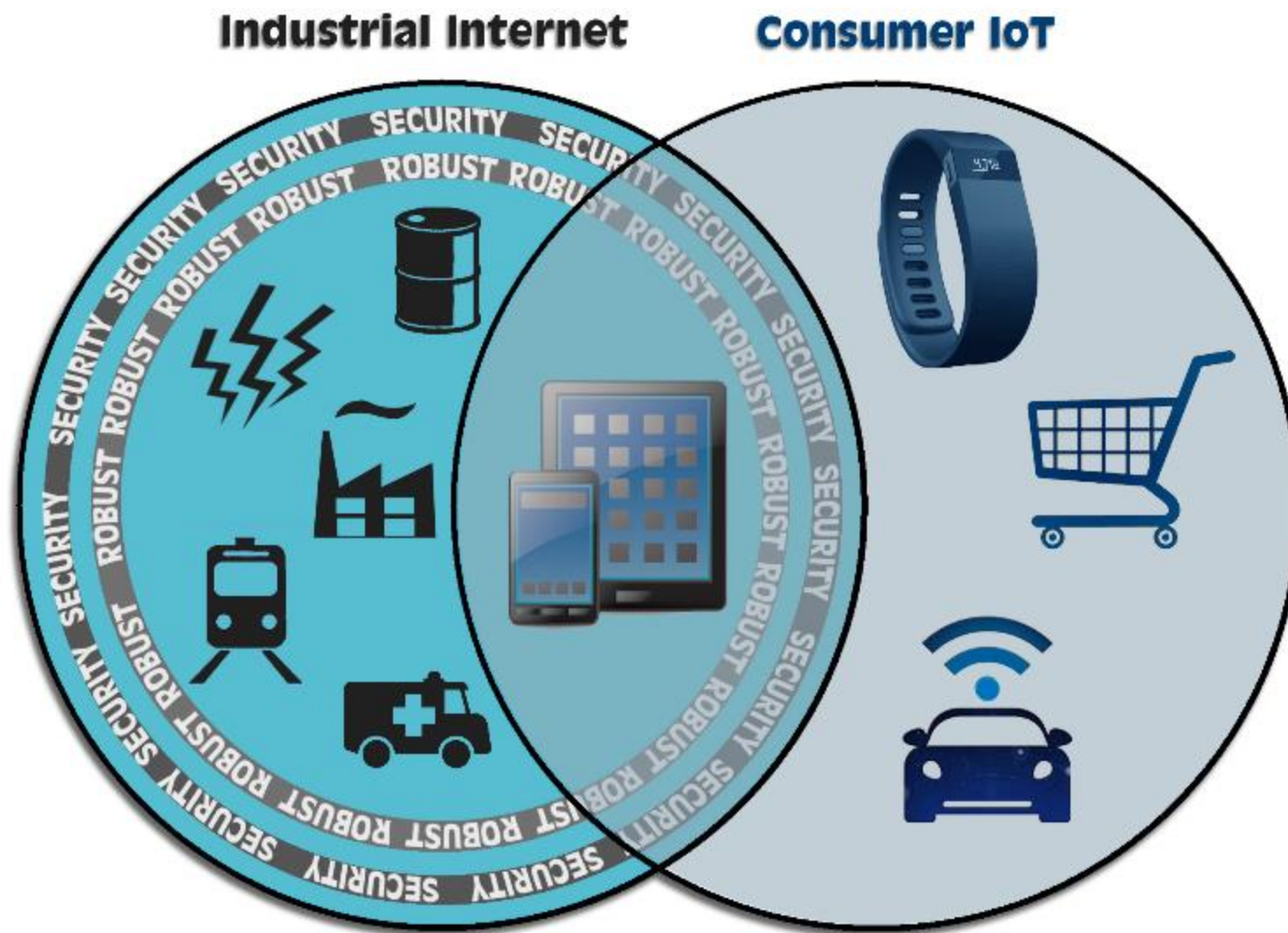# The Industrial Internet is leading the next economic revo

Global GDP Per Capita

Industrial Revolution — Internet Revolution — Industrial Internet

There are key differences between the Industrial Internet and Consumer IoT

The Measurable Outcome will be in the Trillions of Dollar

GE: $32.3 trillion opportunity representing 46% share of GDP today.

Cisco: Internet of Things (IoT) will increase private sector profits 21% and add $19 trillion to the global economy by 2020

Gartner: IoT product and service suppliers will generate incremental revenue exceeding $300 billion in 2020.

McKinsey Global Institute: $36 trillion operating costs of key affected industries could be impacted by IoT

The convergence of *Internet of Things, Industrie 4.0, Cyber-Physical Systems* presents an enormous opportunity.

Sources: GE, Cisco, Gartner, McKinsey

Making Sense of the Numbers

Revenue Generation
- Revolutionary new products & services → Creating new markets

    → Changing the way the world works

New Operational Efficiencies that drive down costs
- Workforce productivity gains → digitization of tasks, better deployment of resources
- Reduced maintenance costs → predictive maintenance
- Material, energy savings → reduced need for product over-engineering
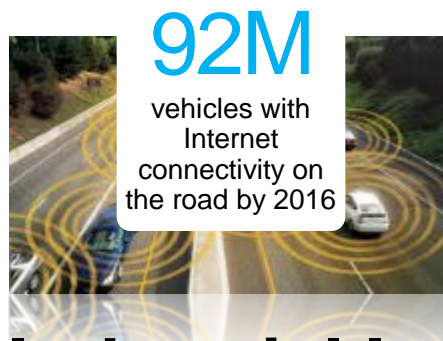- Reduced waste → Precision monitoring to predict and control machines

Improved Customer Satisfaction
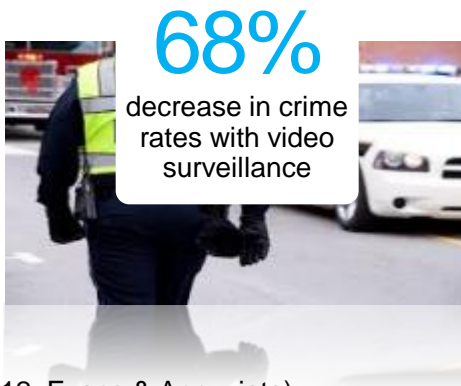- Improved service levels → fewer unplanned disruptions

Opportunities across every industry: GE's 15-year outlook

$30B
fuel cost saving in aviation industry

92M
vehicles with Internet connectivity on the road by 2016

$63B
productivity improvement in healthcare

Beyond the numbers, the Industrial Internet is changing *how things work.*

$66B
fuel cost saving in gas powered fleets

68%
decrease in crime rates with video surveillance

$90B
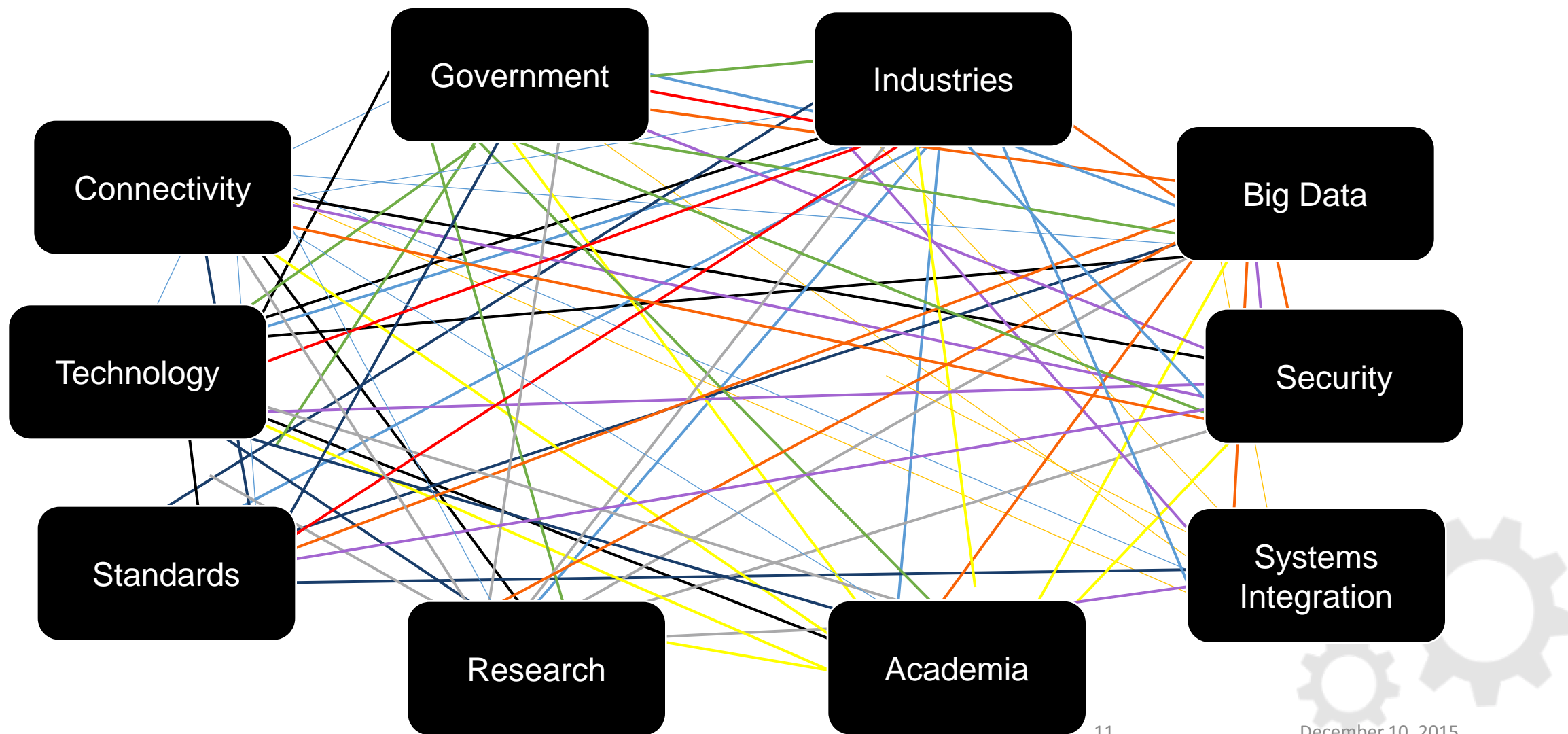reduction in Cap X in oil & gas exploration and development

Source: Industrial Internet: Pushing the Boundaries (2012, Evans & Annuziata)

Yet there are current roadblocks to widespread adoption

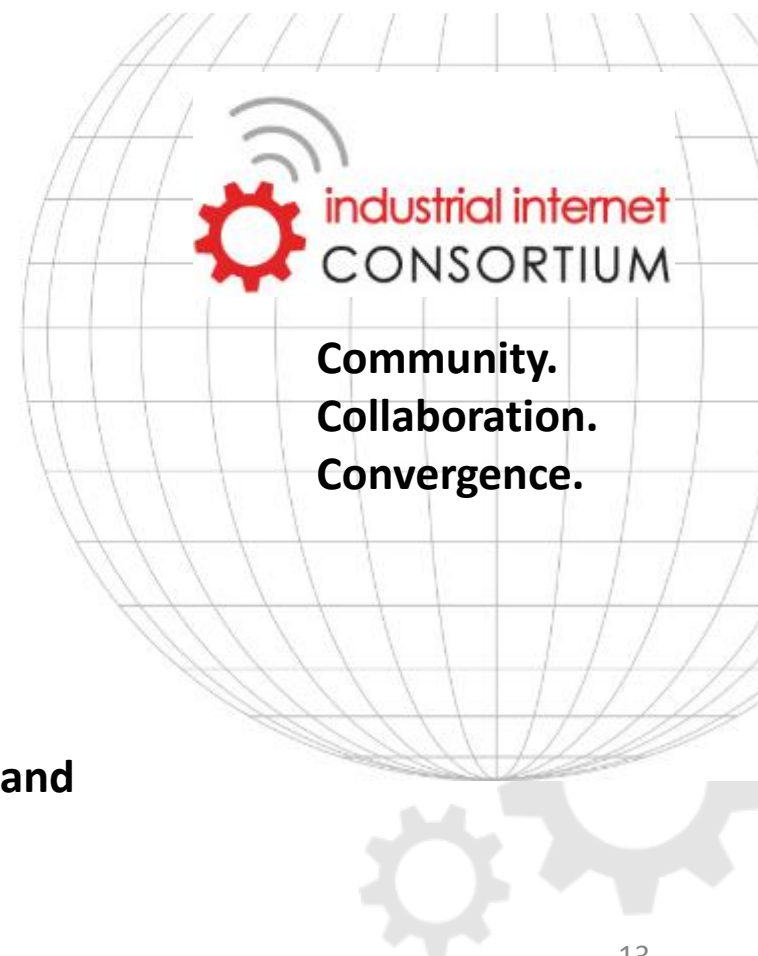# The IIC: Things are coming together

Industrial Internet Consortium

Mission

To **accelerate growth** of the Industrial Internet by **coordinating ecosystem** initiatives to connect and integrate objects with **people, processes and data** using common architectures, interoperability and open standards that lead to **transformational business outcomes**.

Launched in March 2014 by five founding members:

industrial internet
CONSORTIUM

Community.
Collaboration.
Convergence.

The IIC is an open, neutral "sandbox" where industry, academia and government meet to collaborate, innovate and enable.

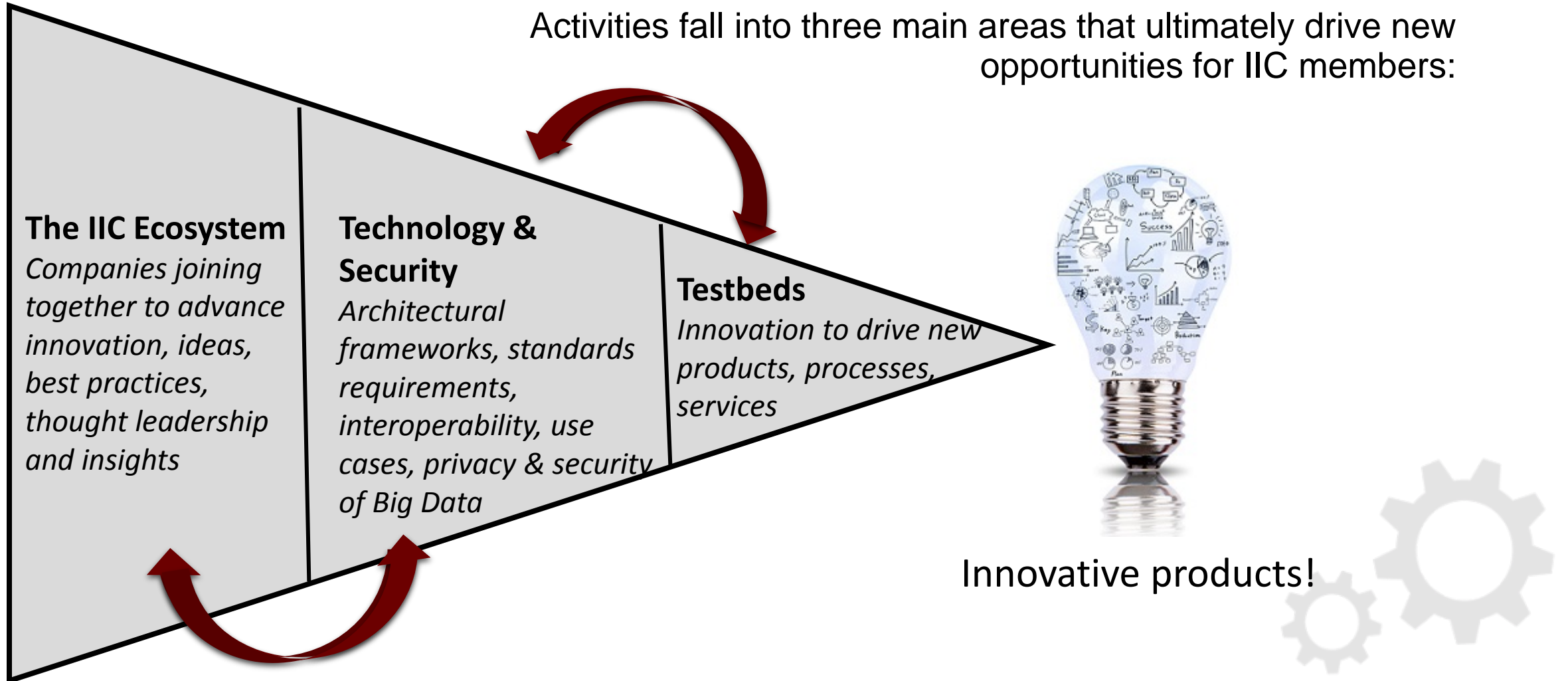# Founders, Contributing Members, & Large Industry

Small Industry

Nonprofit, Academic, & Government

IIC Core Focus Areas

Activities fall into three main areas that ultimately drive new opportunities for IIC members:

The IIC Ecosystem
Companies joining together to advance innovation, ideas, best practices, thought leadership and insights

Technology & Security
Architectural frameworks, standards requirements, interoperability, use cases, privacy & security of Big Data

Testbeds
Innovation to drive new products, processes, services

Innovative products!

What about Standards? And Open Source?

Already plenty of standards at the communications level (e.g., OMG DDS)

Semantic standards are going to be critical in all verticals

IIC is a *source* for standards requirements & priorities

The Future

How will we reduce jet engine failure & maintenance costs?

How will we minimize unplanned factory downtime?

How will we save lives through better patient care?

Things are coming together.

How will we reduce passenger fatalities?

How will we reduce waste of natural resources?

For More Information

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