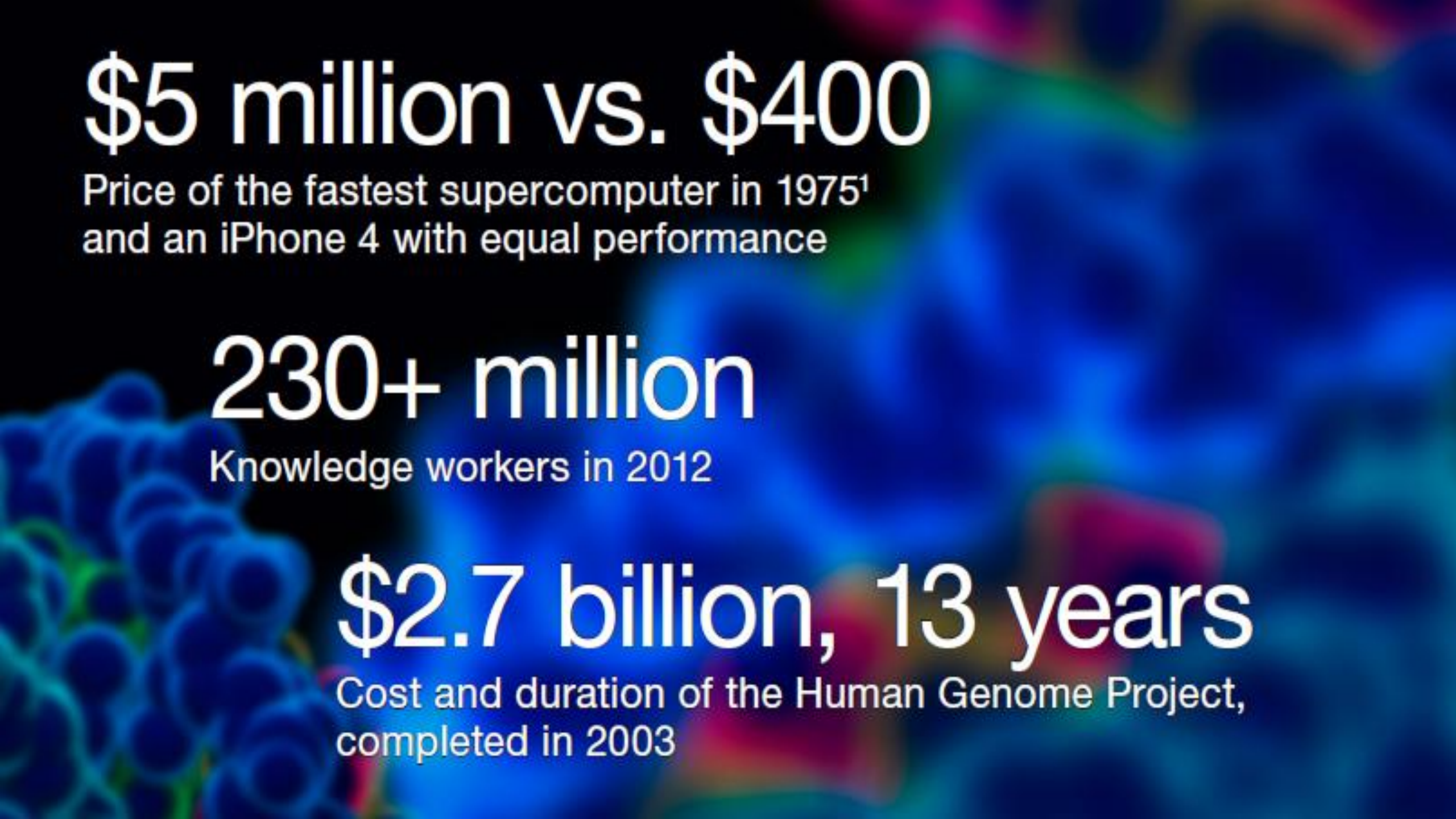
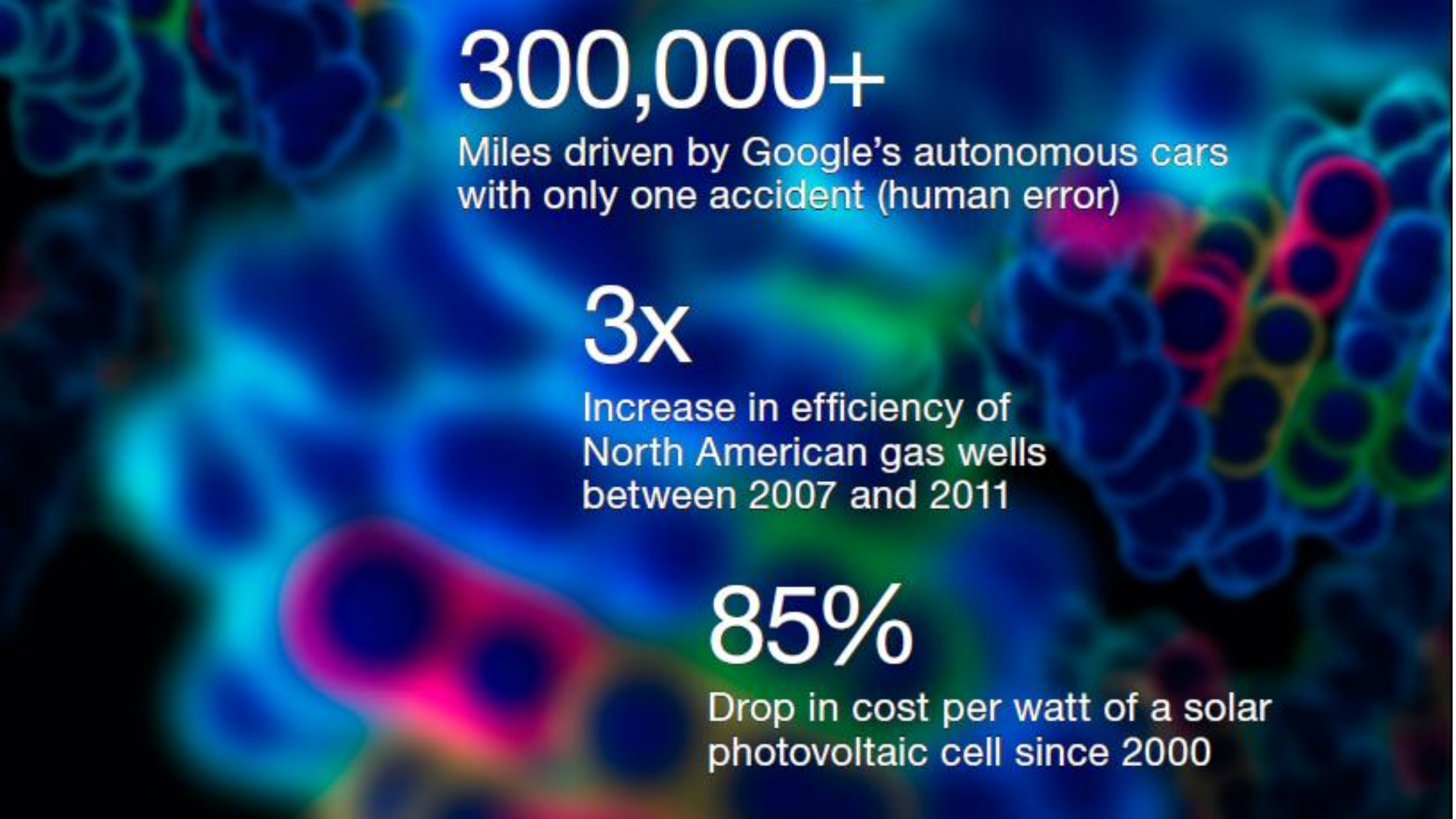
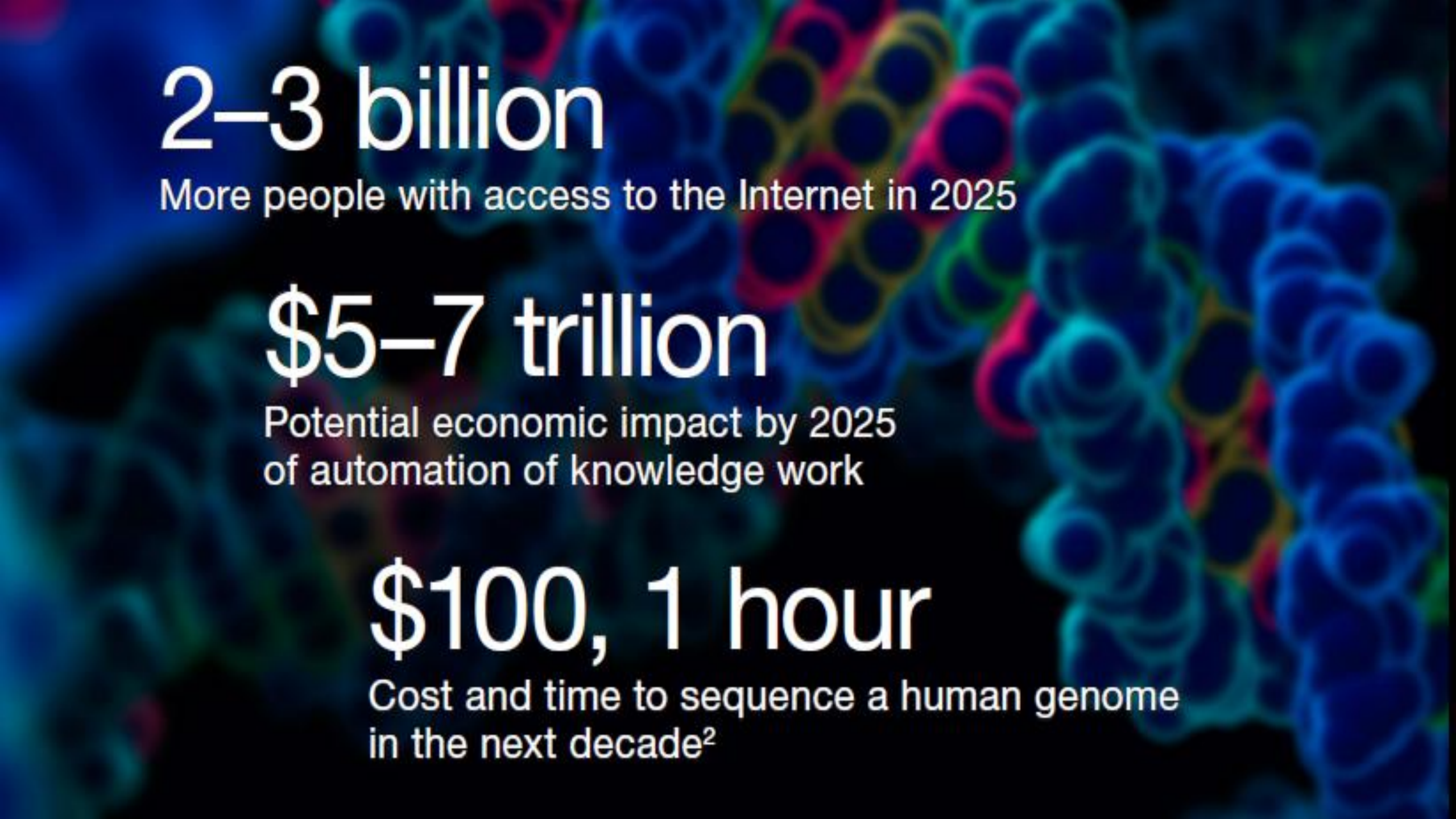
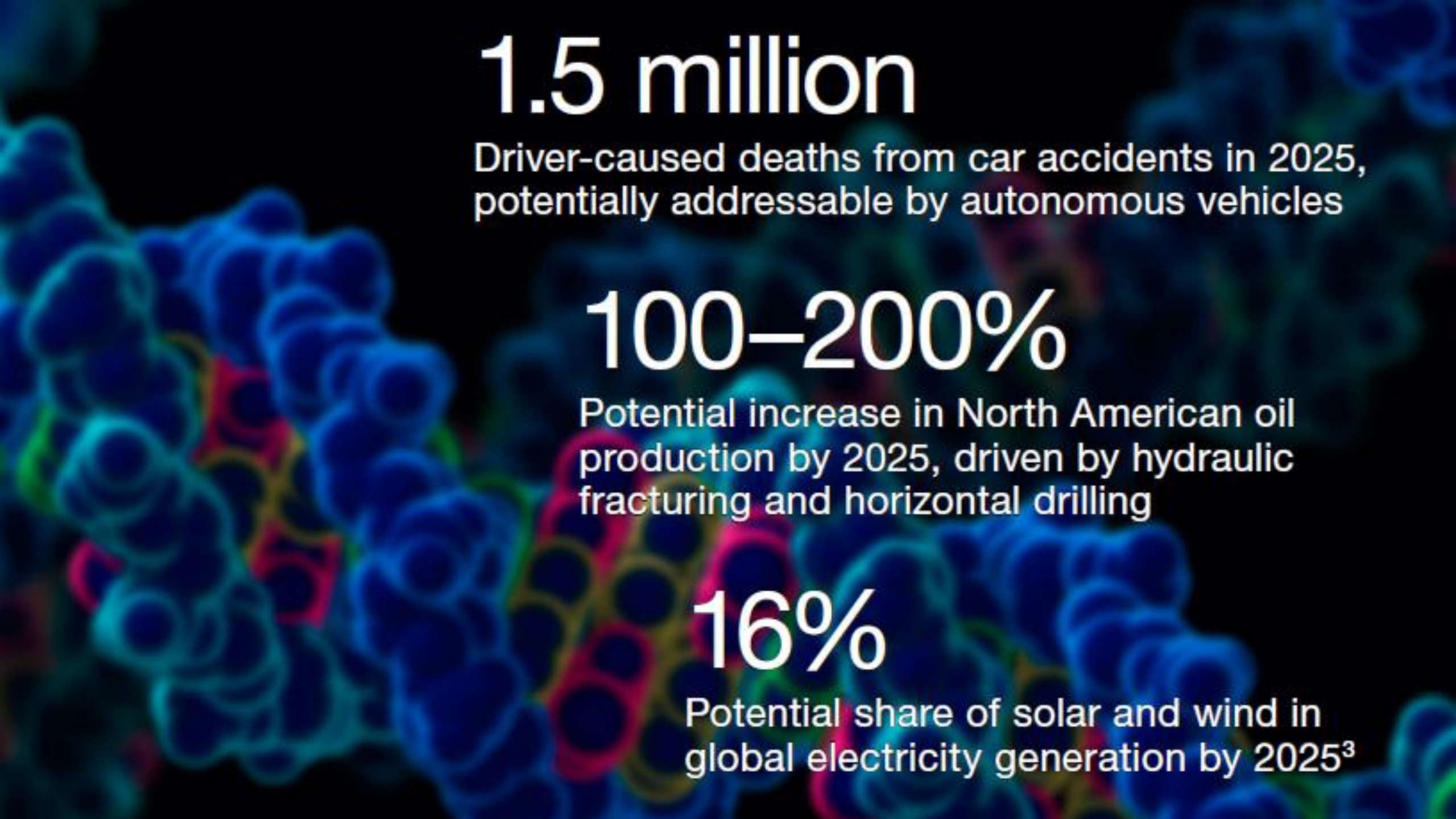
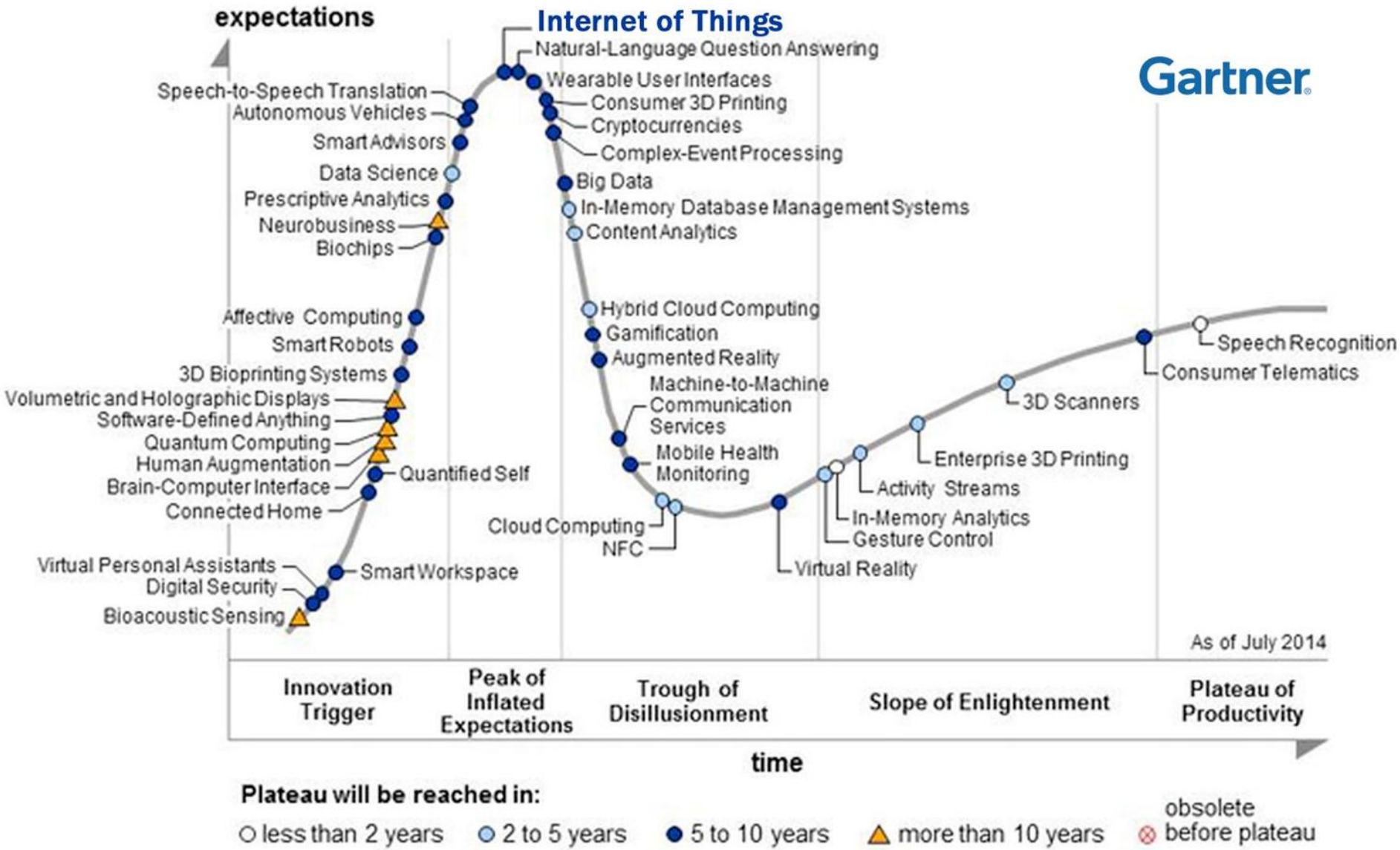
Disruptive technologies: Advances that will transform life, business, and the global economy


$5 million vs. $400
Price of the fastest supercomputer in 1975[1]
and an iPhone 4 with equal performance
230+ million
Knowledge workers in 2012
$2.7 billion, 13 years
Cost and duration of the Human Genome Project,
completed in 2003

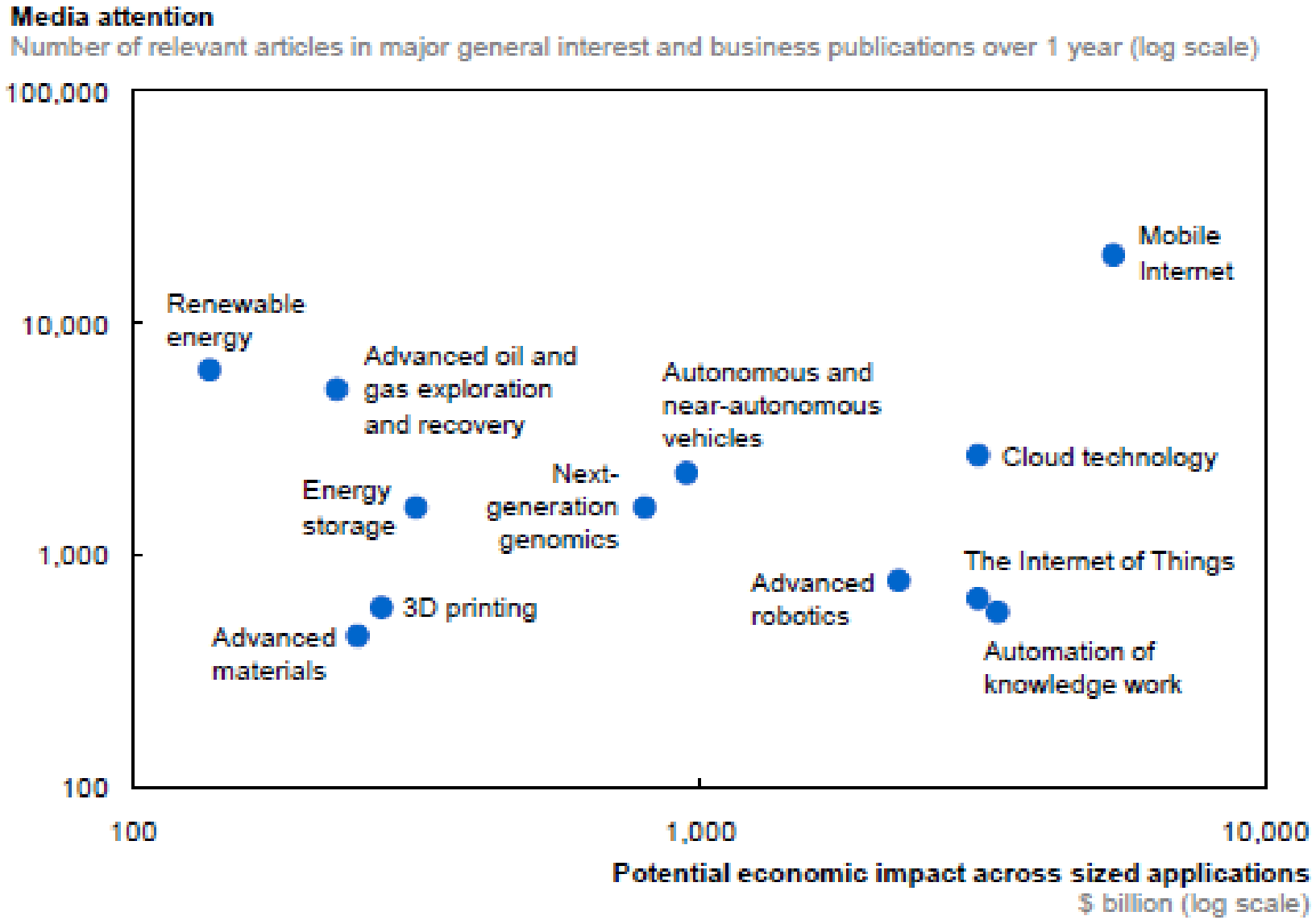

300,000+
Miles driven by Google's autonomous cars with only one accident (human error)
3x
Increase in efficiency of North American gas wells between 2007 and 2011
85%
Drop in cost per watt of a solar photovoltaic cell since 2000


2–3 billion
More people with access to the Internet in 2025
$5–7 trillion
Potential economic impact by 2025
of automation of knowledge work
$100, 1 hour
Cost and time to sequence a human genome
in the next decade[2]


1.5 million
Driver-caused deaths from car accidents in 2025, potentially addressable by autonomous vehicles
100–200%
Potential increase in North American oil production by 2025, driven by hydraulic fracturing and horizontal drilling
16%
Potential share of solar and wind in global electricity generation by 2025[3]


expectations
Internet of Things
Natural-Language Question Answering
Wearable User Interfaces
Consumer 3D Printing
Cryptocurrencies
Complex-Event Processing
Big Data
In-Memory Database Management Systems
Content Analytics
Hybrid Cloud Computing
Gamification
Augmented Reality
Machine-to-Machine Communication Services
Mobile Health Monitoring
Cloud Computing
NFC
Virtual Reality
In-Memory Analytics
Gesture Control
Activity Streams
Enterprise 3D Printing
3D Scanners
Consumer Telematics
Speech Recognition
Speech-to-Speech Translation
Autonomous Vehicles
Smart Advisors
Data Science
Prescriptive Analytics
Neurobusiness
Biochips
Affective Computing
Smart Robots
3D Bioprinting Systems
Volumetric and Holographic Displays
Software-Defined Anything
Quantum Computing
Human Augmentation
Brain-Computer Interface
Connected Home
Quantified Self
Virtual Personal Assistants
Digital Security
Bioacoustic Sensing
Smart Workspace
Gartner
As of July 2014
Innovation Trigger
Peak of Inflated Expectations
Trough of Disillusionment
Slope of Enlightenment
Plateau of Productivity
time
Plateau will be reached in:
less than 2 years
2 to 5 years
5 to 10 years
more than 10 years
obsolete before plateau

The relationship between hype about a technology and its potential economic impact is not clear



Where is the value potential of the Internet of Things?

Interoperability required to capture 40% of total value

< 1% of data currently used, mostly for alarms or real-time control; more can be used for optimization and prediction

2X more value from B2B applications than consumer

Developing: 40%
Developed: 60%

Types of opportunities

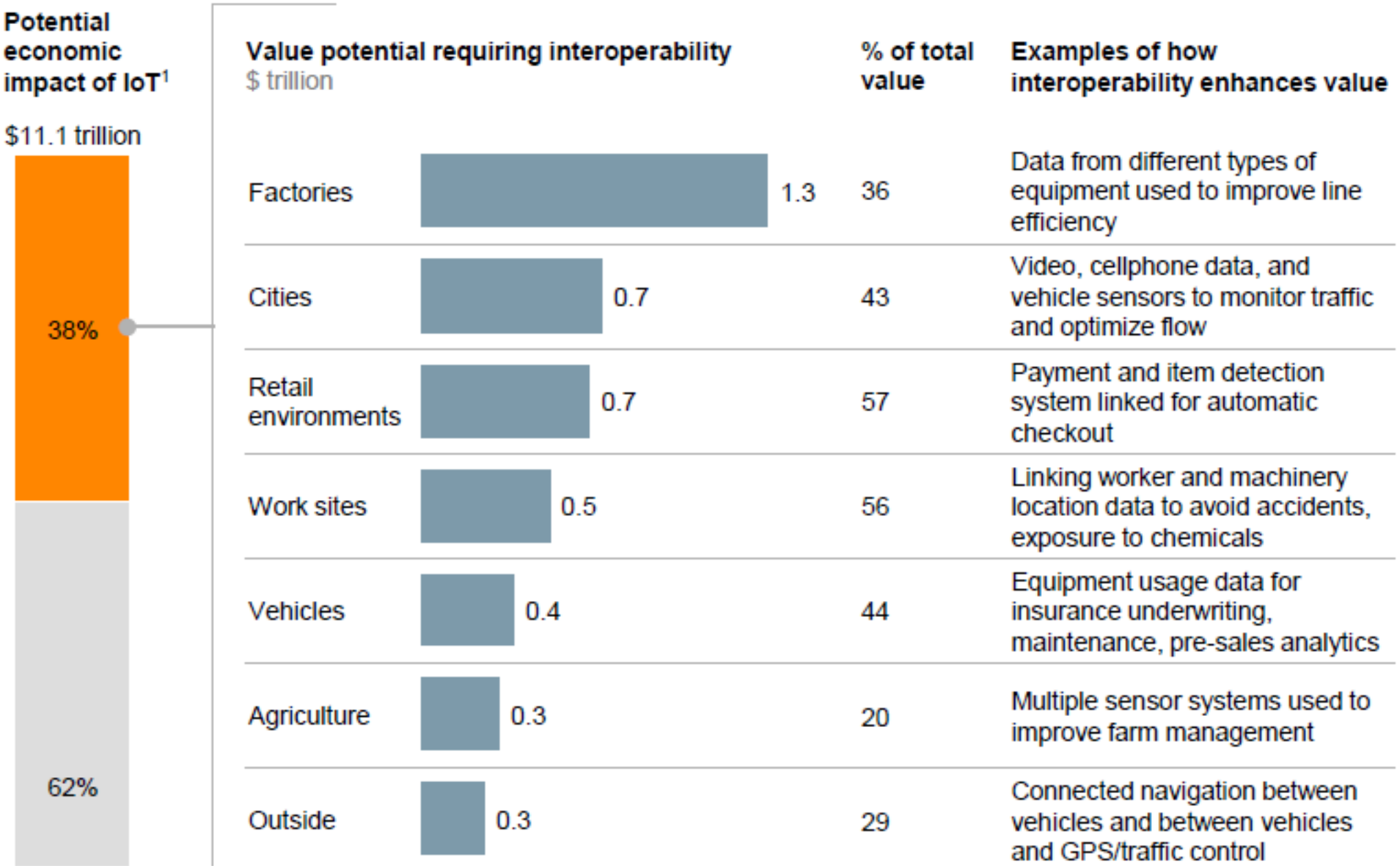
Transform business processes

Predictive maintenance, better asset utilization, higher productivity

Enable new business models

For example, remote monitoring enables anything-as-a-service

Nearly 40 percent of economic impact requires interoperability between IoT systems



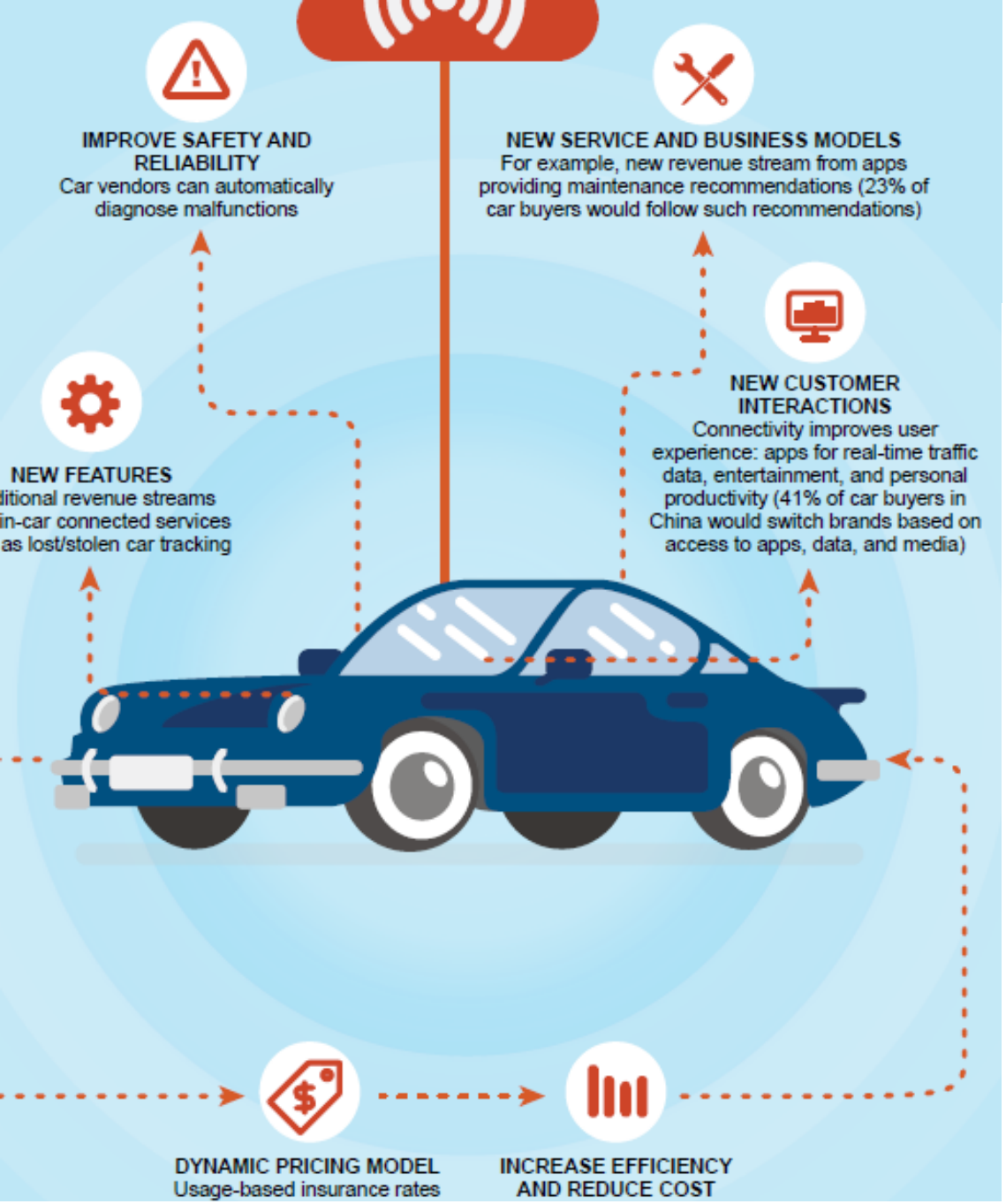
CONDITION-BASED MAINTENANCE	Through continuous monitoring, determine when maintenance will be needed, saving on routine maintenance costs and avoiding failures
OPERATIONS MANAGEMENT	Use IoT to centrally or remotely optimize operations, including use of remotely controlled autonomous vehicles
HEALTH AND SAFETY	Real-time tracking of workers and equipment to issue alerts when they move into areas where injury or exposure to harmful substances could occur
IOT-ENABLED R&D	With actual usage data generated by IoT-enabled equipment, suppliers can develop new components to avoid specific failures and eliminate unused features
PRE-SALES ENABLEMENT	Based on usage data, equipment suppliers can suggest more appropriate models or cross-sell additional equipment

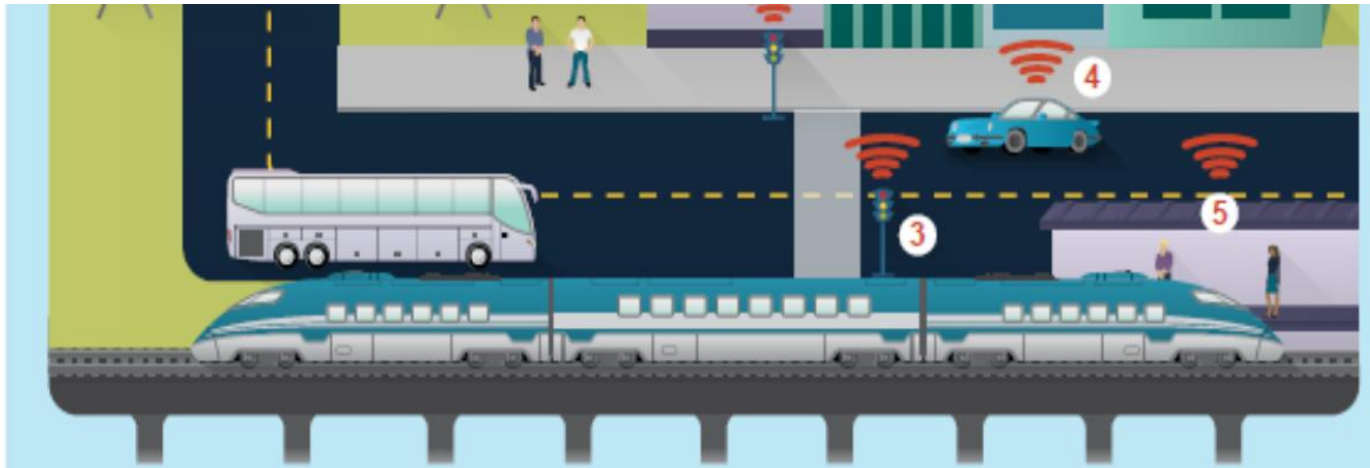
Manufacturers, oil and gas companies, and other businesses have already begun to see the initial payoff from IoT technologies in their operations.

REAL-TIME PRODUCTION DASHBOARDS
Remotely monitor, optimize, and control production

AUTO-SENSING EQUIPMENT
Equipment settings are self-adjusted based on ambient conditions and product being made

Smart Cities





RESOURCE MANAGEMENT

1. **Electrical distribution and substation automation**
   Detect flaws (and theft), predict failures, optimize efficiency
2. **Water leak identification**
   Detect leaks, analyze flows, reduce waste

TRANSPORTATION

3. **Traffic control**
   Optimize traffic flow by analyzing sensor data and providing info to drivers
4. **Autonomous vehicles**
   Driverless cars reduce fuel use, accidents, demand for parking and road capacity
5. **Bus and train schedule management**
   Provide accurate location, ETA, and routing information to passengers

PUBLIC SAFETY AND HEALTH

6. **Air and water quality monitoring**
   Monitor air and water quality to improve public health
7. **Crime monitoring and prevention**
   Detect potential public safety issues and alert officers