



# Disruptive Technologies to Watch

*FTI Consulting has been tracking 24 technologies that have been disrupting value chains, challenging business models, and creating new opportunities. In this short piece we look at those 24 in the context of their stage of maturity, market penetration, time to impact, type of impact and growth potential.*

## DISRUPTORS TO WATCH

<i>Taking Hold</i>	Gigconomy
	Renewable Energy
	SDN/NFV
	SDS
	Open source
	Internet of Things
	Enterprise Mobility
	Payment Tech
	Robotics
<i>Well on the Way</i>	AR
	AI
	Virtual Reality
	Autonomous Driving
	Autonomous Drones
	Blockchain
	3D Printing
	Advanced Materials
	Edge computing
<i>In Search of a Catalyst</i>	Cryptocurrency
	Genomics
<i>Emerging from the Labs</i>	Augmented Intelligence
	Space Economy
	Synthetic Biology
	Nanotech

## DISRUPTIVE TRENDS <sup>i</sup>

Potential Market Sizes by 2020

\$788B

IoT, Gigconomy and Enterprise Mobility are transforming daily lives offering alternate transportation, mode of work, enhanced home automation

\$725B

Blockchain technology and Cryptocurrencies made large advancements recently, beginning to challenge financial systems, record management, supply chains etc.

\$362B

IoT and Edge Computing are enabling real-time analytics at the data source resulting in faster and enhanced decisions by devices

\$49B

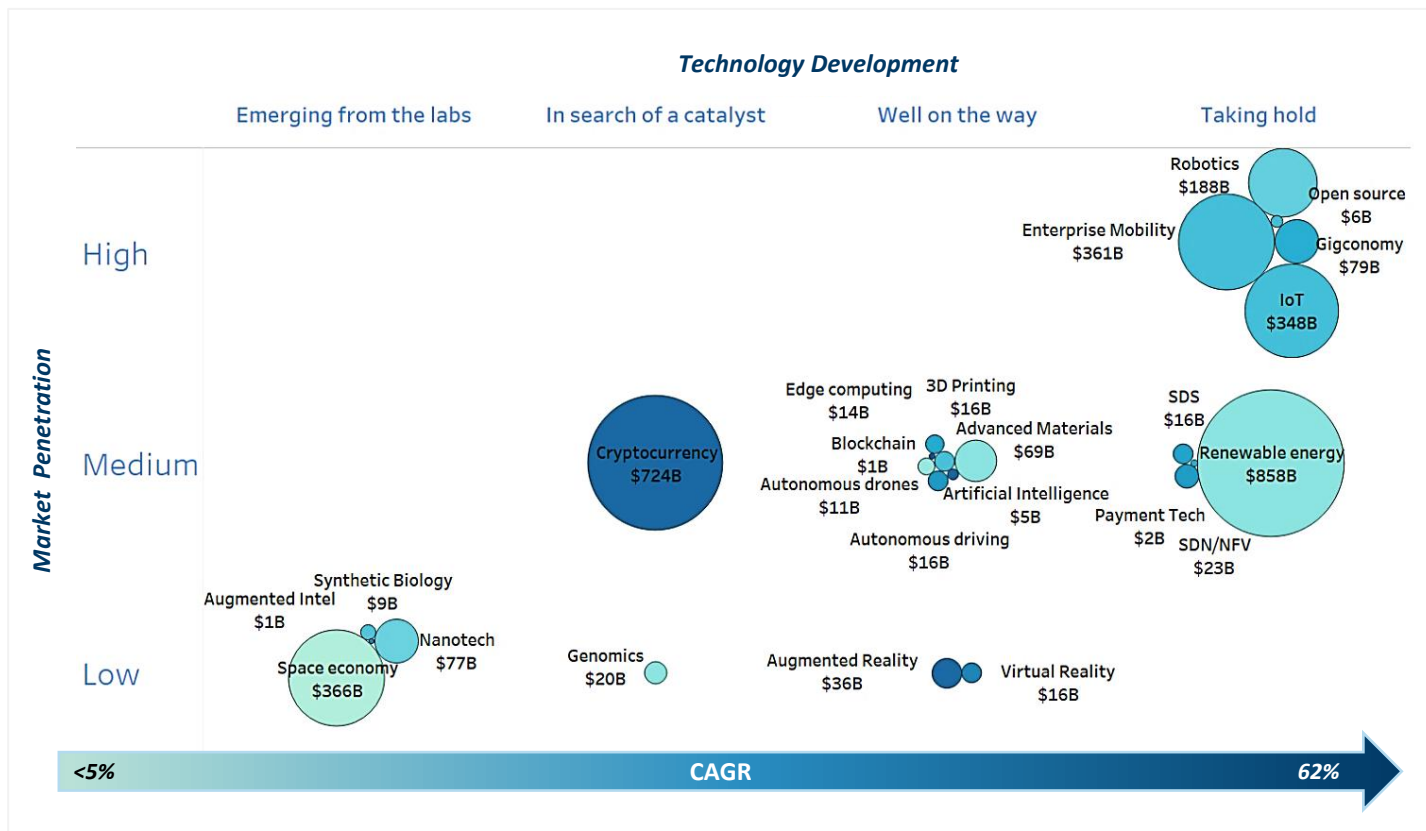
Software-defined technologies and Open Source business models are disrupting traditional IT infrastructure, offering CIOs more flexibility and faster time to market

\$240B

Robotics, VR and AR transforming retail, manufacturing and supply chain sectors reducing dependency on human capital and cost of operations

# Disruptive Technologies to Watch

## Potential Market Size - 2020



The size of each bubble indicates the potential 2020 market size <sup>i</sup>

Technology Development	
<b>Emerging from the Labs:</b>	<i>Technology is still developing</i>
<b>In Search of a Catalyst:</b>	<i>Developed technology, no business model or other barriers to adoption</i>
<b>Well on the Way:</b>	<i>Developed technology, business model exists, but no/limited scale</i>
<b>Taking Hold:</b>	<i>Tech is implemented and is starting to make an impact</i>

Market Penetration	
<b>High:</b>	<i>Commercialized technology, multiple examples of market adoption and implemented use cases</i>
<b>Medium:</b>	<i>Some implemented use cases with increasing commercialization</i>
<b>Low:</b>	<i>No/limited commercialization; use cases still being testing and business models still being defined</i>

# Disruptive Technologies to Watch

## Insights on Major Technology Trends



IoT has demonstrated that value is found more up-the-stack with software, solutions, services and platforms than with hardware and devices.

While lower cost and more efficiency use cases are becoming mainstream, revenue opportunities are still nascent. In order to monetize IoT, data and attributes of data will have to hit a critical mass.



VR is largely viewed as a content and device play. We believe that it is more. The big dollars in VR will be realized when it emerges as the fourth generation compute platform - after PC's, Internet and mobile. Ecosystems are still evolving so anyone in VR needs to have market staying power for another two to three years.



Blockchain has broken out of the currency and financial services box. It has started to go mainstream, and has begun to disintermediate middle-man business models and create new verification systems. Once scaled, it could give rise to a new *Trust Economy*.



2018 will be a pivotal year for AI when its affect will be felt on a multitude of job functions. At that time all the theory will become very real and open era when AI will challenge the limits of business models and stretch the art of the possible.

AI is not one thing, but many: It combines machine learning, deep learning, data science, natural language processing, robotics and more. Expect AI to be embedded in almost every business function over the next few years including sales, marketing, finance, operations and will enable software defined and data enabled everything. A company that does not have a strategy for investment in AI will find itself battling obsolescence soon.

# Taking Hold | Well On The Way

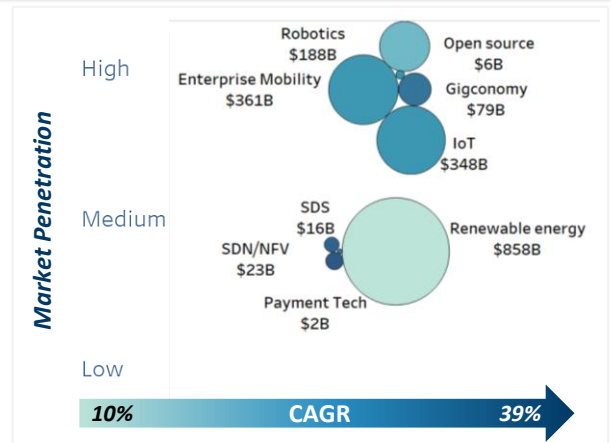


## TAKING HOLD

Tech is implemented and is starting to make an impact

- Renewables will make up 25% of the world's energy consumption by 2025 and maintain modest growth.<sup>ii</sup>
- Enterprise mobility and IoT are quickly shaping workplaces and daily life, with large 2020 market sizes and rapid growth.

Disruptor	Time to Impact
Gigconomy	<1 year
Renewable Energy	2-5 years
SDN/NFV	<1 year
SDS	<1 year
Open source	1-3 years
Internet of Things	<1 year
Enterprise Mobility	<1 year
Payment Tech	2-5 years
Robotics	2-5 years

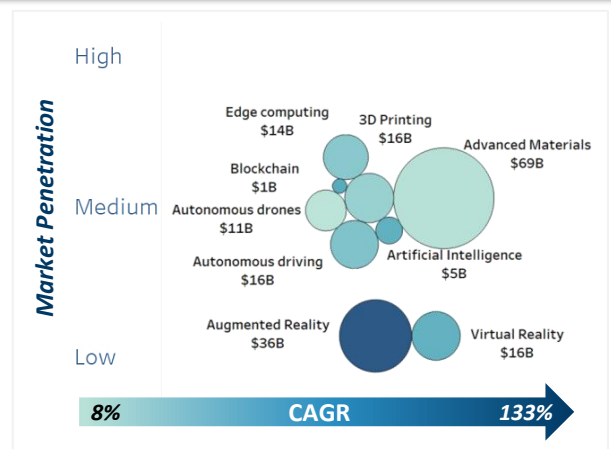


## WELL ON THE WAY

Developed technology, business model exists, but no/limited scale

- AR is growing the fastest, while advanced materials & autonomous drones are growing moderately

Disruptor	Time to Impact
AR	2-5 years
AI	1-3 years
Virtual Reality	2-5 years
Auto Driving	2-5 years
Auto. Drones	2-5 years
Blockchain	2-5 years
3D Printing	<1 year
Adv. Materials	<1 year
Edge computing	1-3 years



**Impact to Value Chain:** A change in any part of the end product's creation or competitive advantage

**Changing Business Models:** A shift in revenue models

**Creating New Markets:** A new addressable market that did not exist before

*"a new raw material"*

*"hardware sales to SaaS"*

*"monetization of services or a new product"*

# In Search of a Catalyst | Emerging from the Labs

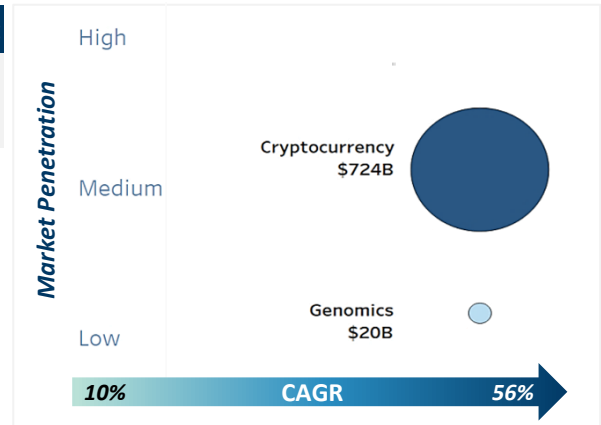


## IN SEARCH OF A CATALYST

*Developed technology, no business model or other barriers to adoption*

- Cryptocurrency values hit all time highs in 2017.<sup>iii</sup> They are increasingly accepted as a form of payment by an increasing number of vendors.

Disruptor	Time to Impact
Cryptocurrencies	1-3 years
Genomics	2-5 years

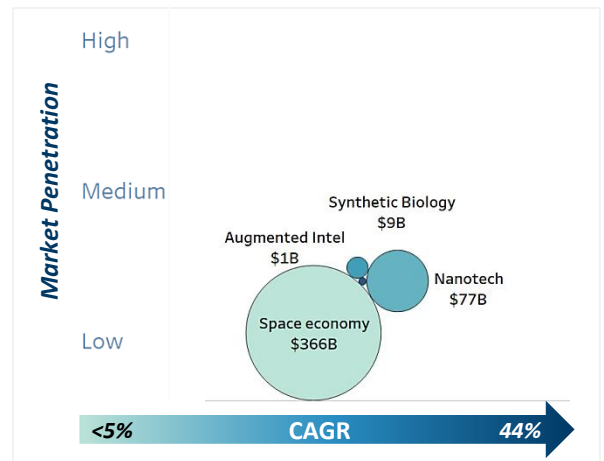


## EMERGING FROM THE LABS

*Technology is still developing*

- Lowest market adoption as they are still in Proof of Concept stage
- Expected to take more than two years to impact the market

Disruptor	Time to Impact
Augmented Intel	2-5 years
Space Economy	>5 years
Synthetic Biology	>5 years
Nanotech	>5 years



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# Taking Hold

## A Deeper Dive

### GIGCONOMY



Gigconomy refers to the set of temporary, contract-based jobs or services ("gigs") for which a contractor provides goods or services. This is also known as the sharing economy.

**+33% CAGR: From \$44.4B in 2018 to \$79.1B in 2020 <sup>iv</sup>**

#### Sample Use Cases

Transportation  
Lodging  
Delivery services  
Freelance services

### RENEWABLE ENERGY



Energy that is collected from non-exhaustible sources, such as solar, wind, and biomass.

**+10% CAGR: From \$705B in 2018 to \$857.7B in 2020 <sup>v</sup>**

Residential power  
Commercial/public sector power  
Residential power  
Automobile energy

### SOFTWARE-DEFINED NETWORKING



SDN allows networking devices to be created and controlled via software and include functional separation, network virtualization, and automation through programmability.

**+39% CAGR: From \$11.8B in 2018 to \$22.7B in 2020 <sup>vi</sup>**

Reducing and routing services  
Centralized network services

### SOFTWARE-DEFINED STORAGE



SDS allows storage to be physically separated from compute and networking in a traditional box; and moves control to the software layer.

**+37% CAGR: From \$8.8B in 2018 to \$16.5B in 2020 <sup>vii</sup>**

IoT data storage  
Hyperconverged infrastructure

### OPEN SOURCE



Open source software refers to software that can be modified and shared because its design is publicly accessible.

**+27% CAGR: From \$3.5B in 2018 to \$5.6B in 2020 <sup>viii</sup>**

Product fees  
Professional Services and support  
User guides and manuals

# Taking Hold

## A Deeper Dive - continued

### INTERNET OF THINGS



IoT a system of interrelated computing devices, mechanical/digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network.

+27% CAGR: From \$216.4B in 2018 to \$348.5B 2020 <sup>ix</sup>

#### Sample Use Cases

- Real-time asset tracking
- Market insights
- Consumer self service
- Performance benchmarking
- Inventory and material mngt.
- Operational intelligence

### ENTERPRISE MOBILITY



The trend toward a shift in work habits, with more employees working out of the office and using mobile devices & cloud services to perform business tasks.

+27% CAGR: From \$225.1B in 2018 to \$360.8B in 2020 <sup>x</sup>

- Communication device sales
- Telecommute
- Unified communication

### PAYMENT TECHNOLOGY



The payment technology industry includes organizations that store, process, and transmit cardholder data. In this context, we look specifically at mobile payments.

+33% CAGR: From \$1.1B in 2018 to \$1.9B in 2020 <sup>xi</sup>

- Consumer payments
- Peer-to-peer payments
- POS hardware sales
- Analytics services

### ROBOTICS



Advanced robotics combines computer applications and machine tools to allow humans to automate processes, increase productivity, enhance quality, and reduce human errors.

+20% CAGR: From \$131.2B in 2018 to \$188B 2020 <sup>xii</sup>

- Manufacturing automation
- Process Automation
- Analytics
- Service industry
- Hazardous industries
- Data management



# Well on the Way

## A Deeper Dive



### AUGMENTED REALITY

Augmented reality superimposes a computer generated overlay onto a users view of the real world creating a composite experience.

**+133% CAGR: From \$6.5B in 2018 to \$35.6B in 2020<sup>xiii</sup>**

#### Sample Use Cases

- Gaming
- Virtual showrooms
- Education
- Printing and advertising
- Entertainment
- Marketing
- Travel and tourism



### ARTIFICIAL INTELLIGENCE

AI is a branch of computer science which seeks to enable computers with the ability to perform intelligent tasks that are normally performed by humans.

**+57% CAGR: From \$2B in 2018 to \$4.9B in 2020<sup>xiv</sup>**

- Real time fraud and risk management.
- Customer support and helpdesk
- Data and advanced analytics
- Trading systems
- Virtual assistants
- Underwriting services



### VIRTUAL REALITY

VR refers to technology which replicates an environment, real or imagined, and simulates a user's physical presence within that environment.

**+56% CAGR: From \$6.6B in 2018 to \$16B in 2020<sup>xv</sup>**

- Manufacturing designs
- Prototyping and demos
- Architecture and construction
- Training and education
- Immersive journalism
- Entertainment
- Healthcare
- Merchandising



### AUTONOMOUS DRIVING

Autonomous cars are vehicles that can drive themselves without human intervention using GPS navigation and external sensors to prevent collisions.

**+40% CAGR: From \$8B in 2018 to \$15.7B in 2020<sup>xvi</sup>**

- Transmitters and sensors
- Data storage and management
- Transportation services
- Operating system development
- Regulatory services



### AUTONOMOUS DRONES

Unmanned Aerial Vehicles (UAVs), are miniature pilotless aircraft, which are either controlled by a remote or an app and use aerodynamic forces to navigate and perform desired functions.

**+8% CAGR: From \$9.8B in 2018 to \$11.4B in 2020<sup>xvii</sup>**

- Supply chain/logistics
- Defense/security
- Agriculture
- Photography
- Supply chain/logistics
- Railway safety
- Cargo delivery
- Construction management
- Property management

# Well on the Way

## A Deeper Dive - *continued*



### BLOCKCHAIN

A Blockchain is a decentralized and distributed digital ledger that is used to record transactions across many computers so that the record cannot be altered retroactively.

**+62% CAGR: From \$0.5B in 2018 to \$1.4B in 2020<sup>xviii</sup>**

#### Sample Use Cases

- Verification
- Peer-to-peer transactions
- Supply chain management
- Identity management
- Record management
- Prevention/traceability
- Asset registration/ownership



### 3D PRINTING

3D Printing is the computer-controlled method of synthesizing 3D dimensional objects utilizing digital files, also known as additive manufacturing.

**+26% CAGR: From \$10.4B in 2018 to \$16.4B in 2020<sup>xix</sup>**

- Prototyping
- Tools and spares
- Bridge manufacturing
- Prototyping
- Healthcare and medical devices
- Product customization



### ADVANCED MATERIALS

These are new, innovative materials technologies, including liquid crystals, superconductors, optics, lasers, sensors, shape memory alloys, light-emitting materials, thin films, and colloids.

**+10% CAGR: From \$56.6B in 2018 to \$69B in 2020<sup>xx</sup>**

- Self-healing materials
- Composite sensor materials
- Ceramics and superconductors
- Bioengineered materials



### EDGE COMPUTING

Edge computing allows data produced by Internet of Things devices to be processed closer to where it is created instead of sending it across long routes to data centers or clouds.

**+35% CAGR: From \$7.6B in 2018 to \$13.8B 2020<sup>xxi</sup>**

- Edge hardware sales
- Edge hosting
- Edge XaaS
- End user applications

# In Search of a Catalyst

## A Deeper Dive



### CRYPTOCURRENCIES

A cryptocurrency is a digital currency that is decentralized to ensure secure transactions, regulate creation of additional units, and to verify the transfer of assets.

**+56% CAGR: From \$296.8B in 2018 to \$724.1B 2020<sup>xxii</sup>**

#### Sample Use Cases

- Money transfer
- Mining infrastructure
- Ledger management
- Peer-to-peer transactions



### GENOMICS

Genomics is a discipline in genetics that applies recombinant DNA, DNA sequencing methods, and bioinformatics to sequence, assemble, and analyze the function and structure of genomes.

**+10% CAGR: From \$16.3B in 2018 to \$19.7B 2020<sup>xxiii</sup>**

#### Personalized medicine

- Genetics testing
- Pharmaceuticals
- Healthcare

# Emerging from the Labs

## A Deeper Dive

### AUGMENTED INTELLIGENCE



The fusion of human and technology in a way that removes the tactile barrier of interaction with physical devices and instead relies on bio-physical signals.

**+44% CAGR: From \$0.5B in 2018 to \$1.1B 2020<sup>xxiv</sup>**

#### Sample Use Cases

*Customer relationship management.  
Retail performance improvement  
Translation services  
Security analytics*

### SPACE ECONOMY



The “Space Economy” refers to exploring, researching, managing, and utilizing space. Due to costly access and technical risks, the sector remains government-dominated for defense purposes.

**+3% CAGR: From \$346.9B in 2018 to \$366.4B in 2020<sup>xxv</sup>**

*Climate and environment  
Tourism  
Satellites/broadband  
Colonization  
Security and safety  
E-Connectivity  
Navigation and traffic*

### SYNTHETIC BIOLOGY



Synthetic biology is the development of artificial biological organisms, pathways and devices or the redesigning of existing ones for new purposes.

**+24% CAGR: From \$6B in 2018 to \$9.2B in 2020<sup>xxvi</sup>**

*Petro-based synthetics  
Medicine and vaccine  
Biofuels development*

### NANOTECHNOLOGY



Nanotech refers to the engineering of functional systems at the molecular scale. It renders several aspects of the manufacturing process unnecessary.

**+18% CAGR: From \$54.8B in 2018 to \$76.5B in 2020<sup>xxvii</sup>**

*Pharmaceuticals  
Semiconductors  
Consumer products  
Healthcare and medical devices  
ICT machines*

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- ii. Union of Concerned Scientists, 2017 [Source](#)
- iii. Coherent Market Insights, October 2017 [Source](#)
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- v. Renewable Energy – Research and Markets, January 2016 [Source](#)
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- viii. Open Source – Statista, November 2017 (*estimated using the openstack market*) [Source](#)
- ix. IoT – Markets and Markets, 2017 [Source](#)
- x. Enterprise Mobility – CxO Today, April 2014 [Source](#)
- xi. Payment Tech – Allied Market Research, January 2017 (*estimated using the mobile payments market*) [Source](#)
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- xiii. Augmented Reality – Digi-Capital, January 2017 [Source](#)
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