

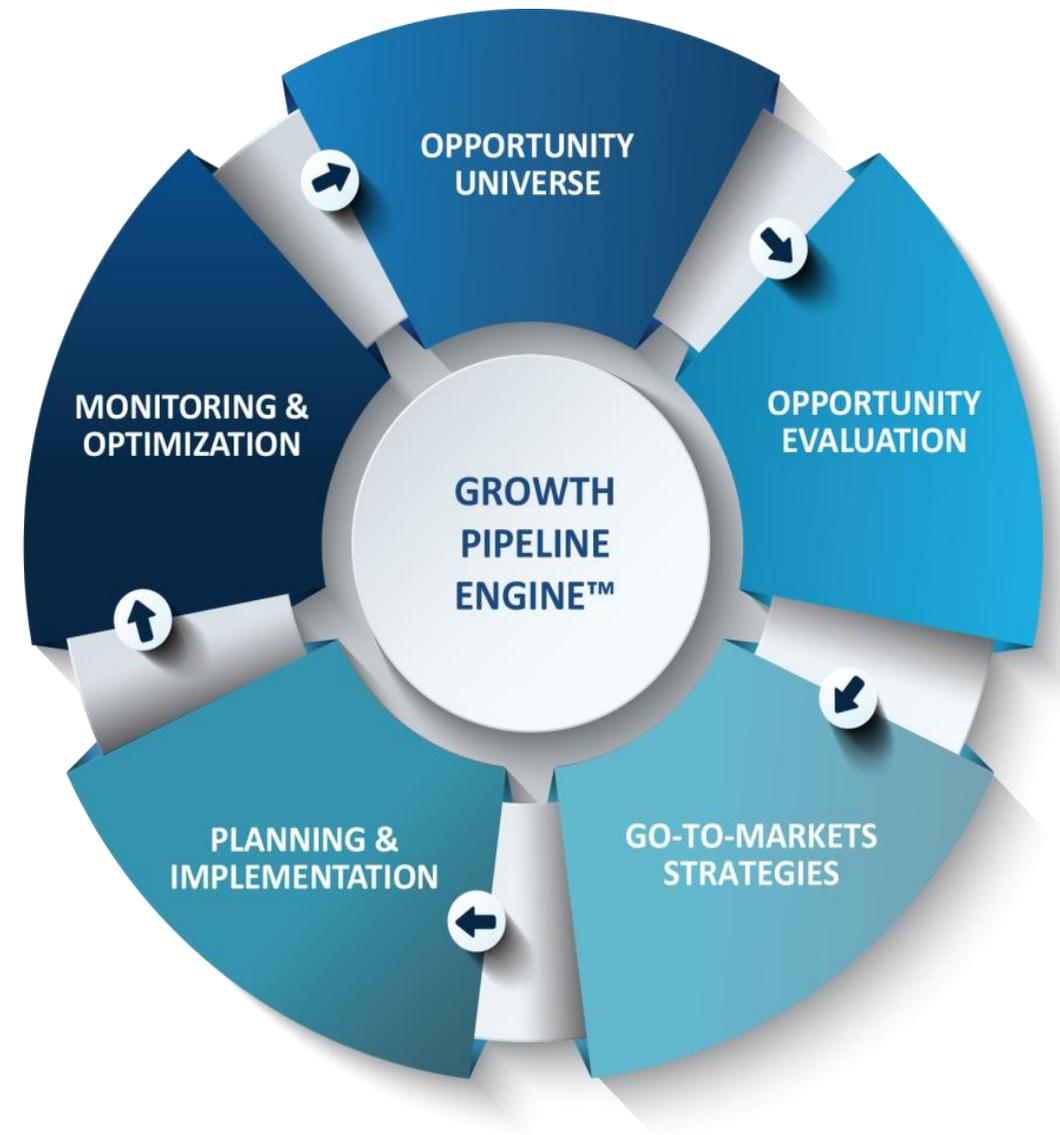
**GROWTH
OPPORTUNITY
BRIEFING**

Top 50 Emerging Technology Growth Opportunities

2021 Edition: Whispers Worth Shouting About

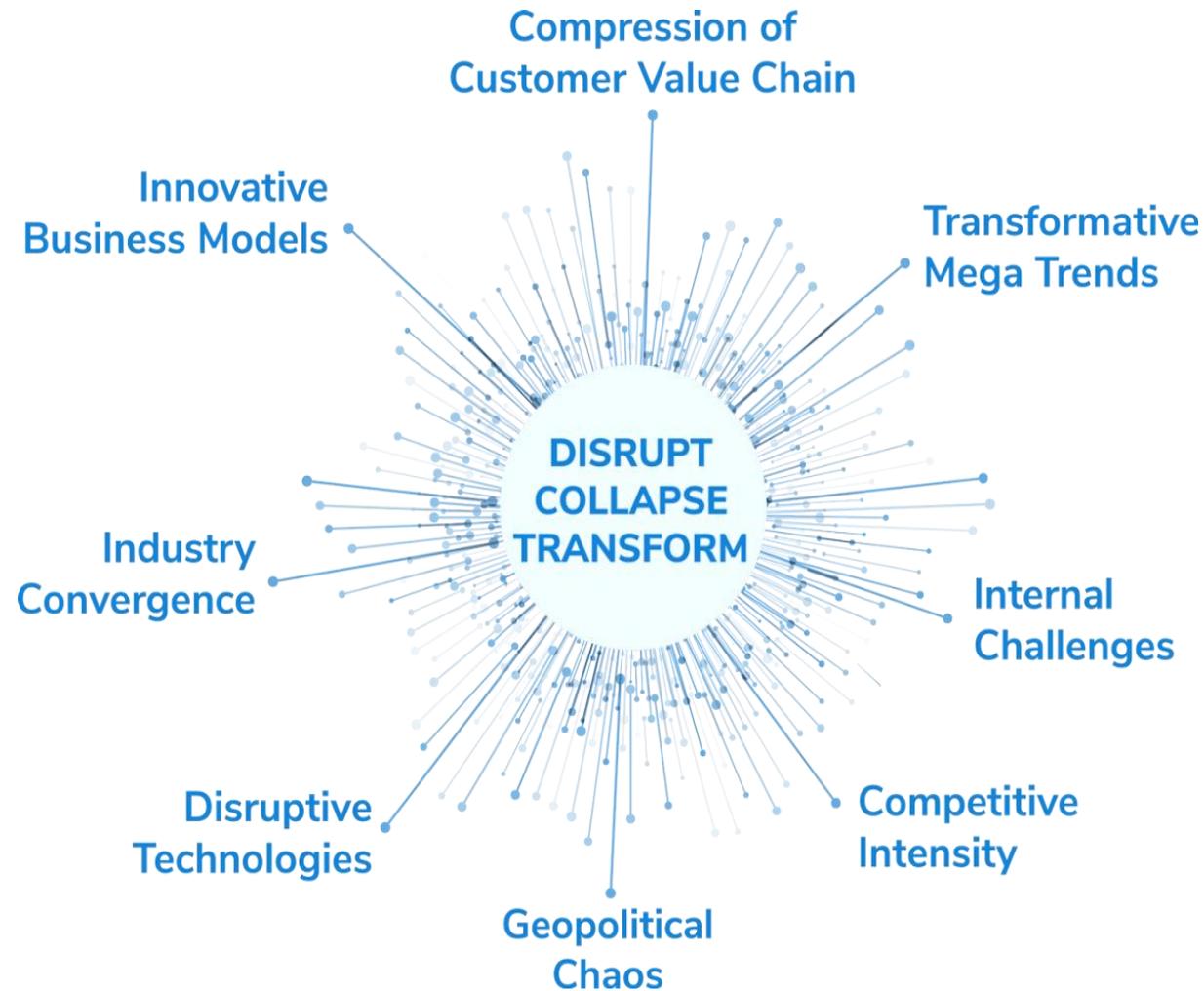
THE GROWTH PIPELINE COMPANY

- Growth is **increasingly** difficult to achieve.
- Our growth experts are **fanatical** about your future growth potential
- 60 years providing global CEOs and corporate leaders **Growth Opportunities**
- Growth **coaching** mentality, guiding you with proven best practices
- Intellectual property focused on **optimizing** your Growth Pipeline Engine



WHY IS GROWTH BECOMING **INCREASINGLY** DIFFICULT TO ACHIEVE?

THE STRATEGIC IMPERATIVE 8™: THE FACTORS CREATING PRESSURES ON GROWTH



WE ARE FOCUSED ON YOUR **TRANSFORMATIONAL GROWTH**

9 CORE TECHNOLOGY CLUSTERS



**Sensors &
Instrumentation**



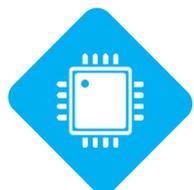
**Chemicals &
Advanced Materials**



**Environment &
Sustainability**



**Information &
Communication
Technology**



Microelectronics



Energy & Utilities



Health & Wellness



**Medical Devices &
Imaging**



**Advanced
Manufacturing
& Automation**

Markets



Aerospace, Security & Defence



Business & Financial



Chemicals & Materials



Digital Transformation



Education



Consumer Electronics



Energy & Environment



Food, Beverage & Nutrition



Agriculture



Manufacturing



Process Control



Mobility



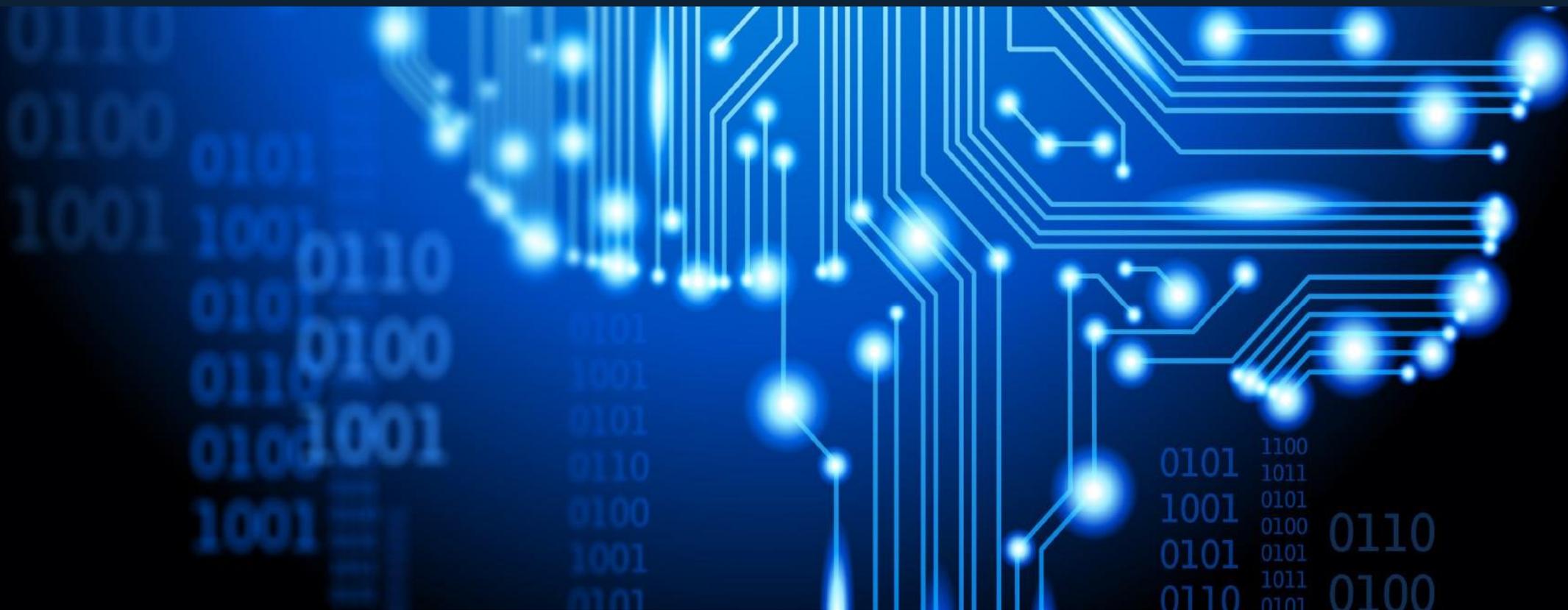
Measurement & Instrumentation



Healthcare



Top 50 Emerging Technologies Growth Opportunities 2021 Edition



TOP 50 SELECTION **METHODOLOGY**

20 Years of Knowledge

Year of Focused Discoveries

Week of Outcome Synthesis

Impact to Clients

**LARGEST HISTORICAL
DATABASE OF
TECHNOLOGY
DISCOVERIES ACROSS
MORE MARKETS THAN
ANY COMPANY
GLOBALLY**

*Over 60,000
Technologies Assessed*



**YEARLY ONGOING
GLOBAL DISCOVERY
TRACKING**

*Over 3,000 Technologies
EACH Year are Assessed*

*15,000 hours of Discovery
Effort & Analysis*

**WEEK OF TEAM
ANALYTICS**

Tools

ASSESSMENT ACROSS

- IP Activity
- Funding
- Market Potential
- Megatrend Impact
- Regional Adoption Potential
- Sector Economic Impact
- Technology Disruptiveness
- Technology Evolution

Outcomes

- Intensity of Impact
- Year of Impact
- Index of Disruption
- Index of Cluster Evolution

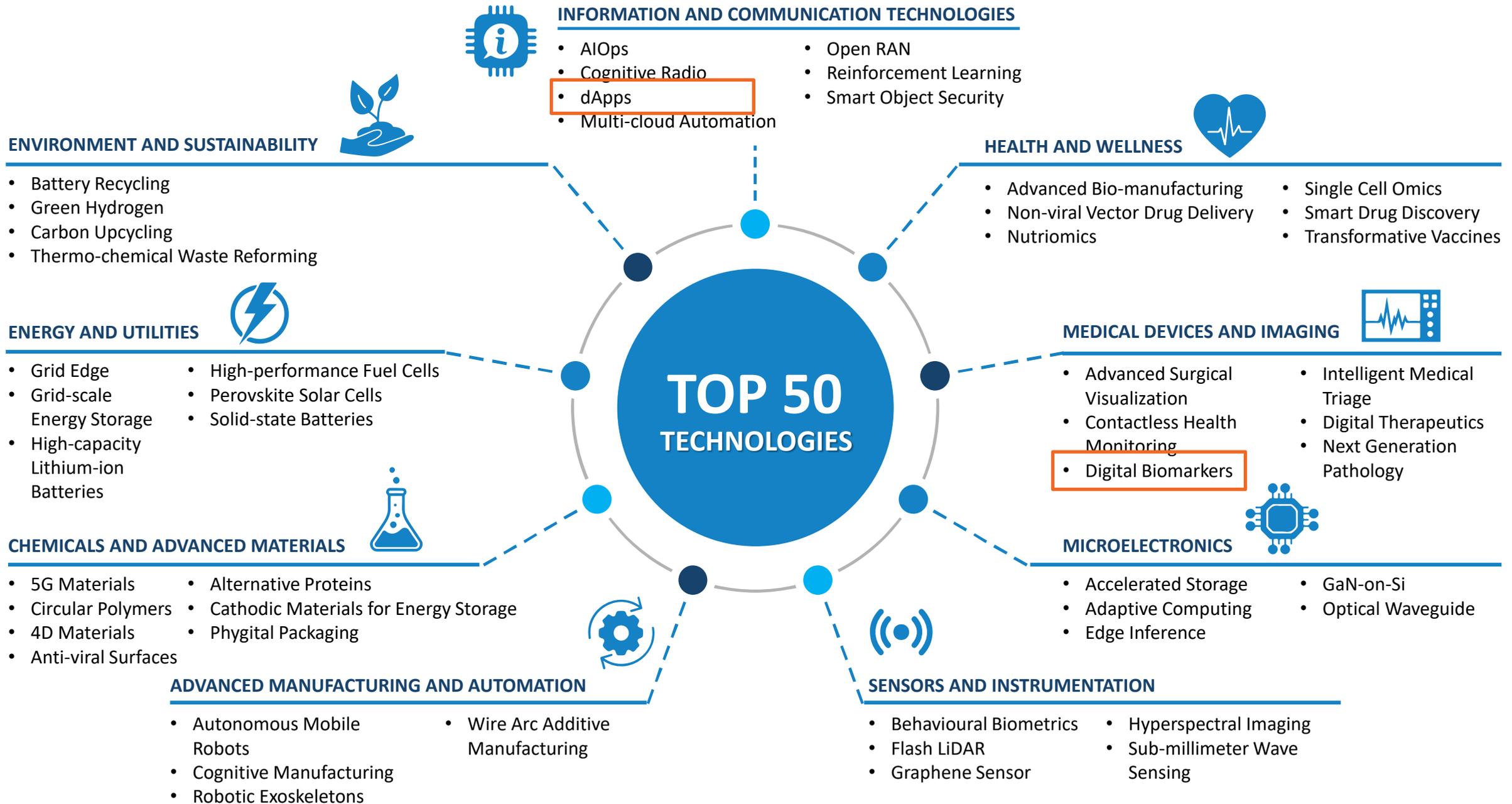


**2021 TOP 50
TECHNOLOGIES**
(four year impact)

+

**FUTURE 18
TECHNOLOGIES**
(long term impact)

THE IDENTIFIED TOP 50 FOR 2021 EDITION



2021 TOP 50 TECHNOLOGY

DAPPS

DAPPS

DAPPS WILL DRIVE NEW WAVE OF **INNOVATIONS** ACROSS INDUSTRY SECTORS

Technology Dashboard



\$129.2 Billion
Cumulative Market
Potential (2021-
2025)



Over \$2 Billion
Funding (2019-2020)



Over 6400 Patents
Filed (2018-2020)



Impact on 4 Mega
Trends

Ecosystem Snapshot

Brave

MakerDAO

Chainlink

Cipher

Circulor

dApps are paving the way for inclusive business growth through native payment systems, reliable data records, voting rights, uncensored content, trustless transactions, and autonomous agents.

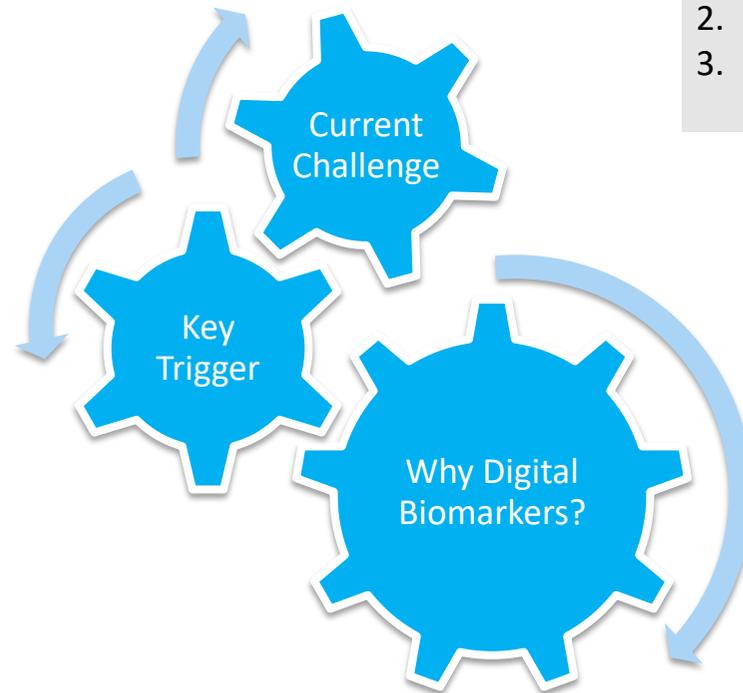
DAPPS

DAPPS CREATES AN INNOVATIVE OPEN SOURCE ECOSYSTEM



dApps or decentralized applications refers to new types of software applications whose underlying technology framework is blockchain. dApps include back end code (smart contracts) running on a decentralized peer-to-peer network.

Security and privacy coupled with low development cost continues to fuel dApps growth. The COVID-19 pandemic contributed to a significant increase in online gaming, which has led to an escalation of in-game crypto usage and connected technology with dApps.



1. Censorship
2. Single point of failure
3. Proprietary applications hinder ecosystem development

- dApps promote a tamper-proof, decentralized environment to solve real-world issues in a transparent manner, giving users digital independence through a distributed, resilient, secure, and open networked enterprise ecosystem.
- dApps allow for the creation of a peer-to-peer system that eliminates the need for a central repository of information and serves as a communication layer in exchanging information across organizations

DAPPS

DECENTRALIZED FINANCE HAS BECOME A DRIVING FORCE FOR THE BLOCKCHAIN INDUSTRY

Key Application Areas of dApps



BFSI



Healthcare



Energy



Transportation



Manufacturing



Entertainment &
Gaming

- The global pandemic has intensified the interest in blockchain, with federal agencies considering the use of dApps to secure supply chains, protect identities, authenticate registries, and support other critical use cases.
- The DeFi ecosystem has benefited the most within dApps, but it is merely one example and dApps can mirror similar transformations in other areas too.

Emerging Trends in dApps

2021

Decentralized Finance: The dApps market saw significant growth in the areas of gaming, gambling, and high-risk areas, creating momentum for the evolution of smart contracts. DeFi and non-fungible token (NFT) were seen as major growth areas for the dApps marketplace.

2023

Insurance will be the next wave of growth: Centralized and decentralized insurance initiatives are emerging: insurance is likely to drive the next wave of growth in the DeFi ecosystem.

2025

Elastic Finance: Next-generation financial platforms known as “elastic finance”, will support rules-based elastic tokens that will be non-collateralized, carry a price target, have a non-fixed supply, and provide automatic supply rebasing.

2021 TOP 50 TECHNOLOGY

DIGITAL BIOMARKERS

DIGITAL BIOMARKERS

ADVANCED RESEARCH ACTIVITIES BY **KEY PLAYERS** TO DEVELOP NEW DIGITAL BIOMARKERS

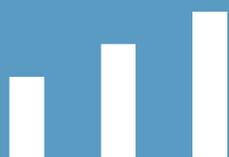
Technology Dashboard



\$15.1 Billion
Cumulative Market
Potential (2021-
2025)



Over \$2 Billion
Funding (2019-2020)



Over 1300 Patents
Filed (2018-2020)



Impact on 5 Mega
Trends

Ecosystem Snapshot

Bayer

Medopad

Janssen

Neurocast

Roche

Acculi Labs



Digital biomarkers gained significant traction during the COVID-19 pandemic due to their ability to track patients' health remotely and continuously. Additionally, they help researchers to better understand complex diseases.

DIGITAL BIOMARKERS

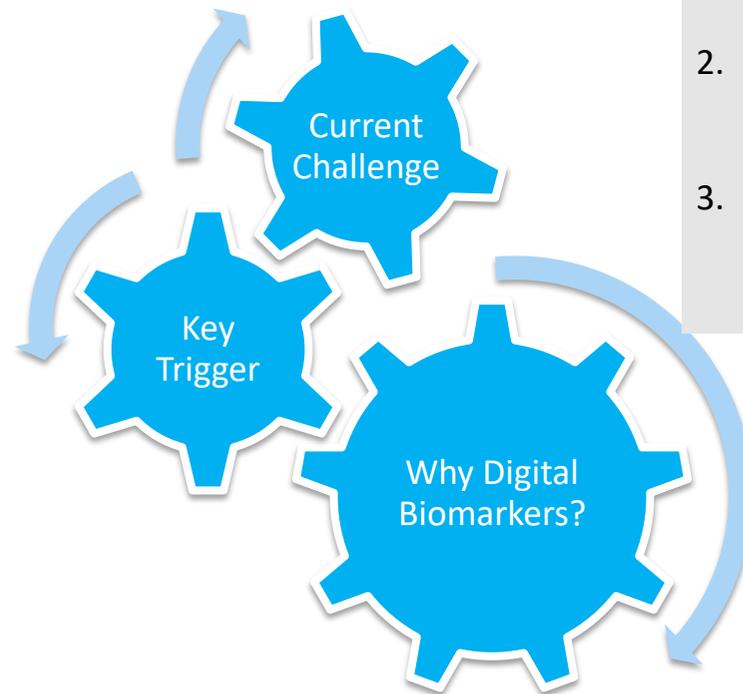
DIGITAL BIOMARKERS FOR **PRECISE** AND **PERSONALIZED** TREATMENT



Digital biomarkers are quantifiable physiological and behavioral data of a person, which are collected by digital devices, such as wearables and implants to predict health-related outcomes.

Analysis of digital biomarkers can significantly improve the state of personalized treatment and preventive measures for different diseases.

The COVID-19 pandemic has created a huge demand for digital biomarkers such as heart rate, respiration rate, and blood pressure that can help in the **early detection** of disease, reducing the risk of disease-related progression or complications.



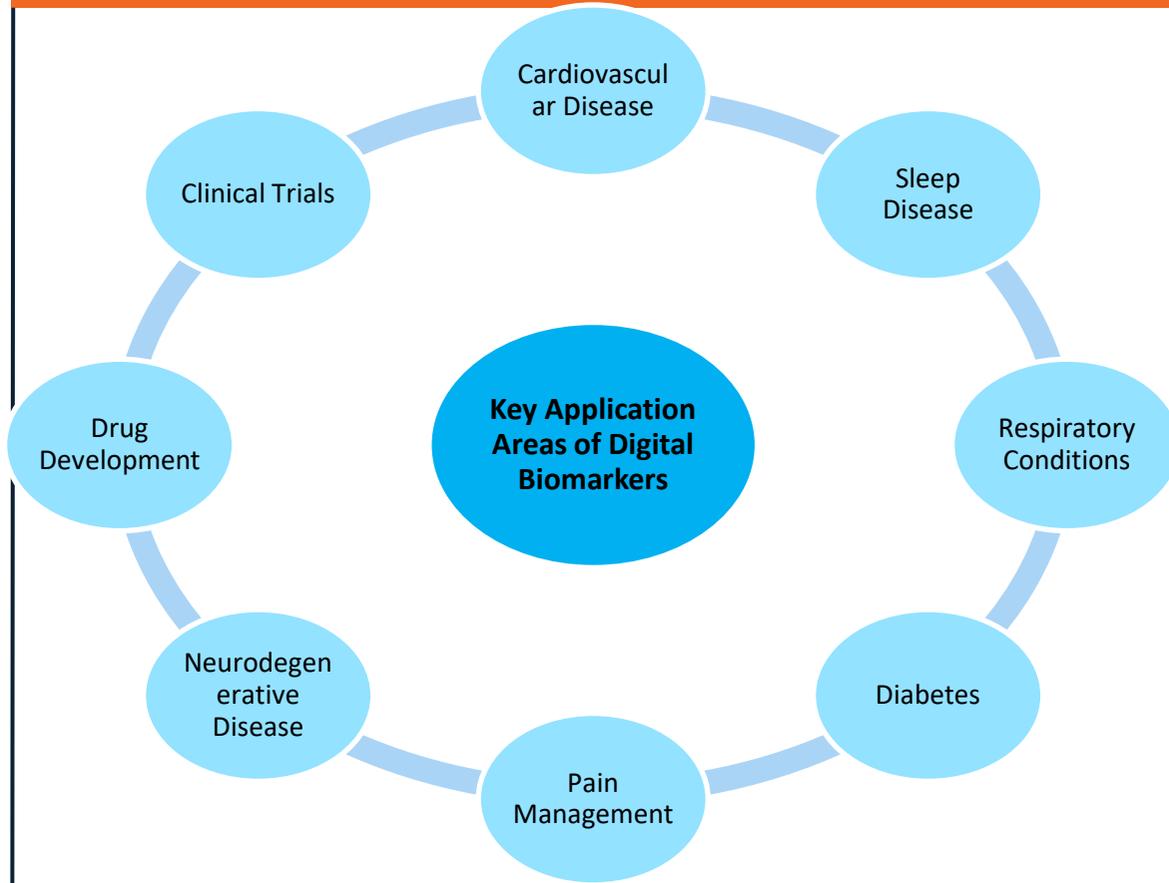
1. Lack of **personalized treatment** often leads to unachieved outcomes and leaves patients dissatisfied with the resulting treatment.
2. A low level of understanding of the cause of complex diseases and the prediction of future health outcomes remains key challenges for researchers.
3. Drug development faces a high failure rate in complex conditions, such as neurodegenerative diseases. Additionally, it includes a long duration and high costs to succeed.

There is a need for **precise and personalized** care for improving the clinical outcomes for individuals. Digital biomarkers collect **objective and clinically meaningful** data to better understand disease and customize treatment according to the patient.

DIGITAL BIOMARKERS

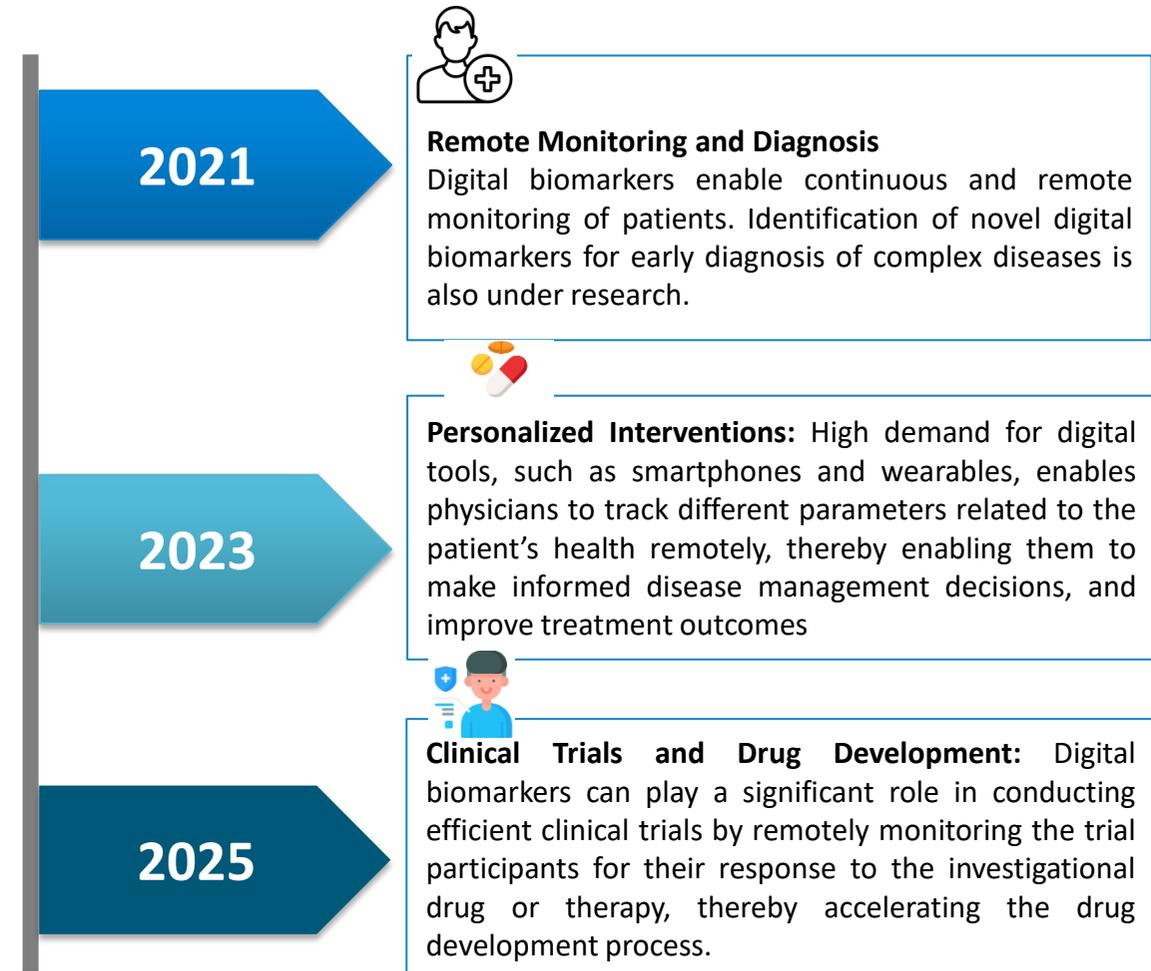
DIGITAL BIOMARKERS ACCELERATE DRUG DEVELOPMENT IN FUTURE

Applications of Digital Biomarker



Digital biomarkers offering insights on the early detection of disease progression and may reduce the risk of disease-related complications.

Emerging Trends in Digital Biomarker



HEALTH & WELLNESS
Senolytic Therapeutics
Nanorobots for Drug delivery



ENVIRONMENT & SUSTAINABILITY
Microbial Electrolysis
Captured CO2based Desalination



INFORMATION & COMMUNICATION TECHNOLOGY
Quantum-safe Cryptography
Sensor-chain



ENERGY & UTILITIES
Triboelectric Nanogenerator
Liquid Metal Battery



MEDICAL DEVICES & IMAGING
Digital Twin of Organs
Theranostic Wound Care

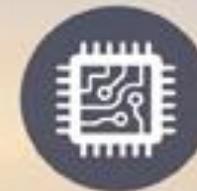


FUTURE 18

CHEMICALS & ADVANCED MATERIALS
Syntactic Materials
Supercomposites



MICROELECTRONICS
Optical AI Processor
Semiconductor Embedded in Substrate



ADVANCED MANUFACTURING & AUTOMATION
5D Printing
Self-reconfiguring Modular Robot

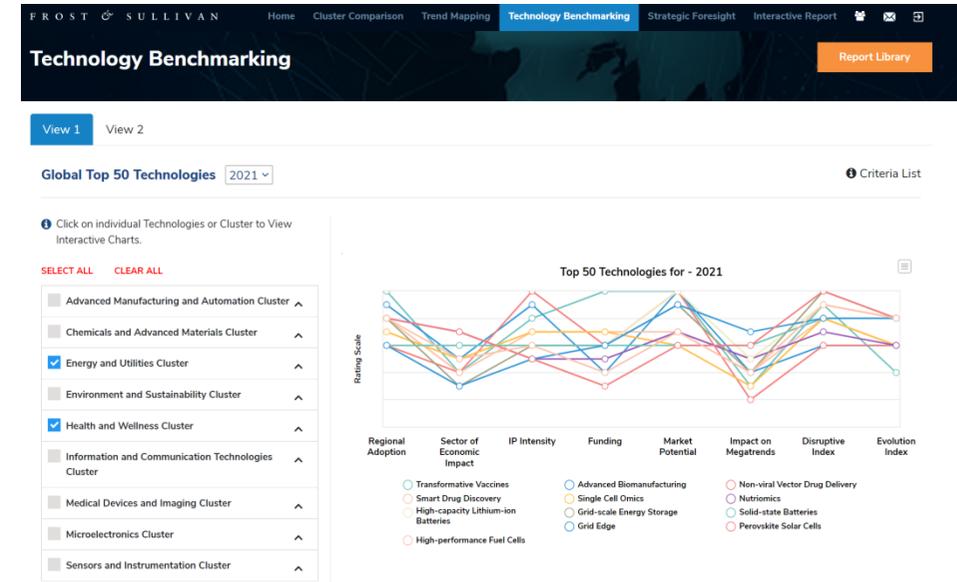
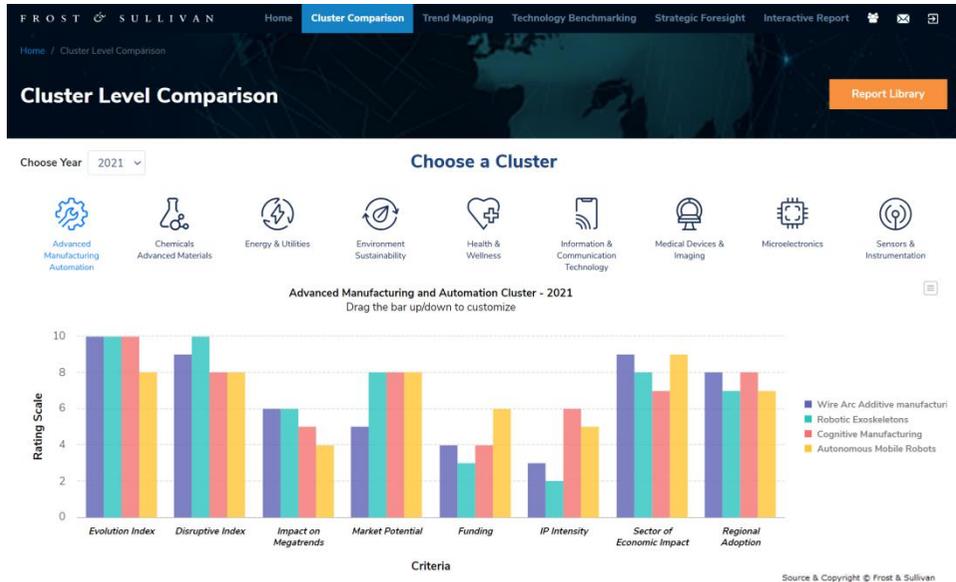


SENSORS & INSTRUMENTATION
4D LiDAR
5D Imaging



THE TOP 50 DIGITAL PLATFORM

INTERACTIVE PLATFORM TO UNDERSTAND AND DRIVE OUTCOMES



Example Feature Sets

- Macro Technology Cluster Comparison Tools
- Technology Past Trend Mapping Tool
- Technology Benchmarking Tools
- Strategic Foresight Analysis Tool
- Interactive (enter & assess your own technologies)



QUESTIONS?

FOR ADDITIONAL INFORMATION

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POWERING CLIENTS TO A **FUTURE** SHAPED BY GROWTH

We provide customers with an experience unlike any other by leveraging a global perspective, technology expertise and in-depth coverage of all industries, paired with world-class coaching and support.

