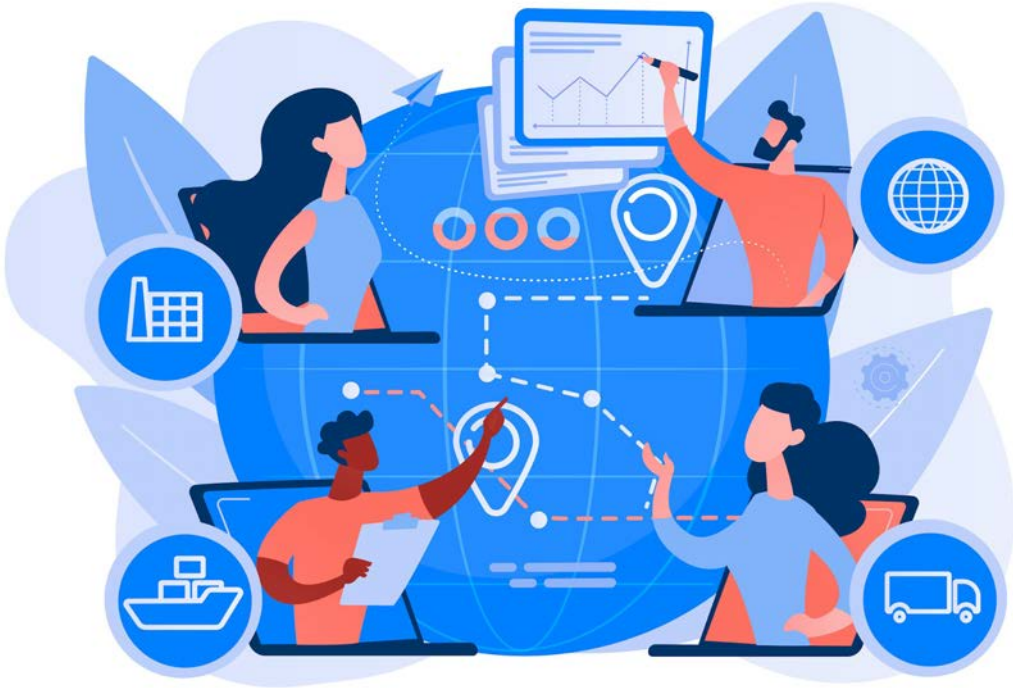
PRESCOUTER

SUPPLY CHAIN RESILIENCE

What does the future of supply chains look like?



Companies need to adopt new supply chain models, as older models clearly couldn’t manage the challenges brought on by the pandemic.

For original equipment manufacturers (OEMs), the supply chain plays a significant role in their strategic business models. Although known to be the best supply chain models across the world, the conventional as well as agile methodologies failed to meet customer requirements during the pandemic.

By integrating emerging technologies into the supply chain, a number of benefits can be attained in terms of efficiency, visibility, and resilience.

In this Intelligence Brief, we take a look at current supply chain models along with some of the weaknesses that were exposed by the COVID-19 crisis, highlight the emerging technology tools that are building more resilient and efficient supply chain models, and provide key analysis on what the future of supply chains will look like.

The best-known currently used supply chain models were not able to function well during the pandemic.

CONTINUOUS FLOW

- ✔ Most traditional
- ✔ Offers stability in high-demand situations with very little variation such as the manufacturer of the same goods repeatedly
- ✔ Best suited for mature industries and commodity manufacturers

FAST CHAIN

- ✔ Flexible
- ✔ Works well with businesses that must change their products frequently and need to get them out fast before the trend ends
- ✔ Best suited for shorter life-cycle products and trends

EFFICIENT CHAIN

- ✔ Offers end-to-end efficiency
- ✔ Works well for businesses that are in very competitive markets
- ✔ Best suited for commoditized businesses where production is based on expected sales

AGILE

- ✔ Flexible or solid, as needed
- ✔ Focuses on the ability of the supply chain to amp up in some cases but also be solid when there is not much movement happening
- ✔ Best suited for companies that offer specialty made-to-order items

CUSTOM CONFIGURED

- ✔ Continuous flow / agile hybrid
- ✔ Focus is on providing custom configurations, especially during assembly and production
- ✔ Best suited for companies that offer specialty products with customizable options

FLEXIBLE

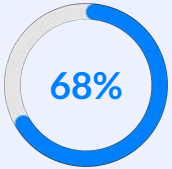
- ✔ Can be switched on and off easily
- ✔ Gives businesses the freedom to meet high-demand peaks and also manage long periods of low-volume movement
- ✔ Best suited for products associated with particular holidays and other seasonal items

Many supply chain weaknesses were revealed, ranging from huge information gaps to product shortages, stockouts, and transport holdups.

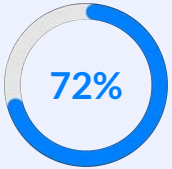
>80%

of 1000 organizations

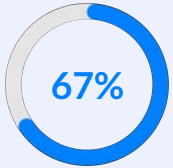
surveyed reported being negatively impacted by the crisis, and a vast majority have struggled with significant challenges across all aspects of their operations.



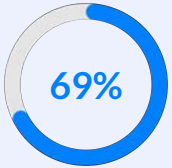
68% had difficulties with products being held up in ports or across borders



72% had difficulties in end-to-end monitoring of the supply chain



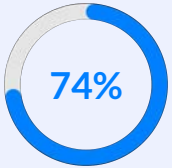
67% lost sales due to stockouts



69% had difficulties in supply planning due to lack of information on impacted suppliers

had difficulties rapidly scaling production up/down

had difficulties balancing stock between warehouses



74% had shortages of critical parts or materials

had delayed shipments or longer lead times

The COVID-19 crisis has forced organizations to question long-established supply chain practices and invest in new technologies.

A recent survey across the consumer products, retail, discrete manufacturing, and life sciences sectors revealed that nearly 38% of organizations already using AI have accelerated their investments in these smart systems.

In the life sciences sectors, it's been reported that as many as 76% are investing in upskilling and reskilling their employees, compared to the global average of 66%.

In the automotive sector, OEMs, suppliers, and transportation service providers have come together to form a community called "AutoSphere" that is dedicated to sharing data and building visibility.

Autosphere: The power of collaboration

AutoSphere is a supply chain management solution provided by Surgere, an industry pioneer that leverages IoT technology to expand visibility into supply chains. The AutoSphere community is a unified system that relies on a massive collaboration whose members receive the advantages and visibility coming from the community's shared data.

Thriving in the post-pandemic world lies in the interconnectivity of digital tools, physical infrastructure, and their underlying data streams.

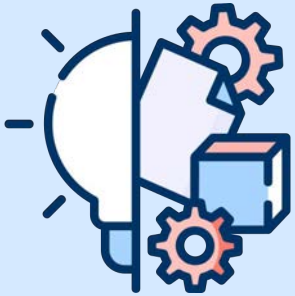
Digital tools such as the **Internet of Things, cloud computing, and 5G** make it possible to create new sources of data from the physical attributes of a supply chain.

Artificial intelligence, machine learning, and robotics can augment and enhance the human workforce to improve efficiency, productivity, and safety in factories, warehouses, call centers, and transit.

Data lakes and control towers can bring cross-functional tools and processes together and apply advanced applications to ensure digital supply networks (DSNs) are optimized to thrive — and trusted to continue to operate and adjust amid unexpected disruptions.

The benefits of a technology-influenced supply chain

- Improved materials tracking from a source, through the supply chain, to the customer
- Reductions in paperwork and administrative processes
- Increased transactional security and visibility with suppliers and subcontractors
- Better fraud detection and prevention for high-value items
- Companies can contract with local 3D printing shops to print and deliver products within a matter of days



WHAT DOES THE FUTURE OF SUPPLY CHAINS LOOK LIKE?

Advanced technological tools will facilitate the enhancement and strengthening of supply chain efficiency.

Examples include:

Blockchain

3D Printing

Digital Twins

Autonomous Mobile Robots

Advanced processes will be also be important factors in enhancing the resilience of supply chains moving forward.

Changes in supply chain processes include:

Supply Chain as a Service (SCaaS)

Driverless Vehicle & Drone Deliveries

Truck Collaboration

Distributed Inventory

Circular Supply Chains & Other Processes to Green the Supply Chain

A number of technologies are emerging as potential disruptors to supply chains.

Immersive reality allows for increased speed, efficiency, and safety.

Immersive reality is the experience resulting from technologies that merge the physical world with a digital production of reality. Virtual Reality (VR) uses computer-generated information via a head-mounted display and input devices to provide the user with a sense of full immersion in a simulated reality, whereas Augmented Reality (AR) projects computer-generated information onto the user's physical environment.

Hyperautomation can help address challenges and mitigate inefficiencies in the supply chain.

Hyperautomation joins artificial intelligence (AI) tools together with robotic process automation (RPA) to create an end-to-end solution that enables automation of complex business processes, taking digitalization automation to the next level.

Digital twins can identify execution risks early.

A **digital twin** is a virtual model of a real object or system that leverages digital tools that allow it to be continuously fed by real-world data so that it can effectively and efficiently offer real-time insights about the object's or system's present and future performance and problems.

IMMERSIVE REALITY

Immersive Reality - Benefits

Immersive reality adds value throughout the supply chain.

Benefits include:

Increased productivity and efficiency

Improved data visualization

Enhanced product and process design

Ability to presence from physical location

Greater employee collaboration and communication

Improved employee training effectiveness

Immersive reality allows for increased speed, efficiency, and safety.

Product development

Virtual reality enhances the ability to rapidly test design iterations to reduce costs in the product development process.

Supply chain planning

As industries increase the use of big data in planning, by working with complex data sets in VR, users can interpret the data across many more dimensions intuitively and collaboratively.

Manufacturing

VR allows organizations to safely and efficiently train in a highly immersive, simulated environment before operating on the costly and sometimes dangerous capital equipment in heavy manufacturing.

Repair

VR speeds up the flow of information during repair response to help ensure equipment uptime.

Communicate

VR can be used to improve communications for high-risk supply chain delivery, such as for medical supplies.

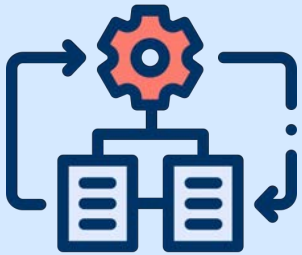
Immersive Reality - Use Cases

Use Cases

FIAT offers virtual test drives to customers and uses a fully immersive virtual reality system called “ImMErsive Technology” in the design and development of plants and production processes.

DHL uses AR to enhance the picking, inspection, and quality assurance processes. The company has also implemented VR-enabled logistics infrastructure design and immersive training.

Augmented reality is being used in almost all **GE businesses** for applications including complex production and assembly, repair, maintenance, and logistics management.



HYPERAUTOMATION

Hyperautomation will be a game-changer for near-future supply chains.

It's been predicted that by 2024, companies will be able to cut operational costs by as much as 30% by combining hyperautomation technologies with redesigned operational processes.

Hyperautomation, which combines artificial intelligence, RPA, and other digital technologies like IoT, intelligent document processing, chatbots, mobile applications, and blockchain, can help address challenges and mitigate inefficiencies in the supply chain.

Gartner ranks hyperautomation as one of the top 8 supply chain technology trends for 2020 and beyond.

Benefits

AI and machine learning are continuous learning systems that can take data collected from the supply chain and update automated systems dynamically, with an exponential effect. This reduces the time required to build and deploy new process models so supply chain process management gets faster and more efficient on an ongoing basis.

As an end-to-end automation solution, hyperautomation can liberate workers from mundane and repetitive tasks across industries.

Hyperautomation - Use Cases

Use Cases

Daewoong Pharmaceutical uses hyperautomation RPA bots to increase efficiency through the automation of external open-market order information downloading and sales order creation.

Amazon has adopted hyperautomation to enhance the consumer experience by improving their recommendation system as well as to aid in their massive logistics operations.

FedEx is another large logistics company that has adopted hyperautomation. Benefits include reduced risks, elimination of human errors, and increased effectiveness and productivity.

DIGITAL TWINS

Digital twins can identify execution risks early.

This means companies can mitigate risks rather than having to manage crises, and it enables them to reduce the idle time of bottleneck assets and improve inventory positions.

For example, Accenture has worked with a number of companies to deploy digital twins in their supply chain, resulting in impressive benefits.

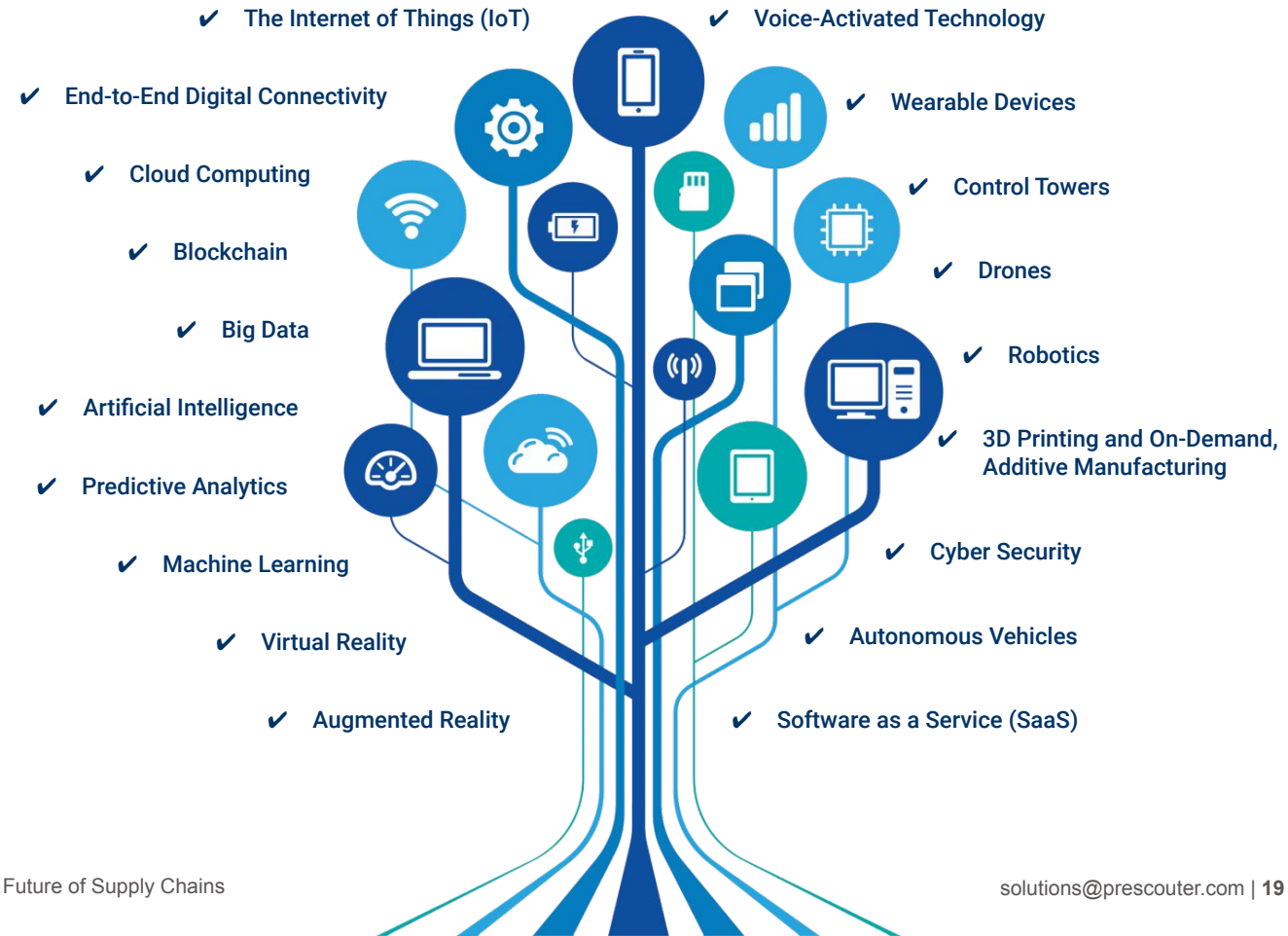
↑ 10% direct savings in cost-to-serve	↓ 40% operational costs	↓ 48% transport costs
↓ 36% machine time	↓ 57% total FTE	↑ 75% throughout

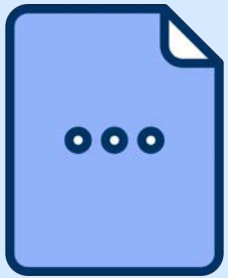
Use Cases

Unilever is operating digital twins across the globe that are allowing for unprecedented visibility and operational control across all levels of its factories, for "everything from soap to soup."

French supermarket chain **Intermarché** created a digital twin of a brick-and-mortar store that enables managers to easily identify bottlenecks, supply shortages, and demand curves, allowing them to replenish goods, readjust placements of products, and create targeted ads to minimize waste and promote sales.

Electronic connectivity is at the heart of the digital supply chain, enabled by a plethora of disruptive technologies, including:





OTHER FUTURE SUPPLY CHAIN TRENDS

In addition to the technologies already highlighted in this report, several other supply chain enhancing trends are emerging - one of the most important being blockchain.

Blockchain is poised to play a central role in securing supply chain integrity and efficiency.

Widely popularized by its cryptocurrency application, blockchain can also assist companies by managing contracts and agreements and monitoring products.

Benefits of blockchain for supply chains include:

- Improved materials tracking from a source, through the supply chain, to the customer
- Reductions in paperwork and administrative processes
- Increased transactional security and visibility with suppliers and subcontractors
- Better fraud detection and prevention for high-value items

These are some of the other new tools that will be key to developing more robust supply chain models.

Distributed Inventory

A tool called “distributed inventory flow forecasting” (DIFF) predicts the flow of materials, enabling businesses to maximize the order fill rate and maintain reduced inventory.

Robotic Automated Storage and Retrieval

Robotic shuttle systems are a hybrid of traditional shuttle systems and free-roaming robots. This bot agility removes throughput and sequencing constraints, providing increased productivity potential.

Truck Collaboration

Truck manufacturers and shippers are preparing for a recession and would be wise to invest in manufacturing and collaboration software systems.

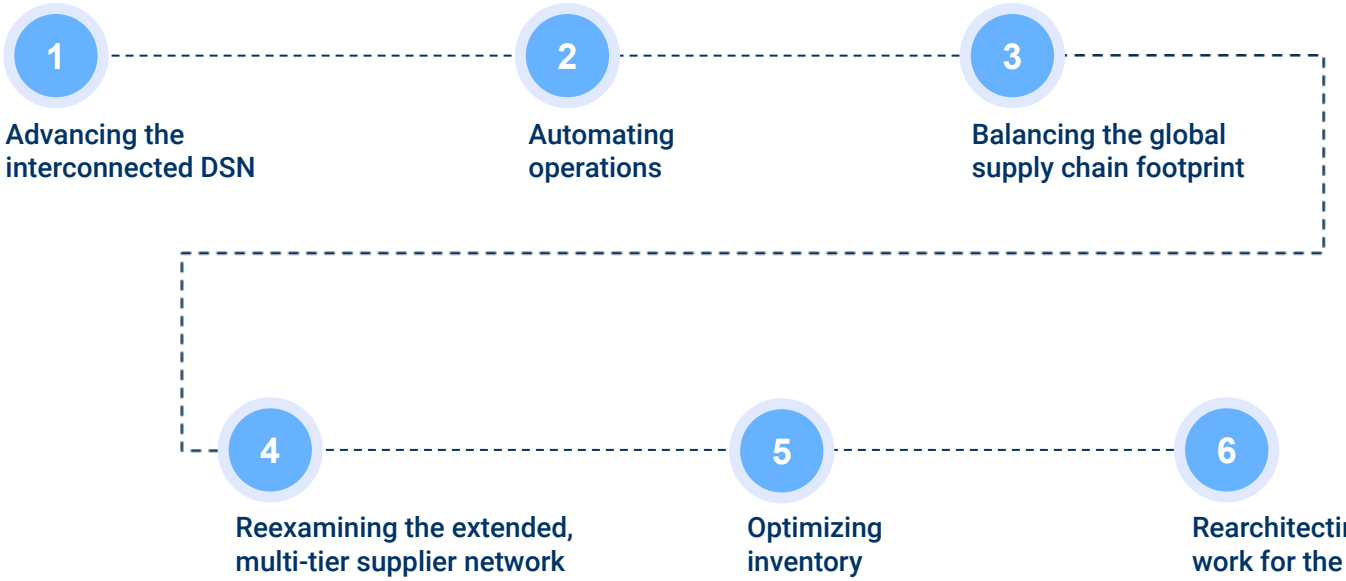
3D Printing

Rather than stocking items in a large warehouse to be shipped all over the world, companies can contract with local 3D printing shops to print and deliver products within a matter of days.

Control Towers

A robust supply chain control tower is built on a cross-functional end-to-end digital twin of the supply chain.
It includes visibility to how events across the extended supply chain will impact the ability to fulfill orders to customers.
The digital twin models the constraints in transportation, warehousing, production and then can produce optimized plans to handle the inevitable exceptions that arise.

Next steps for connected networks



Authors

Sofiane Boukhalfa, PhD

Technical Director

Sofiane leads the high-tech, aerospace & defense, and automotive & logistics practices at PreScouter. For nearly a decade, he has worked with hundreds of F500 and G1000 clients across multiple industries, through which he has developed an expertise in key emerging technologies (such as 5G, IoT, AI/ML, blockchain, energy storage and generation, quantum sensing, and others) and a strong understanding of the associated business ecosystem and drivers pushing these sectors forward (e.g., key players and trends, roadblocks to commercialization, etc). Sofiane's strategic insights have ranged from technical due diligence for acquisition targets to identifying relevant markets for newly developed products based on emerging technologies and assessing market penetration strategies. Sofiane holds a PhD in Materials Science and Engineering from the Georgia Institute of Technology, where his research focused on nanotechnology and energy storage.

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Researcher

Kishore has a background in industrial engineering and supply chain management and has worked on 100+ projects spanning across multiple verticals. As a business analyst in the IoT (SCM) space, he studies customer requirements to come up with new solutions and develop collaterals based on the research. Apart from that, Kishore holds a Master's Degree in Industrial Engineering and Management in Finland, with a focus toward International Sales and Sourcing. His key areas of specialization include project management, supply chain solutions, and market research. He has also done an exchange program in TU Darmstadt focusing on logistics.

References

- https://www.capgemini.com/wp-content/uploads/2020/11/Fast-forward_Report.pdf
- https://www.globenewswire.com/news-release/2020/10/01/2102234/0/en/New-Report-Illustrates-Severity-of-COVID-19-Impact-on-Global-Supply-Chains-Risk-of-Further-Disruption.html
- https://www.gartner.com/smarterwithgartner/gartner-top-8-supply-chain-technology-trends-for-2020/
- https://soluparts.com/immersive-technologies-in-supply-chain-management/
- https://www.vistaequitypartners.com/insights/an-introduction-to-immersive-technologies/
- https://www.riverlogic.com/blog/a-new-trend-has-emerged-in-supply-chain-creating-immersive-experiences
- https://www.sci-techdaresbury.com/immersive-technologies-and-their-impact-on-manufacturing-and-supply-chain/
- https://www.fiat.com/500-electric-virtual-3d-experience
- https://www.dhl.com/global-en/home/insights-and-innovation/thought-leadership/trend-reports/augmented-reality.html
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- https://www.supplychaindigital.com/technology-4/evolution-digital-twins-supply-chain
- https://www.accenture.com/us-en/blogs/business-functions-blog/optimize-your-supply-chain-with-a-digital-twin
- https://supplychaingamechanger.com/what-is-the-digital-supply-chain/
- https://news.microsoft.com/en-au/features/now-its-personal-unilevers-digital-journey-leads-to-real-results-for-consumers-and-employees/
- https://www.softeq.com/blog/5-digital-twin-examples-in-different-industries

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- MARKET RESEARCH & ANALYSIS
- TRENDS MAPPING
- REVIEW BEST PRACTICES
- PATENT COMMERCIALIZATION STRATEGY
- DATA ANALYSIS & RECOMMENDATIONS
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- SUPPLIER OUTREACH & ANALYSIS
- CONSULT WITH INDUSTRY SUBJECT MATTER EXPERTS
- INTERVIEWING COMPANIES & EXPERTS

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- ✔ **CONFERENCE SUPPORT:** Attend conferences of interest on your behalf.
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- ✔ **WORKING WITH A CONTRACT RESEARCH ORGANIZATION:** Engage with a CRO to build a prototype, test equipment or any other related research service.

For any requests, we welcome your additional questions and custom building a solution for you.

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