INDUSTRY 4.0: COVID-19 MODE

A look into today's trends, technologies, startups, and industry activities defining Industry 4.0 during COVID-19.

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CNI

Brazilian National Confederation of Industry

THE FUTURE OF INDUSTRY

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ENTREPRENEURIAL MOBILIZATION
FOR INNOVATION

INDUSTRY 4.0:

COVID-19 MODE

A LOOK INTO TODAY'S TRENDS,
TECHNOLOGIES, STARTUPS, AND INDUSTRY
ACTIVITIES DEFINING INDUSTRY 4.0
DURING COVID-19

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ABOUT CNI

The National Confederation of Industry - Brazil (CNI) is the main representative of the Brazilian industry. It is the highest body of the industry trade union system and, since its foundation in 1938, it has defended the interests of the national industry. It also acts as the main interlocutor with the Executive, Legislative and Judiciary, besides several entities and organizations in Brazil and abroad.

It represents 27 state federations of industry and 1,280 trade unions, to which almost 700 thousand industries are affiliated. It is directly in charge of the Industrial Social Service (SESI), the National Service of Industrial Training (SENAI) and Instituto Euvaldo Lodi (IEL). Together, these three organizations form the Industry System, which yet assembles the state-level industry federations and trade unions.

Since its establishment, CNI has played a leading role in society, promoting debate and building consensus on key national issues. Especially concerning those matters that have strong influence on the development of Brazilian industry and economy.

In addition, CNI incentivizes national industry research, innovation and technological development. Moreover, it supports initiatives that promote the self recognition, social development and professional training of the worker.

The importance of industry in Brazil

- 21.4% participation in GDP
- 70.1% of Brazilian exports of goods and services
- 69.2% of private sector R&D spending
- 33% of the collection of federal taxes
- 31,2% of social security revenue

The power of industry to generate growth

- For every R$ 1.00 produced in the industry, the following are generated:
- R$ 2.40 in the Brazilian economy
- In other sectors, the return is lower:
- R$ 1.66 related to agriculture
- R$ 1.49 related to trade and services

The industry pays the best wages

- The industry employs 9.7 million Brazilian workers
- 20.4% is the participation of the industry in formal employment in Brazil
- Average salary of workers with complete higher education:
- In industry: R$ 7,756
- Other sectors: R$ 5,887
- Average salary of workers with complete secondary education:
- In industry: R$ 2,434
- Other sectors: R$ 2,128

ABOUT
SOSA

SOSA is a global open innovation company.

We believe in building strong relationships within the tech ecosystem and even stronger cross-vertical open innovation programs. By identifying advanced technology solutions and innovative models, we work with corporations and public entities to implement solutions that lead to business growth and successful digital transformation.

Since opening the doors of SOSA Tel Aviv HQ in 2015, we've established locations in New York and London to support our global open innovation activities. It is here innovation professionals from governments, corporations, and tech companies participate in demo days and roundtables, and meet their next business opportunities, with both virtual and in-person programming.

In 2018, SOSA NYC became the official operator of the Global Cyber Center in New York, offering industry-specific programming for corporations and facilitating strategic investments, partnerships and implementations of cyber technologies.

AMONG OUR PARTNERS:

FOREWORD

COVID-19 is disrupting industrial operations on a massive scale. In particular, the global pandemic is challenging large-scale manufacturers from automobiles to pharmaceuticals to retool essential strategies for managing risk, maintaining operational and business continuity, and most importantly ensuring the health and overall well-being of every worker.

At the same time, The Fourth Industrial Revolution otherwise known as Industry 4.0 is transforming traditional manufacturing and industrial practices. Advances in artificial intelligence, data analytics, and machine learning and automation, combined with the proliferation of connected sensors and devices are creating opportunities to adopt leaner and even pandemic-proof methods of production.

Some of the world's most established industry operators are turning to Industry 4.0 startups for generating mutual commercial and strategic benefits. From agile innovation to cultural change, corporations have the opportunity to work closely with startups to address business challenges and innovate at a faster pace, particularly in industries simultaneously undergoing technological and COVID-19 disruptions.

Startups, in turn, recognize that corporate collaborations are key to their ability to grow and thrive. Working with the right corporate partners can provide startups with a platform to attain market credibility required to scale, gain access to resources such as funding and networks, and more.

The National Confederation of Industry (CNI) and SOSA, a global open innovation company, prepared this report to help companies better understand the new technologies of Industry 4.0 and to engage with startups. We hope that this initiative can serve as a starting point for industries to benefit from these profound changes in the way they produce, thriving in these difficult times.

Robson Braga de Andrade
President, CNI

Uzi Scheffer
Chief Executive Officer, SOSA

Q&A

INDUSTRY 4.0
COVID-19 MODE

Q&A

With CNI President
Robson Braga De Andrade

How do you compare the progress made by the Brazilian industrial sector in the area of innovation in relation to the rest of the world, especially to the strongest economies?

Unfortunately, Brazil still does not rank high in innovation rankings. In the latest version of the Global Innovation Index (GII), Brazil ranked 62th. Switzerland, Sweden, the United States, the United Kingdom and the Netherlands are the top-ranking countries. Among Latin American countries, Brazil is behind Chile (54th), Mexico (55th) and Costa Rica (56th). The GII captures the progress made by countries in human capital and research, in the dynamics of markets, in inputs, in the functioning of institutions, in infrastructure and in business sophistication. Human capital formation, which includes education in general, higher education, Research and Development (R&D), which is so essential for innovating and developing technology, is a huge weakness in Brazil.

Studies by the Organization for Economic Cooperation and Development (OECD) and the World Bank corroborate Brazil's performance in terms of innovation. The consensus is that the most diversified and open economies are the ones that innovate the most and achieve positive results in improving people's lives. Brazil has a group of innovative companies investing in R&D at a rate compatible with that recorded in OECD countries. Despite its relevance, this group is still small.

This reality is the result of difficulties in accessing finance, of a weak infrastructure, and of excessive red tape and legal uncertainty. Furthermore, the quality of incentives and public policies for promoting innovation and management cultures prevailing in little competitive environments deserve consideration.

In short, there are examples of excellence across the country, but there is still a lot to be done for industry in Brazil to actually become more competitive.

What is the profile of industrial companies that stand out in Brazil and manage to be more competitive globally?

Brazilian industry has a diversified framework. In different sectors, companies with varying levels of production capacity and competitive performance coexist. However, the companies that stand out are the most innovative and those that keep track of debates on the topic in Brazil and abroad. Today's world is marked by unprecedented progress in the field of information and communication technologies, which are driven by leaps in computing, electronics, space science and integrated digital systems. All of this allows for consistent productivity gains and paves new paths for companies and economies.

A new generation of technologies is being born from digitization, systems integration and automation, known as artificial intelligence, machine learning, big data, analytics, robotics, biotechnology, nanomanufacturing and other technologies allied to new materials, drugs and energy sources. In the Internet of Things, for example, advanced sensors and drivers are enabling industry to be redesigned through the integration of products, inputs and machines, making production lines and services even more integrated.

Governments in advanced countries are developing these technologies, thereby preserving or expanding their influence, their markets and the high technological and living standards of their population. Germany, the United States, Japan and the United Kingdom are at the head of this new world. South Korea follows this group and has been showing superior performance in areas such as communications, electronics and robotics. China, which has already surpassed the United States in manufacturing production, expanded and consolidated its R&D system, diversified the production of more complex goods and will likely rise to a leading position in the areas of biotechnology and artificial intelligence. Finally, industrial companies that stand out are those taking part in these debates and working to incorporate or develop technologies, innovation and new knowledge.

How important is it for Brazil to have a strong industrial sector that ensures economic growth and social development?

Industry is the main driver of economic and social growth. CNI data show that, with a 21.6 percent share in Brazil's Gross Domestic Product (GDP), industry accounts for 70.8% of all exports of goods and services and for 67.4% of all business investments in research and development. The sector also accounts for 34.2% of all federal tax revenues in Brazil. For every R$1 produced in industry, R$2.40 are generated in the economy as a whole. In other sectors, the value generated is lower: R$1.66 in agriculture and R$1.48 in retail trade and services. These figures confirm that Brazilian prosperity depends, among other measures, on improving the competitiveness of industry.

Which instruments and policies are essential for the development of Brazilian industry, especially for the development of human resources suitable for the industry of the future?

The Industry System has been working jointly with the public sector in searching for solutions and in building policies and tools to support investments in innovation. Its main actions include drawing up plans and programs and devising tools aligned with the needs of companies. These initiatives must include guidelines designed to increase the flow of knowledge between countries and the development, assimilation and dissemination of new technologies that can actually reduce costs and provide quality and productivity gains. In addition, implementing these actions will put efficient monitoring systems in place, with periodic evaluations to identify opportunities for improvement.

In the area of human resources, modernizing education and developing skills in line with the current needs of the productive sector is crucial to strengthen industry and improve its capacity to face competition. To move in this direction, it is necessary to improve the quality of education at the basic, technical and higher levels in the country, improving curricula, teaching methodologies and teacher training. In addition, with a focus on the innovation capacity of industry, there is a need to improve the training provided to engineering professionals.

For this reason, CNI proposes the modernization of curricula in the areas of Science, Technology, Engineering, Arts and Mathematics (STEAM) and the process of evaluating courses, in addition to valuing and training teachers.

Our goal is for learning to prepare young people to face the challenges of the labor market. For this purpose, it is necessary to continuously strive to improve knowledge and worldviews.

How important is innovation for industrial, economic, and societal development in Brazil?

Innovation, a key element for economic growth, is even more important in times of uncertainty and recession such as those we are experiencing now. Innovation, science and technology are crucial for the world to overcome this serious crisis and face the challenges brought by the pandemic, which range from producing vaccines and drugs to speeding up necessary changes in production and consumption models.

Brazilian industry needs to prepare for this new era and adapt itself to advances in the digitization of production processes and remote work. There is no space or time for simply going through the motions. A restless and innovative spirit will be increasingly necessary in all stages of production, from phases preceding product design to those involved in the final delivery of products to consumers. The entire production chain is in need of an innovation shock.

What is the impact of the current pandemic on the Brazilian industrial sector and what are the main strategies being adopted in Brazil for resuming growth?

The pandemic caused a crisis in the world economy only comparable to that brought about by the Great Depression of the 1930s. This shock hit Brazil just as the country was beginning to recover from the recession it experienced in 2015 and 2016. According to CNI's forecasts, GDP and industrial GDP will likely decline by at least 4.2% and 3.9% this year, respectively.

In addition, a recent survey coordinated by CNI shows that 70% of all medium and large Brazilian companies have adapted their production processes to mitigate the reduction or suspension of their activities, from modernizing production lines and adopting new sales to management and logistics strategies.

As in other countries, the Brazilian government and National Congress implemented a series of measures to protect its most vulnerable population and ensure companies' survival. In the face of maintaining social distance, consumption declined as well as the income of a significant part of the population. Examples include the approval of an emergency aid of R$600 for informal workers and low-income individuals as well as measures that made labor contracts more flexible, preserving thousands of jobs during the peak of the crisis.

With the gradual resumption of activities, the economy is beginning to recover. However, resuming growth and creating jobs represent a considerable challenge for Brazil. On the public side, we have strong fiscal restrictions. On the private side, companies are financially weakened and not very willing to invest in a scenario in which household income and consumption have decreased. International trade has also been negatively affected by the pandemic, making it difficult to increase exports.

To overcome the crisis on a sustainable basis, the innovation and competitiveness agenda must be preserved. Those who have found ways to adopt innovative practices as a differential in production will come out ahead in the wake of the crisis. We know it won't be easy. Changes already underway as a result of the fourth industrial revolution will be expanded and the consumption pattern of Brazilians, affected by recession and unemployment, will change even more.

What is your perspective for the future of the industrial sector in Brazil?

The future of industry involves adopting a science, technology and innovation policy that can actually increase Brazil's presence in different markets, lead to the creation of qualified jobs and drive profitable and sustainable businesses. The industrial sector must be at the center of this policy due to its capacity to generate, use and disseminate new processes, products and services that can transform the socioeconomic landscape.

The industry of the future is one that makes intensive use of technologies associated with digitization, data science, big data, machine learning, artificial intelligence, sensing, robotics, advanced manufacturing. These new technologies afford opportunities for Brazil to become more competitive, improve its productivity and increase workers' competence. There are huge obstacles to be overcome, but conditions must be created for developing and disseminating cutting-edge technological solutions and innovations in the productive sector.

SUMMARY

INDUSTRY 4.0
COVID-19 MODE

EXECUTIVE SUMMARY

COVID-19 has accelerated the need and demand for Industry 4.0 technologies. Industrial enterprises that are responsible for making steel, automobiles, airplanes, pharmaceuticals, and more are on the hunt for practical solutions to get workers safely back to work, while also maneuvering to capture new opportunities into the future.

This report contains 50+ companies that are able to help industry operators overcome COVID-19 challenges. Their technologies can assist with keeping workers healthy and safe in the immediate term. Other companies featured help automate and optimize industrial production processes and supply chains, and can help keep production operations online through pandemic-related disruptions.

Corporations are increasingly looking outward and engaging startups as a means of innovating to survive. For example, the trends toward higher levels of corporate venture capital investment and more startup investment deals with corporate participation are clearly visible.[1] More than ever, a robust open innovation strategy is key.

The partnership between CNI and SOSA serves as a platform for connecting CNI's members to the technologies featured in this report, and to equip members to maximize the strategic benefits of open innovation. SOSA is positioned at the center of the world's most active startup and innovation ecosystems. Our positioning combined with access to the world's most innovative corporations can be leveraged to engage with Industry 4.0 technologies.

We undertook a global mapping of Industry 4.0 technologies for this report. However, SOSA's headquarters in Israel and our deep presence in New York City, give our partners access to two of the world's most active Industry 4.0 startup ecosystems. The startups and tech featured in this report are derived primarily from these two hubs.

The industrial sector ought to look to the technologies in this report as indicators defining the next wave of Industry 4.0 for the COVID-19 era. For example, forward looking operators will consider the fact that the new Industry 4.0 will incorporate advanced digital healthcare technologies. This includes technology for monitoring workers' vital signs and checking for symptoms of the virus in real-time, and for confidentially alerting management as needed.

Advanced computer vision systems can detect COVID-19 symptoms when workers clock in and out to help prevent outbreaks at work. Machine vision and analytics systems are also being applied to capture real-time data on production-floor activities and operations. This data can be used to flag improper personal protective equipment (PPE), and to monitor conditions for compliance with social-distancing guidelines, as well as uncover new insights to streamline production operations.

Automation and optimization technologies can help production stay online through workforce disruptions. Technologies such as artificially intelligent edge computing, autonomous inspection systems, additive manufacturing, and industrial robotics augment limited workforces and ensure productivity in challenging times.

Now, is the time to invest in optimizing the use of limited resources across all production operations. Advances in intelligent sensors and data analytics technologies are ushering in a new age of industrial efficiency. AI-driven business intelligence systems can help reduce costly waste across production operations; maximizing profits along the production chain from raw materials to finished product and delivery.

In vulnerable times it is important to double down on building effective operational resilience. This means incorporating predictive maintenance technology to prevent extra, and unplanned machine downtime. Other resilience building measures include prioritizing a comprehensive and tested industrial cybersecurity system.

Consumer spending habits are going to continue to change and customer relationships are evolving fast. New technologies can help enterprises forecast demand to enable better planning and decision making. Others assist with improving supply-chain visibility, as well as automation for warehouses, and solutions for last-mile delivery.

The technologies featured in this report are all open for business. In addition to catalyzing creativity and market insights they should be looked at as viable opportunities and avenues for innovation that can be taken today.

EXECUTIVE INSIGHTS
KEY FINDINGS, IMPLICATIONS, AND EVIDENCE

Open Innovation Insights

1	Open innovation is the process of sourcing disruptive products and services from outside your organization by collaborating with others.	Find your organization's balance between fully closed and strictly open innovation.	Page: 16
2	Enterprises have had success deploying open innovation agendas and in turn, best-practices and common strategies have emerged.	Employ a 'Head of Innovation', execute an enterprise-wide strategy and build culture.	Page: 17
3	Industry 4.0 refers to a new phase of Industrial Revolution focused on interconnectivity, automation, AI, and data-driven decision making.	Look to notable heavy industry and Industry 4.0 startup engagements for inspiration.	Page: 19
4	This report contains a vetted list of companies in the form of a market mapping to provide actionable Industry 4.0 solutions.	Look to the startups featured in this report as potential avenues for innovation today.	Page: 20

Industry 4.0 Insights

5	The pandemic is accelerating Industry 4.0 technology adoption and condensing the facility upgrade schedules for manufacturers.	Adopt systems and technologies to ensure that workers stay healthy and productive.	Page: 22
6	The economic impact of the pandemic has made resilience of operations and business continuity the two main priorities.	Leverage the transparency, data, analytics, and display tools offered by digitization.	Page: 23
7	Industry enterprises are taking unprecedented measures to help ensure the health and safety of workers and their families.	Put in place additional safety measures in factories, offices, and distribution centers.	Page: 24
8	Overcoming today's challenges requires taking urgent short-term actions and simultaneously maneuvering for the long-term.	Prioritize Industry 4.0, AI, and automation tech to adapt to workforce disruptions.	Page: 25
9	Two leading innovation hubs are highly relevant for enterprises that are looking for Industry 4.0 technologies: Israel and New York City.	Look to Israel and NY-based startups in areas of AI, automation, mobility, and more.	Page: 29
10	Industry 4.0 startups that can help enterprises overcome COVID-19 related challenges are active, ranging from hygiene to cybersecurity.	Look to these startups as inspiration and practical avenues for innovation today.	Page: 30
11	AI-edge computing or the efficient processing of data at the edge of the network is key to ushering in the next generation of Industry 4.0.	Engage startup Hailo AI for practical, industry leading AI-edge processing.	Page: 38
12	Additive manufacturing hardware and software can help streamline and automate critical components of industry operations.	Engage startup XJet for technology to keep operations online during health disruptions.	Page: 40
13	Industrial robotics technology developed by leading startups signals a future with greater levels of human-machine collaboration.	Engage startup Bright Machines to help scale up and down production levels.	Page: 41
14	AI and data analytics can help manufacturers make more informed data-driven decisions to optimize and pivot operations early.	Engage startup Sisense to help improve data acquisition and data processing.	Page: 42

WHAT IS OPEN INNOVATION?
ENGAGING STARTUPS TO CREATE VALUE

Open innovation is the process of sourcing disruptive products and services from outside your organization by collaborating with others. Fundamentally, the goal of open innovation is to protect and even enhance your strategic market positioning.[1]

Henry Chesbrough, professor at the University of California Berkeley Haas School of Business, conceived the term "open innovation" nearly two decades ago.[2] Since then, the proliferation of successful cases of open innovation and the emergence of enterprise best practices have continuously proven the value of innovating openly.[3]

Today, the practice of open innovation most often takes the form of established enterprises dedicating time and resources to engage with younger and agile startups to create value. These engagements can take multiple forms and range from market research, building corporate-startup incubators and accelerators, to leveraging strategic venture capital, as well as mergers and acquisitions to identify business opportunities and in turn secure an advantage over industry competitors.[4]

Historically, businesses have practiced closed innovation. This means limiting the scope of your innovation efforts to your own internal research labs, and forgoing the opportunity to exchange knowledge with external parties beyond your domain.[5]

Today we can clearly see that closed innovation practices on their own are no longer enough.[6] Engaging startups through proven open innovation methods can help enterprises identify and capitalize on total disruptions to their own business models, a feat that is harder to achieve from within.[7]

The ideal corporate innovation strategy seeks to find a balance on the spectrum somewhere between fully closed and strictly open innovation practices.[8] Developing the capability to find your organization's unique blend of closed and open innovation has never been more important.[9]

Digital technologies and the startups behind them are capable of being generated at increasingly fast rates. In turn, once dominant enterprises across the Fortune 500 are seeing their markets disrupted and their positions unseated by young startups.[10]

Along with today's rapid market digitizations and potential disruptions, enterprises also have to contend with highly unpredictable conditions as a result of COVID-19. The open innovation best-practices and the startups featured in this report can help enterprises rise to the innovation challenge and adapt in uncertain times.

1 Henry Chesbrough, Open Innovation: The New Imperative for Creating and Profiting from Technology, Harvard Business Press, 2003 | **2** IBID | **3** Henry Chesbrough and Sabine Brunswicker, A Fad or a Phenomenon? The Adoption of Open Innovation Practices in Large Firms, RTM, 2015 | **4** Silvia Castellvi, Listing of corporate players open innovation initiatives description, Startup Europe, 2019 | **5** Henry Chesbrough, Open Innovation Results: Going Beyond the Hype and Getting Down to Business, OUP Oxford, 2019 | **6** Alberto Ferraris, Gabriele Santoro, and Armando Papa, The cities of the future: Hybrid alliances for open innovation, Futures, 2018 | **7** Martina Larkin, and Derek O'Halloran, Collaboration between Startups and Corporates, World Economic Forum, 2018 | **8** Huizingh, Eelko K.R.E., Open innovation: State of the art and future perspectives, Technovation, 2011 | **9** Jordan Bar Am, Laura Furstenthal, Felicitas Jorge, and Erik Roth, Innovation in a crisis: Why it is more critical than ever, McKinsey & Company, 2020 | **10** Neil Thompson, Didier Bonnet, Ines Yun YE, The Foundations of Corporate Innovation in the Digital Age, MIT and Capgemini, 2018

OPEN INNOVATION BEST PRACTICES
DEFINING YOUR STARTUP ENGAGEMENT STRATEGY

Over the last twenty years, enterprises have had enough success deploying open innovation agendas that best-practices and common strategies have emerged.

Below, we list the most notable best practices for launching and maintaining a successful open innovation practice, as well as highlight common open innovation strategies that enterprises ought to look to as a potential first steps on this journey.

OPEN INNOVATION BEST PRACTICES:

Employ a Head of Innovation

Successful open innovation practices are led by an executive innovation team. Installing innovation champions in your organization can help ensure that innovation remains an ongoing practice and a consistent voice providing direction in the organization. This team is tasked with setting a compelling vision, rallying leadership around bold ideas, coordinating innovation priorities across different departments, and aligning innovation practices with business objectives.[1]

Execute an enterprise-wide strategy & build an innovation culture

Innovation leaders need to make a compelling case that innovation involves every business unit in the company. This means tasking the corporate innovation team with engaging each business unit individually to lay out the role each unit plays in the innovation process, as well as the potential for each unit to change over time due to new technologies and market disruptions. Conveying innovation priorities and establishing a culture that appreciates innovation across the company can help ensure that vital knowledge and lessons do not get siloed.[2]

Align innovation KPIs with business goals

Many open innovation programs start small. Mostly these initiatives are launched with relatively limited budgets and narrow KPIs compared to other business units. Taking incremental steps towards the development of an open innovation agenda is wise. However, innovation leaders ought to think strategically about measuring initial wins and attributing business impact to specific open innovation practices. Establishing KPIs for innovation practices and using those KPIs to help measure the impact of activities helps make a case for appropriate resources and funding.[3]

STARTUP ENGAGEMENT INITIATIVES:

Scouting Missions - gain insights on leading innovations and engage new technologies

Scouting missions are one of the most valuable innovation initiatives undertaken by corporates. Innovation consulting agencies work on behalf of clients to identify specific challenges and pain points within your organization and use those insights to inform the sourcing of external startup solutions. Scouting missions often culminate in private demonstrations of a startup's product or service that can lead to strategic buy, partner, or investment decisions. In turn, startups are exposed to potential financing opportunities and business deals.[4]

INTERNAL R&D

R&D has been the original and main form of innovation for corporates. These are internal innovation efforts. One of the main advantages in full control of the the process and support intrapreneurs.

LAB/INCUBATOR

Another form of internal innovation. Usually ideas are sourced from within the company, but separately from the company's R&D, and then ideas are spun out as. Incubators sometimes recruit entrepreneurs/early stage startups.

ACCELERATOR

A short structured program led by a corporate. Startups that are accepted will receive mentorship, workshops such as: legal, product, business development, capital raising etc. In many cases, startups will also receive funding in exchange for equity.

M&As

A method to bring into the corporate external technologies/customers/markets. This is an established way to bring external innovation under corporate control.

CVC

A corporate vehicle used to invest in startups. The biggest difference from regular VCs, is that the investments are strategic and not only financial. Usually, the startups continue being independent.

PARTNERSHIPS

The process of partnering with external startups/established companies to bring new technologies/processes within the corporate. The entities remain separate. In some cases, the partners will develop a product together.
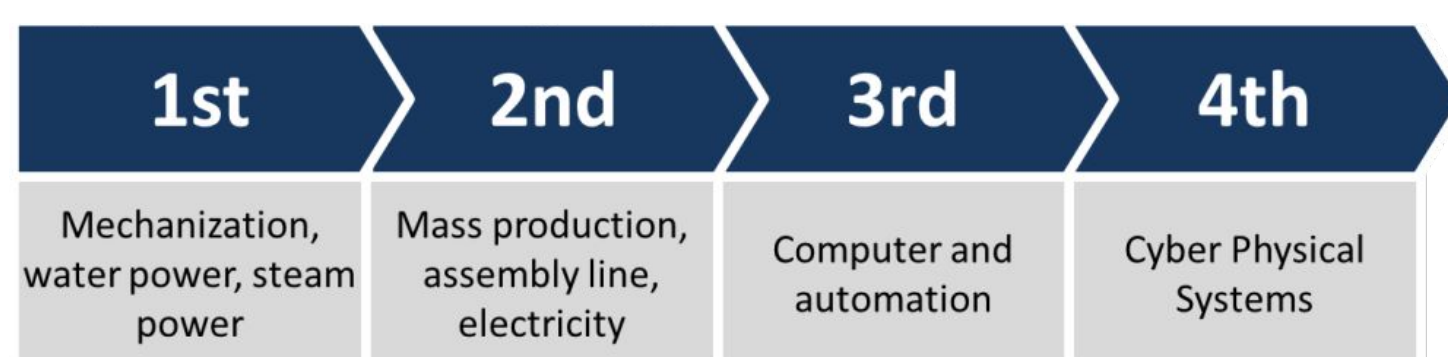
1 Marc de Jong, Nathan Marston, Erik Roth, Peet van Biljon, The Eight Essentials of innovation performance, McKinsey, 2013 | **2** Daniel Cohen, Brian Quinn, and Erik Roth, The Innovation Commitment, McKinsey Quarterly, 2019 | **3** Innovation Leader LLC and KPMG LLP., Benchmarking Innovation Impact 2020, KPMG, 2019 | **4** Scott Kirsner, How Big Companies Should Scout New Technologies, Harvard Business Review, 2019

OPEN INNOVATION FOR INDUSTRY 4.0
INDUSTRY ARE ENGAGING STARTUPS

Industry 4.0 refers to a new phase of Industrial Revolution focused on interconnectivity, automation, AI, and data-driven decision making. In the Fourth Industrial Revolution we are witnessing the emergence of 'cyber physical systems' or autonomous and connected machines that are capable of learning skills and adapting to their context while working with humans.[1]

Industries and especially manufacturers are experiencing technological disruptions during the rise of Industry 4.0. The combination of new technologies such as cloud, big data, mobility, blockchain, augmented and virtual reality (AR/VR), machine learning, artificial intelligence (AI), and the internet of things (IoT) is changing industry. In turn, leading corporations from aerospace to chemicals are engaging startups to survive and win.[2]

1st	2nd	3rd	4th
Mechanization, water power, steam power	Mass production, assembly line, electricity	Computer and automation	Cyber Physical Systems

NOTABLE INDUSTRY & INDUSTRY 4.0 STARTUP ENGAGEMENTS:

General Motors → NIKOLA MOTOR COMPANY

GM has formed a 10-year alliance with Nikola Corp. to engineer and build the electric-vehicle startup's Badger pickup truck. The partnership underscores GM's commitment to a future with electric-vehicles. The move will bolster GMs ability to compete with the likes of Tesla Inc.

ArcelorMittal → canoo

ArcelorMittal's Automotive team, a division of ArcelorMittal's Global R&D organization, has collaborated with the engineering teams at Canoo since the vehicle startup's inception. The ArcelorMittal team has provided co-engineering and steel solutions related technical support.

MERCK → seeqc

M Ventures, the corporate venture arm of Merck, has invested $5 million in the quantum computing and quantum simulation startup Seeqc, betting that in several years, the startup's technology could save Merck time and money related to simulating drugs and chemicals.

Lilly → sitryx

Eli Lilly and Co. teamed with bio-pharmaceutical startup Sitryx, to research and develop new medicines. Lilly formed a five-year research partnership with Sitryx, a two-year-old startup, to study cell metabolism and to help create new medicines for cancer and inflammatory diseases.

BOEING → TACTICAL ROBOTICS LTD

Boeing signed an agreement with the startup Tactical Robotics, to work together jointly on developing, producing, and marketing aircraft with vertical take-off and landing (VTOL) capabilities based on Tactical Robotics' unique and promising enclosed rotor technology.

Honeywell → iTRACE TECHNOLOGIES

Honeywell is working with the startup iTRACE to bring transparency and security to the e-commerce market for aerospace via blockchain technology. This first-of-its-kind process in the aerospace industry could help simplify the complex regulatory and supply-chain landscape.

1 Susheel Vasudevan, Manufacturing Next: Intelligent, Agile, Automated, and Cloud-Enabled, Harvard Business Review, 2019 | **2** IBID

ENGAGING WITH THIS REPORT

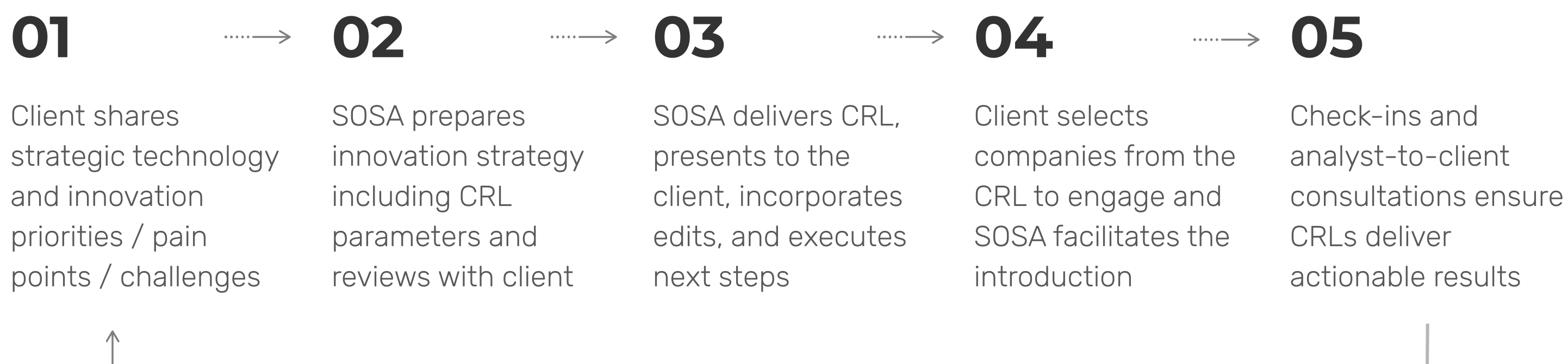## CNI AND SOSA ARE YOUR GLOBAL OPEN INNOVATION PARTNERS

This report contains a vetted list of companies in the form of a comprehensive market mapping to provide actionable Industry 4.0 solutions that can help industry overcome today's pandemic challenges. The startups featured in this report are all open for business. This means that in addition to catalyzing creativity and market insights they should be looked at as viable business opportunities and potential avenues for innovation that can be taken today.

How to engage?

SOSA's proprietary corporate innovation process ensures that our partners connect to relevant technologies to solve pain points and challenges, and leaves room to iterate for satisfying each of our partner's unique innovation goals. The main tool we use to serve our clients is the 'Company Recommendation List' (CRL).

QUICK LOOK
SOSA'S CORPORATE INNOVATION SERVICE

01	02	03	04	05
Client shares strategic technology and innovation priorities / pain points / challenges	SOSA prepares innovation strategy including CRL parameters and reviews with client	SOSA delivers CRL, presents to the client, incorporates edits, and executes next steps	Client selects companies from the CRL to engage and SOSA facilitates the introduction	Check-ins and analyst-to-client consultations ensure CRLs deliver actionable results

NOTABLE SOSA SUCCESS STORIES:

HP Tech Ventures, a long-running SOSA partner turned to us for open innovation solutions in the form of supporting technologies that would take their product to the next milestone in home-printing. After conducting profound research in the photo-sharing industry and understanding HP's needs in this specific use case, our open innovation team scouted relevant solutions ranging from computer vision, AI, image processing, to digital photo tools. SOSA and HP conducted private interviews with forty companies, vetting them based on technology, relevancy and market offers; ultimately moving forward with five relevant solutions.

Swiss Re, the world's second largest reinsurer, wanted to solve 8 acute business cases primarily in Property & Casualty and Life & Health. Swiss Re wanted their management and employees to play an active role in the innovation process in order to optimize its success. The solutions were to be identified in a 4 day timeframe, in parallel with the team's introduction to an entirely new process. SOSA developed a unique 4 day program tailored to Swiss Re's business challenges. We presented Swiss Re with 47 of the most accurate technological solutions from a wide-range of industries. From these, 27 technologies were selected to be presented in face-to-face meetings.

CHALLENGES AND OPPORTUNITIES

INDUSTRY 4.0
COVID-19 MODE

NO ORDINARY TIMES

INDUSTRY CHALLENGES DURING COVID-19

Today's evolving conditions as a result of the global pandemic create unique challenges for industrial and manufacturing organizations. Understanding these new conditions and their effects on production operations is essential for identifying technological solutions that can help industry survive and thrive in the new normal.

NEW CONDITIONS CREATE NEW CHALLENGES

New Conditions

New Challenges

01 A SLIM MARGIN OF ERROR [1]

One confirmed case of the Coronavirus can result in an entire factory shutting down.

Corporate survival is directly linked to the individual health and well-being of all workers.

The pandemic is accelerating Industry 4.0 adoption and condensing upgrade schedules.

KEEPING WORKERS SAFE [4]

The US Occupational Safety and Health Administration recommends 12 precautions.

Adding safety measures means accepting productivity trade-offs which impact financial results.

New systems and technologies will need to be adopted to ensure workers stay healthy.

02 THE MARKET IS VOLATILE [2]

Quick drops in demand, excess capacity, and price sensitivity are eroding prices and value.

Critical industries (healthcare, logistics, consumer packaged goods / grocery), are seeing unprecedented demand.

Consumer spending is going to change and customer relationships are evolving fast.

BUILDING AGILE PRODUCTION [5]

Building accurate supply / demand predictions will involve advanced AI & data analytics.

Automation technologies can help ensure that operations stay online through disruptions.

New data acquisitions can help adapt production toward long-term shifts in demand.

03 SUPPLIERS ARE STRUGGLING [3]

Sudden production cuts are devastating suppliers and pressuring manufacturers.

Despite crisis financing old suppliers will close and new suppliers will be onboarded.

Ongoing budget and workforce cuts could lead to widening gaps in suppliers' cybersecurity.

MAINTAINING RESILIENCE [6]

Streamlining production operations can reduce the impact of supply disruptions.

Predictive maintenance can help ensure uptime amid fluctuating supply quality.

Allocating resources for cybersecurity is especially important in vulnerable times.

1 Nancy Cleeland, U.S. Factories Closing Due to Coronavirus Concerns but Some Must Keep Producing, SHRM, 2020 | **2** Cesar Brea, Chris Brahm, and Sanjin Bicanic, What to Do Now That Your Demand Forecast Is Wrong, Bain & Company, 2020 | **3** Bindiya Vakil, Tom Linton, It's Up To Manufacturers to Keep Their Suppliers Afloat, Harvard Business Review, 2020 | **4** OSHA, COVID-19 Guidance for the Manufacturing Industry Workforce, OSHA, 2020 | **5** Jonathan Tilley, Automation, robotics, and the factory of the future, McKinsey & Company, 2017 | **6** Ben Aylor, et al., Designing Resilience Into Global Supply Chains, Boston Consulting Group, 2020

INDUSTRY 4.0 COVID-19 SPOTLIGHT

Q&A With Schneider Electric

Peter Herweck
Executive Vice President,
Industrial Automation,
Schneider Electric

Schneider Electric is a European multinational corporation providing energy and automation digital solutions for efficiency and sustainability. It addresses homes, buildings, data centers, infrastructure and industries, by combining energy technologies, real-time automation, software and services.

We sat down with Peter Herweck, Executive Vice President, Industrial Automation, Schneider Electric, to discuss industry challenges and emerging technology solutions to help Schneider Electric's clients survive today, and thrive into the future.

What are the most common challenges faced by SE clients and partners today?

The economic impact of the pandemic has made resilience of operations and business continuity the two main priorities for all of us. It has also brought efficiency back to the top of the agenda. Many companies are facing a very volatile environment and the need for superior agility, which is forcing us to look for more efficiency on one side, and at increasing resilience and capacity on the other side.

What kinds of enterprises are you seeing overcome these challenges today?

Industrial companies that had started on their digitization journey and were able, in a highly disrupted environment, to make sure that their production assets were available when needed, avoid any unplanned downtime, and use maintenance resources efficiently do seem to have been the most resilient this year. Resilient supply chains have also been a must. This is mostly enabled by digitization.

What technologies are available today to help industrial enterprises?

Even in these challenging times, there is a universal winner, and that winner is digitization. The need for digitization has been especially reinforced in the manufacturing sector by that fact that we now need to do many more things remotely. Being able to leverage the transparency, access to data, analytics and display tools offered by digitization can help industrial companies in a variety of important ways.

What emerging industrial technologies are you engaging into the future?

Next generation smart manufacturing will be realized with innovative software and services, not hardware. There are three areas where we are focussing to bring this to fruition for our customers: creating smart operations with data-driven and software-based automation, enabling truly open automation to break free from the propriety locked-in model of traditional industrial automation, and combining energy management, automation, and software to drive more sustainable outcomes.

A very important point is how these emerging technologies empower and augment the people working in industries to be safer and more efficient. Locking in resiliency, efficiency and sustainability starts with empowering your employees so they can make safe, fast, and informed decisions.

INDUSTRY IS RESPONDING

GEARING UP FOR HEALTH AND SAFETY

Industrial enterprises are taking unprecedented measures to help ensure the health and safety of workers and their families. This includes putting in place additional safety measures in factories, offices, and distribution centers. These activities are signals for how industry can adapt today and contribute to a better world beyond COVID-19. The most notable activities to improve health and safety include: testing, protecting, and adapting to today's new normal.

GEARING UP: TEST, PROTECT, AND ADAPT

TEST

Amazon is planning to build diagnostic labs as it ramps up Covid-19 testing for warehouse workers. Amazon aims to test the bulk of its workers for Covid-19 every two weeks. To this end, the company is setting up its own Covid-19 testing labs at its fulfillment centers. Amazon's warehouse workers who test positive are referred to a third-party, Grand Rounds, for telehealth consultations. Amazon has already ramped up its testing of warehouse workers following outbreaks of Covid-19 in New York, Colorado, Pennsylvania, New Jersey and Oregon, among other states. Note, setting up an expensive in-house testing program is not the only way to test employees. For example, Eurofin, a world leader in the provision of clinical diagnostics, forensic, pharmaceutical, food and environmental laboratory testing services offers corporate COVID-19 testing-as-a-service.

PROTECT

Lear Corporation created a 51-page, highly detailed set of protocols for manufacturing facilities on everything from creating an in-house pandemic response team to sanitation procedures for production lines to social distancing in break rooms. The manual seeks to meld common manufacturing practices with guidelines issued by the World Health Organization and the U.S. Centers for Disease Control and Prevention. Lear, an automotive parts supplier based in Southfield, Michigan, has 271 production plants in 39 countries, including in China's Hubei Province. The 103-year-old maker of electrical components and seats for cars reported more than $21B in sales in 2018.

PROTECT

The American grocery giant Kroger has published its blueprint showcasing lessons learned on getting back to work during the pandemic. The blueprints includes a section on food production health and safety best practices. As an essential food supplier Kroger spent the first phase of the pandemic helping to flatten the curve by focusing on the most urgent priority – providing a safe environment for everyone in the company's facilities – while maintaining its commitment to remain open and available and even responsibly increasing output to meet the changing demands of customers.

ADAPT

Airbus "e-delivered" three A320neo jets in April. Airbus has created a three-stage e-delivery process which involves connecting with the buyer in a secure virtual environment where the two sides can simplify contractual transactions, from drafting and negotiating the delivery documents up to the remote transfer-of-title digital signature. The digital transfer of ownership can save paperwork and legal costs. Similarly, Italian helicopter maker Leonardo is using a "smart delivery" HeliLink video system for conducting remote inspections before delivery and payments are completed.

THE TIME TO INNOVATE IS NOW

DISRUPTIONS CREATE INDUSTRY 4.0 OPPORTUNITIES

Overcoming today's industrial challenges requires taking urgent short-term actions and simultaneously maneuvering for the long-term.

Critical health and safety measures have to be taken to keep workers alive and operations running. There is no time to wait to integrate PPE, preventative training, and rigorous sanitation protocols across operations. However, forward-thinking enterprises will also look at the integration of Industry 4.0 technologies that can boost worker longevity and productivity.

Enterprises that prioritize Industry 4.0 technologies such as AI and automation systems can better adapt to today's workforce disruptions, and at the same time boost productivity and add to long-term profitability.

Shutdowns create an opportunity to reflect on the prioritization of long-term digitization and Industry 4.0 strategies. Organizations that previously struggled (or neglected) to keep up with the pace of innovation occurring in their industry are feeling the consequences of lagging behind.

THE IMPORTANCE OF DEVELOPING A LONG TERM OPEN INNOVATION INDUSTRY 4.0 STRATEGY

Q&A With Vale

Afzal Jessa
With Head of Digital
Technology of Vale

Vale is a Brazilian multinational corporation with operations in over 30 countries worldwide and a mission to transform natural resources into prosperity and sustainable development. Vale operates across multiple industries including mining, logistics, infrastructure, energy and steel-making.

We spoke directly with Afzal Jessa, Chief Digital Officer and Head of Digital Technology at Vale, to discuss the importance of adopting digital transformation and developing a strong and long lasting innovation strategy.

Is it important to have a long-term or ongoing corporate digital transformation strategy? Why is it particularly important for enterprises in the industries?

While we often see a lot of cases of success in the application of digital to solve a particular problem, scaling these initiatives and connecting the dots takes time. And the transformation process is not linear. It requires experimentation, learning, adaptation and ultimately perseverance to achieve a bold goal. So a longer-term ambition and strategy needs to be put in place to guide the work. This is particularly important in heavy industries that can often fall prey to the pressures of market cycles.

How important is "open innovation" or scouting external technologies for corporate digital transformation, in the context of developing an overall corporate innovation strategy?

Open Innovation provides access to a universe of ideas, opportunities, solutions and people that is orders of magnitude bigger than most organizations have on their own. Learning and experimentation is essential in innovation and digital transformation. We believe that learning with and through others is an essential ingredient in accelerating the transformation. An integrated approach that combines open innovation with internal innovation is essential to apply the right skills and tools to solve specific innovation problems.

What steps can enterprises take to set themselves up for benefitting from adopting a long-term innovation and digital transformation strategy?

Often teams lose sight of why they are pursuing a digital transformation. It's very easy to get caught up in micro problems or intoxicated by the technology solutions. So, start by clearly establish clear goals/business outcomes that are directly and clearly linked with the corporate strategic priorities and goals. Next establish truly diverse teams that are tasked with pursuing these outcomes vs purely deliver project a, b or c. Empower the teams in pursuing those outcomes and placing small bets to test their hypothesis as they go.

When you look at heavy industry in Brazil (or globally) what inspires you?

I'm inspired by the capacity of the people; the capacity and perseverance to drive and deliver results. There's a strong recognition that there's a huge opportunity to improve operational excellence in heavy industry and I'm inspired by the energy that is being placed on pursuing this transformation. As we move forward on digital transformation, this capacity of people will be key in scaling the solutions to transform themselves, transform the business and ultimately capture the potential.

What are some new innovation and digitization challenges emerging for Vale?

The greatest challenges are in adoption of technology at scale. A lot of this has to do with change management from both a human element but also in finding ways to deploy and integrate the technology and process changes into an existing operation without creating a significant operational impact or worse introducing new unanticipated operational risks. This process needs to be accelerated but really well managed.

What emerging industrial technologies have you begun to adopt? Where do you see the biggest changes so far?

I wouldn't call them emerging technologies, but the greatest both potential and gains we are seeing so far are from automation and robotics and advanced analytics/AI. As compute improves and we start employing quantum compute on scale along with 5G for connectivity, it can open a world of possibilities in how we design and operate our mines. In addition, we are working actively to become a leader in the application of alternative energy and carbon management solutions in our operations to transform our energy matrix.

What are some goals for ongoing innovation within the company?

We see a future where we use technology to redesign our work eliminating risk scenarios to be a leader in safety and risk management. Our production is automated removing people from risky work conditions and increasing the agility and productivity of our operations. AI informs all key decisions. We have complete oversight over value-chain and are integrated with customers to create differentiated products/services. Teams collaborate remotely, creating a more accessible environment, attracting a more diverse workforce. Renewable energy powers our business leading to carbon neutrality and new mining/ processing technologies to lower environmental footprint. We co-innovate with partners, customers and our communities to contribute to sustainable development of our Business AND Communities, generating a positive impact for society.

FINDING SOLUTIONS NOW

INDUSTRY 4.0
COVID-19 MODE

WHERE TO ENGAGE FOR THE MOST VALUE?

ISRAEL AND NYC: INDUSTRY 4.0 INNOVATION HUBS:

These respective tech ecosystems will hold the strategic operations for the SOSA-CNI partnership.

A multitude of critical variables come together to form a leading global innovation hub. Those variables include: modern infrastructure, high-speed internet coverage, a cluster of research-intensive universities, access to diverse sources of investment funding and especially venture capital, as well as a pipeline of skilled talent, entrepreneur friendly regulations, successful startup exits, and more.[1]

Two leading global innovation hubs are especially relevant for industry enterprises that are looking for Industry 4.0 technologies and solutions: Israel and New York City. Each hub has its own unique advantages for incubating and growing the next generation of technologies to reshape the industries of tomorrow.

ISRAEL

The Industry 4.0 sector in Israel is well-developed and shows consistent signs of growth. Between 2014 - 2018, Israel was ranked third in the world by amount of venture capital investment after the US and China, and second, surpassing China, in early stage investments. There are now 230+ startups focusing on Industry 4.0 in Israel, up 60% from 2014, and over 50 multinational heavy-industry corporations have a presence in Israel, through R&D, accelerators, and more.[2]

NEW YORK CITY

New York City depends on a thriving industrial economy. Industrial corporations ensure the production, distribution, and maintenance of goods and infrastructure. They also provide over half a million jobs – more than currently exist in NYC's technology or finance sectors.[3] New York City has become one of the world's most notable urban centers for tech companies and the second-largest tech hub in the world. Between 2003 and 2013, the New York City startup ecosystem grew twice as fast as Silicon Valley's in terms of dollars invested.[4]

1. KPMG Global Strategy Group, *The 2020 KPMG Technology Industry Innovation Survey*, KPMG, 2020 | 2. Yuval Engelstein, *Why Industry 4.0 is the Promising New Sector in Israel*, Start-Up Nation Central, 2019 | 3. The Manufacturing and Industrial Innovation Council of NYC (https://maiic.nyc/) | 4.Endeavor Insight, *How New York City Became the Role Model for Other Urban Tech Hubs*, 2014

MAPPING THE MARKET TO INNOVATE

IDENTIFYING THE RIGHT SECTORS AND STARTUPS

The following sections in this report are derived from a market mapping of Industry 4.0 startups. The market map features fifty notable startups developing technologies that can be applied to help industrial enterprises overcome challenges related to COVID-19. The solutions we feature are divided into four primary categories: infection prevention, automation and optimization, supply chain, and operational resiliency. We also feature sixteen sub-categories within the market map ranging from PPE and hygiene solutions to industrial cybersecurity, and more.

Industry operators ought to look to the technologies in this report as signals defining the next wave of Industry 4.0 for the COVID-19 era. For example, forward looking operators will consider the fact that the new Industry 4.0 will incorporate advanced digital healthcare technologies.

We selected these companies based on the applicability of their solutions, their momentum, recency of funding, amount of capital raised, partnerships, and investor quality, among other criteria. The technologies featured in this report are all open for business. In addition to catalyzing creativity and market insights they should be looked at as viable opportunities and avenues for innovation that can be taken today.

MAPPING OF APPLIED TECHNOLOGIES

INFECTION PREVENTION

PPE & HYGIENE
- sonovia
- RAPIDMASK2GO
- ViriMASK™
- SOAPY
- PathSpot
- IMMUTOUCH

EARLY WARNING
- binah.ai
- neteera
- SOTER TECHNOLOGIES
- biobeat Medical Smartmonitoring

SPATIAL ANALYTICS
- BriefCam
- APPLIED MACHINE LEARNING
- drishti

MASS-SCREENING
- anyVISION.
- F⊙RESIGHT
- UVEYE VEHICLE INSPECTION SYSTEMS

AUTOMATION & OPTIMIZATION

EDGE AI
- HAILO Empowering Intelligence

AUTONOMOUS INSPECTION
- KITOV.ai
- INSPEKTO
- vocalZoom

ADDITIVE MANUFACTURING
- XJE
- POSTPROCESS Automated. Intelligent. Comprehensive.
- nTopology

OPTIMIZATION ANALYTICS
- SISENSE
- fero labs
- ODEN TECHNOLOGIES

INDUSTRIAL ROBOTICS
- Bright Machines™
- DLR Deep Learning Robotics
- SEEGRID

SUPPLY-CHAIN

DEMAND PLANNING
- crisp.
- C3.ai
- noodle.ai

VISIBILITY & ANALYTICS
- CONTGUARD SHIPPING WITH INTELLIGENCE
- project44
- roambee

FREIGHT & SHIPPING
- FREIGHTOS
- loadsmart
- cargoX

WAREHOUSE ROBOTICS
- Bionic HIVE
- LOCUS
- VECNA robotics

LAST-MILE DELIVERY
- BRINGG
- Fabric
- Bringoz
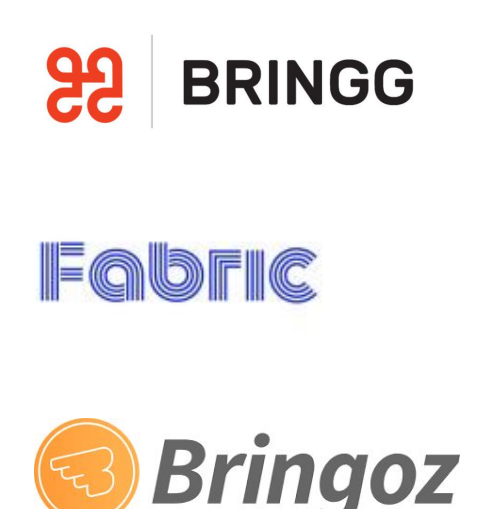
OPERATIONAL RESILIENCE

INDUSTRIAL VISIBILITY
- AUGURY
- SEEBO
- 3dSignals

INDUSTRIAL CYBERSECURITY
- CLAROTY
- shieldIOT
- SCADAfence

This map contains private, active companies and is not exhaustive of every company in this space. Companies were selected based on funding activity, investor quality, momentum, among other criteria. The categories featured in the map are not all mutually exclusive. This is one way to segment the market.

OVERVIEW

These companies equip industry operators with the ability to protect workers' health by preventing infections. They are offering advanced personal protective equipment (PPE), new hygiene systems, wearable devices for monitoring vital signs, and computer vision technology for detecting symptoms.

COVID-19 MODE:
Many of these companies' products and services are already on the front lines protecting health workers from infections.

The adoption of their technologies in industry is an indication that the next wave of Industry 4.0 innovation in the wake of COVID-19 will incorporate healthcare technologies.

COMPANIES FEATURED:

PPE & HYGIENCE

From the beginning of this health crisis, the most repeated and consistent recommendations by the World Health Organization and the Center for Disease Control has been to wear a mask (PPE) and wash hands well and in regular intervals.

PPE companies are creating advanced anti-pathogen fabrics and masks, distributable mask-vending machines, and added protection masks that cover more of the face.

Hygiene companies are offering microstations that gamify hand washing, sensors for detecting pathogens on hands and surfaces, and wearable health devices.

The companies featured below are relatively early-stage compared to the rest of the cohort. They should be viewed as signals that the world's entrepreneurs and inventors are responding to the crisis with extreme ingenuity. Their work is essential to controlling the virus today for a safer tomorrow.

SELECT COMPANIES:

sonovia

Tel Aviv, Israel

Sonovia offers anti-pathogen fabric and it's proprietary coating is safe, and tested for effectiveness against the virus.

Founded: 2013
Disclosed funding: $1.3M
Most recent funding:
$1.3M, Seed, 26-May-2020

RAPIDMASK2GO

New York, USA

Rapid Mask offers a fully customizable vending machine stocked with a variety of PPE including masks, gloves, etc.

Founded: 2020
Disclosed funding: undisclosed
Most recent funding:
undisclosed

ViriMASK™

Haifa, Israel

ViriMASK is a facemask with a replaceable filter that provides protection to a wearer's full face. The mask is designed for minimal skin pressure for extended wear. ViriMASK Ltd. is a subsidiary of Oneg HaKarmel Ltd.

Founded: 2015

SOAPY

Tel Aviv, Israel

Soapy makes AI-enhanced, IoT-connected, eco-friendly hygiene microstations that gamify hand washing.

Founded: 2018
Disclosed funding: $0.02M
Most recent funding:
undisclosed

PathSpot

New York, USA

PathSpot's hand scanner uses detection technology to give workers real-time feedback on the quality of each hand wash.

Founded: 2017
Disclosed funding: $10.35M
Most recent funding:
$6.5M, Series A, 21-May-2020

IMMUTOUCH

Washington, USA

Immutouch makes a wearable smartband that senses movements and vibrates when the wearer touches their face.

Founded: 2020
Disclosed funding: undisclosed
Most recent funding:
undisclosed

EARLY-WARNING SYSTEMS

A rising group of companies is offering non-invasive and scalable systems for detecting the symptoms of COVID-19. They help provide an early-warning that a worker is sick and needs to stay home, and can prevent the virus from spreading. Companies are using novel forms of mobile computer vision technology, wearable devices, contactless entry screening systems, and advanced sensors to monitor workers vitals such as temperature and blood oxygen saturation levels in real-time.

SELECT COMPANIES:

binah.ai

Tel Aviv, Israel

Binah AI offers a digital healthcare and wellness platform that can transform any camera-equipped device such as a smartphone into a body vital signs monitoring solution.

During COVID-19 Binah can help monitor workers health and vital signs voluntarily, remotely, and non-invasively. Workers could use the technology to remotely and voluntarily register as healthy and ready for work.

The company enables users to extract a large set of vital signs and mental stress measurements using signal processing and AI technologies such as machine vision.

Founded: 2016
Disclosed funding: $27.5M
Most recent funding: $13.5M, Series B, 15-Jun-2020

SOTER TECHNOLOGIES
Environmental Intelligence for a Safer World

New York, USA

Soter Technologies uses sensor technology and software solutions to identify environmental and social anomalies across a wide range of industries and situations

During COVID-19 Soter can equip production facilities with the ability to identify sick employees or visitors when they drop off deliveries, clock in, or leave one area for another.

The company makes 'Symptomsense', an identity and vital-signs detection walk-through gate, that looks like a metal detector but can sense a number of vitals including: temperature, blood oxygen, heart rate, respiration, etc.

Founded: 2017
Disclosed funding: undisclosed
Most recent funding: undisclosed

neteera

Jerusalem, Israel

Neteera enables seamless, continuous, and contact-free monitoring of human vital signs across all environments.

During COVID-19 Neteera can enable efficient and passive scanning for virus symptoms. The advanced nature of the company's technology translates in fewer false-positives.

Neteera's micro-radar-on-chip and proprietary algorithms sense microscopic skin motions, even through furniture and clothing, spotting human vital signs such as heart and respiration rates, variability, inhale–exhale ratio, etc.

Founded: 2014
Disclosed funding: $13M
Most recent funding: $4.5M, Series A, 05-Sep-2019

biobeat
Medical Smartmonitoring

Petach Tikva, Israel

BioBeat offers a sensor and wearable device for obtaining precise measurements of a wide range of complex vitals.

During COVID-19 Biobeat can enable real-time on-body vitals monitoring in two forms: short-term disposable chest adhesive monitoring, and long-term wearables.

Biobeat's unique sensor technology is developed in-house and patented globally, the sensor is designed in a way which allows it to get an above average clear reading of a person's PPG signal wave, which contains important vitals.

Founded: 2016
Disclosed funding: $72.85M
Most recent funding: $25M, Series C, 25-Feb-2020

SPATIAL ANALYTICS

Advances in artificial intelligence and video surveillance are being applied to help organizations respond to dynamic spatial scenarios proactively and preventatively.

These technologies can be applied to help industrial operators collect real-time visual production-line data, enforce social-distancing measures, proactively manage building maintenance and cleaning, preventatively redirect traffic to avoid bottlenecks, and ensure productivity while complying with critical health regulations.

SELECT COMPANIES:

BriefCam

Tel Aviv, Israel

BriefCam provides video synopsis technology designed to transform raw video into actionable intelligence.

COVID-19 MODE
Enterprises can use BriefCam to assist in contact tracing, and mask detection while protecting the confidentiality and security of infected individuals sensitive facial identity data.

If worker contracts COVID-19 and discloses that information, managers can use BriefCam to map out the individual's movements and interactions..

Founded: 2007
BriefCam is owned by Cannon, but continues to operate as a separate business entity.

APPLIED MACHINE LEARNING

Tel Aviv, Israel

AML generates alerts based on worker behavior, environment conditions, and safety while working with heavy machines.

COVID-19 MODE
Enterprises can use AML to analyze industrial environments to assess and correct conditions to maximize quality, cost, and safety. The tech connects to cameras or sensors and alerts via email, SMS, or Application Programming Interface call.

With increased burdens placed on workers to comply with PEE and social distancing guidelines, AML can help track compliance, ensure safety, and measure productivity.

Founded: 2012
Total disclosed funding: undisclosed
Most recent funding: undisclosed
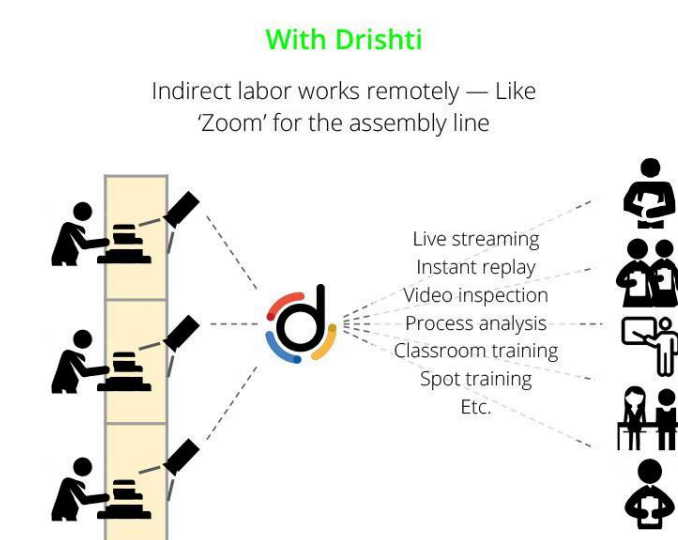
drishti

California, USA

Drishti digitizes human actions inside the factory to create a massive new dataset, enabling faster digital transformations.

COVID-19 MODE
Enterprises can use Drishti's video analytics solutions that are purpose-built for data capture in manufacturing environments to make social distancing and remote work easier to deploy.

With real-time video analytics systems in place, indirect workers can operate remotely and give accurate instructions without the risk of overcrowding facilities.

Founded: 2017
Total disclosed funding: $37.25M
Most recent funding: $25M, Series B, 16-Jun-2020

35

MASSIVE SCREENING

Computer vision technology can help with remote and on-site facial recognition, enable vehicles to sense and see their surrounding environment to avoid collisions, and to help security teams and automobile manufacturers spot anomalies in the exterior and undercarriage of vehicles.

However, each of these companies has been tasked to re-apply their technologies to address challenges related to national COVID-19 solutions. They are set up today to help mass-screen people in healthcare, industrial, and population centers.

SELECT COMPANIES:
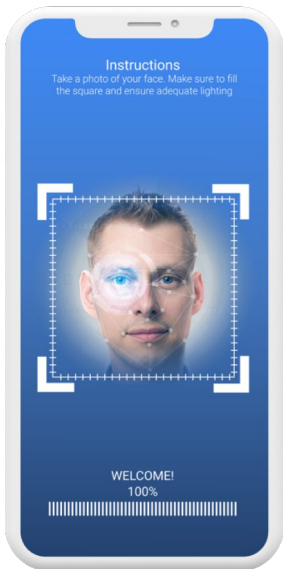
ANYVISION.

Holon, Israel

AnyVision offers remote and on-premise facial recognition access management systems.

COVID-19 MODE
Enterprises can tap into existing security cameras to detect improper PPE use and alert workers if they come into contact with the infected.

Today, AnyVision is deployed at two hospitals in Israel, Sourasky Medical Center, and Sheba Medical Center, where the tech is being used to spot for PPE, symptoms, and to notify potentially infected people.

Founded: 2015
Total disclosed funding: $74M
Most recent funding:
$74M, Series A, 18-Jun-2019
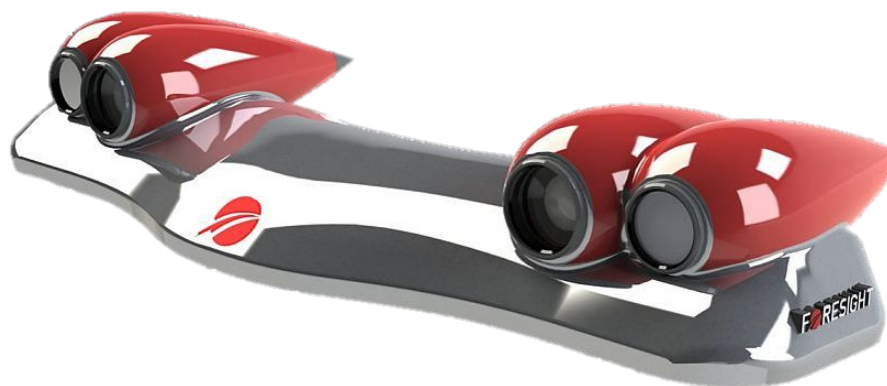
FORESIGHT

Ness Ziona, Israel

Foresight develops camera-based driver assistance systems for accident prevention and safety.

COVID-19 MODE
Enterprises can rapidly scan workers on-site for the symptoms associated with COVID-19, and assess combinations of several symptoms to lower false positives.

Today, Foresight is conducting a pilot with Meuhedet Healthcare Services, and will deploy in their clinic in Ashdod that serves around 50,000 patients. The system will be installed at the clinic's entrance and will scan all incoming people.

Founded: 1977
Foresight is publicly traded, but received $14.4M on June 11, 2020 through a private placement.

UVEYE
VEHICLE INSPECTION SYSTEMS
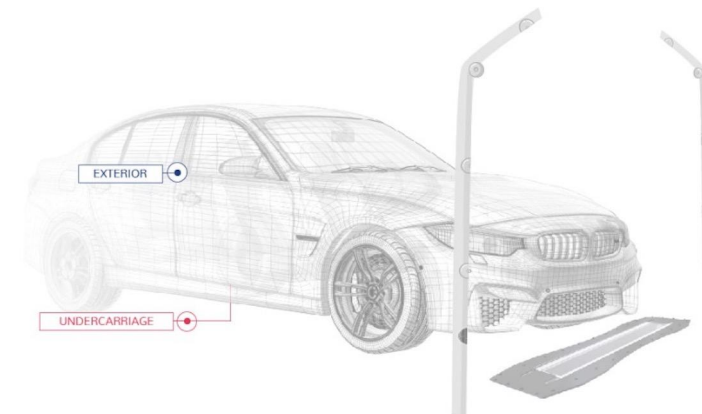
Yokneam Ilit, Israel

UVeye makes vehicle inspection systems to detect security threats or production flaws for OEMs.

COVID-19 MODE
Enterprises can use Uveye to help fleet operators maintain their vehicles in safe operating condition without the need for 'hands-on' testing or inspection.

Today, UVeye can detect vehicle-safety problems and identify passengers with fevers, even through car windshields. UVeye is equipping health-related fleet operators with scanning technology during COVID-19

Founded: 2016
Total disclosed funding: $35M
**Most recent funding:** $31M, Series B, 19-Jun-2019

OVERVIEW

These companies enable industry operations to run autonomously and efficiently. They serve clients in automotive, pharmaceutical, aerospace, energy, and other industries with: edge AI, autonomous inspection, additive manufacturing, optimization analytics, and robotics technologies.

COVID-19 MODE:
These companies can help keep critical industry operations online and productive during COVID-19 disruptions.

COMPANIES FEATURED:
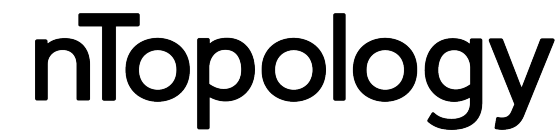
EDGE AI

Processing data right at the edge, without the need to transfer data to the cloud, enables devices to be more powerful, versatile, responsive, and secure. Efficient processing at the edge is key to ushering in Industry 4.0. Indeed, innovative, AI-powered technologies are the very thing the Industry 4.0 revolution requires to reach peak performance. This is precisely what Edge-AI leader Hailo provides.

HAILO
Empowering Intelligence

Tel Aviv, Israel

Hailo, an AI-focused chipmaker, has developed a unique, specialized computer processor that delivers the performance of a data center-class computer to edge devices. The Hailo-8™ Deep Learning Inference Processor for Edge Devices enables smart devices to run sophisticated deep learning tasks with minimal power consumption, size, and cost, revolutionizing a variety of segments including automotive, industry 4.0, smart cities, homes, and retail.

Strategic investors include the Swiss-Swedish global industrial engineering company ABB and NEC Corporation – a leader in the integration of IT and network technologies.

Founded: 2017
Total disclosed funding: $88M
Most recent funding: $60M, Series B, 05-Mar-2020

Deep Learning Processor for Edge Devices

Industrial
Predictive Maintenance, Inspection

Key Benefits

- Low Latency
- Low Power
- Low Cost
- High Privacy
- High Reliability

COVID-19 MODE:

FOXCONN®

Foxconn Partners With Hailo to Launch Next-generation AI Processing Solution for Video Analytics at the 'Edge'

CISION
PR Newswire   May 12, 2020

Foxconn, a global leader in smart manufacturing, Socionext, a provider of solutions for video and imaging systems, and Hailo are launching an AI processing solution for enabling advanced always-on video analytics at the network's edge.

The new joint product enables enhanced automation with faster processing in production lines, augmenting workers and aiding productivity and business continuity while also monitoring for proper social distancing during COVID-19.

Processing and inferencing at the edge such as directly on the production floor instead of in the cloud could save processing time and translate into significant cost savings.

Q&A WITH HAILO AI

Liran Bar,
Vice President of Business Development at Hailo AI

How can Hailo AI be leveraged by heavy industry enterprises to overcome Covid-19 challenges?
The smart factory as we know it is rapidly evolving. The pandemic has accelerated the need for smart factories to prioritize better automation through AI-powered sensors. Hailo's solution can process and analyze multiple streaming camera input feeds in real-time, all at the edge, resulting in reduced costs and higher efficiency. Detecting smaller objects in real time also enables more detailed factory inspections and less friction in the supply chain.

What are the most promising applications for Hailo's technology in heavy industry and especially manufacturing?
In modern factories, where time is money and where every split-second counts, it is essential that multiple video streams from the production floor are rapidly processed in real time to maximize the production line capacity. Processing at the edge rather than in the centralized cloud translates into significant cost reductions along with swift and more efficient operations including inspection, quality assurance, and better safety measures for human interaction with machines. It also eliminates the significant trade-off faced by current processors caught between cost and performance.

Can Hailo support international enterprises such as Brazilian heavy industry enterprises with Edge AI solutions today?
Hailo has vast experience supporting a growing number of companies across the globe. Customers can develop their neural network-based application using Hailo's standard development kit or integrate Hailo's standard M.2 or mPCIe modules. For more information please visit **www.hailo.ai**

AUTONOMOUS INSPECTION

Advanced sensors and machine vision software are enabling autonomous inspection and detection of defects in products as they roll off the line. They can be especially helpful for automobile and aerospace manufacturers that are looking to augment limited workforces and reduce the financial and reputational risks of product defects and recalls. Interestingly, these companies' technologies can also be applied to help fight the spread of COVID-19. For example, VocalZoom's sensors for Industry 4.0 applications are being repurposed for noninvasive skin scans to detect possible COVID-19 symptoms in hospitals and mass transit hubs in Israel.

SELECT COMPANIES:

KITOV.ai

Petah Tikva, Israel

Kitov.ai offers an automated visual inspection system designed to find product defects.

COVID-19 MODE
Enterprises save labor costs and move line workers to tasks with higher and more promising ROI.

Kitov's system imitates the way humans look for defects and facilitates the collection of multiple images of inspected products from various angles, positions and illuminations.

Founded: 2014
Total disclosed funding: $10M
Most recent funding:
$10.00M, Series A, 10-Oct-2018

INSPEKTO

Giv'atayim, Israel

Inspekto offers autonomous machine vision systems for industrial quality assurance.

COVID-19 MODE
Quick integration and ease of customization saves money and reduces time to automation.

Inspekto's system comprises patented self-setting sensors, self-adaptation to changes on the production line, and self-tuning of detection technologies to any inspection product or task.

Founded: 2012
Total disclosed funding: $22.86M
Most recent funding:
$10.00M, Series A, 15-Oct-2018

vocalZoom

California, USA

Vocal Zoom offers autonomous industrial sensors for data processing and communications.

COVID-19 MODE
Enterprises can combine no-contact sensing, data processing, and communications.

VZ's sensors operate on wet, hot, and moving surfaces and work through glass barriers. This system is designed as a standalone solution for monitoring, edge processing, and data analytics.

Founded: 2010
Total disclosed funding: $13.76M
Most recent funding:
$7.54M, Series C, 07-Jan-2015

ADDITIVE MANUFACTURING

Additive manufacturing hardware and software can help streamline and automate critical components of industry operations. In particular, additive manufacturing companies can equip essential manufacturing operations with the right amount of automation to stay online during pandemic related shutdowns. Augmenting human workers to reduce crowding in bottlenecks during the production process can also help manufacturers comply with social-distancing.

SELECT COMPANIES:

XJET

Rehovot, Israel

XJet manufactures a 3D metal jetting system designed to assist production operations in aerospace, automotive, medical, dental, and tooling manufacturing markets.

XJet's NanoParticle Jetting technology enables the creation of detailed high-quality parts with unlimited geometries.

The company's system can produce ceramic or metal parts with the ease and versatility of inkjet printing, enabling operational simplicity in an easy and cost efficient manner.

Founded: 2005
Total disclosed funding: $135M
Most recent funding: undisclosed
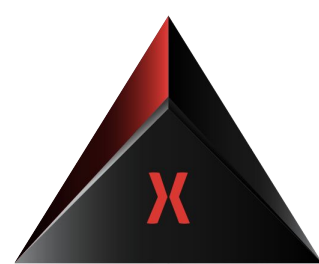
Main Applications

Short-run manufacturing

On-demand manufacturing

Functional prototyping

COVID-19 MODE:

straumann group   3DPRINT.COM
July 2, 2020

Straumann Group 3D Printing Ceramic End-Use Dental Parts with XJet Tech

Straumann, a leading Swiss dental equipment and supplies manufacturer is an early adopter of XJet. XJet helps keep operations online through pandemic related shutdowns.

During COVID-19, **"social distancing is viable because operation of the system is very simple, so Straumann has been able to keep the system running even through the global pandemic."**
- Straumann VP Stephan Oehler

Straumann was one of the first to invest in XJet's NPJ technology. Now, as part of this newly announced partnership, Straumann will employ the Carmel 1400 ceramics 3D printing system at its Basel headquarters, and use it to move more rapidly from concept to end-use parts.

POSTPROCESS
Automated. Intelligent. Comprehensive.

New York, USA

Post Process Technologies offers an automated platform designed to remove the bottleneck in the final step of industrial additive manufacturing or post-printing.

The company work across heavy industries including aerospace, defense, automotive, consumer goods, dental, medical, and more. Its technologies are designed to be compatible with all 3D print materials and technologies.

During COVID-19 Post Process can help enterprises save time, money, and increase throughput and consistency despite limited resources and constrained workforces.

Founded: 2014
Total disclosed funding: $20M
Most recent funding: $20M, Series B, 12-Nov-2019

nTopology

New York, USA

nTopology makes engineering design software intended to accelerate advanced manufacturing. The software enables industrial companies to design products more efficiently.

nTopology's breakthrough computational engineering environment enables the combination of synthesized geometry and simulation results into finely tuned manufacturing models for precision and efficiency.

During COVID-19 nTopology can help enterprises analyze 3D printing operations in a single, connected process, and make informed production design decisions on demand.

Founded: 2015
Total disclosed funding: $68.4M
Most recent funding: $40M, Series C, 14-Sep-2020

INDUSTRIAL ROBOTICS

These companies offer modular-robotic microfactories that can help rapidly scale up and down production levels, novel systems for training robots in dynamic production environments, as well as autonomous vehicles for moving bulk-materials. Notably, humans will always have a critical role in production environments. However, the technology developed by these companies signals greater levels of human-machine collaboration and will likely see higher adoption during COVID-19.

SELECT COMPANIES:

Bright Machines

HQ: California, USA
R&D: Tel Aviv, Israel

Bright Machines brings together configurable robots with intelligent software to automate assembly and inspection.

Bright Machines works with a major North-American auto manufacturer to dramatically increase yield and quality while reducing workforce headcount and defect rates.

The company's novel microfactories reduce reliance on manual processes and ease the impact of workforce disruptions on overall productivity and profitability.

Founded: 2018
Total disclosed funding: $229M
Most recent funding:
$179M, Series A, 23-Oct-2018
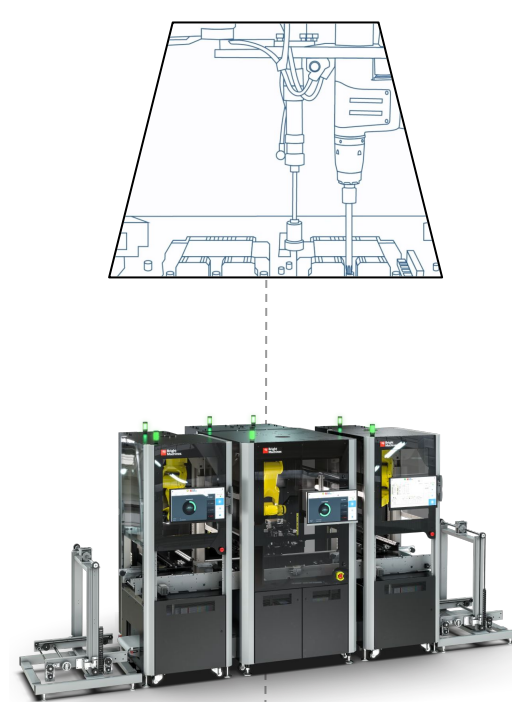
Analyze
Simulate process manually using spreadsheets

Configure
Microfactories programmed using pre-integrated Brightware

Design
Acceptance testing (FAT,PPAP)

COVID-19 MODE:

Bright Machines Scales Up Medical Device Manufacturing in Response to COVID-19

businesswire
A BERKSHIRE HATHAWAY COMPANY
March 18, 2020

Bright Machines launched an initiative to combat potential medical product shortages during the COVID-19 pandemic.

The company is offering no-cost automation for up to a year for manufacturing devices essential to treatment.

During COVID-19 Bright Machines microfactories can help manufacturers quickly scale up production using modular automation which is less reliant on humans, and costs less than traditional assembly and inspection processes.

Manufacturers who might have otherwise been constrained by cost, labor shortages, or slow production can better meet increased demands for essential goods.

DLR Deep Learning Robotics

Ashdod, Israel

Deep Learning Robotics is an early-stage company developing robotic equipment for task automation.

The company offers a novel patented vision-based robotic controller that uses advanced machine vision and deep learning algorithms to enable robots to learn and replicate tasks by observing humans performing them, enabling users to automate and simplify the process of their work.

During COVID-19 DLR can cut down operating and programming expenses associated with adapting industrial robots to constantly changing needs.

Founded: 2014
Total disclosed funding: $20M
Most recent funding: $20M, Series B, 12-Nov-2019

SEEGRID

Pennsylvania, USA

Seegrid offers vision-guided industrial technology designed to enable self-driving vehicles for bulk-materials handling.

The company's patented stereo cameras and advanced machine learning algorithms enable vision-guided-vehicles to see and process more detailed information in dynamic production environments than laser-navigation systems. Humans focus on value-add, cognitive tasks vs. hard labor.

During COVID-19 Seegrid can help enterprises achieve material handling automation initiatives, making industrial facilities safer and operations more productive.

Founded: 2003
Total disclosed funding: $62.12M
Most recent funding: $25M, Series B, 25-Mar-2020

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OPTIMIZATION ANALYTICS

Artificial intelligence and data analytics can help manufacturers make more informed data-driven decisions to optimize and pivot operations early. As industries adopt automation they will have access to more granular data sets derived from increasingly connected infrastructure and machines. Optimization analytics will be key to deciding where and how to automate certain operations, and will increasingly play an important role in measuring the success of automation.

SELECT COMPANIES:

SISENSE

New York, USA

Sisense offers data analytics and business intelligence software to improve data acquisition and processing.

The company's software provides a data engine that ties into an intuitive, user-oriented front end, enabling organizations to create and share business reports, manage data, integrate with other applications, customize and extend data, and discover previously untapped business.

Sisense helps manufacturers adopt a BI and analytics strategy that allows timely and flexible visibility across the production lifecycle, driving agility and speed-to-market.

Founded: 2004
Total disclosed funding: $283.5M
Most recent funding: $100M, Series E, 09-Jan-2020
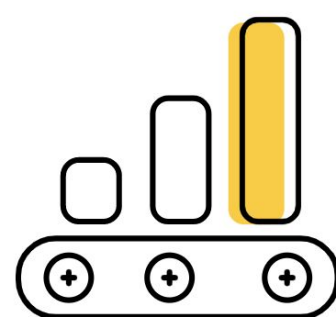
Data Sources

BI Server

Front-End Apps

Runs on Any Device

COVID-19 MODE:

Sisense helps Soft Stuff pivot business during pandemic

TechTarget May 20, 2020

Soft Stuff Distributors, a wholesale food distributor was faced with a choice when the spread of COVID-19 began to affect the economy: either pivot its business or perish.

Using data and analytics from Sinsense executives were able to identify an opportunity to rapidly pivot and become a B2C distributor -- essentially, an online grocery store.

During COVID-19 Sisense can help enterprises acquire, analyze and use data to shift resources, enhance outcomes, support customers, and find new efficiencies.

Additionally, Sisense can help manufacturers unify all data sources into one data management system for getting a fuller picture of the entire production lifecycle end-to-end.

ODEN TECHNOLOGIES

New York, USA

Oden Technologies offers a data acquisition and analytics platform intended to help enterprises monitor and optimize production in real-time, from any device.

Oden combines wireless industrial IoT and proprietary cloud-based analytics into one platform, enabling clients to digitize production and to continuously improve operations using clear data and actionable insights.

During COVID-19 Oden can help enterprises continuously visualize factory operations and processes for optimised production rates, increased yield, and reduced downtime.

Founded: 2014
Total disclosed funding: $15.9M
Most recent funding: undisclosed, 01-Apr-2020

fēro labs

New York, USA

Fero Labs offers an automated machine learning platform intended for improving industrial data analytics in factories.

The company's automated platform uses artificial intelligence for data analysis to continuously predict the quality of all materials used for production, and to automatically identify production inputs and settings that affect critical quality metrics, and are likely to have flaws.

During COVID-19 Fero can enable factories to optimize their energy and materials efficiency to reduce their production costs and thereby increase productivity.

Founded: 2015
Total disclosed funding: $1.6M
Most recent funding: undisclosed, 04-Feb-2020

OVERVIEW

These companies enable industry to stay online by avoiding unpredictable disruptions. They primarily serve large-scale manufacturing and utility-scale energy providers with industrial visibility and cybersecurity solutions.

COVID-19 MODE:
These companies can help spot broken machinery and thwart cyber attacks at a time when unforeseen shutdowns and disruptions could be even more cataclysmic than normal.

Note, hackers are often most aggressive when organizations are perceived to be the most vulnerable. It is increasingly important to take steps to reduce the risks of operational downtime, product manipulation, proprietary data theft, and ransomware cyber attacks.

COMPANIES FEATURED:

INDUSTRIAL VISIBILITY AND CYBERSECURITY

Industrial visibility companies are applying machine learning to identify complex behavior patterns and anomalies in industrial production operations. They also help create digital twins of factories to model behaviors and predict maintenance issues.

Industrial cybersecurity companies are protecting the connected assets and critical operations of industrial energy and manufacturing enterprises. With increased adoption of Industry 4.0 technologies there is a corresponding risk in cybersecurity.

SELECT COMPANIES:

Industrial Visibility

AUGURY

New York, USA

Augury develops predictive maintenance sensors to reduce environmental impact, energy usage, and operational costs.

Founded: 2004
Disclosed funding: $59M
Most recent funding:
$33MK, Series C, 12-Dec-2019

seebo

Tel Aviv, Israel

Seebo collects and analyzes data from production lines and automated inspection systems, enabling clients to streamline.

Founded: 2012
Disclosed funding: $31M
Most recent funding:
$9M, Series B, 14-Jul-2020

3dSignals

Kefar Sava, Israel

3d Signals develops acoustic technology designed to monitor sensory data from various rotating industrial equipment.

Founded: 2015
Disclosed funding: $23.5M
Most recent funding:
$20.5M, Series A, 16-Oct-2019

Industrial Cybersecurity

CLAROTY

New York, USA

Claroty provides real-time monitoring, high-fidelity models, and advanced analytics to detect security anomalies.

Founded: 2004
Disclosed funding: $100M
Most recent funding:
$8M, Series C, 31-Dec-2018

SCADAfence

Tel Aviv, Israel

SCADAfence helps detect cyber attacks and can also sound alarms to spot non-malicious operational threats.

Founded: 2014
Disclosed funding: $10.1M
Most recent funding:
undisclosed, 01-Jan-2018

shieldIOT

Tel Aviv, Israel

ShieldIOT makes security software designed to protect industrial edge devices from security threats and operational risks.

Founded: 2017
Disclosed funding: $4.6M
Most recent funding:
$3.6M, Seed Round, 25-Sep-2019

OVERVIEW

These companies are offering demand planning and visibility analytics to help manufacturers make more informed demand planning decisions and to help enterprises see deeper into supply-chains.

Others are offering online marketplaces to help importers and exporters reduce logistics spend, and to help shippers and truckers connect to move freight more efficiently, making autonomous machines that perform warehouse operations alongside (or in place of) workers, and shipping goods the last-mile, from a distribution hub to final destination.

COVID-19 MODE:

Sudden shifts in consumer spending and drops in demand combined with workforce disruptions have thrown supply chains into chaos. These companies can help industry operators capture insights and automate processes to overcome today's supply-chain challenges.

COMPANIES FEATURED:
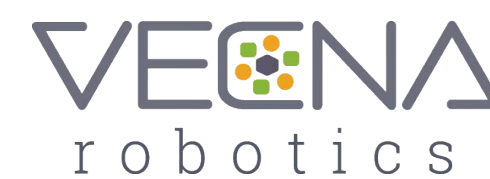
DEMAND PLANNING, VISIBILITY ANALYTICS

Demand planning companies can help industry operators gather and analyze alternative and disparate data sets to make more informed demand planning decisions. These companies are key to limiting waste and maximizing all resources.

Supply-chain visibility analytics companies are offering advanced data gathering and business intelligence services to help enterprises see deeper into supply-chains. Their products can help streamline operations and avoid supply-chain disruptions.

SELECT COMPANIES:

Demand Planning

crisp.

New York, USA

Crisp provides forecasts on food supply and demand, enabling food retailer and suppliers to manage their inventory.

Founded: 2016
Disclosed funding: $36.99M
Most recent funding:
$12.79M, Series A, 15-Jul-2020

C3.ai

California, USA

C3 analyzes variability in demand, supplier delivery times, quality issues, and product-line disruptions to inform planning.

Founded: 2009
Disclosed funding: $335.74M
Most recent funding:
$50M, Series H, 15-Sep-2019

noodle.ai

California, USA

Noodle enables consumer goods, distribution, and manufacturing to understand risk probability and causality for informed decisions.

Founded: 2016
Disclosed funding: $72M
Most recent funding:
$21M, Series B, 12-Mar-2020

Visibility Analytics

CONTGUARD
SHIPPING WITH INTELLIGENCE

Kfar Saba, Israel

Contguard offers a logistics platform intended to offer shipment monitoring and business intelligence services.

Founded: 2012
Disclosed funding: $11M
Most recent funding:
$9.5M, Series A, 28-Mar-2018

project44

Tel Aviv, Israel

Project44 brings dynamic shipment data and supply-chain visibility enabling smarter end-to-end shipping.

Founded: 2014
Disclosed funding: $110.5M
Most recent funding:
$20M, Series C, 19-Jun-2019

roambee

California, USA

Roambee provides on-demand real-time visibility, tracking, and condition monitoring for goods and assets in-transit and in-field.

Founded: 2017
Disclosed funding: $25.2M
Most recent funding:
$15.2M, Series B, 15-Jan-2020

SMART FREIGHT, WAREHOUSE ROBOTICS

Smart freight companies are offering online marketplaces to help importers and exporters reduce logistics spend, and to help shippers and truckers connect to move freight more efficiently, as well as achieve greater visibility into freight operations.

Warehouse robotics companies make autonomous machines that perform warehouse operations alongside (or in place of) workers. This includes providing end-to-end, floor to ceiling picking, and material transport in industrial settings.

SELECT COMPANIES:

Smart Freight

FREIGHTOS

Jerusalem, Israel

Freightos offers an online freight marketplace designed to help importers and exporters reduce logistics spend.

Founded: 2012
Disclosed funding: $79.95M
Most recent funding:
$44.4M, Series C, 17-Sep-2018

loadsmart

New York, USA

Loadsmart offers an on-demand freight marketplace to help shippers move freight and carriers keep trucks full.

Founded: 2014
Disclosed funding: $71.2M
Most recent funding:
$15M, Series, 31-May-2020

cargoX

Sao Paulo, Brazil

Cargo X offers a trucking marketplace using a truck's existing excess capacity, and improve freight visibility.

Founded: 2013
Disclosed funding: $176.8M
Most recent funding:
$82.8M, Series E, 19-Jun-2020

Warehouse Robotics

Bionic HIVE

Ein Habsor, Israel

Bionic Hive offers an automatic warehouse system designed to provide end-to-end, floor to ceiling picking capabilities.

Founded: 2014
Disclosed funding: undisclosed
Most recent funding:
undisclosed

LOCUS

Massachusetts, USA

Locus Robotics makes autonomous mobile robots to simplify and automate warehouses for e-commerce.

Founded: 2014
Disclosed funding: $112.45M
Most recent funding:
$45.89M, Series D, 24-Jun-2020

VECNA robotics

Massachusetts, USA

Vecna Robotics makes self-driving vehicles intended for safe and efficient material transport in commercial settings.

Founded: 2018
Disclosed funding: $63.5M
Most recent funding:
$50M, Series A1, 07-Jan-2020

LAST-MILE DELIVERY

Last-mile delivery companies are solving the persistent shipping problem of getting goods from a distribution or transportation hub to their final delivery destination. They are using proprietary algorithms for delivering packages quickly and efficiently and serving as automated mega-dispatchers that optimize routing and pricing in real time, enabling users to track their packages and receive proof of delivery. Others are offering native push notifications to track deliveries, enabling businesses to manage orders, track drivers and pull reports for performance optimization.

SELECT COMPANIES:

Smart Freight

BRINGG	Fabric	Bringoz
Tel Aviv, Israel	**Tel Aviv, Israel**	**Tel Aviv, Israel**
Bringg offers a web-based delivery management platform designed to manage local and last mile deliveries.	Fabric makes an on-demand fulfillment technology designed to redefine the way goods are fulfilled and delivered in cities.	Bringoz offers a Web based elastic logistics platform designed to connect users with shippers and couriers for last-mile delivery.
Founded: 2013 **Disclosed funding:** $87M **Most recent funding:** $30M, Series D, 07-Apr-2020	**Founded:** 2015 **Disclosed funding:** $136M **Most recent funding:** $110M, Series B, 23-Oct-2019	**Founded:** 2015 **Disclosed funding:** $1M **Most recent funding:** $1M, Seed, 05-Mar-2017

ACKNOWLEDGEMENTS

THANK YOU.

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Data sources used in this report:

Pitchbook

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Crunchbase

IVC

SOSA Q

sosa

CNI

Brazilian National Confederation of Industry

THE FUTURE OF INDUSTRY