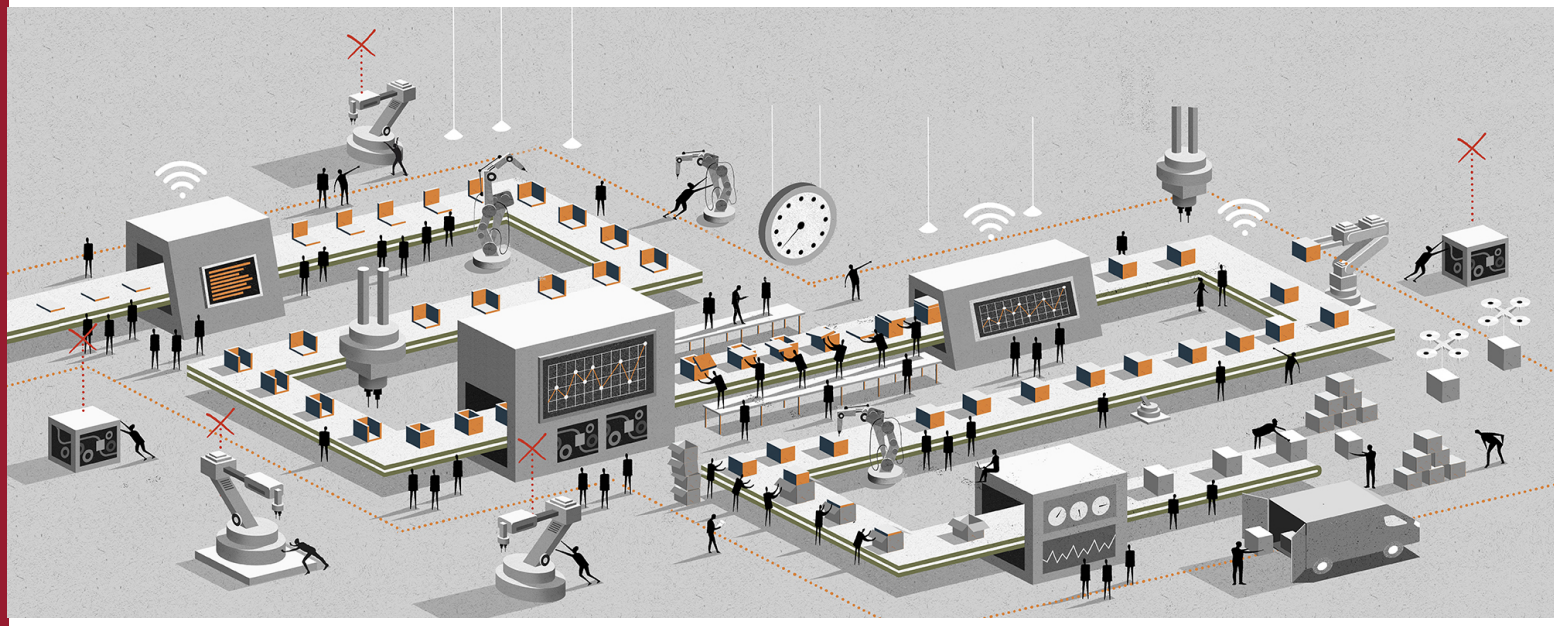

THE ‘NEW TRUTH’ IN MANUFACTURING & SUPPLY CHAIN - HOW LEAN & AGILE METHODS CAN HELP YOU SUCCEED

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RIGHT NOW, MANUFACTURERS BARELY HAVE TIME TO CATCH THEIR BREATH, NEVER MIND CONSIDER HOW THE FUTURE MAY LOOK. MANUFACTURERS FACE A UNIQUE SET OF CONSTRAINTS THAT MAKE THE PANDEMIC CRISIS PARTICULARLY CHALLENGING: FACTORIES HAVE HIGH SUNK COSTS, A NEED FOR SKILLED LABOR, AND COMPLEX SUPPLY CHAINS.

The reality is that "working from home" in a factory is not an option. Large and specialized plants costing millions need to be used efficiently to produce specific products. Even if is still possible to operate in the crisis, operations can be easily interrupted by key skilled workers being absent or supply chains being interrupted. One missing raw material or spare part can bring the whole operation to a standstill. The effects that this can have on the profit or loss of an operation are stark. Simply put, with that level of sunk costs coupled with a dependency on commodity pricing, operational losses can mount quickly.

On top of all this, there is the primary challenge of the health and safety of employees. Regulations are evolving quickly and need to be applied in factory settings that were never designed with social distancing in mind. Managers have spent years optimizing these operations; now they are turned on their head.

Demand across industries, within sectors, and even across product ranges is varying wildly, with some manufacturers having more than peak demand and some having zero demand, and this can change weekly triggered by anything from regulations to supply chain to the media.

Overall, however, many experts predict a global economic slowdown followed by a slow and erratic recovery. Current data suggest a "new truth" in which the world will not return to normal for at least the next two years. Looking ahead, manufacturers must have the flexibility to base predictions on this possibility while also preparing to move quickly if demand increases with a more rapid economic rebound.

As soon as early March, manufacturers surveyed by the National Association of Manufacturers (NAM) were already anticipating that theCOVID-19 pandemic would have long-lasting financial and operational impacts. Almost 80 percent responded that they anticipated a financial impact, more half-expected changes in operations and 35-percent reported they were facing supply chain disruptions.

In April, PwC (formerly known as PricewaterhouseCoopers) issued a report predicting that the manufacturing sector is poised to be hit hard by the COVID-19 pandemic both because many manufacturing jobs are on-site and because a worldwide slowdown in economic activity is likely to reduce demand for industrial products in the Middle East and globally. In a more recent PwC survey, only one of five leaders expected their company to bounce back within a month after the crisis ends.

So, what do we know about how the market will be at the end of the crisis? The only thing that we know for sure is that it will be different.

THE POTENTIAL OF LEAN MANAGEMENT TO COPE WITH DISRUPTION

Four Principles' hypothesis for the end of the crisis is simple: the pace of change and need to adapt is going to increase and stay that way. The need to adapt will not be a one-time action when the crisis is over, but rather customer and market demand will continue to be heavily influenced by a multitude of external factors. These may affect not only demand, but the type of products in demand and their specifications. In addition, external factors over which manufacturers have no control will influence how products can be supplied and which changes will be required to distribution networks and methods.

All of these factors and the fluidity of the situation will drive the need for manufacturers to re-adapt over and over again. We expect that the pace of change will be a lasting effect of crisis.

This means that manufacturers will have to become more Agile. But what does Agile really mean? It is not employees and managers taking a freewheeling approach to business. It is using a highly organized cross-functional approach to regularly re-assess demand and react to that as quickly as possible, continually adapting each time to a moving market target. Those manufacturers who learn to adapt systematically will not only master the crisis but put themselves in an optimal position to succeed afterwards.

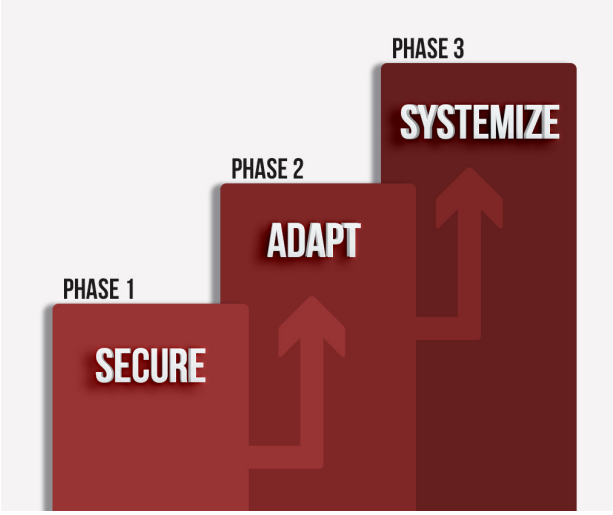
"Lean Management will be the key to surviving in the very difficult manufacturing landscape of today and over the next two years," says Patrick Wiebusch, Co-Founder and Managing Partner at Four Principles.

Four Principles has developed a simple phased approach, leveraging the right Lean tools at the right time, to help manufacturers navigate their way out of the crisis and become Agile: (1) Secure, (2) Adapt, (3) Systemize.

Phase 1 - Secure: secure current production demands and commitments to customers

There is a saying that "Old school is as good school" and there is a pragmatic set of Lean methods that can be deployed quickly to secure production or prepare to re-start after a shutdown:

- Heijunka – this Japanese method of line balancing is useful when lines need to be re-balanced to match current demand. Correctly applied, Heijunka exercises can be re-run periodically to help the operation move with changing demand.
- Work Instructions – well-written work instruction sheets can help add real flexibility in the workforce, reducing dependency on individual skilled employees. Starting with critical tasks, these can be quickly prepared, and multiple workers trained.



- Lean Layout – material flow and handling have to be re-examined to allow workers to maintain social distancing regulations. Quite pragmatic monitoring and material handling solutions can be employed that can be usually sourced locally if not assembled on-site.
- Secure Supply – engaging with suppliers is key. The more that you know about what they can and cannot do regarding availability of materials and components the better you can adapt.
- Communicate, Communicate, Communicate – employees must feel informed and confident. Industrial environments can be intimidating at the best of times, but when social distancing regulations limit contact between workers, the environment becomes more unfriendly just at the time when they need to perform. Engage, allay their fears, remind them of why they are important, give them perspective.

Phase 2 - Adapt: adapt to the new reality

This is an opportunity not only to adjust to a new reality but also to get ahead of the market. Lean offers a rich source of methods that can be applied:

- Agile – basic Agile practices should be implemented quickly, assembling cross-functional teams from across the business and establishing regular meeting times. This facilitates the flow of communication across the operation and improves the ability to adapt.
- DfMA – Design for Manufacturing and Assembly analysis is a powerful methodology that not only reduces cost but also targets products to customer demand. At Four Principles we have seen product cost reductions in the ranges of 7-15 percent.
- SMED – Single Minute Exchange of Dies. This is a fast changeover methodology, which if applied correctly can enable operations to have real flexibility and the ability to switch between products quickly as demand changes.
- Supplier Integration – This is a method to deepen the relationship with key suppliers and build the flexibility into supply agreements to react to demand changes. Standard practice in Japan, Supplier Integration shifts from looking for the cheapest price to mutually beneficial agreements that allow both supplier and customer to act "as one."

Phase 3 - Systemize: continually re-adapt, bringing true agility to the operation

This is the truly challenging phase, turning Lean and Agility into everyday business operations. However, for those who persist and succeed, the rewards are clear.

- Deepen Agile Practices, Anchor Review Points – across the organization, the cross-functional roles and responsibilities are defined and embedded in the operations. Major reviews using DfMA and other methods are performed in a regular cadence re-examining actual customer demands and current performance. This enables the re-adaption each time.
- Flexible Production Systems – what can be learned from fast-moving industries such as consumer electronics that can re-configure whole production lines in one day. Fundamental flexibility needs to be planned in production facilities and plants.
- Additive Manufacturing – New technologies are developing fast and costs are coming down. These need to be considered as real alternatives and cost benefit analyses must be conducted, taking flexibility into account.
- SCR – Sustainable Cost Reduction - engineer the waste out of products and systems.
- Customer Integration – there is an expression at Toyota that knowing your customer is not enough, you must understand them. Just as mutually beneficial agreements can be made with suppliers, building in flexibility, so too with customers.
- Reward Accordingly – the system of rewarding employees needs to be adjusted to reward them for following the new Agile behavior and support the operation to re-adapt every time.

PRIORITY: PROTECT WORKFORCE SAFETY

Whether restarting operations after a closure or continuing operations under COVID-restrictions, manufacturers cannot continue operations via business as usual; numerous changes to workspace configuration and operations are necessary.

Physical Distancing: Workspaces will need to be reorganized to allow workers to be spaced two meters (six feet) apart when possible; when not, screens and barriers can be used to shield workers from each other. The Lean error-proofing strategy of Poka-Yoke will be useful here in putting into place systemic mechanisms to prevent mistakes and human error.

Hand-offs: Changes in configuration and procedure are necessary are to allow workers to transfer tools, equipment and products from person to person safely with minimal touching of shared surfaces. Establishing steps for continual disinfection is necessary.

Workplace health monitoring: To prevent employees with COVID-19 from unknowingly infecting workmates, health screening procedures may be necessary. These include checking temperatures before employees enter the facility and additional medical testing prior to workers resuming work. Taiwan-based Foxconn, Apple's largest manufacturing partner, used strict health check measures including the use of chest x-rays to ensure a healthy workforce before restarting operations to supply Apple's fall launch of the new 5G iPhones.

Communications: Monitor employee performance and morale and provide relief measures. Design a real-time communications strategy for updating all employees and stakeholders.

PRIORITY: RAMP UP AUTOMATION AND REMOTE OPERATION TECHNOLOGY FOR WORKPLACE SAFETY AND GLOBAL EFFICIENCY

The introduction of increased automation provides opportunities for companies and industries faced with the need to increase distancing between workers, reduce equipment handoffs, and decrease the health risks to the workforce.

Robotics: In many industries, such as the auto industry, investment in robots and remote monitoring has been increasing rapidly in recent years, driven by the need to decrease wage spending, and COVID-19 is already leading to rapid acceleration.

Robotics has seen an immediate burst of activity with the use of robots to operate in risky environments such as hospitals. Numerous companies have ramped up robot production. Two Danish companies, Blue Ocean Robotics and UVD Robotics, and San Antonio-based Xenex are experiencing rising demand for disinfection robots that use UVC light to deactivate pathogens. Airports and airlines are also looking to robots for safer disinfection.

Industrial IoT: The deployment of industrial IoT will accelerate, with increased use of sensing, data visualization, remote collaboration tools and AI-based learning. Insights from industrial IoT will be deployed across manufacturing operations insights across their operations. Control-tower view of data and insights across the whole manufacturing operation will become a standard component of running a manufacturing organization.

Remote Oversight and Operation: We predict more rapid adoption of remote diagnostic, management and collaboration tools enabled by real-time data, AI-based insights and a range of communication and collaboration tools. Advances in AI and IoT technologies enable efficiencies in predictability, capacity, availability and flexibility of supply-chain operations. Early adopters of these technologies have seen a 7-percent revenue growth advantage against competitors, according to McKinsey data. Lean tools allow manufacturers to benefit from a robust set of remote diagnostic and management tools to digitize and scale much-needed expertise across the organization, creating a remotely connected "virtual shift" of specialists to guide and oversee the reduced "physical shift" of onsite personnel.

PRIORITY: REORGANIZE SUPPLY CHAINS FOR GREATER FLEXIBILITY

Due to dependence on China for components, raw and processed materials, and manufacturing subsystems, nearly every major industry has been affected by production issues since the earliest days of the pandemic. As China's original equipment manufacturers (OEMs) face the challenges of resuming their production capacity, global manufacturers will continue to feel the impact of parts and materials shortages in their supply networks.

Lean Manufacturing helps address such issues by helping companies leverage communication channels with customers and suppliers to determine demand signals, understand key risks through all tiers, run supply chain stress tests, and conduct scenario planning. Agile operations are much better positioned to evaluate alternative sourcing options, address logistical issues, and rethink supply chain options, which may include future-thinking disruptive strategies.

New tools and approaches will prove critical in de-risking supply chains to better manage future needs and protect in times of crisis. Increased use of local production and digital solutions will be essential strategies.

Forward-thinking manufacturers have used digital printing and additive manufacturing to supply parts and equipment when prior supply chains failed. When Mologic, a UK-based diagnostic testing company, received a grant by the British government for COVID-19 testing research, the company used 3D printers from Formlabs to rapidly prototype and produce COVID-19 test kits.

Manufacturers can use Lean tools to pursue strategies such as maximum modularization of parts and components and to build partnerships for automation solutions and digital services. One key to successful additive manufacturing is having a single, centralized database with identified parts and data from past orders in a digital inventory, enabling access to production requirements and material selection.

San Francisco-based Fictiv rapidly pivoted to produce specialized COVID-19 protective face shields by setting up an injection molding tool based on an open-source design approved by the National Institutes of Health. The company now has a production volume of millions of shields per month, which can be shipped out at one to two days' notice in batches of up to 10,000 at a time.

Four Principles helps clients develop a comprehensive inventory and supply chain planning initiative that includes a sophisticated toolkit of AI, automation and digital solutions and incorporates risk resilience.

PRIORITY: BOOST ABILITY TO PIVOT QUICKLY

In response to critical shortages in disinfecting supplies, medical equipment, and protective gear, companies have used Lean Manufacturing strategies such as rapid prototyping and simultaneous engineering to reorient existing facilities to produce entirely different product lines.

In the US, President Donald Trump invoked the Defense Production Act to enlist companies including General Electric, Medtronic, General Motors, Hill-Rom Holdings, Resmed, Vyaire Medical and Royal Phillips N.V. to build ventilators and other equipment. In response, General Electric partnered with the Ford Motor Company to build a simplified version of an existing ventilator with a goal of producing 50,000 in 100 days.

In the UK, British Prime Minister Boris Johnson (who himself was hospitalized for COVID-19) issued a country-wide call for mass ventilator design and production. Two companies quick to respond to the British government's order were Dyson and Grey Technologies (Gtech), both of which design and produce vacuum cleaners and other equipment that involve motorized airflow technology.

Dyson partnered with design incubator TTP on a new ventilator design, the CoVent, which can be either bed-mounted or portable with a power supply. Because the CoVent required just slight modifications to Dyson's existing digital motor design and air-purification technology, the fan units needed for its production were already available in high volume and Dyson was able to quickly manufacture 10,000 units for the UK and 5,000 more to donate to international relief efforts. Gtech has also developed a ventilator using materials already in stock and off-the-shelf pre-assembled parts, allowing it to produce 30,000 ventilators for the British government in two weeks.

Worldwide shortages in masks, disinfectant, hand sanitizer, and other safety-related products led a host of companies to retool production. Japan's Sharp Corporation reorganized manufacturing to produce medical face masks while office supply company Steelcase turned its plants to producing face shields, masks, and partitions for hospitals. Apparel companies ZARA and H&M began producing gowns and personal protective equipment (PPE).

With virus-killing sanitation products in critically short supply, distilleries and beauty companies retooled to make alcohol-based disinfectants. Anheuser-Busch brewing company had produced more than 175,000 bottles of hand sanitizer for the Red Cross and other relief efforts as of April 20th, 2020, while famed rum distillery Baccardi redirected its operations to produce ethanol, a key ingredient in hand sanitizers and other disinfectant products. Among the global beauty companies Agile enough to retool quickly were L'Oréal, Coty, and Estée Lauder. Smaller distilleries such as Austin-based Tito's Vodka, Vermont-based Silo, Brooklyn-based New York Distilling Company, and numerous Kentucky distilleries were even more nimble in redirecting operations to produce sanitzer.

PRIORITY: IMPROVE FORECASTING, PLANNING AND CRISIS RESPONSE CAPABILITIES

To keep manufacturing companies financially sound, it's important to match production to product needs, an extreme challenge in the current situation. Consumption patterns will continue to be unpredictable for the next 6-12 months and manufacturers must assess the situation customer by customer.

It's likely that there will be subsequent outbreaks of COVID-19, requiring populations to return to confinement again for periods after initial restrictions have been lifted. Manufacturers must prepare themselves for the "new truth." Such variations make it essential to risk-proof operations and plan for the company to be on uncertain footing for a sustained period. The conclusion of numerous experts is that the coming months will be volatile and unpredictable. With the risk of the contagion continuing for 12-18 months, companies should plan to take long-term measures to manage workplace health and their supply chain disruptions.

Lean Manufacturing positions companies for greater success in this environment, enabling them to use predictive and prescriptive analytics, scenario simulation and early-warning detection to forecast demand changes almost in real time. Four Principles excels in helping companies understand and implement Lean Management principles, practices and strategies to address global market uncertainties.

Scenario and crisis planning will be critical and companies must expand scenario planning to take into account more extreme cases. Lean tools can be used to assess the potential effects of various factors and forecast their impact. In fact, Lean Manufacturing can help companies turn the current crisis into an opportunity for disruption. "According to the Japanese concept of Ki-Ki, every crisis is also a chance," says James Ryan, Principal at Four Principles. "Manufacturers will need to make changes from the ground up to magnify customer value while minimizing delivery costs and will need to be fast and agile to do this."

To position themselves for a more disruptive reality, manufacturers must focus on three capabilities: prediction, adaptability and resilience. Companies are rapidly deploying tools and systems to improve prediction, with some good outcomes. However, improving the ability to adapt is proving more challenging.

Four Principles' structured Lean approach allows companies to implement required changes strategically and sustainably, which will be the key to survive in the very difficult manufacturing landscape of today and the next two years.

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