Forbes insights

The Future Of Manufacturing:

Legal Challenges And Market Opportunities In The Digital Age

IN ASSOCIATION WITH

K&L GATES



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Introduction

3D printers that produce complex components, fully automated warehouses manned by robots and tiny sensors that transmit data among smart devices are just some of the innovations reshaping the manufacturing industry today. For organizations that take advantage of these developments and emerging technologies like artificial intelligence (AI), the rewards are plentiful, including better business continuity, reduced operational costs and seamless supply chains.

Despite these opportunities, manufacturers also face significant risks in today's climate. Globalization has created new market entrants, increasing competition for industry stalwarts. Uncertainties around disruptive technologies like blockchain are intensifying regulatory requirements. And geopolitical shifts are causing companies to carefully question their global alliances.

To remain competitive, manufacturers must manage these risks while taking full advantage of the opportunities these changes offer. But operating in an increasingly volatile sector demands strategic leadership—legal teams with an in-depth understanding of everything from technology risks to evolving regulations.

To discover the legal challenges and market opportunities facing the manufacturing industry, Forbes Insights and K&L Gates conducted a survey of more than 200 U.S.-based business and legal executives. These executives hail from organizations large and small in a variety of segments ranging from aerospace and defense to automotive and engineering.

By surveying a wide array of participants and interviewing some of today's leaders in this space, we set out to discover how these executives are responding to rapid change in manufacturing. The findings are highlighted in this report. We show how organizations have been affected by these changes, how they have responded, how they plan to address these changes in the near future, and how these changes are redefining executive and legal roles.

The Tailwinds Of Change

The manufacturing sector is in a state of flux.

Disruptive technologies are challenging traditional business models and overturning age-old processes. Embedded sensors now detect where and when equipment malfunctions occur, alerting systems engineers in real time. 3D printing lets companies make changes to product designs in half the development time and at a fraction of the cost. And blockchain technology, best known for powering cryptocurrencies, is providing unprecedented transparency into supply chains for increased cost savings and regulatory compliance.

However, the more cutting-edge the technology, the more complex the regulations surrounding it. Just ask Barry Draskovich, vice president of program and contract management at Parker Aerospace. Draskovich says "leadingedge technologies are increasingly being incorporated into both commercial and military aircraft." Examples range from automatic flight control systems to composite aircraft designed to survive lightning strikes. "With software ending up in hundreds of millions of lines of code on each airplane, there have been additional regulations put in place that guide the testing and documentation needed" for an aircraft to become commercially available, he says.

Aircraft manufacturers aren't the only ones facing more stringent regulations. One major motor vehicle engine manufacturer is under unprecedented pressure to meet everything from U.S. Environmental Protection Agency requirements to product safety regulations.



"Agency regulators for the Clean Air Act are looking at the emissions of automobile manufacturers with much more scrutiny," says an executive with the company. Long gone are the days, the executive continues, when companies could simply "submit the necessary [emissions and fuel economy] data" and receive certification. Rather, scandals, such as one company's cheating on emissions tests, have intensified scrutiny from governing bodies.

In fact, many manufacturers must comply with increasingly complex laws—or risk stiff legal penalties. Case in point: The General Data Protection Regulation (GDPR) requires companies handling the data of European Union citizens to comply with strict data privacy regulations with the cost of noncompliance set at a staggering 4% of global revenue.

Yet compliance can be challenging when using technologies such as the Internet of Things (IoT). That's because data processing and analytics take place in the cloud where it can be difficult to track and monitor data security across an entire supply chain. Blockchain also comes with its fair share of challenges as regulators curtail the potential mainstream applications of programs involving cryptocurrency. No wonder nearly half, 45%, of respondents believe the complexity of regulations has been increasing. Fortythree percent see an increase in the sheer number of legal requirements, and nearly a third, 31%, fear legal repercussions, including business disruptions and recalls (Figure 1).

Figure 1.

To what extent do you completely or strongly agree with the following statements about the changing legal environment globally?



Legal repercussions (e.g., fines, work stoppages, recalls) have been increasing And then there are the uncertainties fueled by escalating trade wars around the globe. The weapons of choice are tariffs, supply disruptions and other nontariff barriers. Countries are imposing tariffs and countertariffs on everything from industrial and agricultural products to consumer goods, heightening fears of job losses and slowing economic growth. Export restraints and regulatory barriers are disrupting global supply chains, increasing costs and depressing the economic benefits of competition.

Navigating and mitigating the domestic and global impact of these trade restrictions is challenging. It is no surprise then that 36% of companies surveyed cite global trade alliances and commodity tariffs as one of the most pressing legal issues facing manufacturers (Figure 2). And 25% of organizations say political, economic and trade issues are top of mind in terms of legal repercussions (Figure 3).

Together, these three factors—disruptive technology, a stringent regulatory environment and tense trade relations—are prodding manufacturers to rethink the way they do business. The result is a unique opportunity to embrace new and innovative growth strategies, provided they understand and prepare for the legal issues that stem from monumental transformation.

45% of respondents

believe the complexity of regulations has been increasing.

Figure 2.

Which of the following trends and issues are most relevant from the legal point of view?

Global trade alliances and commodity tariffs

36%

Compliance and regulatory environment

33%

Data and analytics

32%

Labor laws/immigration

32%

Digitalization of the manufacturing sector

32%

Figure 3.

Which of the following areas are currently top of mind for you in terms of their legal repercussions?

Regulatory and compliance issues



Internal functional and organizational issues

25%

Political, economic and trade issues

25%

Sustainability/environmental issues

25%

Seizing Growth Opportunities: New Alliances, Innovative Technologies And Hot Markets

To continue to thrive, many of today's manufacturing organizations—and the legal professionals that work for them—must find new ways to grow and innovate, or risk regulatory penalties, data breaches and technological shortcomings.

New Alliances

Chief among these strategies is collaboration with unlikely partners. Thirty-eight percent of respondents are forming alliances or joint ventures to grow their businesses. Recently Ford Motor Co. and Volkswagen Group agreed to form an alliance that would facilitate collaborating on vans and other commercial vehicles. It's a partnership that could help reduce the exorbitant costs of developing new vehicles.

Similarly, pharmaceutical manufacturer Pfizer and pharmaceutical wholesalers, including AmerisourceBergen,

McKesson and Cardinal Health, joined MediLedger, a consortium that's building a blockchain for tracking the provenance of pharmaceuticals. This open and collaborative network promises to increase supply chain efficiencies and reduce the influx of counterfeit drugs.

Innovative Technologies

Technology is also a catalyst for growth. One example is how manufacturers are discovering the power of embedding equipment with IoT-enabled sensors that can send and receive real-time notifications about operating conditions. By predicting malfunctions and flagging areas of deterioration using interconnected devices, manufacturers can shift focus from reducing downtime to drumming up new business.

Draskovich of Parker Aerospace points to the example of a hydraulic pump on an airplane. In the past, he says, operators "wouldn't know if a pump was getting hot and approaching failure" until it was too late. "We'd have to replace the pump while the plane was on the ground at an airport, which could lead to a service disruption."

That changed, however, when Parker Aerospace began "putting features in some new products that can tell airline operators when a component might be wearing out or heading toward failure," says Draskovich. "With IoT, we can proactively replace a part before it fails, allowing the airline to avoid a service disruption." Automation also promises to spur growth among manufacturers. According to Draskovich, Parker Aerospace relies heavily on acceptance test procedures to ensure that hardware components meet rigorous standards of operation. By automating this process, the company can eliminate a time-consuming, manual process while boosting productivity.

But the supply chain is where manufacturers expect to reap the greatest gains from technology. "The accelerating rate of technology change combined with new digital innovation offers game-changing solutions for those supply chains that are ready to harness them," noted James Lisica, a Gartner research director, in his keynote speech at the Gartner Supply Chain Executive Conference. Top supply chain priorities among organizations include creating real-time visibility (38%), improving flexibility, agility and time to market (36%), and shifting supply chain participants across countries and regions (35%) (Figure 4).

It's easy to understand the increased demand for supply chain excellence. Today's supply chains must be more transparent and flexible than ever to accommodate the fast pace of production and fluctuating market trends and customer demands. Thanks to delivery services such as Amazon Prime, customers now expect to-the-minute service updates details that can only be gleaned from sophisticated data analytics systems. And by predicting supply chain disruptions, manufacturers can better coordinate hand-offs between supply chain partners and avoid punitive tariffs.

Hot Markets

Domestic markets also present a growth opportunity for manufacturers. Organizations can experience a high level of success in the U.S. without having to face the challenges of going global, such as operating in more volatile environments. Localizing a supply chain can also reduce logistics costs while allowing for greater control of product delivery, sourcing and purchase orders.

Figure 4.

Which of the following transformations has the supply chain been undergoing?



"The accelerating rate of technology change combined with new digital innovation offers game-changing solutions for those supply chains that are ready to harness them."

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JAMES LISICA

Gartner Research Director

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Calculating The Risks Vs. Rewards Of Transformation

Even the smartest growth strategies require overcoming considerable legal risks. Nearly half— 45%—of respondents believe there are extremely high levels of legal risk associated with collaboration.

Take, for example, the U.S. Food and Drug Administration, which is cracking down on drug quality to prevent impurities, such as potentially cancer-causing chemicals, from showing up in medications. The agency has hired dozens of chemists to review pharmaceutical companies and monitor for any changes in manufacturing techniques.

While greater quality assurance is good news to the millions of people who rely on prescription drugs to fight disease, some measures can complicate partnerships. U.S. drug manufacturers increasingly rely on their foreign counterparts to provide the raw ingredients for drugs sold in domestic markets. But while production costs in countries such as China and India are low, joining forces with suppliers in foreign locales, where government oversight is negligible, can lead to costly recalls, reputational damage and legal liabilities. Technologies such as the IoT, 3D printing and predictive analytics are also guiding manufacturers to new processes and innovative business models—as well as higher risks. More than 90% of respondents are currently using IoT devices, cloud computing and 3D printing to improve supply chain operations, accelerate production and cut operational costs (Figure 5). When it comes to which technology presents the highest legal risk, respondents overwhelming say AI is the riskiest (Figure 6).

However, as these technology solutions and their use cases quickly evolve, legal, governance and compliance teams find themselves struggling to keep up. A perfect example is blockchain: The powerful digitized, decentralized ledger offers benefits ranging from greater supply chain transparency to increased security. Retail giant Walmart, for instance, is using blockchain technology to track shipments from its suppliers and reduce the risk of food contamination such as E. coli. Research firm IDC predicts total corporate and government spending on blockchain will grow from \$2.9 billion in 2019 to \$12.4 billion by 2022.¹

But pushback from the financial industry and a lack of understanding of the technology itself are causing regulators to scramble for universal standards. Indeed, 81% of respondents agree that the next three years will see significant development in how technologies such as blockchain are regulated.

Similarly, as new technologies provide more opportunities for manufacturers, they also increase the risks of cyberthreats and legal liabilities. IoT devices are particularly vulnerable to attack. Malware, for example, can infect an IoT device's

1 "Worldwide Blockchain Spending Forecast to Reach \$2.9 Billion in 2019, According to New IDC Spending Guide," March 4, 2019

storage, remove network configuration and halt the device's operation.

Breaches in manufacturing networks can compromise proprietary information such as copyrights, patents and trade secrets. And security controls bolted onto old manufacturing systems can increase exposure to data theft.

"To the extent that data is in our manufacturing components, there is a chance for harm to be done there," says the executive from a major motor vehicle engine manufacturer. To mitigate security risks, the executive says the company is working closely with governing bodies to establish industry regulations.

In addition to setting standards, manufacturers are taking significant steps to secure physical assets. Parker Aerospace "is very active in setting up security measures to prevent us from being hacked," says Draskovich. For example, all of the company's automated test equipment and proprietary data resides within a highly secure, internal network. "We are defending against potential incursions within our system many, many times every day," he says. "Our goal is to not only protect automated test equipment and its data, but to protect the entire Parker network from intrusions."

Employees are just as threatening to a manufacturer's security posture as factory equipment and sophisticated networks. Consider, for example, the International Traffic in Arms Regulations (ITAR) which mandates that access to physical materials or technical data related to defense and military technologies must be restricted to the U.S. "It's a really serious matter," says Draskovich, noting that "a violation could lead to jail time." To ensure compliance, he says the company does "a lot of work internally to make sure that everyone who is working in an ITAR-controlled environment is aware of what the regulations are and strictly abides by them."

Figure 5.

Which of the following technologies is your organization currently utilizing? (top five)

Internet of Things	99%
Cloud	98%
3D printing	95%
Predictive analytics	94%
Mobile	93%

Figure 6.

Legal risks of emerging technologies (percentage high risk)



Beyond innovative technologies and errant employees, where a manufacturer chooses to operate can also present legal hurdles. Top manufacturing companies are expanding to new geographical markets in search of fresh business models and revenue streams. But while 98% of respondents view the U.S. as a growth market, 45% believe entering new domestic markets presents significant legal risks.

For many manufacturers, the alternative is to expand internationally. In fact, 56% of respondents view South America as a top destination for manufacturing facilities, and it ranks second highest (71%) among desirable growth markets. No wonder nearly all companies (98%) say 25% to more than 50% of sales will be coming from different geographies.

However, taxation and complex regulations can act as a legal hindrance to global expansion (Figure 7). Events such as Brexit can lead to declines in output and exports, while legislation such as the EU's GDPR can complicate the storage and processing of consumer data.

Figure 7.

Which of the following recent political, trade or regulatory changes are causing very high or extremely high legal challenges?





How General Counsel Can Make Its Mark In Manufacturing

Fortunately, the right legal team can address the numerous legal, regulatory, operational and financial issuesthat manufacturing companies face.

But this is only if legal executives are permitted to play a more critical and consistent role in strategic decision making. Although 53% of respondents are typically involved in decision making, starting with strategy execution, only 39% are involved throughout the process, from design to execution. By changing this dynamic, executive and legal teams can ensure manufacturing companies make legal issues a top priority when mapping growth strategies.

As it stands, more than a third of respondents—39%—say legal matters are only one of the top five considerations when deciding on a growth strategy. That has to change so that regulatory standards factor into a company's decision making when forming an alliance or deploying a new technology.

Another opportunity for greater impact: a stronger CEO connection. Among nonlegal executives, a meager 3% of respondents most often collaborate with the company CEO, while a full 97% wish they could collaborate more. The majority of respondents—95%—collaborate with supply chain executives. By enabling general counsel to act more as a strategic advisor to the C-suite than just a lawyer, manufacturing companies can embed legal precautions in everything from supply chain processes to factory floor operations.

Executives are already noticing a seismic shift. A substantial 71% of C-level and legal executives believe their role will substantially change over the next three years. "More than half of what I do now as general counsel is provide strategic advice," says the executive from a major motor vehicle engine manufacturer.

Another 77% of respondents believe they will have to deal with a lot of new issues. But new roles and responsibilities call for new competencies. More and more respondents are feeling the pressure to acquire industry knowledge (39%), develop change management acumen (27%), and use technology for predictive thinking and analytics (27%) (Figure 8). Together, these skills can help close critical knowledge gaps and ensure that legal teams provide the most accurate and informed advice.

But it's not enough for general counsel to simply learn about technology; they must also embrace it. Ninety percent of respondents report the legal department's technology use is only satisfactory compared with other functions, such as finance and marketing. That's changing as technologies such as blockchain revolutionize the way the legal function operates. Smart contracts, for example, let multiple parties trade and transact without an intermediary. Terms of agreement are written directly into lines of code so that clauses are fully self-executing and self-enforcing. By automating aspects of contract management, smart contracts challenge general counsel to explore new pursuits and expand their role.

When it comes to which areas of legal experience will be most needed over the next three years, respondents cite competition and antitrust, international trade politics, and energy/the environment (Figure 9).

Figure 8.

Beyond understanding the legal issues, what are the skills and talents that are most required of you?



Figure 9.

Which areas of legal expertise will be the most needed over the next three years?



By enabling general counsel to act more as a strategic advisor to the C-suite than just a lawyer, manufacturing companies can embed legal precautions in everything from supply chain processes to factory floor operations.

A Look To The Future

The way manufacturers use technology, comply with regulations and partner with competitors will affect strategic decision making for years to come.

But it will also necessitate a new breed of general counsel: Tech-savvy lawyers with practical business knowledge to help manufacturers capitalize on sector changes and address the challenges they face in today's economic climate, wherever they operate.

For some manufacturers, this may mean hiring lawyers with a strong technology background. For others, the answer will be establishing centers of excellence where lawyers report to general counsel but work closely with IT teams. Regardless of the organizational configuration, one thing is for certain: The manufacturing revolution will create ripples that extend beyond the factory floor into boardrooms and courtrooms around the world.

Methodology

The data in this report is based on a survey of more than 200 U.S.-based legal and nonlegal executives from the manufacturing sector conducted by Forbes Insights.

Twenty-five percent of survey respondents were chief legal counsel/officer, general counsel or top legal officers. A majority of companies (88%) had revenues of \$1 billion or more. The manufacturing segments represented were aerospace and defense products, automotive, engineering, metals, consumer products, conglomerates, and transportation and logistics.

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