McKinsey & Company

Operations Practice

The coming evolution of field operations

New technologies are reshaping aftermarket services—and both customers and providers can benefit.

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It's Thursday afternoon when you get an alert from an embedded sensor. One of your machines at a customer's production plant is about to go down. Your customer finds out when you do, and you both know that the asset is business-critical—if it goes offline, it will cost the customer millions. Within minutes, you line up on-demand technicians from an open-market source, all certified experts with this equipment. As soon as the job gets assigned, the customer can start tracking the technicians via a mobile app. Rather than waiting to run traditional diagnostics on-site, the technicians leverage embedded sensors while on route, which tell them exactly what's wrong, how to fix it, and the precise set of parts and tools they need to bring. Once they arrive, they're armed with augmented reality tools and remote support from experts at headquarters that walk them through the repairs step-by-step. Even better, the team identifies two other looming issues with the equipment and proactively fixes them. Less than four hours after the initial alert, the crisis is averted and the customer is beaming.

This is the future of field operations. Industrial manufacturers with aftermarket services have been disrupted by new technologies and advanced analytics, but the best organizations are not resisting but capitalizing on those trends. These companies are transforming their field operations to dramatically improve service levels and the customer experience, increasing efficiency and productivity, and creating value in new ways—both for customers and for themselves as original- equipment manufacturers (OEMs).

Based on our experience, field organizations that transform themselves to capitalize on new technologies can generate significant gains in labor costs, productivity, and other performance metrics (Exhibit 1).
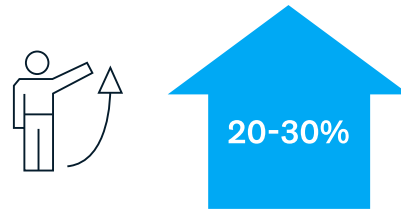
Exhibit 1

Technology advances have led to major performance improvements in field operations.

Lower costs

10-40%

Improved productivity
Jobs / FTE / day

20-30%

Repeat visit reduction

5-20%

Travel time reduction

5-30%

Four essential technology-enabled trends

The field-operations function has evolved over the past several decades, keeping pace with changes in technology. However, new technologies mean that field service will take a quantum leap forward in terms of efficiency, effectiveness, productivity, and the customer experience (Exhibit 2).

In the current environment, there are four critical areas in which technology evolution is reshaping the field force. Each of the five warrants a closer look.

Smarter and more integrated workflow tools
In the past, companies strived to aggregate information into dashboards. That's a decent first step, but dashboards have drawbacks. They often overwhelm users with too much data and not enough insight. They also don't address the variability in managerial effectiveness, and they tend to bunch problems and issues into slow reporting cycles—often weekly or monthly.

In contrast, advanced analytics allow companies to generate specific action steps based on the out

information being tracked. These steps—presented through intelligent actionboards—can be extremely prescriptive, down to the level of coaching individuals, following up with specific customers to address low customer satisfaction scores, or visiting facilities to sort through service-level-agreement misses. The advantage of this approach is that it eliminates the often-manual step of analyzing data in a dashboard a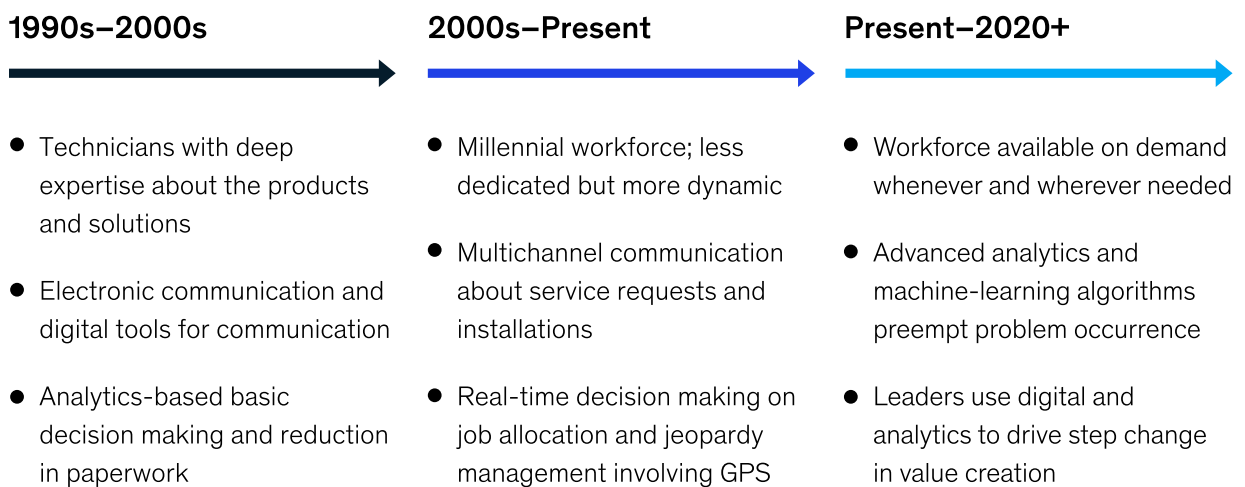nd figuring out what to do based on that data. Instead, actionboards give managers a clear course of action to take, through standardized measures to ensure that all managers are acting consistently and effectively. What's more, this approach allows companies to respond to metrics in real time.

Artificial intelligence and machine learning
Artificial intelligence and machine learning empower machines to improve predictive maintenance. Embedded sensors and other tools allow manufacturers to track all of their assets in real-time, with all alerts visible on a single screen. Detailed views give key indicators of machine performance, enabling manufacturers to create a service ticket with likely resolutions—instantly.

Exhibit 2

Technology is deepening a paradigm shift in how field operations are run.

1990s–2000s	2000s–Present	Present–2020+
• Technicians with deep expertise about the products and solutions	• Millennial workforce; less dedicated but more dynamic	• Workforce available on demand whenever and wherever needed
• Electronic communication and digital tools for communication	• Multichannel communication about service requests and installations	• Advanced analytics and machine-learning algorithms preempt problem occurrence
• Analytics-based basic decision making and reduction in paperwork	• Real-time decision making on job allocation and jeopardy management involving GPS	• Leaders use digital and analytics to drive step change in value creation

When equipment does fail, AI and machine learning help technicians reduce diagnostic time. For example, smarter IoT applications can give techs a single-screen view of all necessary service requirements and details for a given job, along with easily accessible knowledge documents to solve support requests quickly. Technicians can also get on-demand support and work in parallel with an experienced, remote technician that can guide them through complex repair processes. One global OEM used this approach for roughly 25,000 field technicians across the globe, reducing maintenance costs by 15 percent for the entire organization.

Augmented reality (AR)

The simplest form of AR is a tablet in the hands of a technician. Consider a technician on a job site who needs to fix a circuit board but does not know how. The tech could either open up a binder and start trouble-shooting—an approach with a high probability of wasted time, or ask the dispatcher to send another tech with more specialized expertise, resulting in continued downtime and a negative customer experience. Alternately, that same tech could use an AR-enabled tablet, glasses, or other tools to gain richer information about a downed asset. For example, a headset-enabled service motion can free up one or both hands, leading to clear productivity gains. More advanced AR tools are becoming available that will let workers hold a tablet up to a machine and download an internal schematic, allowing a service tech to see what the inside of a device is supposed to look like before he removes the cover. A common theme of AR is that these tools allow technicians to solicit help from a remote expert at headquarters, who can guide the on-site technician, through visual steps depicted in an AR-enhanced view of the situation. That leads to much faster problem resolution, improving the customer experience. Companies in sectors ranging from semiconductors and high tech to oil and gas and heavy equipment are all using AR applications for their field technicians.

On-demand workforce

Last, technology is changing the labor force within field organizations. Rather than retaining a complete staff of full-time employees, companies can use on-demand staffing to reduce complexity in the workforce. Essentially an "Uber-like" model for talent, on-demand staffing lets skilled workers like certified technicians, coders, electricians, and other specialists provide their services via an on-demand marketplace. For OEMs, this approach can optimize labor costs, particularly for non-core activities. Companies can also streamline support functions, even as they improve service levels and broaden their service footprint.

Putting the tools to work

To see how these tools could come together in the real world, consider the following applications.

1. *Matching demand.* Many OEMs struggle to accurate gauge demand. By using advanced analytics tools such as machine learning, they can integrate multiple sources of data—both internal and external—to build accurate forecasts of demand for each local market. They can also set the right level of in-house staffing with on-demand workforce resources to flex up or down in order to meet demand. And they can set up dynamic dispatching systems to put field technicians at job sites quickly, with the capability to react to changes in real time. Total savings: 5-20 percent in labor costs.

2. *Increasing efficiency.* By automating and digitizing processes, OEMs can run their field operations far more efficiently. For example, they can digitize manual processes and paper documentation and replace clipboards with smart devices. They can also use advanced analytics to sort through job reports and identify best practices that can then be standardized across the organization. And they determine performance-management metrics and create action-oriented dashboards to better manage performance. Total gain: 10-30 percent gains in productivity.

3. *Improve the customer experience.* Perhaps most important, OEMs can use new technology to improve the customer experience. For example, they can apply analytics to identify

the biggest drivers of satisfaction across the entire customer journey, in order to eliminate pain points and refine the offering. OEMs can also use analytics to increase service-to-sales performance. Total gain: 5-15 percent increase in sales, and 20-40 percent increase in customer satisfaction.

Consider a telecom company that was struggling with the high cost of running field service operations. Worse, it was lagging its competitors in key performance metrics like technician utilization levels and the percent of customer appointments met on-time. A key problem was that different divisions—sales, forecasting, dispatching, and field operations—were all operating in silos, each focused on their own unit execution rather than the real goal of serving customers. To overcome this issue, the company set up a cadence in which all units started collaborating in near-real-time. That allowed the organization to be more flexible with labor scheduling, hold everyone accountable for performance, focus on the end customer, and make continuous improvements to its field operations—all at the same time. As a result, the organization improved the productivity of field technicians by 10 percent and the rate of on-time appointments by 5 percent.

Four priorities for management

To capitalize on these new technologies—and treat them as catalysts for performance, rather than disruptions—OEM leadership teams should focus on four priorities, bearing in mind that the rewards tend to go to first movers (Exhibit 3).

Build digital and analytics skills

Many organizations simply do not have sufficient capabilities in place yet. OEMs need to launch a concerted effort to build up these capabilities, either through training and development programs for existing team members or through targeted recruiting and hiring initiatives. Notably, these capabilities do not all need to come through full-time employees. Instead, companies can tap into institutional expertise through contracting with suppliers, partnerships, and joint ventures.

Collaborate with solution providers

Rather than waiting for technologies to emerge and then determining whether and how they might meet a need within the organization, OEMs should be far more proactive, partnering with the providers developing these new tools. Not only will this allow OEMS to get a better understanding of what's coming, but solution

Exhibit 3

First movers have significant advantage over companies with average response.

Percentage-point change in 3-year revenue growth of first movers vs other organizations

| 12.3 | -7.0 | 5.3 |

Benefit captured by first mover | Benefit captured through average responsiveness
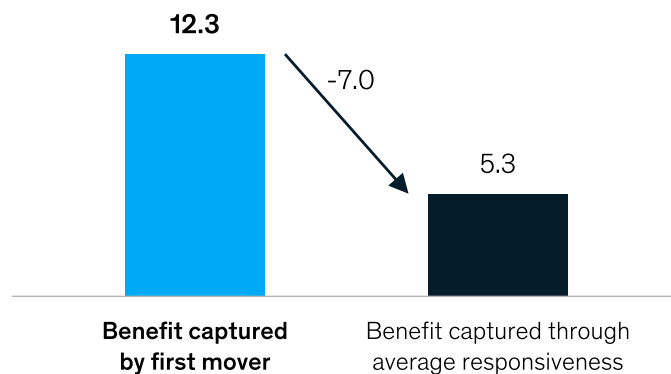
providers can often lack some of the real-world experience specific to a given industry; they might welcome the input and knowledge from end users.

Modernize workers' mindsets

Many OEMs have powerful inertia in their existing field workforce people and processes. Technicians adopt a zero-sum mindset in which they don't collaborate or share best practices. You can expect some to resist change, arguing in favor of "the way we've always done it." OEMs should create a culture and mindset of continuous improvement, potentially structuring rewards and incentives so that technicians and front-line employees can share in the gains from suggested improvements.

Redesign the organizational structure

Many OEMs have organizational structures that were designed for an analog world. Sometimes they grew through M&A and without sufficient integration. Digitization and advanced analytics can dramatically change how work gets done—they alter some processes and eliminate others altogether. But organizations won't be able to capture all the potential benefits from these technologies unless they rewire their organizational structure accordingly.

A real-world example: a global OEM that was struggling with low turnaround times for maintenance requests on its equipment. The company determined that the underlying problem was lost time during diagnostics and technicians being sent to the job without the right skills or parts to resolve the actual problem in the equipment. The OEM actually had sensors embedded on some of its equipment that could capture performance data, but that information was being sent to a data lake where no one looked at it. To improve, the company set up an analytics team and tasked it with developing machine learning algorithms to identify the most common failures on key equipment, along with the most common reasons for those failures. Once the algorithms were in place and harnessing sensor data, the team that could predict the top three reasons for a device failure with 75 percent accuracy. This led to dramatic improvements in the first-time fix rate.

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In the past, companies struggled to know what was happening with their equipment in the field. Today, the equipment can often tell them remotely—not only what's wrong but also how to fix it. Field 4.0 may seem like a futuristic vision, but digital and advanced analytics are real-world, proven technologies that forward-looking organizations are already using today. They offer companies a clear means of improving performance, reducing costs, and increasing customer satisfaction. In fact, the only uncertainty is whether management teams will have the foresight to begin capitalizing on these tools, or cede the future to their competitors.

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