

The Future of Field Service Management

Published 6 December 2019 - ID G00464790 - 23 min read

The future of work in field service will require both digital transformation and business model change in areas such as technician bots, digitally augmented subcontractors and outcome-based contracts. Application leaders will need to lead evolution in areas that have remained unchanged for decades.

Overview

Key Findings

- Outcome-based business models have arrived. Asset operators will need field service providers (FSPs) to minimize outage risk by dynamically adjusting maintenance activities.
- Evolution toward hybrid workforces, which combine subcontractors and employees in one labor pool, will become widespread. This will require new methods of triage, scheduling escalation and oversight to overcome barriers to good technician engagement and customer experience.
- Aging workforces will transition to workforces with less experience but more autonomy. This will require better digital service support techniques, especially for training, safety, collaboration, and democratization of distributed knowledge.
- Customers and their assets will require means to self-initiate, monitor and assist in work. This will force digital transformation into even the most resistant organizations, requiring adaptation to support new skills, analytics and monetization techniques.

Recommendations

For application leaders evolving customer service and support technology to align with the future of field service management (FSM):

- Use this analysis to determine which of four future scenario(s) align with your organization.
- Prioritize your digital and process transformation roadmap by using peers in industries that fit your selected future business scenario(s) as reference guides.
- Assess your organization's maturity, especially in areas such as data acquisition and analysis tools, access, mobile apps, integrations and business models.
- Use competitive intelligence to justify adding labor resources that will help you adopt Gartner's suggested new approaches and technologies now, before competitors take them.

Strategic Planning Assumptions

By 2025, over 50% of FSM deployments will include mobile augmented reality collaboration and knowledge sharing tools, up from less than 10% in 2019.

By 2025, over 50% of equipment manufacturers will offer outcome-based service contracts that rely on access to digital twin data, up from less than 20% in 2019.

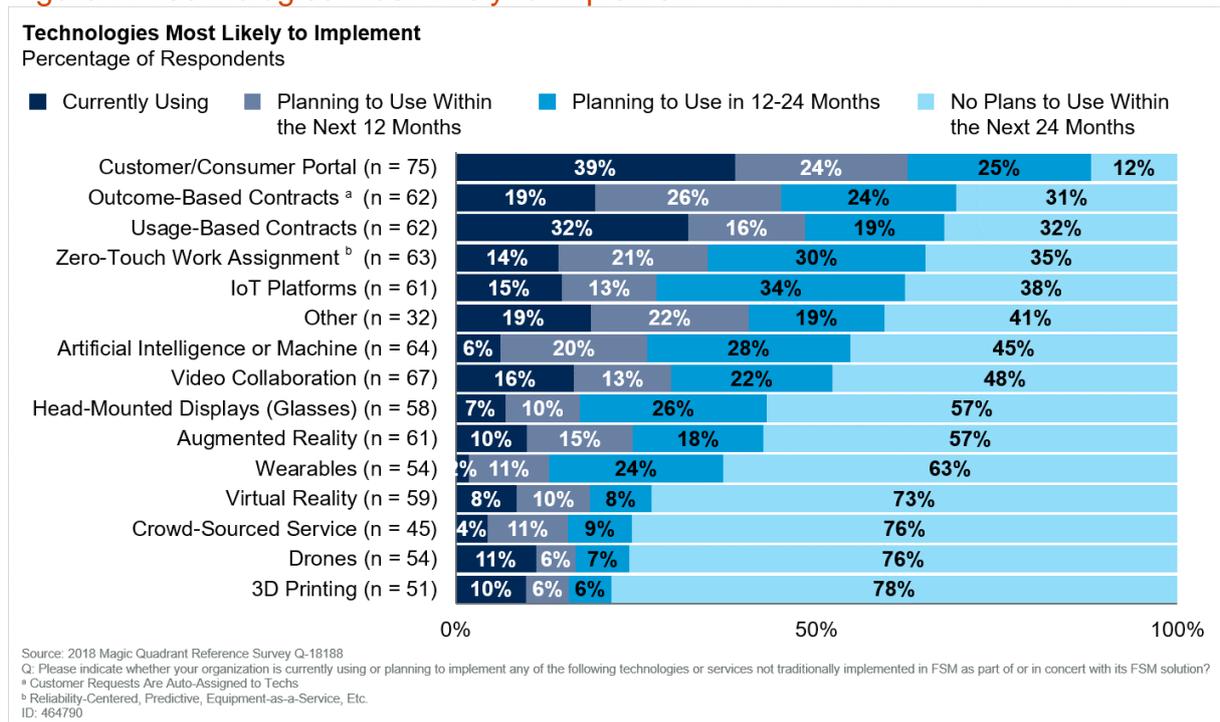
By 2025, in automated schedule optimization-dependent FSPs, algorithms and bots will schedule over two-thirds of field service work, up from less than 25% in 2019.

Introduction

Field service provider (FSP) organizations have been inundated by vendors offering so-called opportunities to improve efficiency, attract and engage talent, and improve customer experience. Application leaders must find innovative approaches to address challenges within their own organizations or even their own industry, but they find it difficult to develop defensible transformation roadmaps.

During our Magic Quadrant research (see "Magic Quadrant for Field Service Management"), we asked customers that were submitted as references by the included vendors to share their progress and plans toward adopting several approaches and technologies not traditionally included as part of FSM deployments. A summary can be found in Figure 1 below.

Figure 1. Technologies Most Likely to Implement



The right prioritization depends on factors unique to the organization, such as its technological maturity, change management skills, prerequisite systems, industry and aspirations. But it is important to also learn from competitors and collaborate with peers.

This research will help application leaders and field service leaders to develop their roadmaps by:

- Describing common characteristics across four future FSP operating scenarios — one or more of which application leaders can help their respective organization align with.
- Calling out key activities for each scenario and which industries might align with each, which will help application leaders identify cross-pollination opportunities.
- Identifying steps to begin the journey toward adopting key technologies and approaches for each scenario.

Analysis

Determine Which Scenario(s) Align to Your Organization’s Goals

It is helpful for application leaders and their field service leader counterparts to envision how adopting different processes, technologies or business models that are more mature in other industries could improve their organization. To frame this exercise, Gartner identifies potential long-term operating scenarios that differ from each other along multiple axes. Aligning to a scenario can help application leaders uncover how similar their aspirations and needs may be to other FSP organizations, even in other industries.

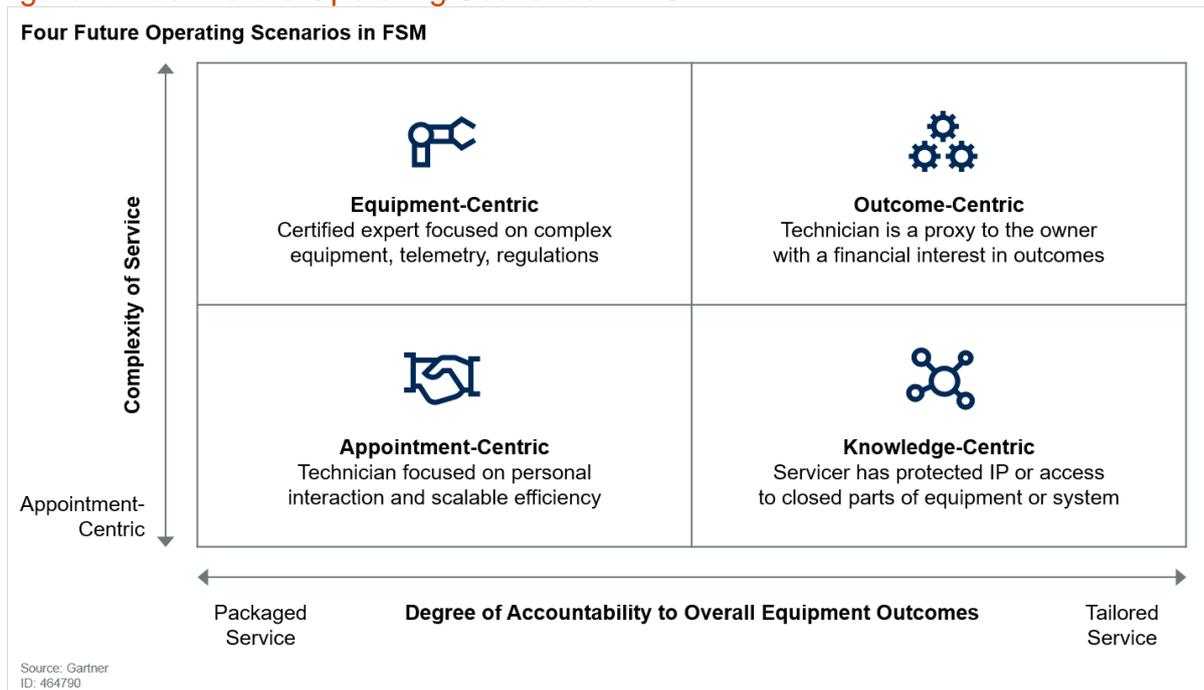
Several market factors will impact FSM, such as:

- the rise of triage centers staffed by former field technicians
- increased use of subcontractor and freelancer
- new business models driven by outcome-based contracts
- growing customer experience and workforce engagement expectations

But, for FSM, two considerations are most likely to drive prioritization of technologies and new business models:

- Degree of control and accountability to equipment outcomes — Gartner defines the *field service technician* as the role that typically travels to perform inspections, installations, maintenance, or repairs on equipment or systems operated by another organization in a remote location. The FSP is accountable to the quality of those services, but day-to-day tasks are left to the equipment owner or operator. In some scenarios, FSPs will drive loyalty by owning responsibility for the day-to-day drivers of the overall equipment performance — an “outcome.” In scenarios at the other end of the spectrum, the FSP may interact with a customer as little as once in a lifetime and only reactively, but the customer will still expect a personalized, effortless experience. The degree to which FSPs take responsibility for outcomes will heavily impact the transformations ahead.
- Degree of service complexity and asset-centricity — While service and scheduling are complex in their own ways, there are degrees in each. In some cases, the nature of the service is more appointment-focused while in others it is more equipment-focused. In appointment-centric use cases, optimizing scheduling to minimize things like travel time and late arrivals while also becoming better at communication remain important. At the other end of the spectrum are scenarios where the FSP’s knowledge of, and communication with the equipment as well as the ability for technicians to collaborate and assimilate knowledge will become increasingly valuable.

Figure 2. Four Future Operating Scenarios in FSM



By evaluating the degree of importance and relevance of each of these factors, an application leader can place the organization in one of four quadrants, as follows:

- Appointment-centric (low complexity, low accountability) — An appointment-centric technician will focus on the human touchpoints more than the equipment. They will often visit a high number of customer locations per day, but still be expected to arrive at specific times so they can have personal interactions. The skills variation among the technicians will be low and they will be a mix of employees and subcontractors. Scaling a simple, repeatable process to very large workforces (thousands of technicians) will be of critical importance.
- Knowledge-centric (low complexity, high accountability) — A knowledge-centric technician will often service a massive number of customers that are using the same equipment model. This reduces complexity but parts of the equipment may be closed to outside service — requiring specialized knowledge (think mobile phones, smart home devices or building controls). Knowledge-centric FSPs will need to learn the customer’s configuration and react quickly to issues that could affect many customers before they tarnish the brand.
- Equipment-centric (high complexity, low accountability) — An equipment-centric technician will need many years of experience to become an expert. They will “drop in” occasionally — only when called or according to contractually prescribed maintenance schedules, but will possess the certifications and equipment to diagnose complex issues safely. Equipment-centric FSPs will not continuously

monitor equipment or alter maintenance based on conditions. They will instead work to normalize planned maintenance packages in order to scale. Resolving equipment issues may require on-site and remote expertise as well as equipment telemetry access.

- Outcome-centric (high complexity, high accountability) — An outcome-centric technician will be an owner or operate as an owner's proxy — having a heavily vested interest in equipment performance. The FSP may have a contractual obligation that makes them accountable to certain “outcomes” (such as power consumption, output or uptime) or may have been assigned to be the owner's/operator's outsourced facility support.

Recommendation:

- If the organization has multiple identities, or is interested in changing position, determine whether it is moving closer or farther away from its goal quadrant(s). To do this, consider each active initiative's impact on the organization's position along each axis.

Adjust Your Roadmap Based on Adoption in Your Target Quadrant (Scenario)

Every FSP organization is at a different point along its technology maturity path, so each must adjust based on its own capabilities, but it is useful to understand what FSPs moving toward each scenario are building. Use Figure 3 as a guide toward choosing technologies that require urgent attention to keep pace as your organization evolves toward its goal scenario(s).

Figure 3. Top Technologies of Focus and Expected Impact by Scenario

Top Technologies of Focus and Expected Impact by Scenario		
Scenario	Top Changes/Tech	Impact
 Appointment-Centric	<ul style="list-style-type: none"> AI-informed automated schedule optimization Subcontractor onboarding and multifactored scoring 	<ul style="list-style-type: none"> Dispatchers will perform better troubleshooting Subcontractor quality will improve
 Knowledge-Centric	<ul style="list-style-type: none"> Conversational AI (chatbots) Customer self-service portals and workflows 	<ul style="list-style-type: none"> Customers will get to the right expert faster with chat triage Customers will initiate service
 Equipment-Centric	<ul style="list-style-type: none"> AR supported video collaboration IoT-based reactive troubleshooting (with customer assist) 	<ul style="list-style-type: none"> Office-based expertise will grow Junior technicians will be on-site alone sooner
 Outcome-Centric	<ul style="list-style-type: none"> Outcome-based contracts IoT-based predictive maintenance 	<ul style="list-style-type: none"> FSPs will become more adept at limiting maintenance First technician steps will be done remotely

Source: Gartner
ID: 464790

The above is a good starting point, but not intended to be an exhaustive list. For example, a specific organization may find it is better suited to adopt other technologies such as additive manufacturing (3D printing), knowledge management, or field service drones (see “Hype Cycle for CRM Customer Service and Support Technologies, 2019”).

Recommendations:

- Assess your organization’s current maturity in each area for each target scenario and begin analysis of what peers moving toward those scenarios are doing and why.
- Use the scenario-specific steps in the section below as guideposts to prioritize your roadmap.

Use Scenario-Specific Analysis to Select Top Areas to Focus On

Some of the same problems exist in all scenarios. However, organizations in some scenarios will be more heavily impacted by certain problems than others. Below, we review:

- Characteristics of organizations that will likely fit into each scenario.
- Most pressing challenges receiving investment in each scenario.

- Progress that the organizations likely to fit a given scenario have made (the current state).
- Approaches necessary to get to the future state that addresses the challenges.

Appointment-Centric FSM: Working to Simplify and Scale the Service Organization



Accountability to equipment outcomes: Low

Complexity of service: Low

In this scenario, organizations offer services that are largely similar from job to job, so they must seek consistency and simplicity in order to scale. They often must cover wide geographical areas, so they make heavy use of third-party subcontractor technicians.

Candidate FSPs:

- Cable operators have a high volume of technicians but each receive the same training, so there is low skills variability between the technicians. There is a high degree of volatility within their schedules and they visit several customer locations per day.
- Debt collectors that make home visits also have a high number of stops per day, so organizing them in a manner that is geographically efficient is important.

Top challenges:

- Scheduling constraint data exceeds human analysis capacity. Organizations have access to data but often this is ignored in favor of dispatcher intuitions because there are too many constraints to consider them all manually.
- Subcontractors need guidance, approvals and oversight in order to carry the brand promise. Many organizations are increasing their use of subcontractors, hoping for higher margins. However, inefficiencies in interactions and approvals prevent subcontractors from getting what they need in time to complete customer requests during the same visit.
- Onboarding is more frequent with a hybrid workforce due to the transience of subcontractors. But FSPs lack the tools to handle procedures, such as background

checks and subcontractor scoring, that are needed in order to identify the best and worst contractors for each customer.

- It is difficult to predict things that will impact the schedule in day, such as job overruns, missing parts and cancellations.

Current state:

- Cable companies and utilities are using advanced scheduling optimization tools that can consider factors like predicted traffic patterns and nearby maintenance. These offer means to develop weightings for other constraints such as likelihood of cancellation and customer preference (see “How to Achieve Scheduling Optimization in Field Service”) and to define different weightings for storm conditions.
- Original equipment manufacturers (OEMs) of residential equipment like dryers and dishwashers have automated the process of onboarding subcontractors, communicating work, and adjudicating changes and payment requests.
- Subcontractor onboarding and performance scoring is often still handled outside of FSM manually, making it cumbersome and resulting in nonoptimized assignment.

What’s next for appointment-centric FSM?

There are still countless other factors and patterns waiting to be discovered in datasets, such as the impact of time of day or season on task duration for an individual technician. Also, there are more sources of data, such as weather and customers’ peak operating times, that should be considered (such as avoiding servicing of a restaurant during lunch rush), but balancing dozens of factors goes beyond the capacity of the human dispatcher. Artificial intelligence (AI) and natural language processing (NLP) will be used to identify patterns in historical work descriptions and parts usage. These patterns will help predict constraint values such as the percentage chance that the technician will need a particular part based on the problem description. This will start as augmentation to the human decision-making process, and then replace it in a higher and higher percentage of cases.

More FSM vendors will offer flexible pricing for enablement tools (different than per-user-per-month pricing that works well for full-time employees). This will enable organizations to arm subcontractors with the same secure tools as employees, such as mobile apps, tightly controlled access to knowledge artifacts, and electronic adjudication of requests for scope change and payments. More vendors will offer ways to calculate a composite “rating” for each subcontractor that will incorporate additional assignment criteria that are not used for assigning employee technicians.

Recommendations for appointment-centric FSPs:

- Hire data scientists and heuristic experts to develop and train AI models that will automate even complex scheduling and assignment scenarios.
- Design procedures to identify best and worst contractors and plan to build these into your systems. Examples include percent of work accepted, percent of work delivered, customer feedback, price and capacity.

Knowledge-Centric FSM: Working to Improve Work Initiation, Escalation and Turnaround Time



Accountability to equipment outcomes: High

Complexity of service: Low

In this scenario, technicians are often direct or indirect employees of the manufacturer and have specialized access to intellectual property.

Candidate FSPs:

- High-tech OEMs may have the same piece of equipment installed in hundreds of thousands of locations, but the equipment itself is largely a “black box” — that is, it is protected or not easily serviceable by outside organizations or technicians — decreasing the potential for an FSP to hold another organization accountable for service issues.
- Mobile asset manufacturers such as automotive and earth moving equipment enable some repairs and services to be made by uncertified teams but others must be certified by the manufacturer.

Top challenges:

- Many requests come in reactively, making it difficult to forecast shift requirements — increasing risk of staff overload. This is exacerbated by the experts spending too much time on simple tasks like collecting model number information and other general information about the product.
- Customers seek control. They want more ability to initiate, change and cancel activities.

- Tight labor markets are making it difficult to find resources to handle common issues such as home Wi-Fi connection troubleshooting.

Current state:

- FSM software now includes basic portals to request service, register equipment (such as home automation equipment) and adjust appointments.
- Chatbots in customer service use cases can collect basic information and then hand it over to the customer service agent for further triage. Some organizations have used vendor-provided chatbot platforms to build bots that respond to voice requests from the technician to order parts, verify that the next customer is home and help customers reschedule visits.

What's next for knowledge-centric FSM?

Chatbots will become more powerful and will be able to perform more of the legwork so experts can focus less time on basic data collection and more time on heuristic diagnostics and maintenance procedures. Customers, especially in younger generations, will make greater use of portals and bots to initiate service.

Recommendations for knowledge-centric FSPs:

- If not already in use, reevaluate your FSM vendor's customer portal capabilities. More than 60% of organizations indicated an expectation to adopt a portal within the next 12 months, so vendors have been enhancing capabilities significantly (see Figure 1).
- Seek simple use cases where customers and technicians can interact with chatbots and evaluate your vendor's chatbot development platform (see "Governance and Best Practices for Chatbot Development"). Determine which technician functions can be instead performed by a "technician-bot" (a bot that handles technician functions).

Equipment-Centric FSM: Working to Scale Maintenance Offerings by Being Prescriptive



Accountability to equipment outcomes: Low

Complexity of service: High

Equipment-centric organizations have technicians with deep skills, certifications and experience on specific equipment and componentry. They provide reactive service in cases of emergency but also look to package one-size-fits-all maintenance procedures that can be delivered consistently and inexpensively, while also improving equipment reliability. Day-to-day maintenance procedures are deemed too expensive to outsource, so these are left to the equipment owners or operators.

Candidate FSPs:

- HVAC mechanical contractors and fire protection system FSPs often offer inspection services as well as prescribed preventative maintenance to replace components such as belts and batteries that wear out. Some reactively escalated issues with equipment can be resolved via use of telemetry data and remote access to the equipment.
- Oil and gas service providers have very strict guidelines under which they can perform services. Inspections and audits are complex and regulatory safety protocols are important.

Top challenges:

- Expertise does not scale. With fewer experts available due to retirements and increasing complexity, it is difficult for the new junior field technicians and subcontractors to find experts to help them, even when experts exist in the organization.
- Once identified, collaborating with an expert is difficult because of distance, issues understanding jargon or shorthand and the likelihood that a technician may lack cellular connectivity for much of their time at a job site.

Current state:

- FSPs have redoubled efforts to keep an inventory of technicians' skills, so dispatchers can either assign the best technician in the first place or provide supervision for junior technicians. Some vendors have integrated their learning management systems (LMSs) to FSM. However, even with a combination of LMS and dispatcher insight, FSPs often fail to connect the right experts.
- FSPs have created new triage and digital service support (DSS) roles for senior field technicians that no longer want to work in the field. However, these field technicians are not career trainers and junior technicians find them difficult to follow using voice only.

- The majority of organizations have armed technicians with mobile devices, which provide a means to communicate and a lot of potential for DSS. However, in many organizations, the FSM mobile apps are only being used to debrief work (enter time spent, parts used, customer signature, etc.). There is no way to access knowledge.
- Some organizations, particularly oil and gas, HVAC, and other specialty service providers, are utilizing video streaming and augmented reality products to enable remote expert guidance — remote technicians and agents see what the field technician sees by mirroring the technician’s phone or head-mounted display. Then they provide guidance by annotating the field of view (drawing circles and arrows as needed).

What’s next for equipment-centric FSPs?

Traditional roles of the OEM, owner, operator and FSP will intersect more often, increasing the need for cross-organizational collaboration. Machine learning and tools that manage cross-functional communities across organizational boundaries will increase workforce collaboration and engagement. These tools will help connect subcontractors, technicians, engineers, dispatchers and customers with similar interests and skills. Once the connections happen, FSPs will scale the high value interactions by turning them into knowledge. Some vendors are already working to produce a simplified means to curate long recorded video conversations in order to create short multiformat knowledge artifacts (video, text, voice, etc.) for other technicians.

Once the knowledge exists, AI and NLP projects underway today will be used to help organizations predetermine which knowledge artifacts (as well as parts) a technician will need based on past resolution descriptions. The knowledge artifacts will then be automatically preloaded into their mobile app for offline consumption.

Recommendations for equipment-centric FSPs:

- Investigate ways to build — or let your workforce build — communities that cross organizational boundaries. These communities should enable collaboration and become knowledge centers. Technicians in need of help will connect to these knowledge centers as an additional resource.
- Develop a company lexicon and a tagging technique for work order resolution descriptions to improve structure and consistency in wording. While NLP has come a long way, having tags and other attributes of prior work orders that can associate them with similar work will aid creating materials that will be used to train AI models once enough data exists for ingestion.

Outcome-Centric FSM: Working to Scale Maintenance Offerings by Being Prescriptive



Accountability to equipment outcomes: High

Complexity of service: High

Outcome-centric FSPs are often using FSM to manage work on equipment they own or operate. As such, they are less concerned about things like scope and contract, and more concerned about managing the risk that decisions to delay maintenance to save on cost will cause equipment outages. They may also be outsourced FSPs that have committed in some way to an outcome such as the equipment's productivity, power consumption or uptime.

Candidate FSPs:

- Medical device manufacturers service equipment that is highly mission critical. If a CT scanner or an MRI machine goes down for even a day, this results in lost revenue and may impact hospital and surgical operations and scheduling. As such, FSPs are asked to monitor these machines closely, so they can predict outages in time to avoid them.
- OEMs are interested in equipment performance and want as much information as possible, so they can use it to inform the design of next-generation products.

Top challenges:

- FSPs see opportunity to gain loyalty and charge premiums by owning risk associated with an outcome (such as equipment uptime) but require visibility into usage and condition patterns. FSPs in this scenario face many of the same challenges as those in the equipment-centric scenario.
- Customers blame their FSP when reactive service is not completely eliminated by an outcome-based contractual relationship, this increases the urgency of resolution.

Current state:

- Many organizations, especially those that service factory equipment, are piloting connected equipment diagnostics (see definition in Note 1) to improve turnaround time for reactive support (having learned much about IoT platforms through their use

in informing diagnostic efforts performed by equipment owner/operators). However, in a customer base, the heterogeneity of equipment models, time installed and configurations make it difficult to normalize the data enough to automate diagnoses.

- FSPs, especially in medical device OEMs, offer outcome commitments, having been able to retrieve and analyze telemetry from large portions of their installed base of equipment. However, in this model, it is no longer profitable to over-maintain equipment, so FSPs seek to provide the minimum amount of trips to both meet commitments and maximize profit.

What's next for outcome-centric FSPs?

Organizations will start by raising the skill in a remote triage role — recognizing that technicians with more field experience are more likely able to predict, diagnose and resolve issues remotely than traditional call center staff. On-site technicians will also interact with the digital twin (the electronic record and active capture of readings from in and around the equipment) and use this data for diagnostics and to tailor maintenance activities more quickly and correctly.

Organizations will further normalize and structure their records of reported issues, diagnostic steps and resolution descriptions. These will feed pattern recognition and asset performance management (APM) tools that help FSPs focus on only the highest priority maintenance. APMs do this by continuously assessing equipment health and performance degradation and comparing this to history to predict the likelihood and timing of outages. Reducing truck rolls will increase in importance because there will be no “trip charge” to offset the FSP’s cost for each technician visit.

Recommendations for outcome-centric FSPs:

- Review the path from prescribed preventative maintenance to financially optimized maintenance. (see “Financially Optimized Maintenance Planning Using Asset Performance Management”)
- Identify ways to “think big and start small” and work with technicians to identify things to monitor for that could help predict outages, then begin to build a base of data you will use to train IoT-based analysis (see “Explore the Internet of Things’ Potential for CRM”).

Seek People and Process Insights From Similar Organizations in Other Industries

- Review existing projects' expected ROI and consult with newfound peers, employees, vendors, and industry experts about whether these predictions are reasonable.

Acronym Key and Glossary Terms

FSM	field service management
FSP	field service provider
LMS	learning management systems
NLP	natural language processing
AI	artificial intelligence
IoT	Internet of Things
DSS	digital service support
OEM	original equipment manufacturer

Evidence

A total of 87 reference customers from 16 vendors responded to a survey completed in September 2018. These reference customers were required to meet specific criteria, including having more than 100 technicians and the references were required to represent multiple regions and industries. Gartner analysts also met with over 450 clients through the Gartner interaction process, and used a continuous flow of vendor reviews on Gartner's Peer Insights page.

Note 1 Definitions

Digital Service Support Channels

Includes remote support with video streaming, augmented reality with collaborative annotation and context-specific work instructions, and guidance to suggested knowledge base artifacts, chat and chatbots. Must enable and improve the quality of technicians' access to resources for assistance.

Connected Equipment Diagnostics

Considers tools such as IoT platform integration, sensor data visualizations, advanced analytics and escalation workflow development tools that are useful for deriving an actionable and defined scope of work based on data collected from real-time or near-real-time equipment or environment sensors.



Jim Robinson Sr Director Analyst



Kristian Steenstrup Distinguished VP Analyst



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