

White paper

**Make Field Service Best
Practices Even Better by
Leveraging Mobile Technology**

While each field service organization has its own workflows and customer requirements, there are several well-documented best practices that can be widely adapted and applied. Technology use isn't enough to propel organizations to best practice status, and in fact has become a requirement to efficiently execute basic tasks to remain competitive in many field service segments. As mobile computing and communication technology has become more sophisticated, less expensive and more accessible, it has become harder for field service organizations to maintain a competitive advantage through these tools.

This white paper identifies best practices for workforce optimization, resource management, revenue assurance and performance control, explains how technology supports these processes, provides leveraging current mobile and wireless technology to enhance processes to improve productivity and profitability.

Introduction

As a field service professional, you may well have been the first of your friends to carry a cell phone. Your organization may have been an early adopter of mobile and wireless technology. Today you'd be hard-pressed to find a middle schooler that isn't carrying a cell phone, or a field service organization that isn't making some use of smart phones or handheld computers, GPS, mobile printers and other technology to support its operations. As technology has evolved and become more accessible, it has helped field service organization set new standards for productivity and customer responsiveness. It has also become harder for companies to gain a competitive advantage through technology, since mobile computing, real-time communication and extending work order, inventory, sales and CRM functionality to the field is a de facto requirement for many companies.

Nonetheless, some organizations continue to drive down their costs, improve efficiency and achieve revenue growth by enhancing their processes and technology. Extensive research conducted over years by Aberdeen Group¹ has identified the top-performing field service organizations, the benchmarks they attain, and the practices and technologies they use to get there. Today's best-in-class field service providers (defined as the top 20 percent) successfully blend process and technology to attain the following benefits, according to Aberdeen:

- 21 percent year-on-year service revenue growth;
- 2 percent decrease in service and support costs;
- An 18 percent improvement in workforce utilization, to 85 percent;
- 92 percent customer retention.

These companies share bonds beyond their excellent business results. They are also among the leaders in adapting technology to enhance field service processes. They are up to three times more likely than some of their competitors to leverage service performance management solutions.

Case in Point

"As the mobile handheld devices add functionality, new areas of business value have emerged. The convergence of technologies includes GPS, GIS, Wi-Fi, RFID, voice-to-text data, text-to-voice, digital camera, and gauges with Bluetooth enable more powerful applications. Increased productivity can be realized with applications such as location identification to optimize the travel time of technicians to geographically dispersed assets."

ARC Advisory Group

Enterprise Asset Management and Field Service Management

Leveraging is a key and powerful concept. Field service organizations can use their existing technology systems in new ways, or make additions and enhancements to them, to create more efficient processes. For most companies there are excellent opportunities to leverage technology to improve operations in four areas:

- Workforce optimization
- Resource management
- Revenue assurance
- Performance control

Even the best practices can be made better by taking advantage of technology developments and other innovation. The following sections describe how to apply mobile computing technology to common field service processes, profile successful users, and explain how systems can be leveraged to drive additional improvement.

Workforce Optimization

Workforce optimization represents the low-hanging fruit for field service automation, but still provides even experienced organizations the opportunity to improve efficiency. Workforce optimization encompasses work order management, data management and productivity management. Scheduling software provides the foundation for automating these operations, while electronic forms, mobile printing, GPS and other technology tools can increase the benefits.

Work Order Management

Basic: The good application of technology is to use field service workforce management software to automatically generate schedules and routes for field service technicians. Software can make the most efficient use of resources, especially applications that can factor in each tech's experience and skill set. In basic operations technicians receive work orders and other instructions in paper at headquarters at the start of the shift and report their progress periodically throughout the day via cell phone.

Better: Equip technicians with mobile computers and automatically push assignments, routes and driving instructions to the devices. This not only eliminates the need for paper, but eliminates the need for techs to check in at a central location to receive assignments. By reducing drive time, organizations can increase wrench time and/or time spent in sales and customer engagement. Technicians use the mobile computer to record service performed and can submit this information to headquarters using a modem or wireless connection.

¹ Unless otherwise noted, business performance and benefit data cited in this report comes from two Aberdeen Group Reports: *Field Service 2011 – Key Trends in Workforce Management* by Sumair Dutta and Aly Pinder Jr., released January, 2011 and *Service Intelligence and Performance Management – Moving Beyond the Rearview Mirror* by the same authors released April, 2011.

Best: Continually update job status and technician availability to enable real time dynamic dispatch. This practice helps organizations hit service windows and meet SLA compliance. The process is enabled by taking advantage of mobile computers' real-time wireless communication capability to provide the best possible data to workforce management application. Aberdeen's best-in-class metrics call for updating service schedules at least twice daily. Real-time status data from technicians can also be integrated with CRM systems to give customers and customer service representatives greater visibility. Top-performing field service organizations are twice as likely as laggards to leverage mobile applications for workforce automation. These practices help them attain 85 percent workforce utilization, which compares to 77 percent for average companies and 59 percent for laggards.

Technology requirements: A rugged mobile computer or smart phone suitable for field service use; wireless wide area data communication capability in the mobile device; workforce management software that supports dynamic scheduling and status messaging.

Case in Point

When cleaning company Stanley Steemer switched from paper work orders to electronic forms on mobile computers, it reported paperwork reductions that averaged between 40 and 80 minutes per truck, per day, which enabled it to complete more daily service calls and reduce its dispatch staff.

[See the complete case study](#)

Data Management

Basic: More than 90 percent of field service professionals surveyed said access to timely, accurate performance data was very important to their operational and financial success – but only 34 percent of companies say the accuracy of their field service data is very good or excellent; data timeliness is rated even lower. A wireless handheld computer gives field service representatives timely access to accurate data held in enterprise systems, such as customer contact information, contract status and service eligibility. Using bar code scanning or other automated data capture (e.g. image capture, RFID, contact memory, speech recognition) for data entry whenever possible helps maintain accuracy.

Better: Load sales and services histories into the mobile computers to help service representatives diagnose problems and recognize opportunities for preventive maintenance, service contract renewals and other up-sell possibilities. Alternatively, store asset information and maintenance histories on an RFID or contact memory tag directly on the asset so service representatives can access the information through a reader integrated with their mobile computer.

Best: Provide technicians with real-time access to customer and asset information held in enterprise systems, including complete maintenance histories and knowledge management systems that provide schematics and how-to videos to aid repairs.

Technology needs: A mobile computer with real-time communications capability that supports all the data collection technologies that will be used in the field, such as bar code scanning, electronic signature capture, speech input, RFID and contact memory; WWAN communication and Web browser; access to back-office enterprise applications. Intermec's *Eliminating Paperwork Is More Than Just Efficient* white paper documents how these technologies can reduce paperwork and data entry errors, and profiles a customer that eliminated its annual use of 90,000 multipart forms from its field service operations.

Case in Point

After Hurricane Katrina, FEMA commissioned contracts to set up temporary housing for displaced residents, and required home inspections prior to move-in. To speed the process, inspectors used digital forms on handheld computers with integrated GPS units, which automatically recorded the location of the inspection. Data accuracy improved 20 to 30 percent after the automated system replaced paper inspection forms.

[See the complete case study](#)

Workforce Management

Basic: Use standardized forms for time and expense reporting to promote consistency and to simplify data entry, and periodically analyze completed job records to monitor productivity and costs.

Better: Free field service workers from recording their hours, mileage and expenses on paper, and office staff the time and trouble of entering it into the computer system, by using electronic forms on mobile computers.

Best: Service calls and other activity are automatically time stamped by the mobile computing application, which eliminates the time-recording requirement for technicians and prevents arbitrary time estimates. GPS systems can apply location stamps to transactions, automatically record mileage, and flag miles driven outside of assigned routes or work hours.

Technology needs: Mobile application software that can share data with payroll and other enterprise applications and supports status reporting; GPS-enabled mobile computers; WWAN communication; workforce management software with performance management analysis capability at the enterprise level.

Case in Point

"Whenever we ask our technicians what we can do to make their jobs more enjoyable or efficient, the message that always comes back is, 'Do something about all this paperwork.' We knew that mobile computing and wireless communication technology would eventually come to our industry..."

Steve Raymond
Raymond Handling Concepts

[See the complete case study](#)

Resource Management

Besides making field service staff more productive, enterprises can also get more out of their equipment, vehicles and other assets by collecting and using more information about them. Best-in-class companies are 2.5 times more likely than others to use rugged mobile computers for asset management. Not coincidentally, best-in-class organizations also outperform others in resource management², service parts logistics operations and asset utilization.

Technician & Vehicle Tracking

Basic: Technology enables managers to monitor a workforce that is dispersed over a large area. A good start is having mobile workers periodically call in status updates to a dispatcher or manager. A GPS unit in the vehicle promotes productivity by helping mobile workers get to their calls most efficiently.

Better: Handheld computers can also support cellular voice, data communication and GPS, giving users all the functionality they need in a single device. This combination results in fewer devices to purchase and maintain, and for the mobile worker to keep charged. Set the mobile application software to send status updates to the office automatically, either at periodic time intervals or when certain tasks are completed.

Best: Proactively use location data, rather than simply waiting for updates. Vehicles can be tracked in real time to aid dispatch decision making and to provide up-to-date information for customer service. The GPS unit within a handheld computer can automatically attach a location stamp to all activities, which improves documentation and can help resolve any disputes. GPS-enabled location data can also be used to power route analysis and dwell time analysis that can suggest more efficient routes or alert managers to potential abuses.

Technology needs: Mobile computers that can support multiple communications methods without having to swap and install radios and GPS units in the field; dispatching application with mapping software; mobile application with location reporting.

Parts Logistics Handling

Basic: Manually record parts used on jobs and track in-vehicle parts inventory on paper forms.

Better: Use bar code scanning to record parts, supplies and other inventory used by technicians. Forty-four percent of best-in-class field service operators automatically track parts in the field, compared to 24 percent of all others. Share parts data with inventory and billing applications so parts used can be automatically listed and billed on invoices that are generated at the customer site. This integration will speed up the payment cycle for parts and keep inventory levels more accurate. Not having needed parts on the truck is a leading reason technicians cannot complete service calls, so improving parts inventory management will help raise first-time-fix rates.

Best: Update enterprise inventory systems with real-time data from the field. Expand basic parts tracking to give technicians access to manuals, schematics and other information that will help them select the right parts and install them properly.

Technology requirements: Mobile computer with integrated bar code reader for parts identification plus sufficient screen size and resolution to support schematics applications; wireless data transmission capability; mobile application that supports parts tracking and integrates with service parts inventory system.

Case in Point

“Exploiting actual part usage data captured in real time to drive replenishment ensures more accurate and timely part procurement and leads to fewer unexpected stock-outs and increased part fill rates. This will ultimately lead to better first time fix performance and lower part distribution costs by minimizing the number of expedited part orders and transportation costs. ...top companies have demonstrated a commitment to technology to aid service supply chain optimization.”

Aberdeen Group
Optimizing the Service Chain

Asset Tracking & Management

Basic: Use ADC technology to automatically identify assets each time they are inspected or serviced. Use the data to power service, EAM and compliance applications. Using ADC technology such as bar code or RFID enables technicians to collect asset ID information more quickly and prevents data entry errors.

Better: Link asset ID application to databases and customer records so technicians can validate the authenticity of the asset and its eligibility for service. Accurately identifying asset assures the technician will access the correct record, which in turn helps assure that proper service and maintenance will be performed – and that unnecessary procedures will not.

Best: Fully integrate field operations with EAM and ERP systems to leverage those investments and enable advanced operations such as predictive maintenance. Automatically identifying assets and applying time stamps and location stamps to the transaction helps audit procedures and makes it easier to comply with SOX and other reporting requirements.

Technology requirements: Mobile computer with integrated reader for preferred data capture method (e.g. bar code, signature/image capture, RFID); GPS if location-stamping is desired; mobile asset tracking application; wireless access to back-office asset database.

Case in Point

“Traditionally, maintenance employees collected asset and equipment information on paper while on maintenance rounds for routine inspection of equipment. However, the Best-in-Class are eliminating this manual approach by equipping their employees with mobile devices to input equipment inspection data directly into mobile devices that are integrated with the asset management system.”

Aberdeen Group
Enterprise Asset Management – Maximizing Return on Assets and Emerging Trends

² “Enterprise Asset Management Maximizing Return on Assets and Emerging Trends” Aberdeen Group, June 2008.

Revenue Assurance

Top performers not only work more efficiently, they also grow their service revenues – by an average of 21 percent in the last year. One way to raise field service revenue is to do more upselling and cross selling. Another is to complete as much of the transaction as possible while the service representative is at the customer site, such as by preparing and printing the invoice or even accepting payment, which reduces the billing lag and improves the cash cycle. These strategies can often be implemented with legacy equipment by making slight process modifications.

Customer Close-out

Basic: At the completion of a job, record all time spent, activities performed and parts used while still on site to prevent errors and omissions. Obtain customer signature for the work order.

Better: Automate the data recording process with mobile computers and bar code scanners. Immediately present customer with a work order and/or invoice that is generated on site with a mobile printer. Obtain customer signature at the same time. One of Aberdeen's recommended steps to field service success is: *"Equip field agents with tools to expedite work order closure. ... bar code scanning capabilities can expedite work order closure by allowing for immediate and accurate capture of leveraged parts, labor and materials per service visit. With the aid of printing capabilities...technicians can produce proof-of-service receipts for customers to sign, thereby driving closure rate, reducing invoicing cycles and enhancing eventual time to cash."*

Best: Attach a digitized image of the customer's signature to the transaction record on the computer. Enable field staff to accept payment at the time of service via a credit card reader. Payments can be authorized immediately using a wireless connection, or processed in batch later.

Technology requirements: Mobile computer with bar code reading capability and either a touchscreen or imager to capture signatures; mobile invoicing application; mobile printer. Additional requirements if payment will be processed: payment card reader; wireless connectivity; PCI-compliant settlement software.

Case in Point

"Sometimes I'd get materials receipts for a job after I'd already invoiced the customer. There's a lost billing opportunity. Mobile computing has let us capture an additional two weekly hours of billable labor per technician. That by itself would pay for the system."

Joe Weeber, President
Maintenance Resources

[See the complete case study](#)

Upselling & Cross Selling

Basic: What better time to sell an extended service plan than after a technician has just saved the day for a customer by getting equipment back up and running? Field service representatives should continually make customers aware of new services and products through discussions or by printing offers and promotions on invoices, work orders and other forms that are given to the customer.

Better: Empower field service workers to quote programs, terms and prices. This requires giving them access to product information and price lists, plus up-to-date information about the customer, such as current contract status.

Best: Enable field service representatives to complete the sale by printing a contract or receipt, recording the transaction and customer signature electronically, and accepting payment.

Technology requirements: Mobile computer that supports signature capture; integrated payment card reader; access to sales and CRM systems; mobile printer. Mobile computers with integrated imagers are advantageous because imagers can be used to scan paper forms into electronic documents, capture customer signatures, plus read bar codes and take digital pictures.

Performance Control

Mobile computers can help technicians perform service, not just record it. The computer can serve as the field service worker's ultimate e-book, as a content repository for how-to videos, parts lists, schematics, training information and other resources helpful for completing service calls. Mobile computers can also interface directly with the equipment being serviced, collecting diagnostic data to guide activity.

Integrated Testing

Basic: Manually collect information from diagnostic resources such as probes, meters and test equipment.

Better: Develop a machine-to-machine (M2M) interface so equipment data can be automatically transferred for archives or analysis. Data may include hours of use, error codes, etc. Give technicians a mobile M2M interface or probes so they can access data on demand when they arrive at a machine to service it.

Best: Integrate knowledge management tools to help the technician take the correct action based on the data that is received (e.g. suggest service, provide instructions). An elevator service company provides an example of a best-in-class process. Technicians connect their handheld computers directly to the elevator being service and use it as a computerized stethoscope. The software application checks downloaded data, performs a diagnostic routine, then displays any problems detected on the screen, along with the recommended service. Technicians can adjust elevator settings directly through their mobile computer. Satellite TV providers have developed similar systems.

Technology requirements: Mobile computer with interface to service equipment (a Bluetooth connection is advantageous for machine-computer interface to eliminate risk of breaking cables); sufficient screen display, video support and speakers to support information presented through documents, instructional videos, animations, etc.; mobile knowledge management application.

Case in Point

We Energies, an electric and gas utility, developed a probe that checks for gas leaks that interfaces to the handheld computers carried by its field service technicians. During inspections, the probe reports results directly to the computer, saving technicians the additional step of recording results. "The technicians are saving time and completing more surveys because they can record their data and move on without taking time at the end of the day for data entry."

Kris Ackerman, Senior Engineer
We Energies

[See the complete case study](#)

Case in Point

"M2M (Machine to Machine) connections will be the catalyst for over \$35 billion of service revenues across a diverse range of industry sectors by the end of 2016."

Juniper Research
M2M to Generate \$35bn in Service Revenues by 2016

Technician Training & Support

Basic: Automatically download service bulletins and other notices to technicians' mobile computers.

Better: Provide online access to training and instructional materials, such as schematics, manuals and videos.

Best: Enable collaboration among remote worker that does not rely on a dispatcher. Texting, voice and video connectivity built into handheld computers enables peer-to-peer communications so technicians can consult with supervisors or more experienced colleagues to resolve problems.

Technology requirements: Wireless computers that are certified for use on voice networks, speakerphone so technicians can keep their hands free; imaging capabilities so technicians can share pictures or video of the equipment being services; mobile application that supports texting/messaging; integration with knowledge management systems.

Case in Point

"With the aid of better access to service knowledge and best practices, Best-in-Class field agents are able to improve their issue resolution rates, learn to identify revenue generating opportunities and improve their overall customer management skills."

Aberdeen Group
Field Service 2011: Key Trends in Workforce Management

Conclusion

Organizations don't typically attain best-in-class status by throwing a lot of technology and investment at their operational problems. Instead, they continually look for ways to leverage the technology tools they have to make incremental process improvements. As the examples presented in this paper have shown, many field service organizations already have most of what they need to improve, make good practices better ones, and make company-specific innovations that result in best practices. Even best-in-class companies continue to improve. For example, in the preceding 12 months these firms reduced service costs by 2 percent while increasing revenue by 21 percent, and raised workforce utilization an additional 18 percent.

Intermec can help you find the process and mobile technology tweaks to drive incremental improvements in field service workforce efficiency, cost reduction and revenue enhancement. For more than 30 years Intermec has helped hundreds of field service organizations automate and improve their operations. We have the technology products to make good operations better, and the experience to help you make the jump from better to best.

Intermec Inc. (NYSE:IN) develops and integrates products, services and technologies that identify, track and manage supply chain assets and information. Core technologies include rugged mobile computing and data collection systems, bar code printers, label media, and RFID. The company's products and services are used by customers in many industries worldwide to improve the productivity, quality and responsiveness of business operations. For more information about Intermec, visit <http://www.intermec.com> or call 800-347-2636.

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