

The XYZ's of BYOD

Everyone knows the ABCs of BYOD
- but it's the details that matter.



Most of the considerable attention given to the BYOD (Bring Your Own Device) trend is focused on management and sales professionals who use their mobile computers for messaging and to access spreadsheets, documents and other mainstream applications. The BYOD value proposition and strategy considerations are quite different for workers who depend heavily on their devices for job-specific tasks and workflows like field service, inspection, delivery and other activities that may be completed miles from the home office. This white paper identifies BYOD considerations that are specific to these “device-dependent” mobile workers so enterprises can accurately assess the true costs and strategic value of BYOD in those environments. It will specifically address BYOD program implications for:

- The devices themselves;
- Mobile device software and the developers who create and maintain it;
- The mobile workers who depend on devices to complete their core job tasks, and;
- The IT staffers that support them.

BYOD is an appealing concept for workers and enterprise management alike, but the true value of BYOD programs comes down to how well the details are thought through and managed. Not all devices are created equal, so allowing BYOD necessitates making some tradeoffs that can sacrifice performance to accommodate user preference. There are more of these tradeoffs than most people realize, especially when devices are used by workers who perform specialized tasks.

User Considerations

Improving worker satisfaction and morale is one of the strongest drivers that lead enterprises to introduce BYOD. The thinking goes that happier workers are more productive. However in field service and other specialized operations, productivity is highly dependent on the workflow. Companies go to great lengths to develop, document and train on the procedures that promote maximum productivity while ensuring that safety, regulatory and customer service requirements are met. Enterprise mobile device and application investments are typically guided by finding the optimal hardware-software combination that enables the most efficient and productive workflows. These efforts and investments can be undermined if employees choose devices that are inefficient at meeting basic requirements, such as data entry by bar code scanning.

Feature Support

Personal devices tend to excel when used as phones or for playing media (videos, music, etc.). Conversely, enterprises prefer to equip their mobile workers with devices that are more rugged, “purpose-built” and are designed for specific tasks that are highly repetitive in multiple environmental conditions all in the course of a day’s work. These repetitive tasks include workflows like advanced data capture, signature capture and directing a mobile printer, and can be in a variety of varying environments with unique challenges. This comparison of use cases and requirements can present a fundamental conflict between worker and enterprise needs. Here are several points to consider when evaluating whether a BYOD environment can support efficient work processes:

- Do workers need to read bar codes? – If bar code scanning is part of the work process, how quickly can the user device read a bar code? Using a camera phone to take a picture of the bar code for

“Finding a solution comes down to what the context of the application is and how advanced it might be. With features like payment, dispatching, GPS, mapping content, data capture, RFID tag scanners, and receipt printing, how are businesses going to get an application that operates effectively across device to device without developing a native app for each version?”

David Krebs, VP of mobile and wireless at VDC Research, quoted in *The SmartVan*

<http://thesmartvan.com/blog/2013/04/17/25111/vdcs-david-krebs-why-byod-doesnt-cut-it-in-the-field/>

processing is slower than using a commercial imager with native bar code support. Imagers are also much more tolerant of poor quality bar code symbols. If the device produces frequent non-reads or is slow to respond, users will become easily frustrated and resort to data entry by keypad, which is significantly slower and highly prone to errors.

- Is electronic signature capture possible? Many enterprises require employees to get an electronic signature from the customer to approve sales or work orders and to expedite the billing cycle. Mobile devices therefore need to be able to capture stylus input, and critically must be rugged enough so the screen doesn’t become damaged after repeated signings on the same area.
- Does the handheld device interact with mobile printers or other peripherals? It takes more than a Bluetooth connection to make a handheld computer or smartphone compatible with a mobile printer. Native drivers, bar code and graphics support and other features all play a role in how quickly invoices, receipts, work orders, reports and other documentation are printed. There are similar considerations for cameras and imagers, RFID readers, sensors and other peripherals.
- Is the screen appropriate for lighting conditions? Mobile workers may need to fill out a screen-based inspection report in a dark crawlspace at an odd angle at one job site, and in bright sunlight at another. In these conditions it is important to have a transreflective display or other features that automatically adjust screen brightness to the conditions.
- Does the workflow involve the use of paper forms? Some enterprise mobile computers have integrated imagers and embedded image processing software that essentially enable them to function as flatbed document scanners. Mobile workers can take pictures of the forms used in the field and the form data can be automatically extracted and processed, which eliminates the need for manual data entry back at the office or depot. The digital cameras built into consumer-grade devices do not have these capabilities, and thus automated form data entry is impossible.

- Will batteries last the full shift? Scanning and imaging, data collection and processing, wireless voice and data communication and other enterprise mobile computing activities all draw power from the device battery. When devices that were designed primarily for talk and texting are used for data collection and enterprise mobility tasks their battery life may degrade considerably. Enterprise-class mobile devices typically have higher capacity batteries than consumer-grade mobile devices. It is important to determine if battery life can last the length of the shift and if daily workflows allow time to recharge batteries without affecting productivity.

The above use case scenarios are but a few of the questions to consider. Many purpose-built mobile devices support other data capture and workflow capabilities such as RFID tag reading/writing, GPS-centric applications and low-power sensor interfaces. Such features can extend the value and usable life cycle of the device and help insulate the enterprise from wholesale hardware upgrade costs should they avail themselves of these growing workflow technology solutions.

A user-owned device likely will not perform the above tasks as well as a mobile computer that is designed to support enterprise workflows. So what is the appeal to using personal devices in the workplace? Familiarity is one advantage, because workers get to use the devices they like and the enterprise does not need to invest as much in training. A big reason users become loyal to their phones or tablets is because of the convenience and performance the devices provide for personal applications like texting, FaceTime™, games, Facebook™, Skype™, etc. Many businesses do not allow that type of application on company-owned devices, yet may not be able to block them in a BYOD environment.

Reliability

The biggest impact a mobile device will have on worker productivity is not how well it restricts games or Web browsing, but how reliable it will be in the field. Lost productivity from device failures accounts for nearly half (49 percent) of the total cost of ownership for mobile computers used in enterprise operations, as documented in independent research presented in Intermecc's white paper [How Ruggedness Reduces TCO for Mobile Computers](#). For comparison, the purchase cost for the devices themselves is only 14 percent of the TCO. For mobile operations, profitability depends on productivity, and productivity depends on reliability.

When an office worker's smart phone, tablet or laptop crashes, the user usually has alternatives readily available or can simply use a desk phone to call for support. Field service, delivery and other off-premise workers have no such fallbacks. When their devices fail their work stops. And worse, their customers are kept waiting until a replacement worker or device can be dispatched. Delays and failing to fix the problem on the first service call create unhappy customers and often lead to the loss of future business. It is telling that real-time connectivity is considered essential by 95 percent of field mobility professionals, and 64 percent say they cannot afford downtime; consequently 79 percent believe some level of ruggedness is essential in a mobile device, according to a 2013 survey by Field Technologies.¹

Failure rates of 50 percent or higher are not uncommon for consumer-grade devices that are used for mobile enterprise

operations. The TCO for consumer-grade smartphones, tablets, notebooks and handheld devices is about twice as high for consumer models as their ruggedized counterparts. Protective cases provide some help, but still do not bring consumer devices close to the ruggedness level of enterprise mobile computers that are sealed against liquids and dust and can withstand multiple five-foot drops to concrete. To learn more about the specific ruggedness features and specifications to look for, the reasons why ruggedized devices are more reliable and cost effective, and to get the statistics on reliability and TCO, see Intermecc's white paper [How Ruggedness Reduces TCO for Mobile Computers](#). More up-to-date cost data and TCO information is available from [VDC Research](#). For insight specific to smart phones, see Intermecc's white paper [New Rules, New Roles: Are Your Smart Phones Tough Enough for Work?](#)

As noted, lost productivity is the largest component of the TCO for mobile devices lost in the field. The actual cost of downtime is different for each company, depending on its workflow and the importance of completing tasks on schedule. Being a day behind to take meter readings isn't good for productivity, but won't likely cause any long-term problems. But being even a half hour late to provide emergency repair service on a crucial piece of production equipment for a customer may result in a cancellation of the service contract or financial and/or legal exposure for failing to meet SLA agreements. The value of device robustness is tied directly to how much the enterprise values customer satisfaction, on-time performance, first-time-fix rates and other productivity and quality metrics. Frequent breakdowns or loss of features also frustrates users, which defeats the purpose of BYOD programs that are intended to increase employee satisfaction.

Security, Support & Management Considerations

One of the tradeoffs in converting from a company-issued to BYOD computing environment is that making device options more flexible for mobile workers makes security and device management more challenging for the IT department. Today the vast majority of mobile devices used for enterprise workflows run some form of Microsoft® Windows® operating system. Therefore most support infrastructure, including help desk operations, application development and maintenance, security and mobile device management, is oriented and optimized for Windows users. Even in such seemingly homogenous environments it is difficult for IT managers to keep security and applications consistent and up to date because of the many flavors of Windows (e.g. Windows Mobile, Windows CE, Windows Phone, et al) that are in the market. These challenges grow exponentially with each new operating system that is introduced. Even if BYOD policies restrict operating system options there could still be a wide range of device types, models (with different OS and firmware versions) and features to support.

If the IT department cannot quickly resolve help desk calls and keep applications performing consistently across the device population, the enterprise will not be able to maintain the workflow consistency that is essential for getting ROI from mobile automation programs. If security policies cannot be applied consistently across all devices the enterprise is at elevated risk of a data breach and/or compliance violations, especially if mobile workers process payment or have customer data on their mobile devices.

¹Field Technologies Annual Report: "Field Mobility 2013 How The Latest Technologies And Trends Are Transforming The Mobile Workforce"

These complexities do not prohibit enterprises from implementing BYOD for specialty mobile worker operations, but make it imperative for enterprises to upgrade how their workers and devices are supported. Companies will need to develop an overarching strategy and supporting policies to set direction and limits for BYOD initiatives

Enterprises usually cite security as the top obstacle or drawback to BYOD, but in the experience of Intermec and Enterprise Mobile (an Intermec company), managing devices and ensuring consistent, reliable performance often prove just as challenging for companies.

Software Considerations

User preferences for their personal devices are often based on how well the device runs personal apps and the user experience it provides on favorite websites. The momentum behind BYOD is an acknowledgment that not all devices perform the same. That is a problem for mobile enterprise operations, because efficiency depends on all users performing at a consistent high level.

Allowing BYOD for specialty mobile enterprise operations will likely require some software redevelopment. Most mobile enterprise applications in use today were developed for rugged handheld computers running a Windows Mobile operating systems. These applications are incompatible with Android® devices, and often even with Windows tablets. Enterprises will thus need to redevelop their legacy applications for additional operating systems. The time and effort spent redeveloping current software diverts resources from enhancing the applications and creating new ones.

Web applications are an exception to the need for redevelopment. The appeal of Web apps is that they are device and OS agnostic and can run on any device with a compatible browser. The downside is that Web apps are not optimized for any device and may offer limited functionality. This is changing through the emergence of HTML5, which brings Web application performance and functionality in line with OS-specific native applications, but to date most enterprises have not adopted HTML5-compatible devices and applications. For more on this topic, see Intermec's forthcoming white paper *Does HTML5 Make Sense for Mobile Enterprise Applications?*

Software considerations go beyond basic OS compatibility. Many mobile enterprise applications were developed for a specific device or family of devices. For example, some ISVs have created sales order entry, inspection and other forms-based applications that take advantage of the Mobile Document Imaging (MDI) technology available in select Intermec handheld computers. While almost every mobile device today is capable of taking a picture of a document, MDI technology enables software applications to automatically extract and process data from the document via the high-quality imager. This is an example of a feature that requires device-specific application development. In a BYOD environment, the MDI-enabled document processing feature may not be available. These documents would then have to be processed with an alternative likely manual, not real-time and error prone solution via back office support.

The use-case scenario above illustrates why BYOD policy decisions must take more than hardware into account. Enterprises need to take a holistic view of their workflows to determine if BYOD have an advantageous, negative or neutral effect on optimal work processes and the software applications that support them.

Cost Considerations

Cost savings are the second-leading driver for enterprises to embrace BYOD, after improving employee satisfaction. BYOD does not necessarily result in higher or lower costs for mobile operations, but does ensure the cost structure will be different. BYOD allows enterprises to reduce or avoid hardware acquisition costs, but there is frequently a rise in soft costs resulting from increased device downtime, expanded support requirements and software redevelopment. Telecom expenses can also rise considerably without controls in place.

Reducing device purchase costs is a powerful component of the BYOD value proposition. For some companies, having employees use their own devices is what makes it affordable and practical to introduce automation to mobile operations. There have been many studies and theories published about BYOD's cost-saving potential, but most focus on occasionally connected white collar workers and not on device-dependent technicians, inspectors, delivery and sales personnel. The cost of downtime needs to be factored in to the BYOD cost analysis because the cost of lost productivity represents nearly 50 percent of the TCO for mobile devices in those types of operations, and as noted, downtime can cost repeat business.

BYOD can also have unforeseen consequences on telecommunications expenses. Enterprises may lose discounts that are based on the number of employees that are covered under the master contract with their wireless carrier. Companies spend an average of \$10 per month more per BYOD user for wireless service than they do for employees with enterprise-owned devices, according to an Aberdeen Researchⁱⁱ study.

Here is a summary of some of the expenses an enterprise may need to incur to support a BYOD environment:

- Increased repair or equipment reimbursement costs for employee-owned, non-rugged devices;
- Increased downtime; reduced productivity and service levels;
- Help desk talent acquisition or training to support new operating systems and devices;
- Application software redevelopment;
- Mobile device management (MDM) software acquisition;
- Enhancements to device and network security;
- Higher per-user wireless costs;
- TEM software acquisition;

The analysts and researchers that study these factors in field service, delivery and similar mobile enterprise operations are coming to consensus that BYOD will not reduce enterprise costs. Aberdeen has concluded it costs enterprises 33 percent more to support BYOD than company-owned devices,ⁱⁱⁱ and VDC cautions^{iv} "While sanctioning employee use of personal mobile devices may reduce hardware costs, the total cost of BYOD support often outweighs these savings."

ⁱⁱCIO.com "Mobile BYOD will cost you about 33 percent more than a company-owned mobile device approach, says Aberdeen Group. Here are five hidden costs." April 4, 2012. Accessible at: http://www.cio.com/article/703511/BYOD_If_You_Think_You_re_Saving_Money_Think_Again

Workflow Considerations

BYOD is much better suited to some types of enterprise workflows than others. Intermec and Enterprise Mobile have collectively provided mobile workflow solutions and support services to thousands of customers and have seen both BYOD success stories and failures. In our experience BYOD's success and value correlate directly to the complexity of the work process. The simpler the process, the greater the flexibility for devices that workers can use. "Complexity" is subjective. Some of the specific factors that determine complexity include how much information needs to be entered into the device to complete the work process, how the information is collected, and whether mobile applications and users work independently of host databases, CRM systems and other enterprise applications. The level of help desk and software development resources available to support mobile workers are also important variables for BYOD effectiveness.

The more simple the process the more likely that a business can survive on a consumer device. The more complex the workflow the less likely that a consumer device can accommodate the solution effectively. Consumer devices, even the most complex, are generally designed for single-threaded workflows such as taking a picture, making a phone call or searching the Web. A more robust platform is needed the moment these functions start to converge in a workflow that uses additional functions, such as data capture and database lookups over the Internet. This is especially true considering that this convergence of activities for some workflows may happen 30 to 300 times a day in enterprise operations.

To summarize: if the workflow calls for minimal interaction with the user during the workday and is more of a failsafe communications tool used in the case of a rare exception event, a consumer-based, user-owned device may be acceptable. If mobile needs include frequent interaction, reliable integration with back office systems and enterprise level solutions availability, then an industrial, corporate-managed solution is likely a more appropriate choice. The key factors to consider are summarized in the following sections.

BYOD Can Be Effective When...

- Users have minimal interaction with the device;
- Mobile device is a fallback communication tool rather than a primary work tool;
- Mobile workers and/or applications do not need frequent interaction with back office systems;
- There is little or no use of automated data collection features and peripherals;
- Legacy applications are Web-based and will not require redevelopment

BYOD Is Probably Inappropriate If...

- Bar code or other automated data collection is fundamental to efficient work processes;

- Software is optimized for data collection devices, e.g. to take advantage of scan data entry;
- Workflows or mobile applications depend on interaction with enterprise systems;
- Devices are commonly used in outdoor, industrial and non-office environments;
- Software and tech support resources are limited'
- Specialized mobile applications are supported;
- Device failure will cause prevent workers from completing their primary tasks.

Conclusion

When mobile devices are not essential to complete primary work tasks there is a lot of flexibility in the devices that can be used. That is why BYOD took root among office-based and occasionally connected mobile workers. Now BYOD interest is spreading to mobile workers who perform specialized tasks, where there is a less clear value proposition. Enterprises are finding themselves having to make the decision of giving workers what they want, or giving them what they need.

The BYOD value proposition for specialty mobile environments is not clear cut because downtime, service and software development costs may all be higher compared to general-use environments where workers run common business applications and can continue working if their mobile devices are unavailable. A BYOD cost-benefit analysis must look at factors other than hardware savings and address software and support considerations.

Even with comprehensive analysis the costs and value of specific device can still be hard to fully measure. The value of mobile automation initiatives comes from having consistent, optimized work processes. Mobile devices are often essential enabling tools for optimized work processes, so failing to take full advantage of their specialized features and capabilities undermines the value of mobile automation.

About Intermec by Honeywell

Intermec Inc. (NYSE:IN) is the workflow performance company. We design the leading data capture and information management solutions at the interface between mobile workers, assets, and customers.

About Enterprise Mobile

Founded in 2006, Enterprise Mobile, a business unit of Intermec Technologies Corporation, specializes in delivering the widest range of comprehensive mobility services—from strategic planning and deployment through support and mobile device inventory management. Enterprise Mobile is headquartered in Plano, Texas. For more information, visit www.enterprisemobile.com.

¹CIO.com "Mobile BYOD will cost you about 33 percent more than a company-owned mobile device approach, says Aberdeen Group. Here are five hidden costs." April 4, 2012. Accessible at: http://www.cio.com/article/703511/BYOD_If_You_Think_You_re_Saving_Money_Think_Again

²Network World "12 BYOD Disaster Scenarios" August 1, 2013. Accessible at www.networkworld.com/slideshow/113443/12-byod-disaster-scenarios.html?source=NWWNLE_nlt_daily_am_2013-08-04#slide6

³Britt Libby and David Krebs/VDC Research "BYOD as a Managed Service" April 2013. Accessible at [Enterprise Mobility Exchange](http://www.enterprise-mobility-exchange.com) and [VDC Research](http://www.vdc-research.com).

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