



Whitepaper

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Empowering Mobile Workers: Choosing the Right Device

A J.Gold Associates White Paper

“The push to deploy consumer-grade mobile devices in businesses is a result of their popularity and availability at low cost and massive end user adoption based on personal preference.....organizations must evaluate the pros and cons of selecting and deploying a durable purpose-built device for their mobile workforce, instead of automatically enabling a diverse base of end-user selected consumer mobile devices as a result of employee pressure... overall lifecycle cost is more important than the low acquisition cost common with consumer grade devices, and that productivity can only be maximized when fitting the required features and functions into the total mobile workforce solution...”





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Choosing Mobile Devices that Work!

Can companies actually run an efficient operation if they allow end users to choose their own consumer-grade mobile device?

The push to deploy consumer-grade mobile devices in businesses is a result of their popularity and availability at low cost and massive end user adoption based on personal preference. But is lower acquisition cost a liability or an asset? Do end users really know what device they need/want while doing their work, or are they simply reacting to what they prefer in their outside-of-work lifestyle? And can companies actually run an efficient operation if they allow end users to choose their own devices and update them

at will, which results in having multiple device types, sizes and styles that are often incompatible with each other.

Organizations must evaluate the pros and cons of selecting and deploying a durable purpose-built device for their mobile workforce, instead of automatically enabling a diverse base of end-user selected consumer mobile devices as a result of employee pressure. To this end, enterprises must evaluate the key parameters required to optimize device selection, including cost, security, reliability, productivity, manageability and support. End user preferences should not be ignored outright in deploying mobile workforce devices. But selection criteria other than popularity is what will ultimately enhance the end user experience and increase productivity. And durable devices often enable solutions beyond those obtainable from consumer-class devices. Further, there is no inherent reason why purpose-built work devices can not achieve the “coolness factor” that drives consumer selection/acceptance. The mobile market moves so quickly that outdated notions of slow rate of change for purpose built durable devices no longer apply.

We take the view that the overall lifecycle cost is more important than the low acquisition cost common with consumer grade devices, and that productivity can only be maximized when fitting the required features and functions into the total mobile workforce solution. Further, the special needs for manageability, security, support, specialized accessories and replacement/repair are critical to making a mobile workforce project successful and are most easily achieved with a workforce targeted purpose-built device in conjunction with an available ecosystem. This paper will address and detail that point of view.

Deciding on Device Characteristics

The initial acquisition cost should not be the primary factor in determining the best device to deploy for a task-oriented mobile solution

Most current generation off-the-shelf consumer-grade smart devices are highly capable and can do a variety of tasks. However, while they are generally attractive and compelling to end users, there are many situations where a dedicated workforce’s productivity may actually be hampered by such devices. It is difficult or impossible to customize such devices to specific workflow-related tasks that require data gathering functions (e.g., laser scanning, RFID, data entry keypads). And required necessities for

many full-shift field work situations are unavailable (e.g., extended replaceable batteries and rapid chargers, specialized grips and/or mounts, weatherproofing).



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Consumer-grade devices are available at relatively low cost. But the initial acquisition cost should not be the primary factor in determining the best device to deploy for a task-oriented mobile solution. Rather, low acquisition cost of consumer-grade devices often results in a substantially larger Total Cost of Ownership (TCO) when deployed in a dedicated mobile workforce. In evaluating TCO, companies should examine multiple factors, including:

- *Productivity* – the primary reason to deploy mobile smart devices is to enhance the productivity of the mobile worker. Yet many smart phone devices are not optimized for dedicated functions often required by a field workforce. The ability to specifically program and enforce workflows dedicated to the work processes is more important than providing consumer-oriented full web browsing, media players and social networking capability. While these can all be advantageously deployed in a mobile workforce setting, they should be enabled as a targeted application need and not solely because they are available on the device. As little as a 2% productivity increase can provide a return of \$3K per user per year. And it's not uncommon to find a 5%-15% improvement in deployments of optimized solutions. Further, properly designed specialized accessories (e.g., vehicle mounts, batteries, chargers, scanning) can increase productivity for the end user and contribute significantly to minimizing TCO.
- *Security* – most consumer-class smart phone devices are not optimized to meet the needs of the organization for maximizing data security and preventing corporate data leakage. This is increasingly important as many mobile workers are now engaged in field-based financial transactions, and not just accessing or collecting data. Any data breach could put the organization at risk of substantial penalties and liabilities, and must be considered in any mobile workforce deployment. Further, loss of sensitive or proprietary data can have a profoundly negative impact on customer relations and result in substantial loss of sales.
- *Support* – our research indicates that non-optimized mobile workforce devices can add to the support staff workload by 3% to as much as 15%. This represents not only a considerable addition to TCO, but also requires substantially more help desk and support staff at a time when most companies are trying to reduce staffing and costs. Further, many organizations require a level of support from device manufacturers that is generally not available from consumer-class providers, including access to an ecosystem of devices, peripherals, specialty components, ISVs, etc. Such vendor support is often critical in determining whether a particular mobile workforce deployment is successful.
- *Longevity* – most consumers consider mobile devices disposable, given their relatively low cost and expected limited lifetimes of 18-24 months. However most enterprises can't afford to adopt this disposable mentality, since production-level devices are expected to remain on duty for at least 3-5 years to optimize ROI. Further, consumer grade mobile devices upgrade/change functions, operating systems and applications on a rapid and often unpredictable basis. It is critical that organizations deploying work related devices retain a level of stability that allows for maximum productivity and minimum cost of operations. As a result, the rapid change

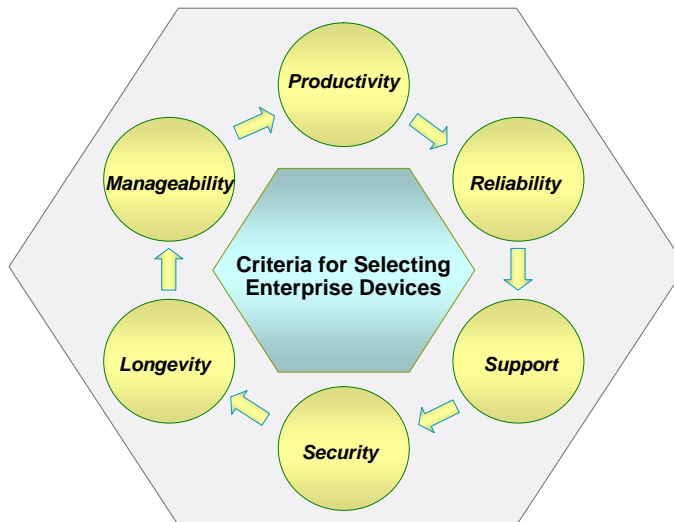


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cycle of consumer-grade devices is often at direct odds with corporate needs/requirements to maximize ROI and minimize TCO.

- **Manageability** – it is critical that any devices deployed by enterprises be fully controlled and managed as the only way to achieve the lowest possible TCO. It is not acceptable practice to allow end users to modify/alter devices at will, which is often the case with consumer-grade devices. Initial automated provisioning, updating the device software, managing on-board functionality, peripheral support, asset management and recovery, etc. are all critical issues that must be addressed by an automated tool set available as part of any mobile workforce deployment. Most purpose-built solutions provide such capability, while most consumer-grade products do not without substantial investment in third-party add-on toolsets.
- **Reliability** – our research indicates that off-the-shelf smart phones can have a 15%-25% yearly failure rate in mobile workforce field deployments, and in difficult environments much higher failure rates are common. While the devices themselves may be inexpensive to acquire, replacing and re-outfitting them are not, nor is the loss of productivity of the end user during the time the device is not available. Further, support costs are directly related to device durability/reliability. As such, a purpose built device, although costing more initially may save hundreds or thousands of dollars in TCO over its lifetime.

Figure 1: Enterprise-Class Durable Device Selection Criteria



Unique Requirements not Present in Consumer Devices

It is access to a “mobile tool kit” which provides for the large gains in productivity and customer interaction improvements.

Many mobile workers require a set of functionality which is specifically targeted at repetitive and well defined tasks. It is this access to a “mobile tool kit” which provides for the large gains in productivity and customer interaction improvements so attractive to enterprises. Yet some of these tasks are much harder to implement on consumer-grade devices which are general purpose and not



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always easily targeted at the task at hand. Further, since most enterprises require dedicated workflows and connectivity to back end systems as the primary worker's enablement, the need to create a solution that optimizes for those parameters is key. And the ability to disable competing applications on the devices not needed to perform the task at hand can be a benefit to worker productivity.

There are a number of industries where task-specific solutions are desirable, including:

- Health Care – e.g., mobile nursing, medication delivery, patient maintenance
- Inspections – e.g., form completion, inspection procedures
- Light Courier – tracking, delivery confirmation
- Public Safety – ticketing, records management, database retrievals
- Retail – e.g., inventory management, “line busting”, sales person empowerment
- Utilities – e.g., customer interactions, meter reading, maintenance
- Distribution – e.g., order processing, workflow, packing and shipping
- Field Force – e.g., trouble ticketing, dispatch, spare parts control

Field workers often require dedicated functionality which may be difficult to add to consumer-grade devices, including bar code scanning, RFID, magnetic card reading, weather-proofing, keyboard/data entry, sunlight viewable screen, enhanced battery life, vehicle mounting, etc.

Extended Levels of Security

It is imperative mobile workforce solutions employ enhanced security to protect both the organization and its customers.

Organizational data is increasingly coming under risk of loss with subsequent penalties rising dramatically as a result of various legislative mandates and legal actions. Further, data breaches can result in relationship injury or even loss of customers. Existing customers moving to different suppliers is highly costly to the organization both in revenues and in reputation. It is therefore imperative any mobile workforce solutions employ enhanced security capabilities that protect both the organization deploying the solution and the customers of that organization. Further, with the increase in full-time connectivity and the need to prevent malware attacks, it is important that security take a prominent roll in device selection. To this end, organizations must evaluate any devices deployed to field workers for their ability to enhance and enforce security, including:

- Hardening supplements to off-the-shelf OS since most OSes have limited security
- Encryption of all data on board (and extendable memory)
- User modification prevention to control potentially unsafe activity
- Device lockdown to prevent any change to the device or solution
- App selection and elimination to prevent users from adding apps or using apps not needed for their work
- Loss/theft prevention to “kill” any lost devices, and to make it easy to recover lost or stolen devices
- Peripheral communications to allow attached work-associated secure peripherals for printing, e-commerce, communications, etc.



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Leveraging Enterprise Infrastructure

Optimized mobile devices that can efficiently leverage existing corporate infrastructure will minimize TCO and maximize ROI.

Few companies have field force applications deployed in an isolated scenario. Indeed, connectivity with existing widely deployed enterprise apps (e.g., Microsoft Exchange, SQL Server) enabled through existing infrastructure components (e.g., Active Directory, VPN) are of paramount importance if maximum productivity is to be achieved. Further, improved connectivity/communications enables the remote worker to stay both connected to the company and in touch with co-workers, enhancing productivity. Companies should also examine whether a selected device can leverage existing corporate apps deployed to desktop users. While existing desktop “thick” applications can generally not be directly run on mobile devices without modification, the ability to leverage compatibility modes, common programming tools and common styles of interface are all advantageous in minimizing deployment and operations cost. Optimized mobile devices that can efficiently leverage existing corporate infrastructure will minimize TCO as components won’t need to be duplicated through costly third party add-ons, and maximize ROI through increased end user productivity. Companies should consider several factors for devices including:

- On-board support for existing communications suites and protocols
- Compatibility with existing networking and firewall solutions
- Ability to leverage existing end user deployed applications whenever possible
- Commonality of program interfaces for ease of end user training
- Ability to leverage internal programming tools/skills as appropriate
- Commonality of end user licensing/management for infrastructure enablement

Device Lifecycle Management

Companies often look at management as an add-on when it should be evaluated in the strategy phase of any project for maximum benefit

Mobile device asset management is a key contributor to both end user satisfaction and optimized TCO. Companies often look at Mobile Device Management (MDM) as an add-on after the fact when it should be evaluated in the strategy phase of any project if it is to achieve maximum benefit. Workforce-optimized device suppliers have the capability to provide a full service MDM solution to a mobile deployment. And while MDM is important, it is only one component of a vendor’s full lifecycle services. Companies should evaluate full lifecycle service capability for any products being considered, including:

- Provisioning on initial deployment or replacement of devices
- Asset Management of all devices deployed
- Operational and policy enforcement to manage usage of the devices
- Warranty/Repair Services to quickly deal with any failures
- Device Replacement to insure devices can be replaced if needed
- Upgrading to enhance the HW or SW environment
- Remediation to keep connected devices up to date
- App Delivery to add and/or upgrade needed apps



EDA Maximizes Productivity That Off-The-Shelf Devices Can't

Field deployed solutions require special capabilities beyond those typically available in consumer-oriented devices

Field deployed mobile solutions require special capabilities beyond those typically available in off the shelf consumer-oriented devices. Without these capabilities it may be impossible to create the optimum solution to empower the field worker and it's likely that organizations will have to deploy a compromised capability instead. All of the built-in functions may not be used initially, but updated solutions will often add capabilities that may leverage these components. Some of the most important functions required that go

beyond off-the-shelf smart devices include:

- Biometrics for user confirmation and security
- Optimized scanner with targeting LED for efficient scanning
- Replaceable high capacity battery to power a full work day of continuous use
- Drop testing to limit breakage and subsequent need for replacement
- Weather resistant to allow outside work in various conditions and temperatures
- Guaranteed lifetime, non-obsolescence (both HW and SW) to assure a 3-5+ year life
- Device management/control to allow the organization control over features, functions, apps and assets
- Product stability and guaranteed availability to assure continuity and/or non-obsolescence of the solution once its deployed

In determining the optimum mobile device, organizations should evaluate the required capabilities for both consumer-grade and durable-grade devices. The following chart highlights the key strengths and weaknesses of each device type for a number of important comparison points.

Figure 2: Comparison Points in Determining the Optimum Device

	Off-The-Shelf	Durable Purpose-built
Purpose Built Functions (scanner, biometrics, docking)	-	++
Durability (drop, elements)	-/+	++
Platform Stability of OS and HW (cost of constant change)	-/+	++
Compatibility with existing apps/solutions	+	++
Productivity enhancers (long life battery, screen, keyboard)	-	++
VoIP, optimized WLAN	-	++
Industrial WiFi, including dual bands	-	++

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Maximizing ROI by Minimizing TCO

To maximize end user productivity, enable an optimized ROI, and minimize TCO, organizations should focus on the following criteria

To maximize end user productivity, enable an optimized ROI, and minimize TCO, organizations should focus on the following criteria:

- *Lifecycle TCO vs. acquisition costs* – Many companies emphasize upfront acquisition costs when evaluating devices without looking at the overall TCO. This is often a false economy, as higher upfront costs may actually reduce TCO over the lifecycle of the device and decrease the total ROI.
- *Minimizing support and maximizing manageability* – these are two of the largest components of TCO, and should be included in any evaluation and selection criteria. Most companies underestimate the support costs associated with field deployments, and many totally ignore it in their initial project plans. Failure to include analysis of these costs will inevitably lead to poor performance, limited end user productivity, and out of control support costs.
- *Selecting for durability and repairability* – even assuming that organizations can obtain lower cost consumer-class devices and save upfront costs, the need to repair and replace a large number of devices will likely overwhelm the support organization, cause tremendous increase in call volumes to the help desk, and significantly stress the technical staff's ability to cope with the solution. Further, "throw away" devices may actually end up being more expensive in TCO than devices that can be repaired.

In analyzing the optimum solution, organizations should look beyond acquisition cost of a device and concentrate on discovering the true lifecycle costs of the entire solution. Only then can the organization maximize its ROI.

Determining Lifecycle Costs

Few companies do an adequate job of determining the true lifecycle costs of a field workforce solution beyond the acquisition cost

Few companies do an adequate job of determining the true lifecycle costs of a field workforce solution beyond the acquisition cost. While its easy to assess the acquisition costs of the devices and the cost per license for the applications and/or total SW solution, it is much harder to look at all of the components contributing to the true cost of operation of the device over its useful life. Many organizations underestimate the difficulty of changing platforms when consumer-grade devices need to be replaced because of their short term of availability. It is generally difficult and costly, and it requires having multiple devices in services simultaneously. Further, users of consumer-grade devices often request change simply due to new devices being available in the market. Finally, although solutions are generally deployed for a number of years, obsolescence of off-the-shelf consumer-grade devices may make it impossible to continue to deploy the solution without a major re-engineering or upgrade. These factors are generally



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not the case with purpose-built durable devices, which remain in the market for an extended period of time and provide for continuity and solution longevity.

In determining the true lifecycle cost, organizations should take into account a number of factors. Figure 3 represents some of the key points that an organization should evaluate.

Figure 3: Determining True Lifecycle Cost

Device Acquisition Cost
Network/Connectivity Cost
Application Development Cost
User Training/Support Cost
Help Desk Cost
Repair/Warranty Availability and Cost
App/OS Acquisition and Upgrade Costs
Device Maintenance Cost
Productivity Costs – operations, downtime, ease of use
Opportunity Costs – lost sales, unhappy customers, failed security

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TCO Comparison of Consumer-grade vs. Durable Smart Devices

In a study¹ comparing the TCO of durable handheld devices with those of commercial off-the-shelf devices deployed to field workers, we found that:

- A durable enterprise-class handheld device has a 3 year TCO of \$1294, compared to a 3 year TCO for a consumer-class device of \$1819.
- The enterprise-class device represents a 3 year lifecycle savings of \$525
- This savings will often cover the premium price of the durable device
- In a 500 user organization, the total cost savings is more than \$262K over 3 years.

Further, if enterprise-class devices provide a 2% productivity improvement over their consumer-class rivals, companies can generate an additional \$3,000 per user per year, or \$9,000 over the expected 3 year life of the device². This revenue enhancement potential more than makes up for the premium costs associated with business-class handheld devices. It may also enable companies to scale back on personnel and/or support costs and do more with less, which is of high value in the current business climate. Our research also indicates that support and technical staff burdens can increase by as much as 3%-12% when consumer-class devices and their associated costs are evaluated compared to business-class handhelds deployed in field worker situations.

Overall TCO is typically higher for consumer-class devices. They can cause excessive user down time associated with device failures and a subsequent substantial reduction in



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productivity through business interruptions and user frustration. And with a projected life cycle of 3 years for an enterprise-class handheld vs. 1 year for a consumer-class device, the need to purchase and replace the devices is substantially reduced, saving not only device cost, but support costs as well.

Figure 4: Three Year Cost Comparison of Consumer-grade vs. Durable Smart Devices

3 Year TCO of Consumer-grade Device	\$1818.80
3 Year TCO of Durable Device	\$1294.07
3 Year TCO Difference	\$ 524.73
Overall Cost Benefit for a 500-user Enterprise	\$262,367

References:

- 1- A 3 Year Cost Comparison of Consumer-grade vs. Durable Smart Devices, © Copyright 2010 J.Gold Associates. Available by request from www.jgoldassociates.com
- 2- Based on an employee fully burdened rate of \$150K per year, including salary, benefits and overhead

Conclusions

Picking an optimum mobile field force device that maximizes ROI and minimizes TCO is not a trivial exercise.

Picking an optimum mobile field force device that maximizes ROI and minimizes TCO is not a trivial exercise. There are a number of key factors that must be evaluated. Organizations must look beyond initial acquisition cost and look at the complete lifecycle cost. Many companies are being influenced by the pressure exerted by users who prefer the latest popular devices. However enterprises should not make consumer-grade vs. durable grade device acquisition costs the determining factor. Selecting the most appropriate device for the task must be based on sound analysis, and not based on consumer trends and/or end user pressure. It is imperative that the organization fully understand the actual mobile worker requirements and enterprise needs before making any selection and evaluating and determining a total lifecycle cost is critical.

Selecting and deploying enterprise-class durable handheld devices represents a significant savings over deployment of consumer-class devices for mission critical field workers. They should be the product of choice in most situations where end user productivity is important. For most businesses, mobile solutions are now mission critical and failure is not an option. Concentrate on functionality, usability, durability and manageability. Failure to do so will result in substantially increased costs, lower end user productivity and dissatisfaction with the final field force solution deployed.



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