

## **Mobilizing Field Forces on Smartphones**

Sponsored by RIM

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### **Executive Summary**

This ABI Research white paper examines the use of smartphones as tools for mobile field workers as a replacement for rugged devices. For many field workers, ordinary smartphones can perform many of the required tasks at a fraction of the cost of rugged handhelds. Through interviews with multiple companies with experience in using rugged devices and ordinary smartphones, the analysis shows the total cost of ownership (TCO) of a smartphone-based mobile field force solution was 14% to 85% less expensive than alternative rugged device solutions.

The primary benefits that drove the lower TCO were improved worker productivity and lower device costs. Productivity benefits were achieved through the longer battery life of smartphones, integrated mobile voice, and data connectivity, and can be maintained using OTA technologies. Smartphone device costs are as much as eight times less than the alternative rugged devices. Even considering a higher replacement rate for smartphones, lower lifetime hardware costs were a driving reason companies chose smartphones over rugged handhelds for their mobile field force applications.

## Market Update

### Section 1. METHODOLOGY

ABI Research conducted interviews with four companies that have implemented a wireless field force application using Research In Motion (RIM) BlackBerry devices. One of these companies was used as the basis of a case study presented in this white paper. All of the companies interviewed are RIM customers and RIM provided the contact names for the interviews.

Companies interviewed included:

- Coca-Cola Enterprises, Inc, Atlanta, GA
- LTT Vending Group, West Yorkshire, UK
- Videotron Limited, Montreal, Quebec
- Bell Industries Inc, Indianapolis, IN

### Section 2. SITUATION

Today, field workers are expected to be connected, responsive, and collaboratively informed with the ability to accept changes from dispatch centers on the fly. Once thought an investment in personal productivity, the concept of mobile devices connected to back-end applications is now recognized as an investment in corporate competitiveness. There is clear appreciation for the returns that come from putting the most up-to-date information into the hands of those in the field who can do the most with it. Whether that means improving interactions with customers, partners, and suppliers, or refining the processes that make data consistent to all levels of the organization, mobile field force solutions are increasingly recognized as investments in efficiency and innovation that can inspire fresh ideas for building new levels of flexibility into all levels of corporate operations.

#### 2.1 Device Decisions

Differences in business models and the varied responsibilities of field forces means that today's mobile devices must meet a wide variety of requirements.

Some field service solutions have a transactional and order-entry component (e.g., ordering parts remotely for field technicians), some require advanced content viewing (e.g., charts and technical diagrams for utility workers) while others require remote data entry capabilities (e.g., insurance assessments for adjusters). The decision on the type of mobile device used in the field needs to be matched to not only the application, but also the environmental conditions and usage scenarios of the field force.

Mobile device technology has evolved so that management now has a variety of device form factors to match to its field workers' unique requirements.

#### 2.1.1 Rugged Handhelds

Positioned as the device class specifically designed for field workers, rugged handhelds are ruggedized devices from such companies as Intermec Technologies

and Motorola Inc. that are designed to withstand harsh environments. They are optimized for information access, creation, and collection and often include integrated bar code scanners, large touch screens, keyboards, complete wireless suites, and run high-level operating systems (commonly Windows Mobile) that can extend enterprise applications.

Devices in this class are an investment in physical strength, reliability, and durability, which come at a significant cost. Their price points range from approximately \$1,500 to more than \$2,000, depending on form factor and integrated capabilities and their all-in-one design has made rugged handhelds a staple device for such industries as trucking and logistics.

### 2.1.2 Notebook and Tablet Computers

Rugged notebook computers are intended for field workers that have high data creation requirements or need a larger screen for viewing detailed content. One of their main benefits is the ability to have high application compatibility between the field, the data warehouse, and headquarters. They are designed with features for outdoor use such as daylight readable screens, backlit keyboards, touch screen displays, and removable hard drives for security. In many cases, notebook and tablet computers are vehicle mounted; this severely diminishes their mobility but can be suitable for a particular vertical's usage needs, law enforcement and insurance agents, for example. Rugged notebooks such as the Toughbook line from Panasonic range in price from \$2,000 to more than \$5,000.

One of the companies interviewed for this white paper, Canada-based Videotron, evaluated truck-mounted connected notebooks for mobilizing its field technicians. Videotron, which installs home telecommunications services ranging from home phone service to cable TV, wanted to replace its paper-based work order system with a mobile solution that would allow it to receive work orders, route them to customer premises, and update the work orders all on a mobile device. In the end, it chose BlackBerry mobile devices for its lower cost and for productivity reasons. Because all the information tasks can be accomplished on the handheld, Videotron realized its technicians would be more productive at customer sites if they did not need to walk to and from their trucks to access work order information.

### 2.1.3 PDAs

Personal Digital Assistants (PDA) were originally positioned as devices to replace paper and became handheld tools for accessing and managing data. Their open platforms include Windows Mobile and Palm OS and they were one of the first handheld platforms used for extending corporate applications to field workers. Although many models are equipped with wireless data connections, they are most often used in an off-line mode. Field workers access and update data on the device then synchronize it with the vertical applications on their PCs.

PDAs remain one of the most cost-effective platforms for deploying mobile applications to the field. PDAs are extremely affordable since they are neither ruggedized nor voice-enabled. Their large touch screens and stylus input continues to make PDAs widely used in such verticals as healthcare and utilities. However, the lack of a voice connection limits their functionality and when only used in a cradle-and-sync mode, collected data is put at risk if the device is lost or damaged in the field.

#### 2.1.4 Smartphones

Smartphones are gaining momentum as a device option for field forces, in part because they have high functionality that comes in a relatively low-cost device. Smartphones are mobile phones based on high-level operating systems that are open to third-party application development. Their mass market availability has created a wide variety of affordable form factors that span the continuum of voice versus data-centric designs. Enterprises evaluate smartphones as the main device for certain types of field workers for three reasons:

- 1 They have an always-connected status;
- 2 They have the ability to act as a user's primary communication terminal;
- 3 They can be the platform for mobilizing enterprise applications.

#### 2.2 Smartphones over Rugged Handhelds

Companies that chose ordinary smartphones over rugged handhelds for their field forces say they made the choice with a clear understanding of the business tasks to be mobilized, the environment of their field forces, and the unique mobility constraints of the different device types.

The companies ABI Research interviewed for this white paper stressed that getting the right device for their field forces was just as important to user acceptance and overall success of the solution as launching a correctly architected solution from the beginning. The right device needs to meet the end-user's needs as much as it must meet the business's cost and system requirements. While that does not always mean rugged when it comes to devices for field workers, it does mean the device needs to perform in the environment where work is conducted and should not stretch the end-user's technical aptitude to the point that the technology itself could be an objection to its use. As this study reveals, ordinary smartphones can work just as well as rugged handhelds in enabling workers to perform at a high level.

#### 2.3 Benefits of Smartphones

Companies pointed out the following benefits as the main decision factors leading them towards ordinary smartphones for field force mobility.

##### 2.3.1 Cost

Device cost is one of the chief incentives enterprises cited for why they chose to use commercially available smartphones over rugged handhelds. The opportunity to save money while still providing field workers a device that meets all of their requirements is a benefit interview subjects described as difficult to ignore.

A straight device-to-device cost comparison clearly favors smartphones, which average \$200 per device compared to more than \$1,500 for a rugged handheld. However, a great deal of the rationale for choosing a smartphone came from an evaluation of the mobile application and requirements of the specific field workers. If features such as integrated bar code scanners go unused or if the job requires only mid-level durability, a company sees little reason to pay for a rugged device, given the wide choice of other mobile device options.

Another cost benefit is the flexibility to add peripherals, such as a scanner, printer, and rugged hard shell casings when required. For about \$50, a hard case from

companies such as Otterbox can protect devices from road abuse. Digital pens, bar code scanners, signature capture pads, mobile payment terminals, and mobile printers using Bluetooth technology are affordable additions when required.

### 2.3.2 Size and Weight

Look and feel can have marked impact on the success of the overall mobile initiative. Because value is only realized from solutions that are actually used, choosing a device that users will accept as their own – rather than one they would use only as a condition of the job – can be important to the device's overall success. This is especially true for field workers who want to project a professional image or for those who might resist changes to processes they view as tried and true.

Given the size difference between smartphones and rugged handhelds, there is little chance that either device class could be mistaken for the other. Rugged handhelds can weigh as much as 25 ounces compared to smartphones, which often weigh less than 4 ounces. Weight is an extremely important device differentiator for field forces that are required to keep a specific device with them at all times, whether for communication or other reasons specific to their roles.

### 2.3.3 Battery Life

Field workers want devices that can last for a day, but do not want batteries that double a device's weight. The length of charge among various devices can be a few hours, a few days, even a couple of weeks depending on the size of the battery, a device's capability set, and its power management features.

Most rugged handhelds are designed to hold their charge through a single shift. Their large touch screens and comprehensive feature sets make hot swappable and extended battery packs important features, especially for field forces working where power is not always accessible. Smartphones are also feature-rich devices, but their functionality is balanced so they can perform as a primary mobile device and typically hold a charge for more than a day.

### 2.3.4 Device Accessibility

Smartphones are available from a wide variety of retail outlets around the world, making replacement on short notice easy. The distribution reach required to compete in the smartphone market makes same-day or overnight replacement for broken or lost devices a capability most manufacturers can handle.

Some of the interviewed companies told ABI Research that the availability of smartphones reduced their need to keep a large stock of additional devices on hand. Extra devices become important when field forces use rugged handhelds, because their high price point and long replacement cycles mandate that they be shipped out and repaired rather than simply replaced.

### 2.3.5 Accessories

Smartphones can be accessorized to fit the job requirements with a flexibility not always offered in rugged handhelds. From rugged cases that insulate against shock and moisture damage to Bluetooth bar code readers and printers to signature capture pads and charging stations, smartphones can be tailored to jobs without forcing users to contend with unneeded features.

For example, Bell Industries, a provider of integrated technology services, needed a mobile device for inventory tracking. The device needed to be durable as well as capable of reading 1D bar codes and capturing a signature. After evaluating a

connected rugged device from Intermec, Bell Industries chose the BlackBerry 8310 equipped with an EnterMoCase, which gave the BlackBerry all the required capabilities and allowed Bell Industries to extend its existing BlackBerry experience to its field application rather than introduce a new platform. The ability to accessorize the BlackBerry to complete the capability set allowed Bell Industries to take advantage of the cost savings of the device as well as free itself from the high-priced repair policies.

### 2.3.6 Connectivity

Connected devices can help alleviate many of the challenges firms face in managing a field force, such as tracking workers' movements and updating customer data on home office servers as quickly as it is updated on the road. Connected devices eliminate the data loss risks inherent in solutions that only download data once a day, while improving the efficiency of backend processes because of the real-time transfer of data.

LTT Vending, in West Yorkshire in the United Kingdom, employs a team of seventy merchandisers that maintain more than 2,000 refreshment machines. Unconnected Symbol PDT 5100 devices tracked each machine's inventory as well as cash receipts and upkeep and maintenance for each machine. The company recently switched to connected BlackBerry 8300s. Cost savings per device and form factor improvement were contributing factors, but real-time updates of machine, receipt, and inventory data cinched the decision to switch to BlackBerry devices. LTT calculated that the BlackBerry platform's responsiveness combined with real-time data access and transfer would save one minute per vending machine visited and up to thirty minutes per week in the office, due to the availability of real-time data.

## 2.4 Conclusion

Companies interviewed for this white paper validate that smartphones can fit the needs of professional-level field forces that do not always need the protection that rugged devices deliver. While some benefits were unique to each deployment depending on the application and type of field force, some were common to every company.

- **Overall cost:** The cost of any initiative should always be weighed against the alternative methods for getting the job done and smartphones proved to have an undeniable cost advantage over rugged handheld devices. The smartphone's flexibility to be accessorized to fit the job at hand allows a company to pay for only the functionality it needs without forcing users to contend with unnecessary capabilities.
- **User acceptance:** Field workers, like most mobile technology users, understand that a mobile device can be a reflection of its user. Field workers looking to project an advanced level of professionalism accepted the smartphone because it fit an image they wanted to portray. Also, since most field forces have established processes and communication methods for carrying out their responsibilities, new methods can meet resistance. However, the slim form factor and function of smartphones like Blackberries often led to users adopting the device as their own, which help push forward the adoption of new systems and procedures.
- **Experience:** Smartphones are a known type of device to many IT departments; successful mobile solutions often hinge on companies leveraging existing deployments and knowledge.

## Section 3. TOTAL COST OF OWNERSHIP ANALYSIS

### 3.1 Cost Categories

Ultimately, a company's decision to use a particular device comes from understanding the total cost of ownership (TCO) of different solutions. A total cost of ownership analysis involves identifying all the costs that will be incurred over the lifetime of a solution. For a mobile field force solution, the lifecycle costs fall into four major categories.

#### 3.1.1 Hardware, Software, and Service Costs

Hardware costs include the costs of the device (which can provide both voice and data access), peripherals, accessories, and replacement parts for devices and peripherals. Server costs such as addition of a BES and licenses are also included in this category.

Software costs include development of the mobile application (either in-house or outsourced), and application maintenance fees. In some cases, device configuration, provisioning, and testing fees are included in this cost category.

Service costs are the monthly fees for data network connectivity. Mobile voice services are also included, if required, for conducting field force activities.

#### 3.1.2 Product Launch Costs

This category quantifies the cost to configure, provision, and field-test a device. It also includes time in training for field-force workers and IT time to conduct the training.

#### 3.1.3 Maintenance and Support Costs

Maintenance and support costs are expenses to address hardware and software repair events – either by internal IT staff or an external firm. Repair events that require replacement parts are placed in the hardware, software, and services costs category. This category does not include costs for call and dispatch centers to support field-force workers with information that could have been found if the mobile solution provided real-time access to customer, inventory, time sheet, and other data.

#### 3.1.4 Productivity

Productivity costs are the costs of lost productivity by end-users of the mobile solution and fall into three categories.

- **Downtime** includes worker productivity losses that occur from hardware and software repair events.
- **Efficiency** losses are driven by two factors.

The first is device functionality. An example: will a device that has a bar code scanner provide greater work efficiency than a device that requires manual input of a numerical code?

The second factor is real-time connectivity, which provides gains over unconnected mobile solutions by precluding the end-user from accessing information from less efficient means such as calling the dispatch center. It can also mean not needing to use landline access for voice and data communications.

Lack of any telecommunication access can add costs for worker time needed to transport collected data back to the home office. Fuel costs for transport of data is not included in this category.

- **Quality costs** can occur if information cannot be read because of poor screen resolution in the mobile device or if inputting data causes errors. The latter can vary from worker to worker and usually results from worker device familiarity, eyesight, and dexterity, as well as other factors.

### 3.2 TCO Analysis Methodology and Assumptions

In this ABI Research whitepaper, the TCO analysis quantifies the differences in mobile solution costs of four companies that evaluated both a BlackBerry solution and a mobile solution that used another device.

The four companies interviewed for this analysis were Videotron, Bell Industries, LTT Vending, and Coca Cola Enterprises (CCE). In all cases, the comparison was between a BlackBerry 8300 and an alternative portable device, which included laptops (Videotron), Symbol devices (LTT Vending and CCE), and Intermec (Bell Industries). Five TCO models were created with two of the models generated from CCE. In one CCE model, the Symbol device was not connected with a data plan; in a second CCE model, the Symbol device was connected with a data plan. In these cost models, companies expected to replace the BlackBerry every fourteen to eighteen months. The replacement rate for Symbol and Intermec devices ranged from two and one-half to five years.

The number of devices by company ranged from 35 to 11,000. Although the relative differences for TCO models of 35 devices versus 11,000 devices changed very little, the models were adjusted so the same number of devices was used in each company cost analysis. The device number chosen was 200 devices.

The TCO model is based on adding up all the costs in each category over a six-year period from 2009 to 2014. Costs in years 2010 to 2014 were discounted back to 2009 using a 3% discount rate.

The TCO model results will be presented for four categories of devices:

- BlackBerry Solution
- “Connected” Laptop Solution, which refers to Videotron’s truck-mounted laptops connected via a broadband cellular connection.
- “Unconnected” Handheld Solutions, which were the Symbol device solutions used by LTT Vending and evaluated by CCE; they have no wireless data connection for transfer and retrieval of information.
- “Connected” Handheld Solutions refer to the Intermec and Symbol devices equipped with wireless radios and a wireless data plan.

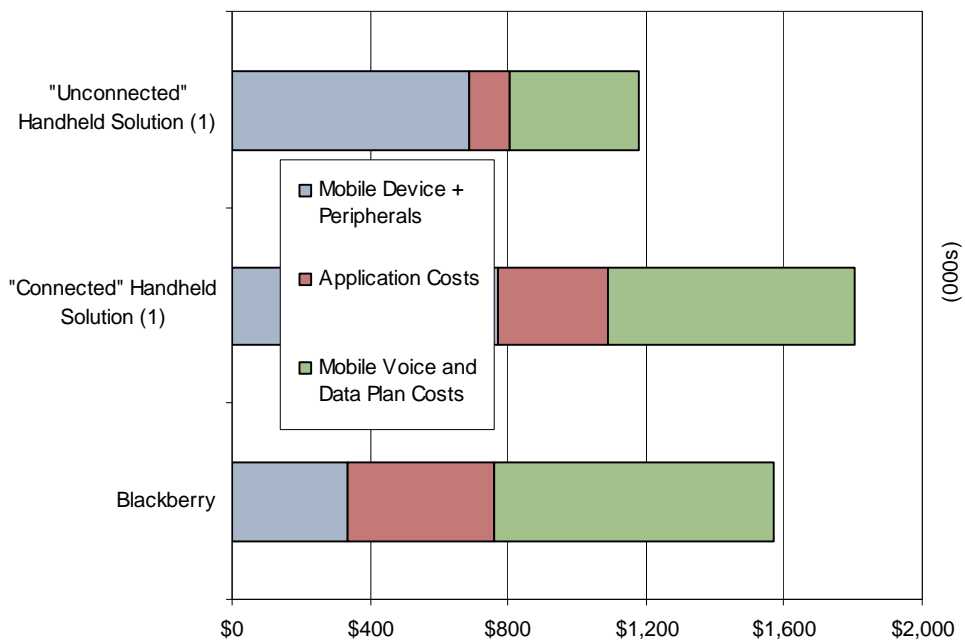
The TCO models did not include savings in fuel costs and reduced back-office support, both of which arise from comparing an unconnected solution to a connected solution. Because these costs can vary widely based on a particular company’s mobility situation, they were not included in the TCO model.

3.3 Results

3.3.1 BlackBerry Solution Provides the Lowest Hardware Costs

The TCO of the BlackBerry solution was lowered significantly by its low device cost. Approximately 21% of the hardware, software, and services costs are contained in the cost of the device and any attached peripherals. In the TCO of connected handheld solutions, nearly 42% of the hardware, software, and services costs are in the mobile device. Low total hardware cost – even at high replacement rates – was a primary factor that led all of the interviewed companies to choose the BlackBerry over the alternative solutions.

**Chart 3.1 Hardware, Software, and Services Costs**



(Source: ABI Research)

(1) Connected solutions refer to a device that can send and receive data wirelessly; unconnected solutions have no wireless data connection to a network.

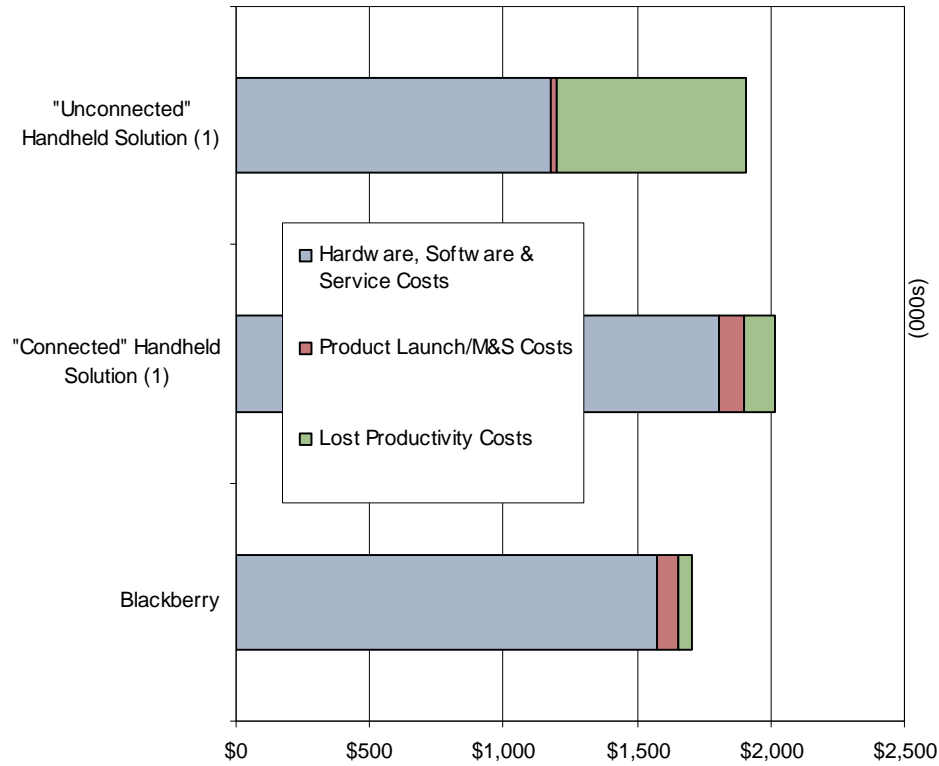
3.3.2 BlackBerry Solution Provides the Highest Worker Productivity Benefits

As shown in Chart 3.2, the BlackBerry was the lowest cost solution relative to the other device options, primarily because lost productivity costs are the least when using a connected device. Real-time data connectivity is critical because it allows access and retrieval of information and avoids calls or a return drive to the home office, which incurs either human support costs, fuel costs, or both.

However, if a company expects to reap the benefits of real time connectivity, the device also needs to be in the hands of the technician. Videotron’s truck-mounted laptop solution demonstrated this: 87% of its total solution costs came from lost

productivity because technicians needed to travel to the truck to retrieve and record information on a laptop. Chart 3.2 does not illustrate the laptop solution but the TCO was over \$14 million, over seven times (7x) more costly than the handheld solutions.

**Chart 3.2 Total Solution Cost**

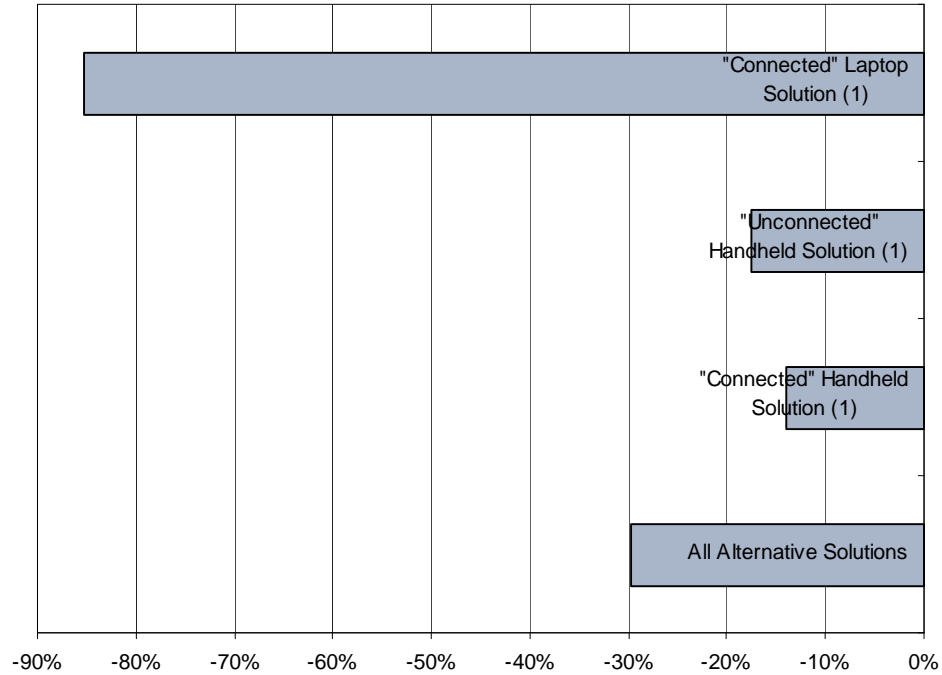


(Source: ABI Research)

(1) Connected solutions refer to a device that can send and receive data wirelessly; unconnected solutions have no wireless data connection to a network.

3.3.3 BlackBerry Provides Business Savings across All Mobile Solutions

**Chart 3.3 BlackBerry Solution Cost Savings Relative to Alternative Mobile Solutions**



(Source: ABI Research)

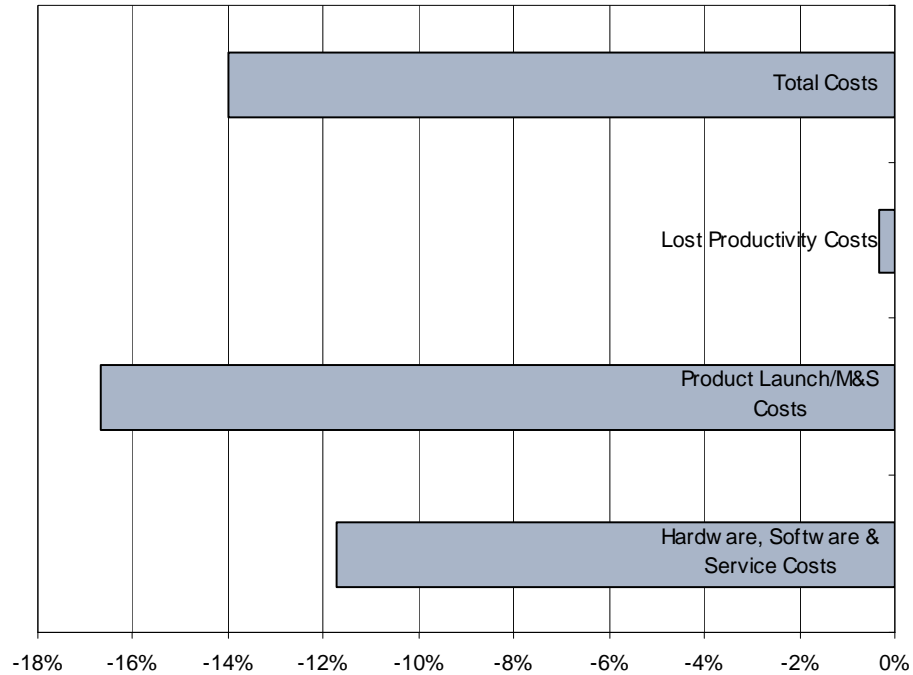
(1) Connected solutions refer to a device that can send and receive data wirelessly; unconnected solutions have no wireless data connection to a network.

Relative to the alternative mobile solutions, the BlackBerry field force solution saved on average approximately 30% over a six-year period across all devices. When compared to unconnected handhelds, the savings were 18%. Those figures validate what is already known of the value of connected solutions as well as the value of BlackBerry solutions. Examples of BlackBerry solution benefits over unconnected devices included:

- greater device availability due to longer battery life,
- improved work efficiency from real-time data access and transmission,
- OTA repairs avoiding use of less efficient work practices while waiting for a replacement device.

3.3.4 BlackBerry – Cost Effective Alternative to the “Connected” Rugged Mobile Device Solution

**Chart 3.4 BlackBerry Solution Cost Savings Relative to Connected Handhelds**



(Source: ABI Research)

When compared to connected handhelds, the total cost savings of the BlackBerry solution was over 14% and was achieved in all the major cost categories.

In the productivity category, no solution had the edge. While Symbols and Intermec devices are hardened, the BlackBerry with the proper casing can provide sufficient protection to avoid device replacement which reduces worker productivity until a new device arrives. As was the case with the companies interviewed, the BlackBerry with associated peripherals was not experiencing any greater loss over Symbol or Intermec devices in the field.

Product launch and M&S cost differences varied by solution type. The key cost driver of product launch costs is familiarity with the devices; for the companies interviewed management and technicians were familiar with the BlackBerry which generated lower overall costs in this category.

M&S costs can vary for each device type and are extremely dependent on IT familiarity with the device, and any M&S contracts companies may have with a VAR or the device manufacturer. If IT personnel are not adept at maintaining a device, M&S contracts will provide this support; however, these contracts may not be as cost effective. It was for this reason that the BlackBerry had lower M&S costs when compared to the connected handheld group in this analysis.

Finally, the cost of Blackberry hardware (both the device and peripherals) was lower than the ruggedized devices in the connected handheld group over the lifetime of these solutions. A Blackberry cost that is four to eight times less expensive than rugged alternatives provides not only a TCO boost to the Blackberry solution, but also causes IT managers to take a second look at Blackberries if their field forces do not need the most hardened device.

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