Enterprise Mobility & Connected Devices Practice

Strategic Insights 2012: Enterprise Mobility Solutions Market

Mobile Device TCO Models for Line of Business Solutions

Volume 1 | Track 7: Enterprise Mobility Mobile Device TCO

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VDC research

March 2013

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Critical Takeaways

Enterprise Mobility Investments: TCO & ROI Models Becoming More Critical

CRITICAL TAKEAWAYS

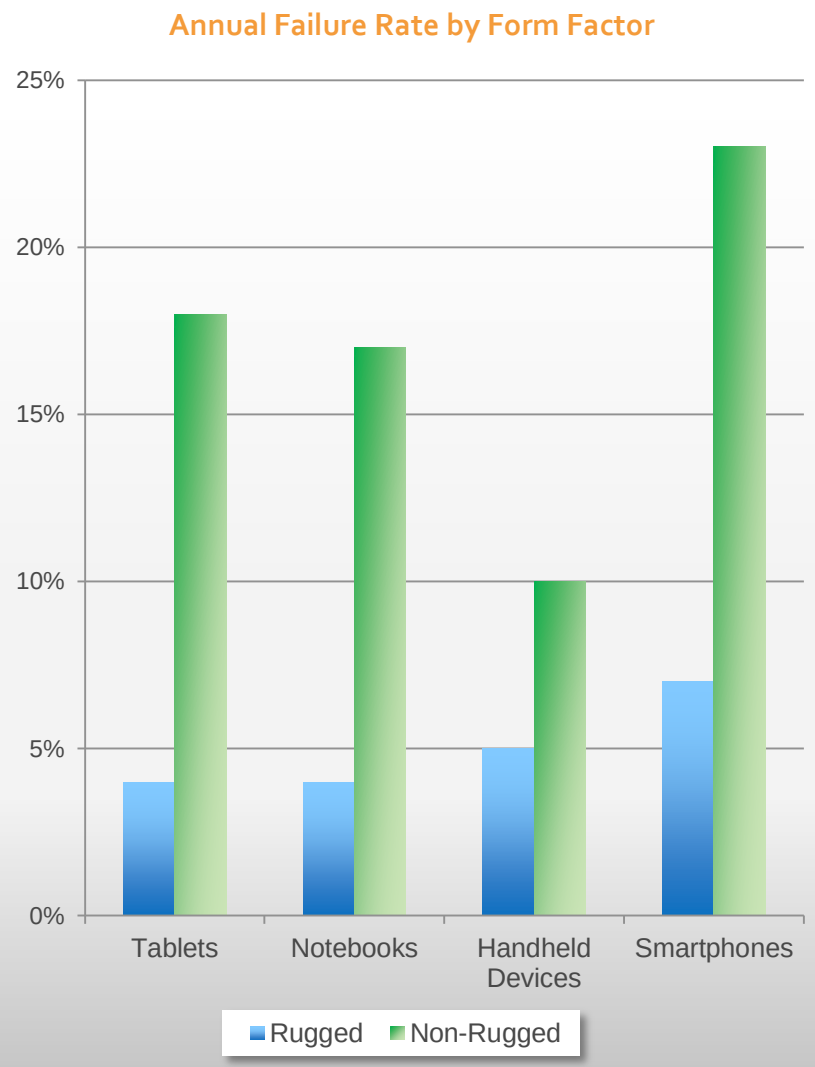
IT budget pressures driving greater focus on ROI and TCO of mobile investments – major projects require hard metrics

- With almost 500 million mobile devices expected to be used by enterprise mobile workers by 2015, demands for robust enterprise mobile management solutions are increasing. Of equal importance are strong metrics such as ROI and TCO to not only validate investments, but to track and measure use of mobile solutions within the enterprise post deployment.
- Today, the most sophisticated enterprise mobility solutions remain concentrated in line of business and operations-centric environments such as transportation and delivery, field service automation and mobile enterprise asset management. It is within these environments where enterprise organizations have been most actively (re)evaluating their investments, especially around mobile device types, level of ruggedness and mobile OS.
- The use of smartphones and tablets – especially those running iOS and Android – has exploded with enterprise support and acceptance similarly increasing. In customer facing line of business applications, these devices are increasingly being evaluated and deployed by enterprise organizations. This is in part a result of lower upfront adoption costs of these devices in relation to more enterprise-centric devices, especially ruggedized devices. However, of equal importance is the intuitive nature of the user experiences and interfaces unique to those platforms.
- Traditional enterprise mobile OS platforms, especially for handheld, smartphone and tablet form factors (primarily Microsoft), have lagged in that respect, creating a perceptible void and opportunity in the market. Microsoft's recently upgraded Windows 8 platform and announcement of Windows 8 Embedded Handheld are addressing many of these issues and are receiving strong support from the mobile device OEM vendor community.
- While the availability of third party device management, accessory and other capabilities have created a stronger value proposition of iOS and Android devices in the enterprise, major functionality and use gaps remain, especially for line of business solutions.
- At the core of the issue is that many of these devices are not designed for use in many line of business environments and hardware failure is a major issue. It is not uncommon for enterprises to report failure rates in excess of 50%.
- However, issues extend well beyond hardware failure and span management and support requirements of mobile devices, mobile OS stability and support options, and sustainable development. It is within the context of these issues that mobile devices supporting business and mission critical line of business applications needs to be evaluated.

Mobile Device Failure Rates by Device Type

CRITICAL TAKEAWAYS

Failure rates of mobile devices used for line of business applications increases substantially for non-rugged devices



The recent influx of consumer devices into the enterprise through broader support for BYOD programs and the desire by users for a more intuitive and modern platform has contributed to an increase in device failure rates.

Failure rates for popular (non-rugged) consumer devices used to support line of business applications exceeds 15% for tablets and 20% for smartphones, representing a measurable increase in comparison to the previous research conducted by VDC.

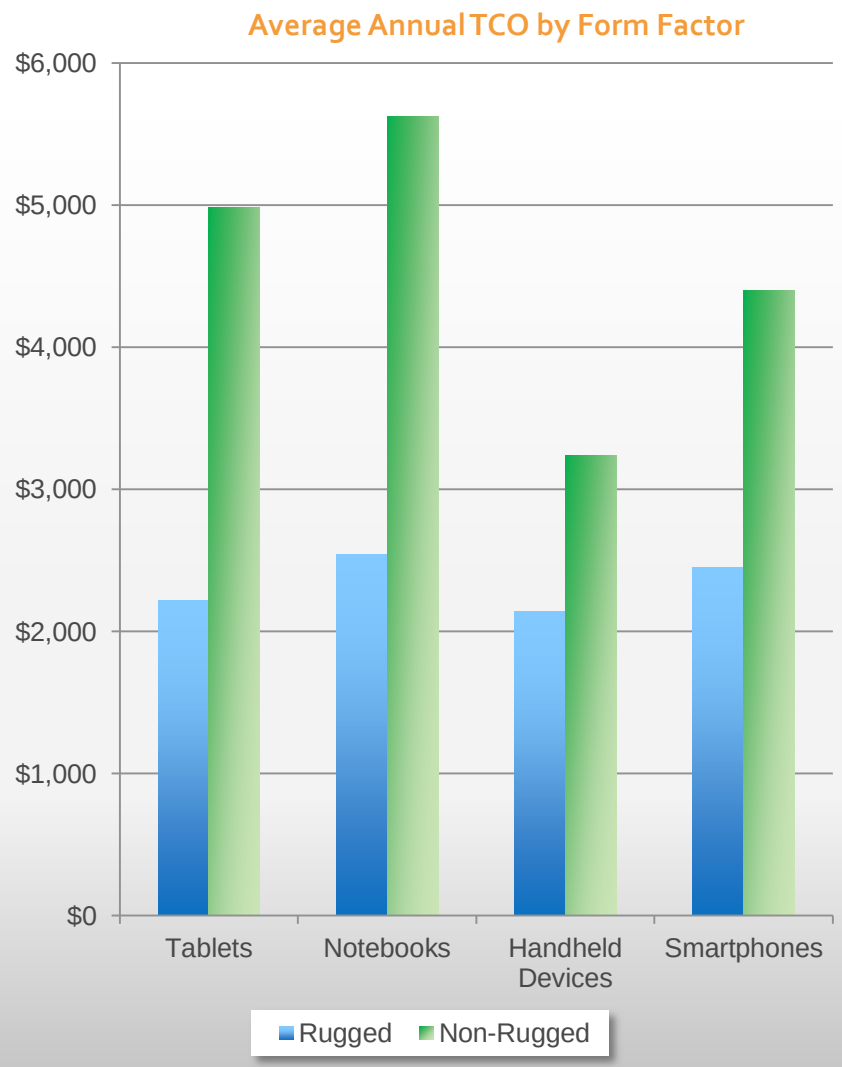
Conversely, failure rates of rugged devices dropped. While customers are using devices longer, on average, as a result of limited access to capital issues, a shift in device class deployed has contributed to a drop in average failure rate.

Many smartphones and tablets are being deployed with specialized accessories – such as a sled based device for scanning and payment. While accessories can be valuable to create a more flexible and functional mobile platform without having to invest in a more purpose built or integrated solution. Important considerations for end users is that these accessories can represent a significant increase to upfront investments and also represent an additional source of failure.

Mobile Device Annual TCO for Line of Business Applications

CRITICAL TAKEAWAYS

Rugged device TCO measurably lower in comparison to non-rugged TCO



As a result of the increased failure rates of consumer devices used in line of business environments, their TCO relative to rugged counterparts grew considerably.

An additional factor contributing the to the higher TCO (and failure scenarios) is the added cost of accessories (such as scanner and payment sleds) required for consumer devices to deliver similar levels of LOB functionality. In addition to the high adoption cost of these accessories, many of them are not forward compatible when device OEMs change the interface and I/O configurations of their devices.

Nevertheless, the appeal of consumer devices lies not only in their lower upfront adoption cost but also the significantly superior user experiences delivered on these devices. It is here that rugged devices – especially handheld devices and tablets – need to improve (read Microsoft UX and UI needs to improve) to counter this trend.

A critical – yet often overlooked – element of cost of ownership is the notion of sustainable development. The rapid pace of change and innovation in mobile technology – while creating new opportunities for mobile solutions – represents a key issue and concern for enterprise end users that favor consistency and robust lifecycle management. If not adequately managed, support costs can rapidly spiral as version control and other issues are addressed.

Key differences also exist between solutions that are used "within the four walls" of the end user's organization and mobile solutions "in the field" that will contribute to overall TCO. One of the most substantial is device replacement and upgrade cycles which are typically longer for solutions used within the four walls.

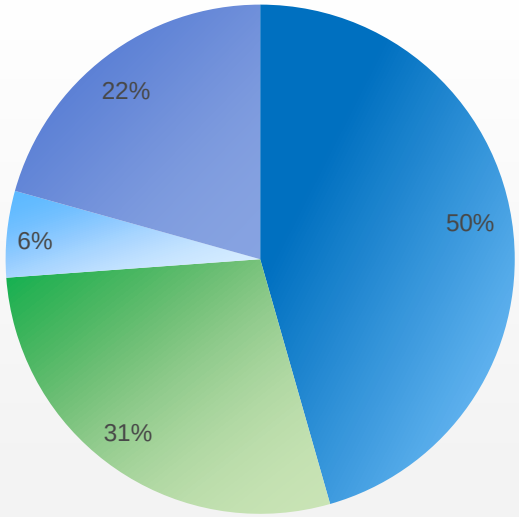
Rugged Value Proposition

CRITICAL TAKEAWAYS

Amid increased consumerization rugged vendor community faces challenges regarding solutions' perceived value

Attitude towards ruggedized mobile devices

(% Respondents, N= 218)



- Ruggedized devices are overpriced relative to their value
- Ruggedized devices are critical for several workflows
- We are planning on replacing ruggedized devices with non-ruggedized devices
- None of the above

Perception of ruggedized devices

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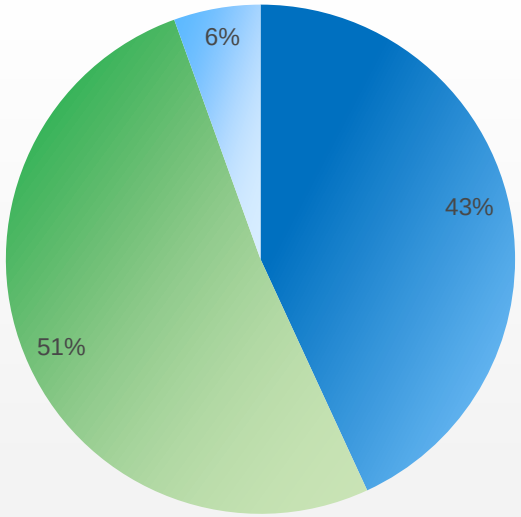


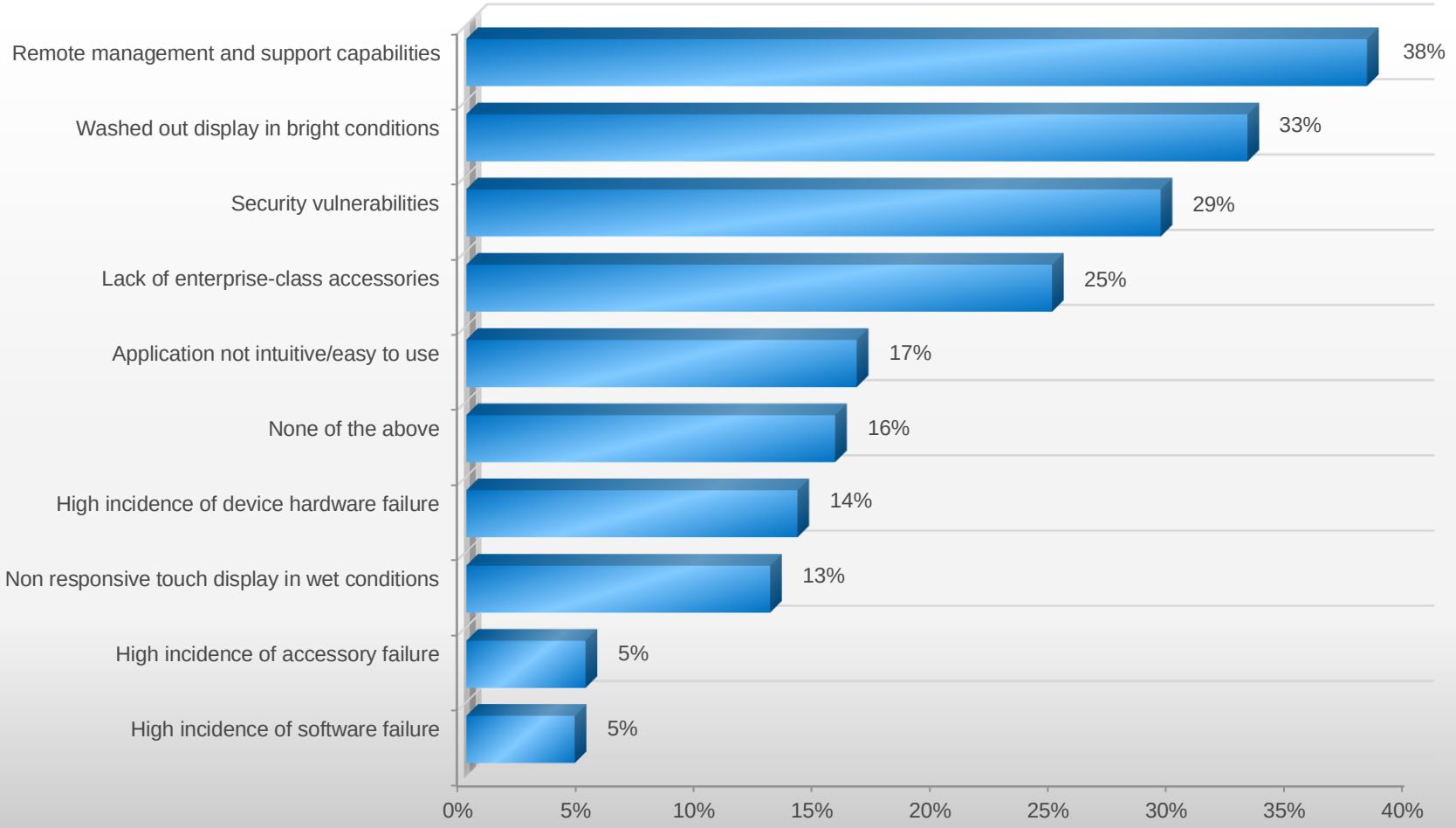
- Ruggedized devices are significantly lagging behind key mobile technology trends
- Ruggedized devices are on a par with key mobile technology trends
- Ruggedized devices are leading key mobile technology trends

Enterprise Mobility Issues Far Reaching

CRITICAL TAKEAWAYS

Focus of solution providers needs to emphasize the complete user experience

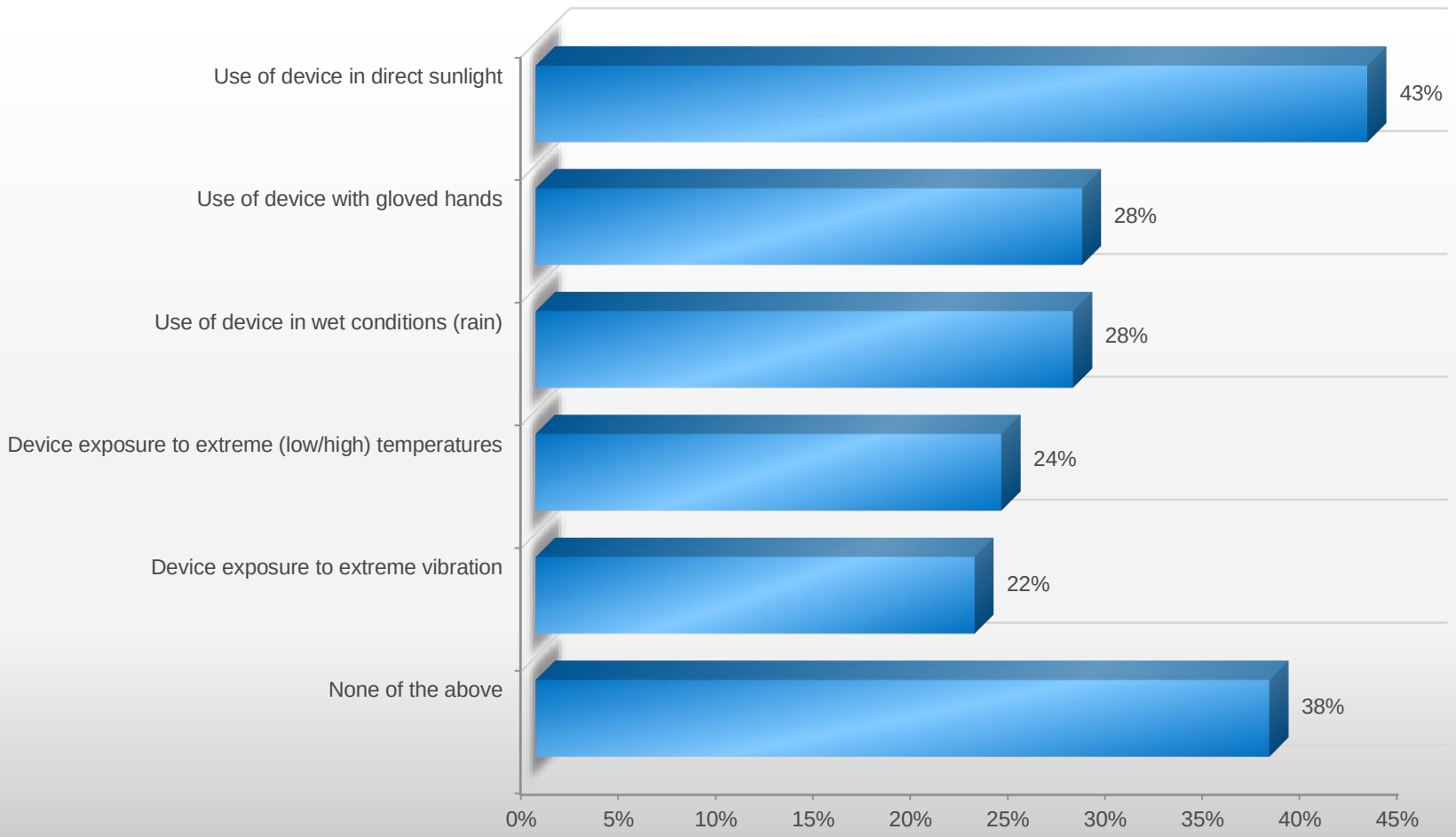
Mobility Issues of Greatest Concern to Organization



Considering the Use Environments Critical to Device Selection

CRITICAL TAKEAWAYS

From direct sunlight exposure to use of device with wet or gloved hands, all impact the usability of mobile devices by field workers



Vendor Implications

Implications for Vendors: Rugged Mobile Vendors

Refocus and redefinition of rugged market needed

Rugged mobile vendors need to reestablish the rugged value proposition amid increased competition from consumer grade devices

- The growing design and usability gap between rugged and more consumer oriented mobile devices needs to be addressed by the rugged vendor community to stem further erosion of their market opportunity. End users are showing greater tolerance for less rugged/industrial designed devices in return for greater ease of use and ergonomics.
- A critical requirement for the rugged community moving forward is for their customers to fully understand the implications of the transition from Windows Mobile 6.5 to Windows Embedded 8 Handheld. These include the cost implications from application development and support perspective and benefits from an ease of use and experience perspective. There continues to be a void in the market around addressing the this transition with more open and clear communication needed to stem the confusion and concern evident among end user decision makers today.
- Positioning of rugged mobile needs to extend beyond traditional TCO arguments and look more specifically at the life-cycle requirements of enterprise-class devices and their applications. Closer accounting of the management and support costs of the add-on peripherals that make up a consumer-grade solution critical.
- Moreover, the enterprise support channel for more consumer-oriented solutions – especially for services such as break-fix, depot and helpdesk services – is often lacking, yet represents a critical requirement for enterprise mobility end users.
- The TCO value proposition for rugged solutions needs to extend beyond accepted failure rate models and focus more on the lost opportunity cost of failure (customer service impact, for example). In addition the value of sustainable development and support needs to be clearly communicated.

Ease of use critical…not only in use but also in deployment and support

- Next generation mobile solutions – especially consumer devices – have raised the bar in terms of user experience and ease of use. Enterprise solutions need to learn from and leverage these capabilities as part of their solutions' DNA.
- Ease of deployment and support are just as critical. For example, for more sophisticated solutions that require vehicle mounting and wiring, numerous failure points emerge making the consolidation of wires into a wiring bracket or frame a key value add.

Value proposition of Android needs to extend well beyond the OS

- There is growing interest from the vendor community to leverage Android as a differentiated (consumer-like) platform for next generation rugged handheld and tablet solutions.
- The value of Android lies not in the user interface and design of the platform, but rather in the promise of a vibrant eco-system and broad choice of targeted applications.
- Hardware OEMs need to ensure that they are actively supporting the development of this eco-system by engaging and investing in third part application development.
- Part of the enterprise Android requirement will also be to support an *'enterprise hardened'* Android solution that functions outside of the volatile consumer upgrade cycles and subsequent platform fragmentation.

Lifecycle Solutions a Key Value Proposition…Especially with Consumer Technologies

BYOD is not enterprise mobility. A major gap for (consumer-focused) mobile vendors is in enterprise delivery and support channels

One of the most significant enterprise mobility solution developments will come with increased sourcing and deployment consolidation. While fragmentation remains the rule of the day, we see wireless carriers and large systems integrators organizations accounting for a larger share of the enterprise mobility solutions market – especially as they continue to build out their solutions capabilities (acquiring system integration capabilities).

However, while improving, many of these organizations lack the intimate market knowledge and understanding of industry capability requirements. Moreover, their lack of consistent global services and – in the case of large Sis – limited current revenue contribution from mobile solutions, represent key gaps in their portfolios.

At the other end of the spectrum, specialized integrators are focusing on either a specialized application and service capability or industry specific solution. However, these organizations' lack of scale represents a key limitation, especially when bidding on multi-national accounts.

Consolidation is expected to continue to be a key theme as organizations look to fill service capability and global footprint gaps.

Some of the critical success requirements for enterprise mobility professional service organizations include:

- Critical knowledge of target industry requirements to better address operational issues, regulatory pressures and other factors driving mobile demand.
- Development of recognizable and defensible set of services – especially around repeatable services such as mobile on-boarding.
- Global service footprint – especially for mobile helpdesk services
- Pricing and bundling flexibility
- Consulting and mobile center of excellence services. While many organizations are beginning to roll out mobile centers of excellence to identify opportunities and establish policies, most are looking externally to identify opportunities and areas where they can best leverage mobile.
- Monitoring and analytics. Providing visibility through improvement real-time monitoring capabilities – for example, for repair functions or for usage scenarios – is a growing requirement and opportunity for competitive differentiation.

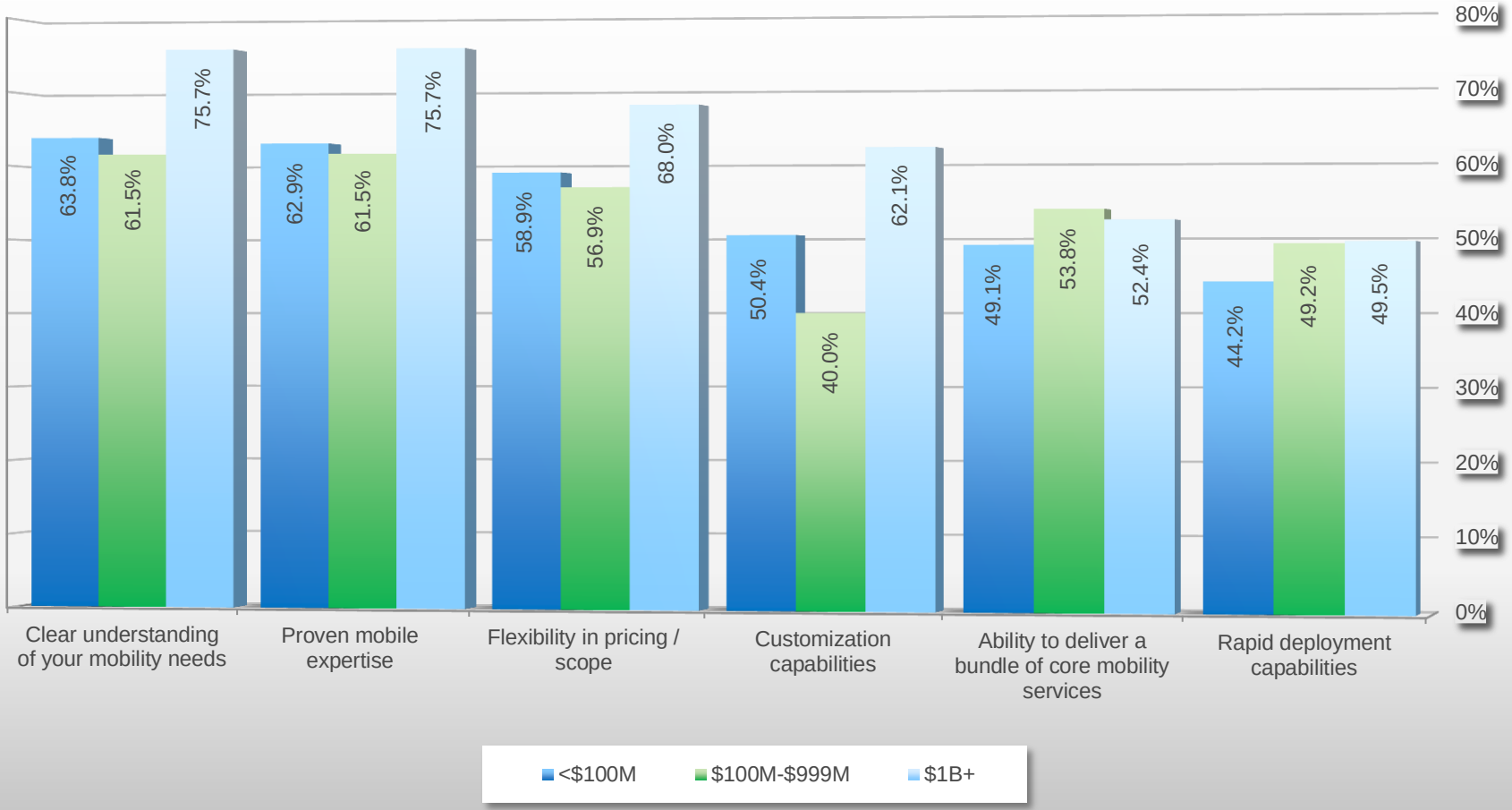
Key Enterprise Mobility Solution Source Selection Criteria

Strong understanding of industry needs and delivering end user intimacy are crucial

When selecting a mobile service partner, rate the importance of the following capabilities in terms of your partner selection decision, on a seven point scale

Where 1 = not at all important and 7 = very important

(Percentage of respondents)



End User Implications

IT Priorities, Security Concerns, In-House IT Skills & Initial Costs are Barriers …

Enterprise Mobility leads all IT modernization projects

Critical for enterprise mobility end users to take more comprehensive approach to enterprise mobility investments. Key investment recommendations include:

- **Let the application and environment drive device selection**. Understanding the conditions within which devices are used – especially for mission and business critical applications – is imperative to select the best fitting solution. Issues are far reaching as exposure to sunlight and ambient, water vibration and dust can directly influence the success of the deployed device.
- **Don't make accessories an after-thought**. Many mobile solutions are supported by third party accessories such as payment sleds, bar code scanners and others. These add-on devices can represent substantial upfront investments and often can be a key source of failure. Moreover, not properly anticipating accessory lifecycles and replacement/upgrade can adversely impact the success and ROI of a solution.
- **Prepare for the 'hidden costs'.** Understanding what the support requirements will be for mobile solutions – from helpdesk calls to replacement and upgrades of mobile devices – is critical. Establish and track key support metrics. Poorly designed enterprise mobility solution can result in a post deployment cost – including support and downtime – in excess of 80% of total solution TCO.
- **Focus on sustainable application development**. Lifecycle management for not only the mobile device but also the application and any associated peripherals, including key upgrades, needs to part of a broader mobile strategy. For more sophisticated enterprise mobility applications, the need for stability and reliability is critical.
- **BYOD should not spell self service**. With the *"bring your own tech"* trend continuing, we see significant opportunities for mobile managed service offerings that will clearly help with the complexity and management of what will likely be a multi-OS environment.
- **Develop mobile talent**. Critical challenge for both enterprise end users and solution providers is lack of skilled mobile professionals. Massive talent drain an increasingly critical issue for the industry.
- **Battery management is a key requirement**. According to our research, approximately 60% of respondents indicated that their batteries were not lasting the entire shift "Frequently" or "Occasionally". Better management of batteries and battery upgrade and replacement options represent key considerations for mobile deployments.

Broader Turnkey Mobile Services Required by End Users

END USER IMPLICATIONS

Enterprise mobility service constructs are evolving as solutions become more sophisticated and critical to enterprise operations

Enterprise Mobility1.0

- HR intensive
- Challenge to scale
- Diminishing differentiation
- Foot in door provides access to broader service opportunity

Enterprise Mobility 2.0

- Expansion into higher value adding services
- Greater opportunity to create 'sticky' accounts
- High caliber employee recruitment requirement
- Evolve from device-centric strategy to content and solution centric approach

Professional Services	Description	Success Requirements
On-Boarding & Configuration	Configure devices and set policies	▪ Standardized processes and delivery methodology ▪ Demonstrated execution
Support & Helpdesk	Provide helpdesk support Proactive troubleshooting	▪ 24/7 capabilities ▪ Global footprint ▪ Self-service options
Depot Services/ Provision	Provision devices, apps and policies	▪ Customer dashboards and portals ▪ Opportunities to self-service enroll
Security	Secure devices, apps, network and data	▪ Securing data at rest and in transit ▪ Security leadership in target markets ▪ Ease of use/unobtrusive design
Monitor & Analytics	Monitor and report on device, service and compliance	▪ Customer dashboards and portals ▪ Solution usage trends ▪ KPI measurement and tracking
Mobile LOB Support	Support mobile initiatives	▪ Backend enterprise integration ▪ Tracking and geo-fencing services ▪ Compliance and governance
Lifecycle Support Services	Decommission devices upon departure or EOL	▪ Turnkey lifecycle management services
Mobile Strategy & Consulting	Mobile strategy development and identification of key opportunities	▪ Mobile solution thought leadership ▪ Team talent and talent retention

TCO Models

TCO Models Analysis Reveals Increasing Costs from Consumer Solutions

The focus of the research is to compare the cost profiles of rugged and non-rugged devices supporting frontline line of business workflows across various industries including retail, manufacturing, healthcare, public safety, transportations and others. Many of these workflows – such as field sales and service, law enforcement, supply chain management, etc. – are considered business or mission critical to their business operations. Consequently, mobile solution reliability and uptime are of critical importance.

Failure rates of mobile devices used by frontline enterprise workers across a variety of disciplines has increased measurably since the most recent research conducted by VDC Research. A direct contributor to this increase in failure has been the use of non-rugged mobile devices to support line of business applications. Average annual failure rates (during the first year of deployment) of rugged devices ranged from 4% to 7% while failure rates of non-rugged devices ranged from 10% to 23%.

Although the use of protective cases can help reduce some failures associated with non-rugged devices their benefit is mostly by preventing damages from dropping a devices. However, other issues such as protection from temperature extremes, vibration, water, etc. are not covered.

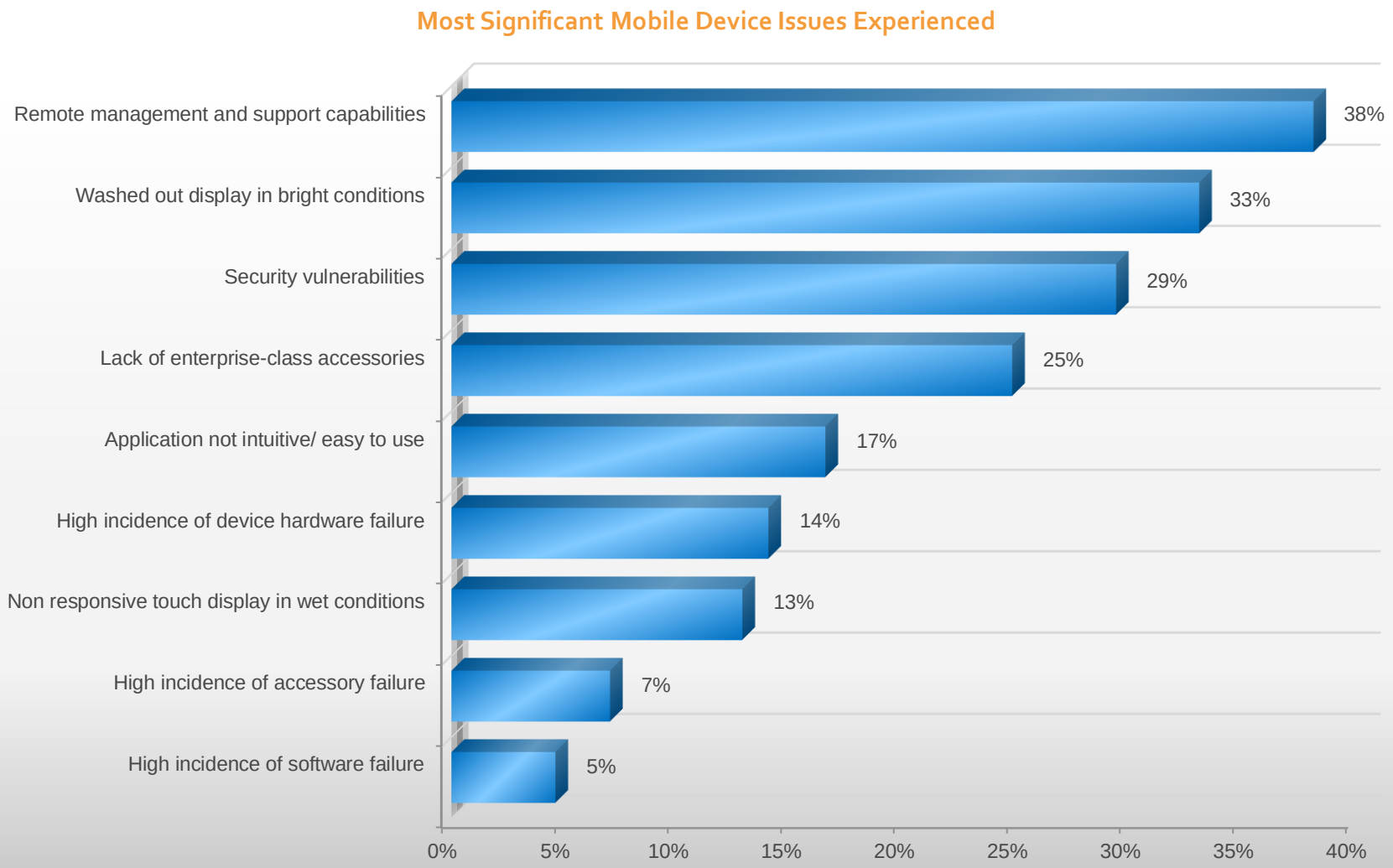
Taken together, the TCO of consumer devices in line of business environments was inflated by over 80% of the cost attributed to lost productivity due to device failure and mobile support and device redeployment costs. Each device failure resulted in an average of approximately 80 minutes in lost worker productivity and over 100 minutes of support time.

Although a key driver for organizations to adopt non-rugged mobile devices for frontline workers is their lower upfront deployment costs, other key considerations are their overall ease of use and attractive ergonomics. It is here that rugged mobile vendors need to most closely focus on closing the gap as the perception of their solutions are increasingly lagging in terms of innovation and leading key mobile trends.

There are several key 'hidden costs' associated with deploying consumer devices in the enterprise. These range from the greater dependence on third party accessories to support complex enterprise application I/O requirements to issues such as the performance of embedded wireless radios.

Enterprise Mobility Issues Far Reaching

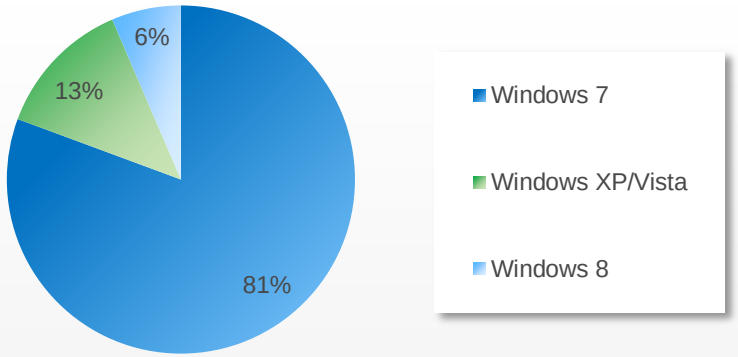
Focus of solution providers needs to emphasize the complete user experience



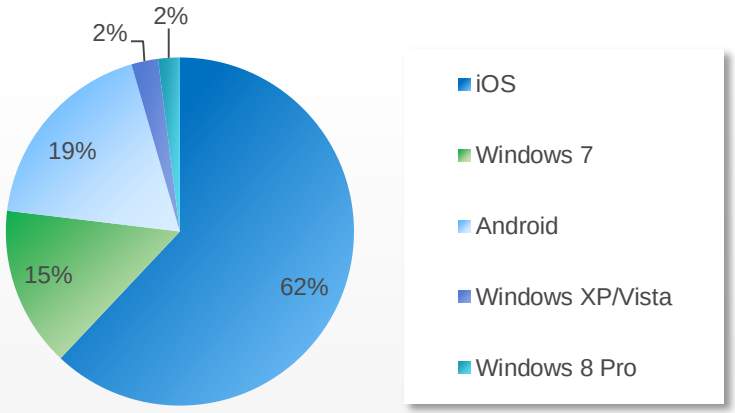
Primary Mobile OS by Form Factor

Lacking user experience of enterprise dominant Windows platforms has opened the opportunity for consumer devices. Consumerization driving effort to create more intuitive enterprise-capable mobile platforms

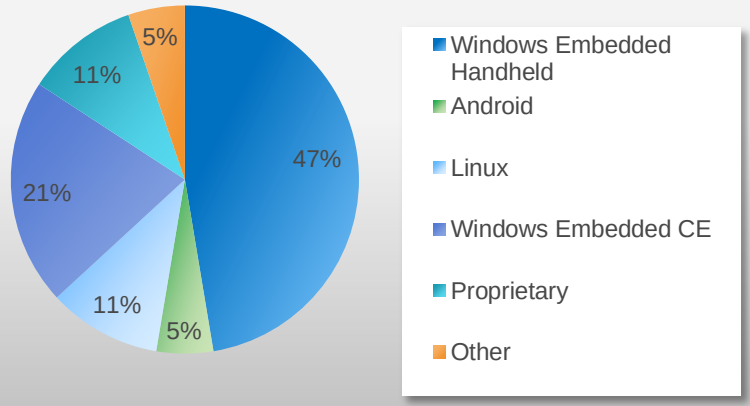
Notebook OS



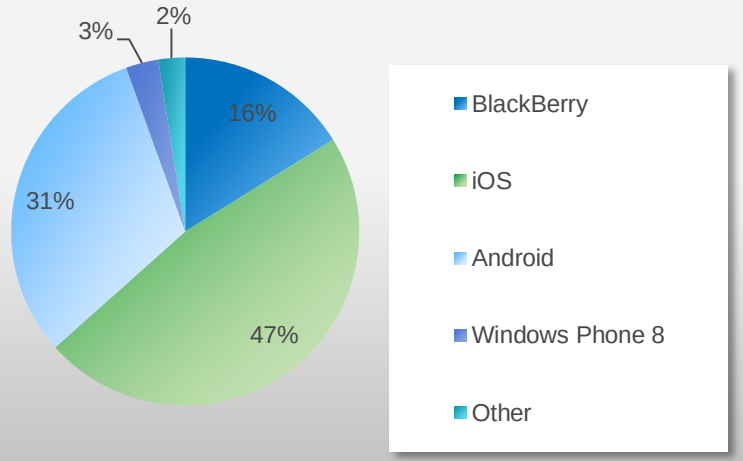
Tablet OS



Handheld OS



Smartphone OS



Microsoft Remains in Drivers Seat in Enterprise…However, Increasingly Unstable

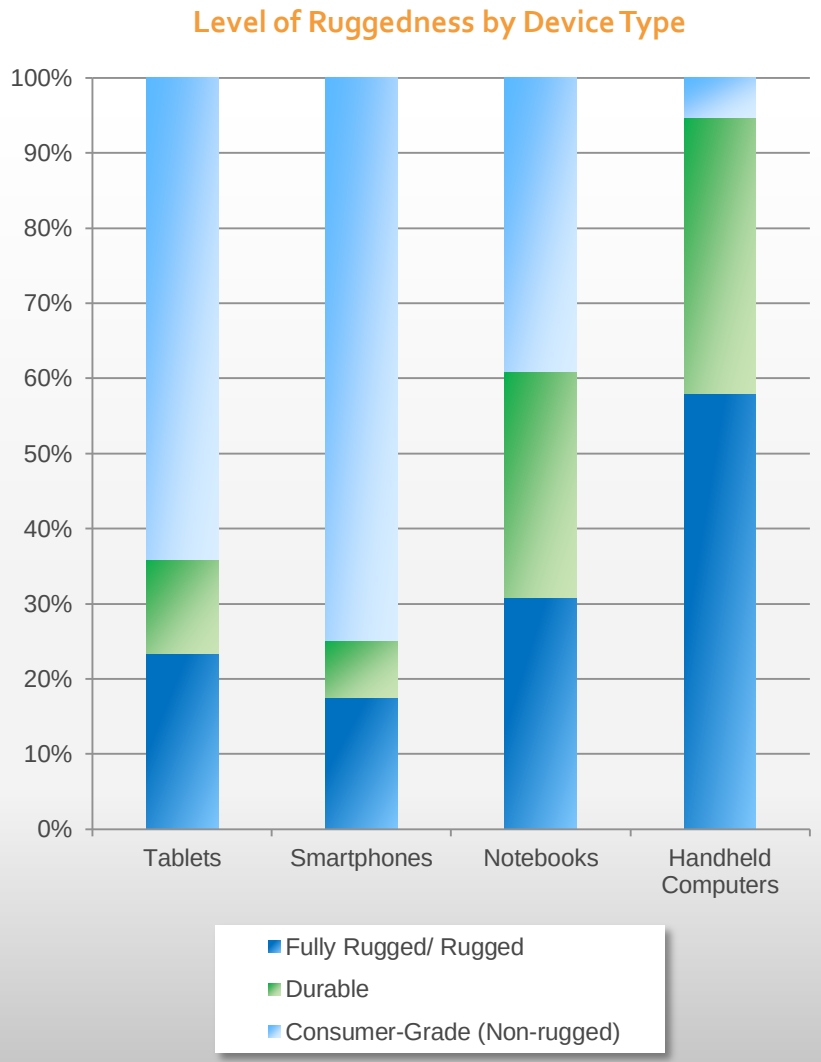
Consumerization of IT less about bringing consumer devices into the enterprise and has more to do to delivering 'consumer-like' experience on enterprise devices. In line of business, enterprise-lead processes dominate

Leading consumer platforms – Android and iOS – still have major limitations for enterprise-centric use cases, especially in line of business environments. Key challenges include:

- Security support. For issues as far reaching as SOX, HIPPA and Privacy, compliance and managing data mining and password management expose significant flaws with more consumer oriented platforms.
- Multitasking capabilities. The ability to reference and support multiple applications simultaneously is a limiting factor on many consumer devices.
- WiFi Connection Management. There is a clear difference between enterprise and consumer-grade WiFi connectivity. This is exposed when roaming from one access point to another when data connections are frequently lost for lower power consumer radios.
- Compatibility. Interfacing iOS and Android with enterprise backend systems – while improving – has been a major limitation.
- Lifecycle support and version control. Enterprises desire predictable and stable lifecycles. Managing the unpredictable nature of consumer platforms (especially Android) and the cost of constantly upgrading hardware which conforms to a 18-24 month retail lifecycle.
- Help desk. Limited enterprise-class helpdesk support functions are a key challenge. For example, when Apple upgrades their OS, functions such as WiFi profiles are disabled. Lack of a clear enterprise support channel is a major limitation.
- Device and OS maintenance. Similar to help desk support channel limitations, lack of clear maintenance channels and options make managing the device in enterprise settings cumbersome.
- File Transfer. Moving files from one system to another is complex and the use of many (consumer) cloud-based file sharing solutions makes version control complicated.
- Printing. Connecting to any printer is not guaranteed and the need to support various drivers, especially for mobile printing in line of business environments, is a challenge.
- Connectivity. For many line of business applications, the need for a variety of I/O connections is critical – especially for legacy connections that require serial connections. Represents a key functional gap among consumer platforms.

Level of Rugged Design by Form Factor

Use of non-rugged devices for line of business applications pervasive – especially for smartphones and tablets



The use of non-rugged (consumer) devices for line of business applications under study has increased substantially since VDC last conducted the survey.

For fast growing tablet and smartphone categories in particular, use of consumer devices over rugged devices among survey respondents was larger by a factor or three of four to one.

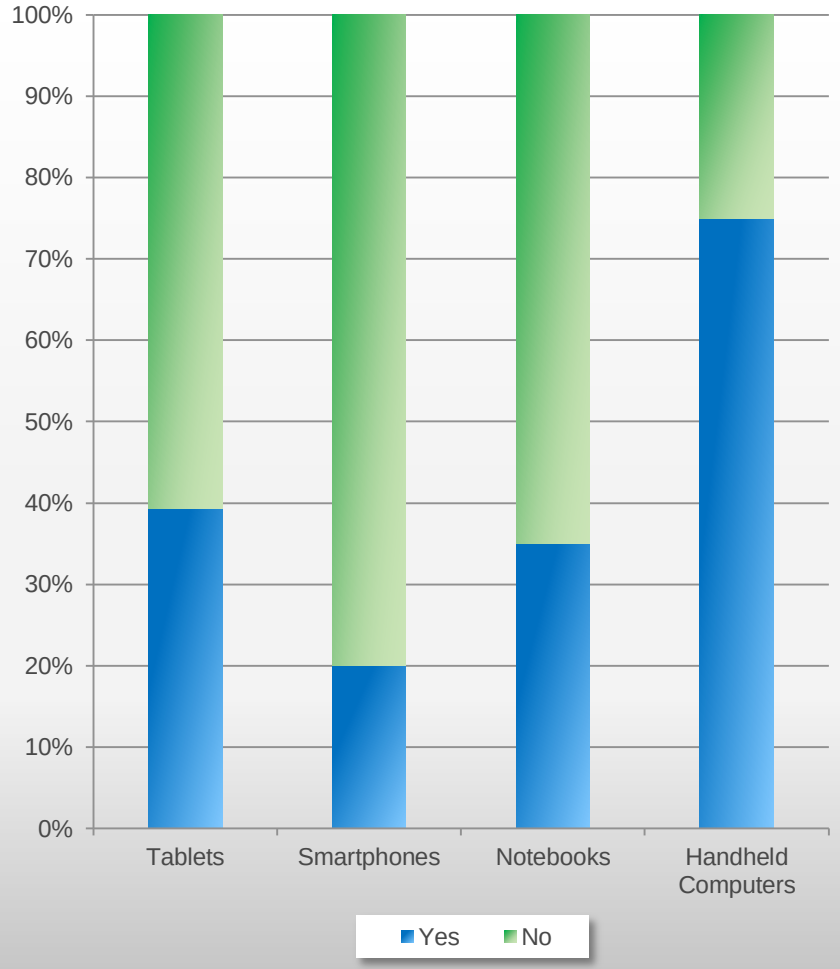
Several factors have contributed to this shift with the more prevalent being:

1. Lower adoption cost of consumer devices
2. Substantially superior platforms in terms of user experience and interface in comparison to the Windows-centric platforms dominant on rugged devices
3. Growing acceptance of BYOD programs – even in select cases for line of business solutions
4. Failure of rugged devices to 'keep up' with major recent mobile technology trends and the growing impression that rugged devices are inferior technically.

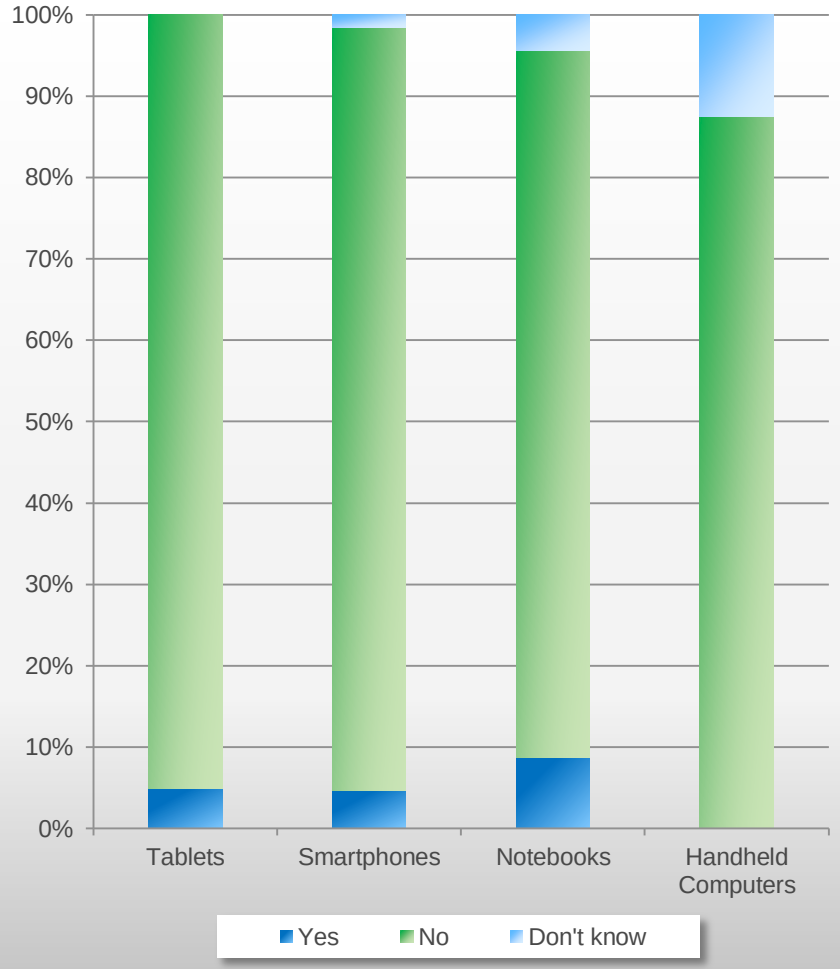
Evaluation of Rugged Devices Prior to Deployment

For many organizations the option of a rugged device was not even considered upfront…however, most existing rugged users are inclined to stick with rugged solutions. Consumer deployments frequently represent net new users

Evaluation of Rugged Devices Prior to Deployment



Replacement of Existing Rugged Devices with Consumer Devices



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Amid increased consumerization rugged vendor community faces challenges regarding their solutions' perceived value

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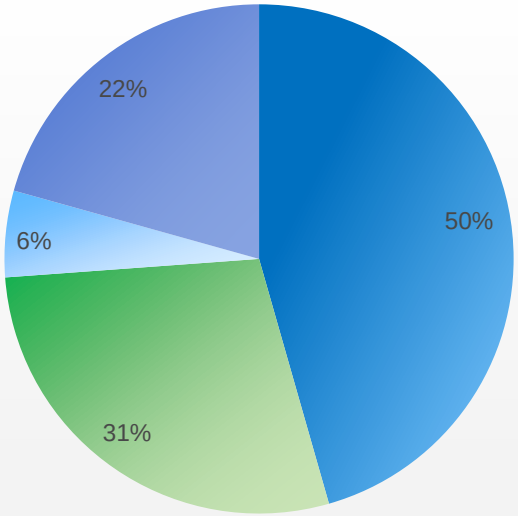

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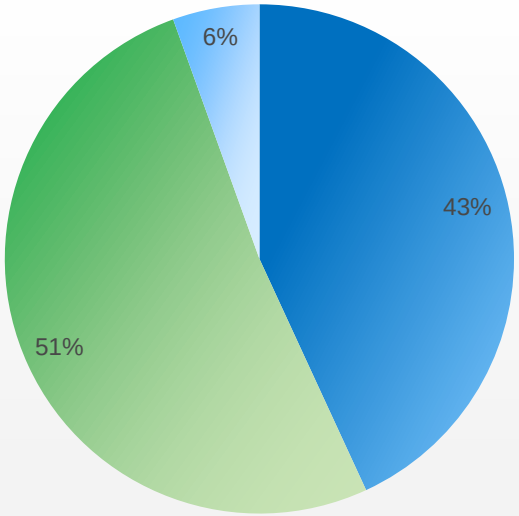

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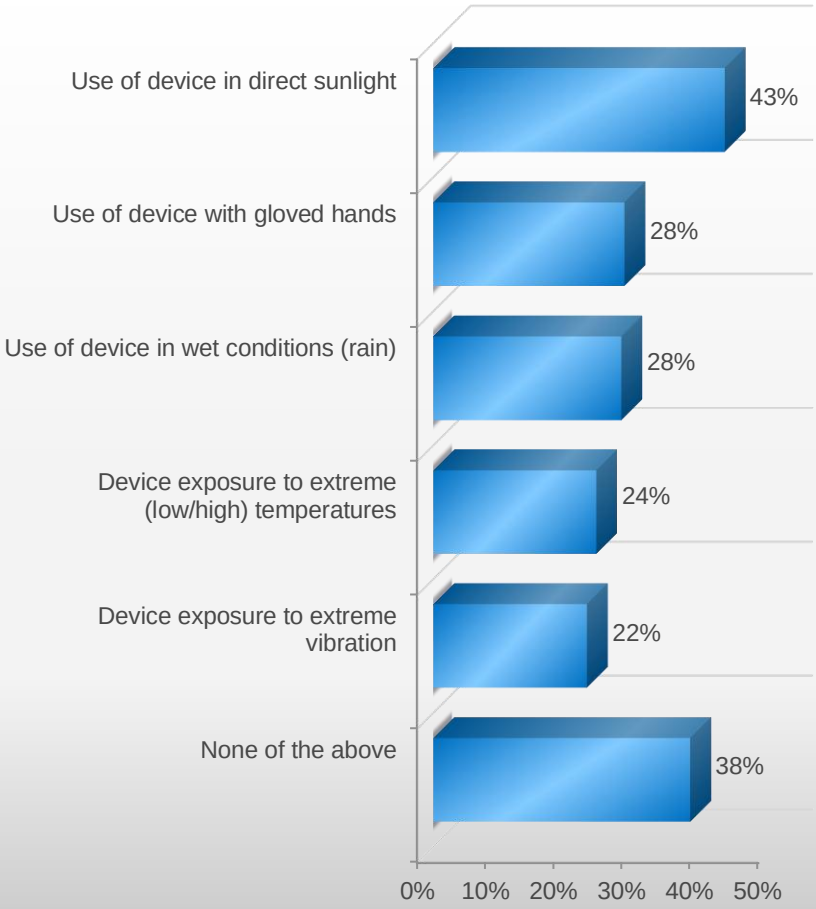
Considering the Use Environments Critical to Device Selection

From direct sunlight exposure to use of device with wet or gloved hands, all impact the usability of mobile devices by field workers

Environments or scenarios common to your most recent mobile deployment by form factor



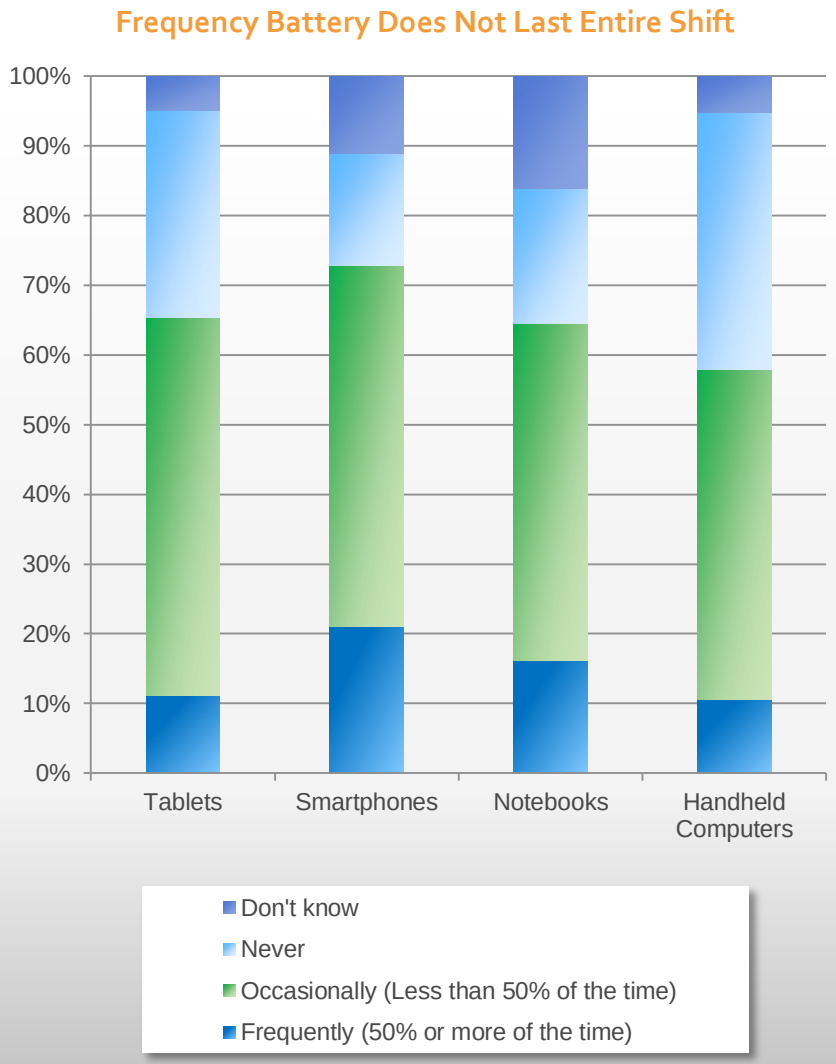
The unique usage scenarios and environments common to many line of business workers and applications create substantial complications for consumer devices.

Key issues range from interfacing with a device using gloved or wet hands to using a device in direct sunlight or exposing the device to extreme temperature and vibration.

Key causes of failure of consumer devices include exposure to water, dropping the device and temperature exposure.

Batteries Not Lasting Entire Shift a Frequent Issue for Frontline Workers

Consumer devices exposed with battery performance and in case of iOS devices the ability to replace batteries



As mobile devices embed more functionality and operate faster processers battery performance is increasingly exposed. For line of business applications the need for a device to support a full shift on a single charge is especially critical.

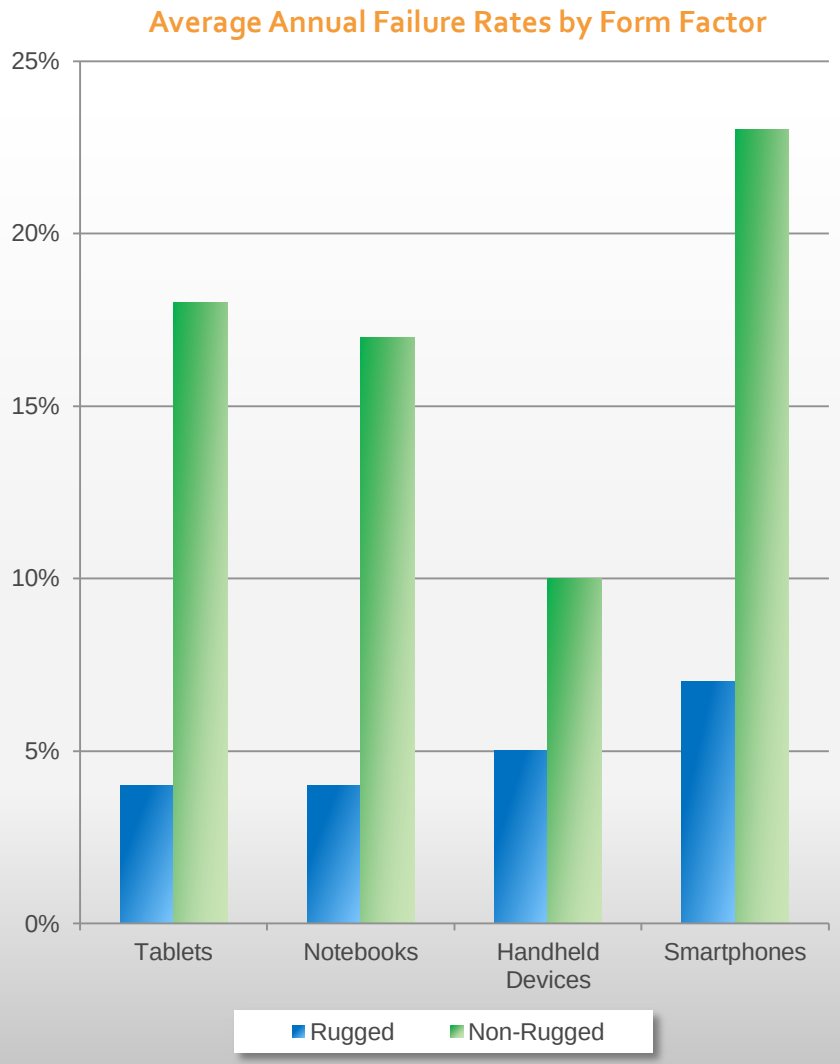
According to our research over six in ten tablet users and seven in ten smartphone users either occasionally or frequently experience batteries not lasting an entire shift.

For the majority of tablet and smartphone users this issue is further complicated by the fact that their batteries cannot be replaced.

Another key requirement for enterprise users is a strong battery management program including, for example, servicing and replacing batteries that cannot charge beyond a certain point.

Mobile Device Failure Rates by Device Type

Failure rates of mobile devices used for line of business applications increase substantially for non-rugged devices



The recent influx of consumer devices into the enterprise through broader support for BYOD programs and the desire by users for a more intuitive and modern platform has contributed to an increase in device failure rates.

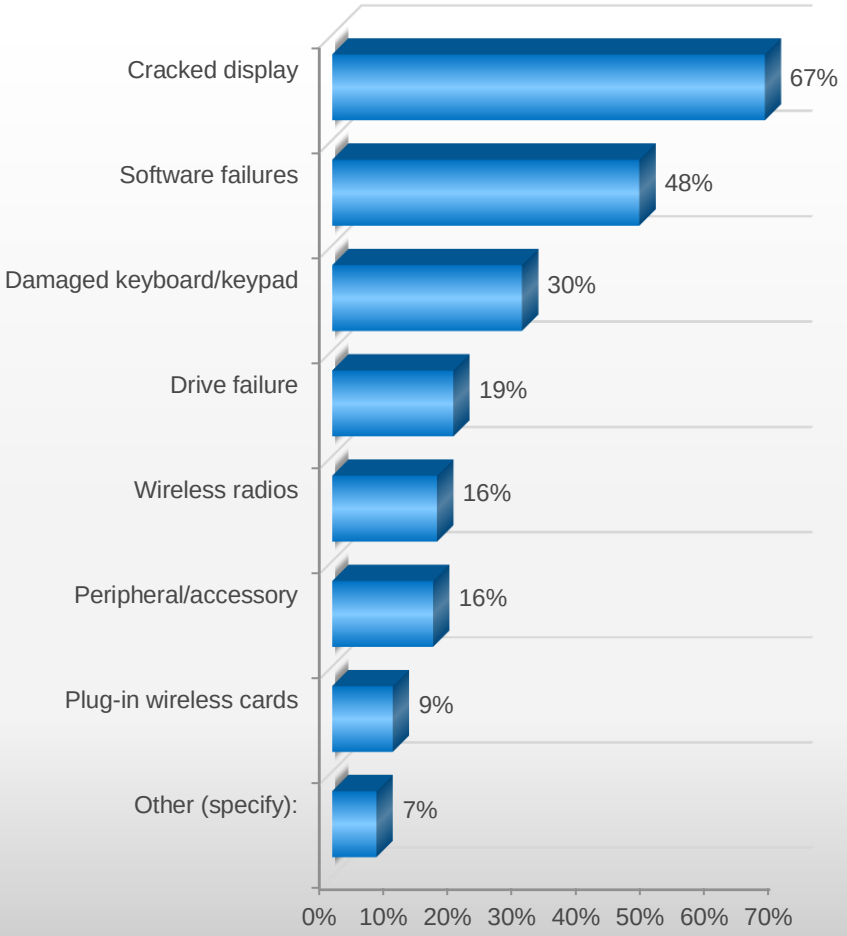
Failure rates for popular (non-rugged) consumer devices used to support line of business applications exceeds 15% for tablets and 20% of smartphones, representing a measurable increase in comparison to the previous research conducted by VDC.

Conversely, failure rates of rugged devices dropped. While end users are using devices longer, on average, as a result of access to capital issues, a shift in device class deployed has contributed to a drop in average failure rate.

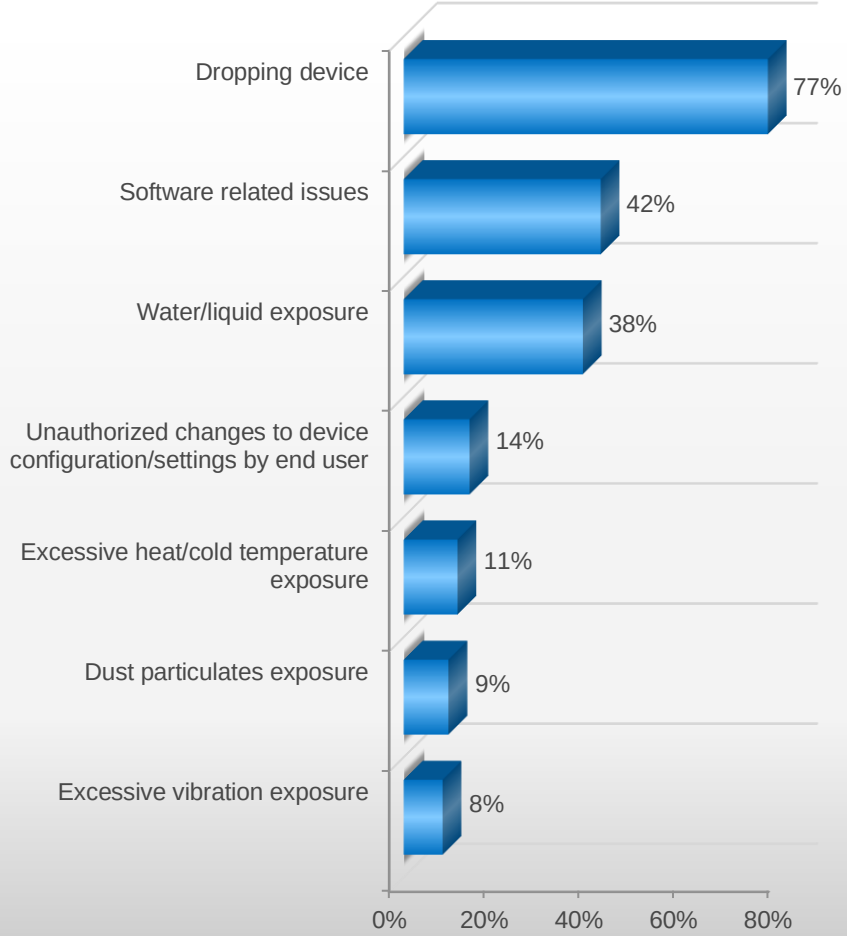
Leading Symptoms of Device Failure

Variety of hardware and software issues driving failure

Leading Symptoms of Device Failure

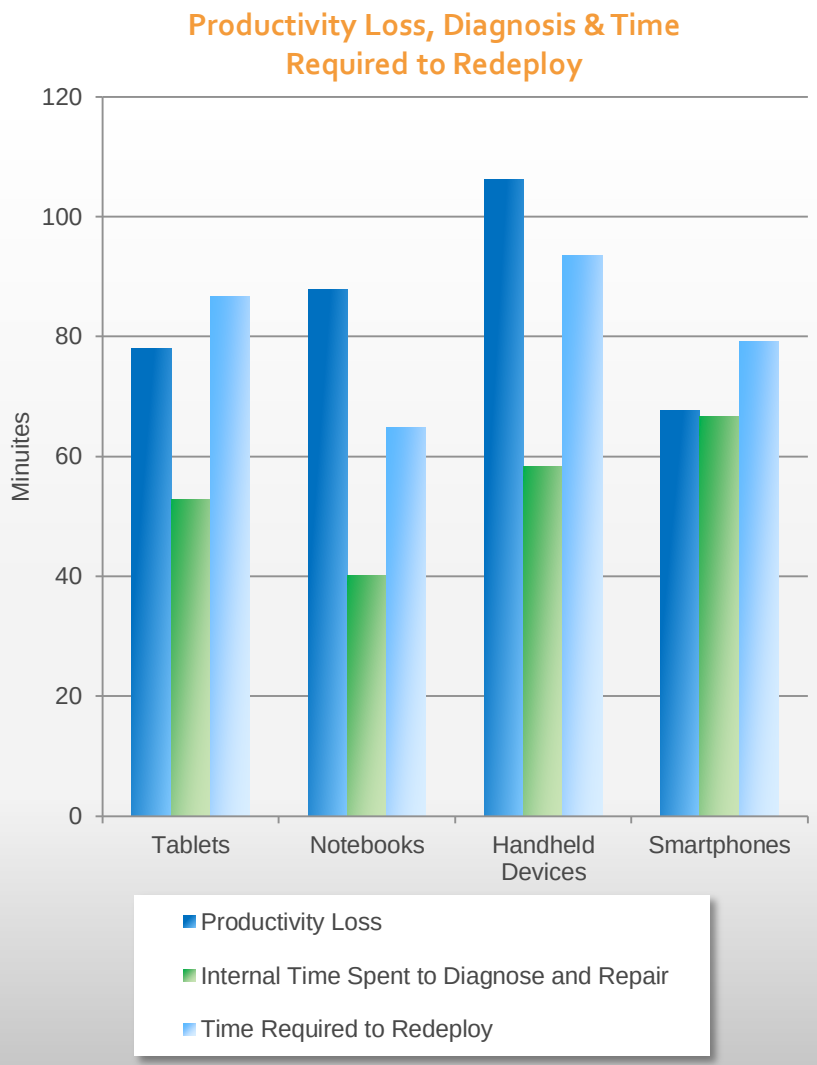


Leading Causes of Device Failure



Productivity Loss, Time Required to Repair & Redeploy Devices Significant

Each device failure can cost an organization in upwards of 200 minutes of labor



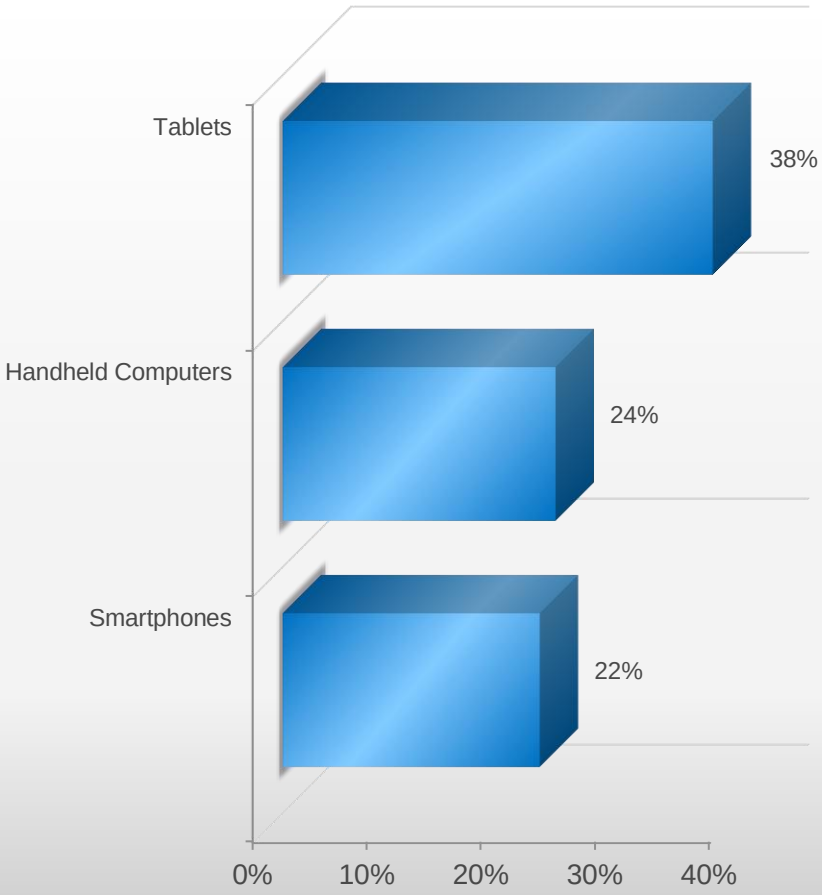
The largest contributor to mobile device TCO is the loss in productivity of the mobile worker and the time and staff required to support these mobile devices.

Each device failure can result in 180 to 260 minutes in lost mobile worker productivity and internal support.

Use of Scanning & Payment Sleds Expanding Consumer Device Use Cases….

…and potentially increasing their TCO

Current & Planned Use of Sled for Scanning & Payment by Device Form Factor



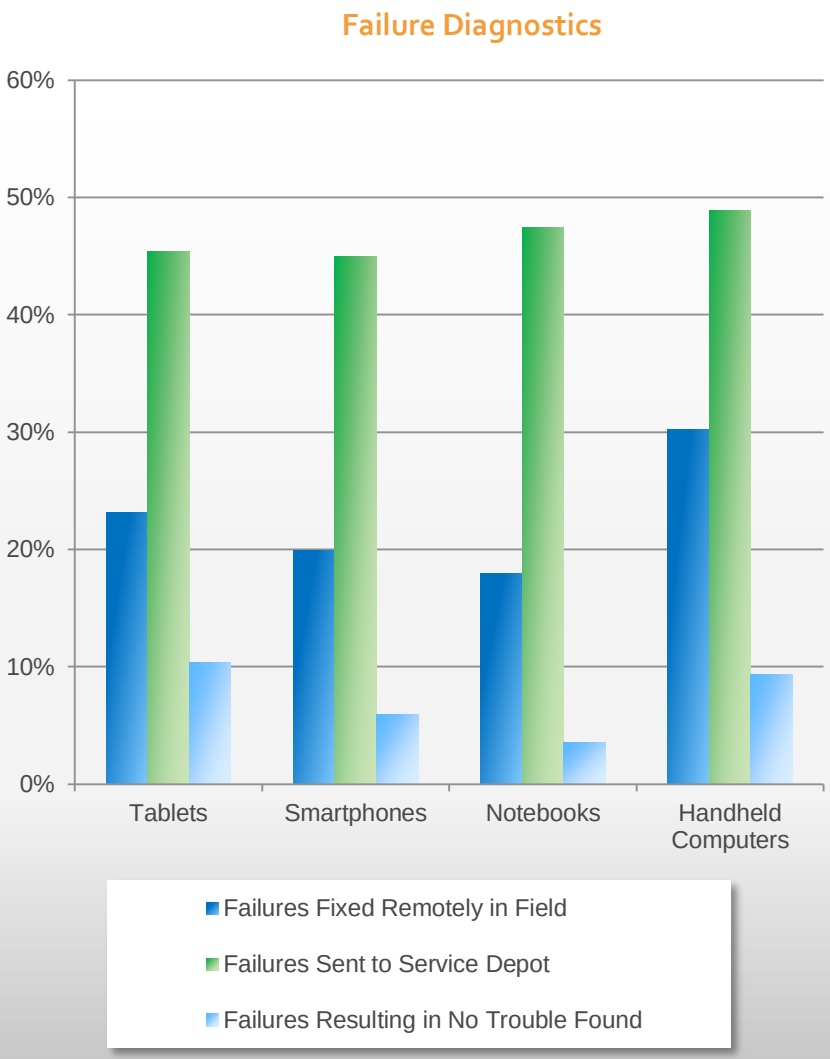
The use of sled accessories for scanning and payment has expanded the functionality of consumer devices – especially in support of many line of business use cases.

However, the adoption cost of these accessories is significant – often exceeding the cost of the actual consumer device. Moreover, the replacement and upgrade cycles frequently differ to those of mobile devices. Forced obsolescence becomes an issue when the mobile device interfaces change.

Peripherals are cited by 16% of survey respondents as a 'top three' symptom of device failure.

Mobile Device Failure Response Scenarios by Form Factor

Use of device management critical to provide remote diagnostics and support

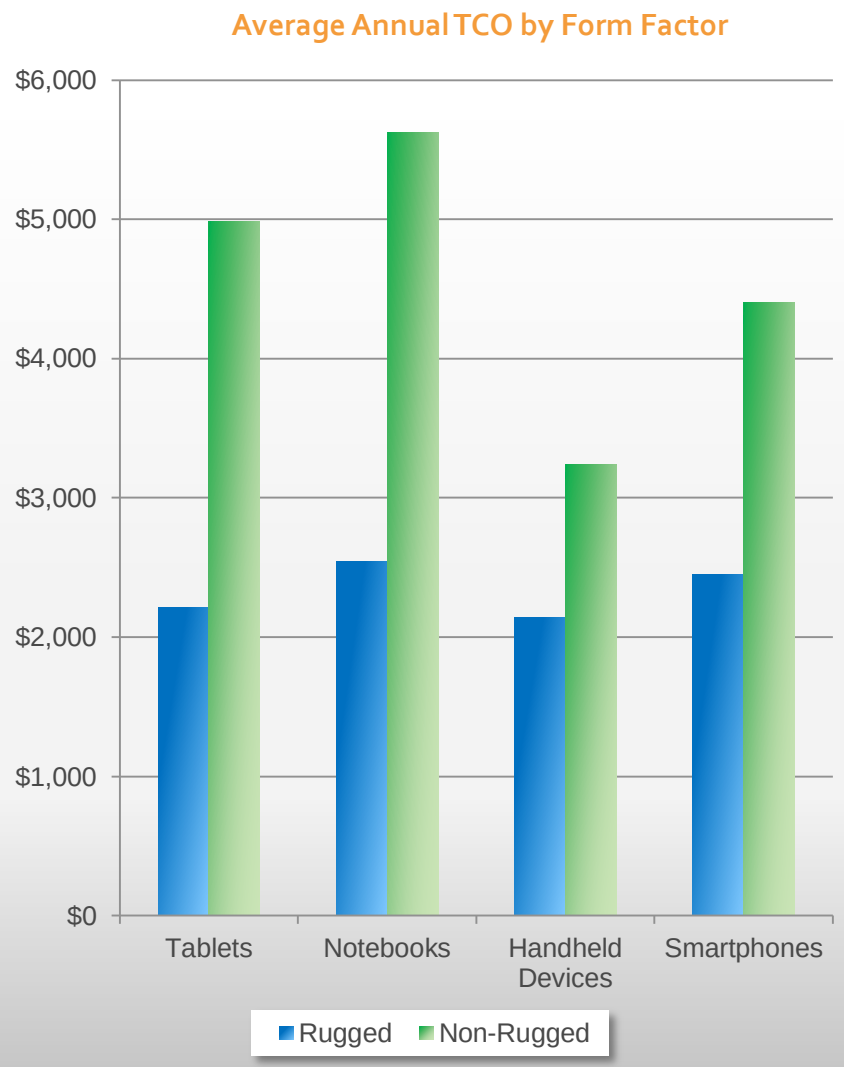


Addressing issues remotely in the field without delivering devices to a service center can save organizations considerable cost and prevent lost productivity.

The increasing use of mobile device management is leading to reduction of 'no trouble found' tickets, an issue identified in previous studies.

Mobile Device Annual TCO for Line of Business Applications

Rugged device TCO measurably lower in comparison to non-rugged TCO for many line of business applications covered by research



As a result of the increased failure rates of consumer devices used in line of business environments, their TCO relative to rugged counterparts grew considerable.

An additional factor contributing the to the higher TCO (and failure scenarios) is the additional cost of accessories (such as scanner and payment sleds) required for consumer devices to deliver similar levels of LOB functionality. In addition to the high adoption cost of these accessories, many of them are not forward compatible when device OEMs change the interface and I/O configurations of their devices.

Nevertheless, the appeal of consumer devices lies not only in their lower upfront adoption cost but also the significantly superior user experiences delivered on these devices. It is here that rugged devices, especially handheld devices and tablets, need to improve (read Microsoft UX and UI needs to improve) to counter this trend.

TCO Critical to Making Right Tablet Investment Decision

Hard Costs

Hardware
- Mobile Platforms
- Peripherals

Software
- Upfront Fees
- License Fees
- Development Costs

System Design & Integration
- Application Design & Development
- System Integration
- Staging

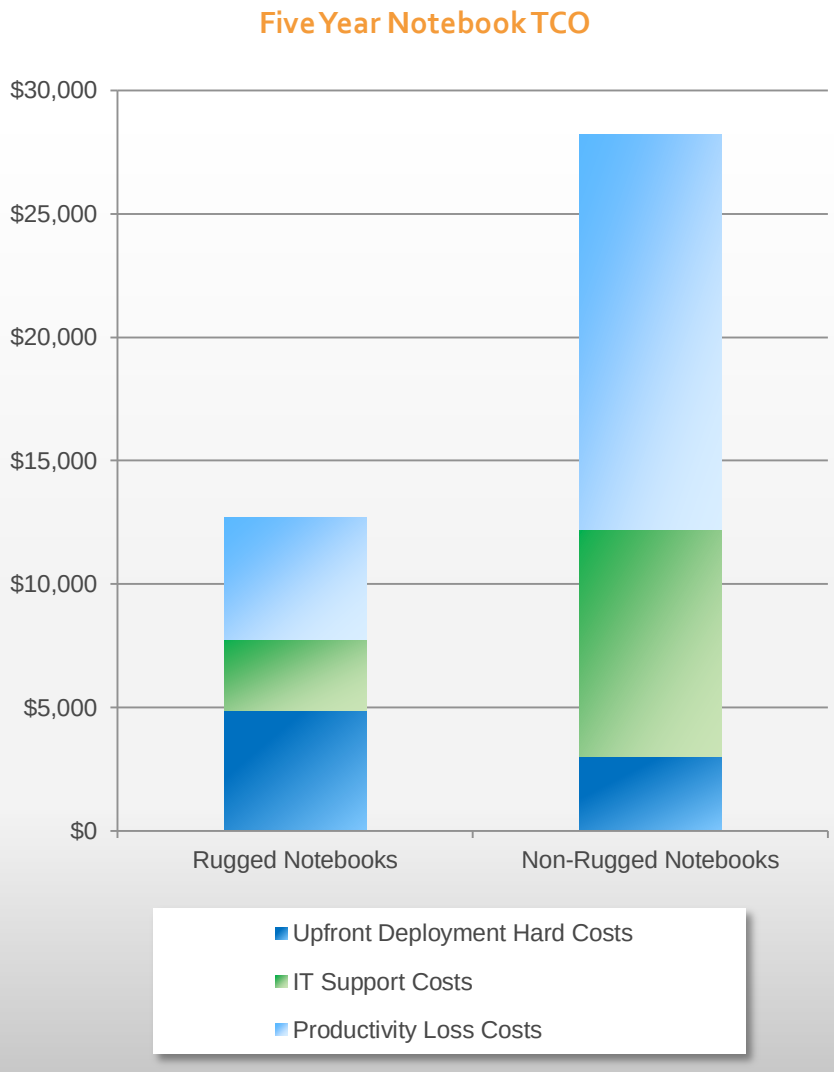
Soft Costs

Training
- Initial User Training
- On-going User Training

Operational
- System Maintenance
- Third-Party Technical Support
- Internal Technical Support
- Upgrades
- Application Management

Downtime
- Lost Manpower/Wages
- Lost Revenues
- HW Replacement

Notebook TCO for Line of Business Applications



Most rugged notebooks are deployed mounted into vehicles. The exposure to temperature, vibration and other environmental extremes makes these environments ill suited for non-rugged notebooks.

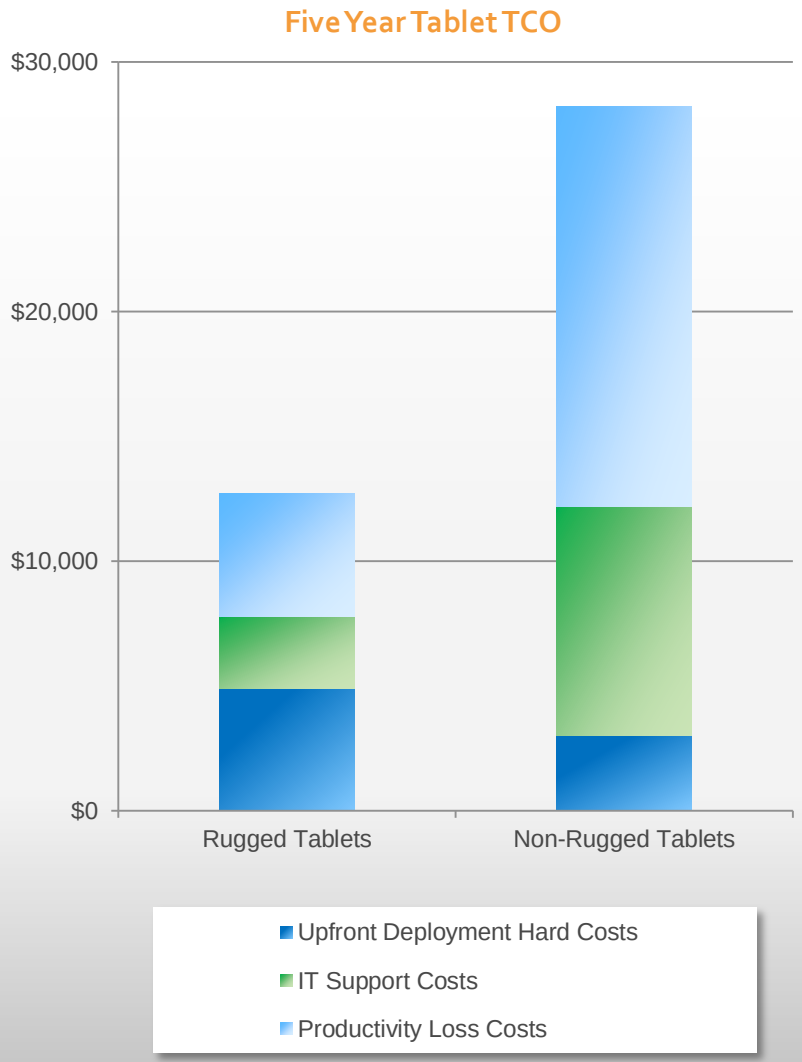
In comparison to other form factors the research revealed a substantially lower adoption of non-rugged notebooks in traditional rugged notebook environments indicating a stronger acceptance of their use case.

However, we are tracking a growing shift away from traditional (clamshell) notebooks towards other mobile form factors, especially tablets.

Post deployment costs as percent of overall TCO:

- Rugged notebooks: 89%
- Non-rugged notebooks: 62%

Tablet TCO for Line of Business Applications



The tablet form factor is gaining a lot of attention for frontline workflows and applications due to its strong combination of portable convenience and processing capacity.

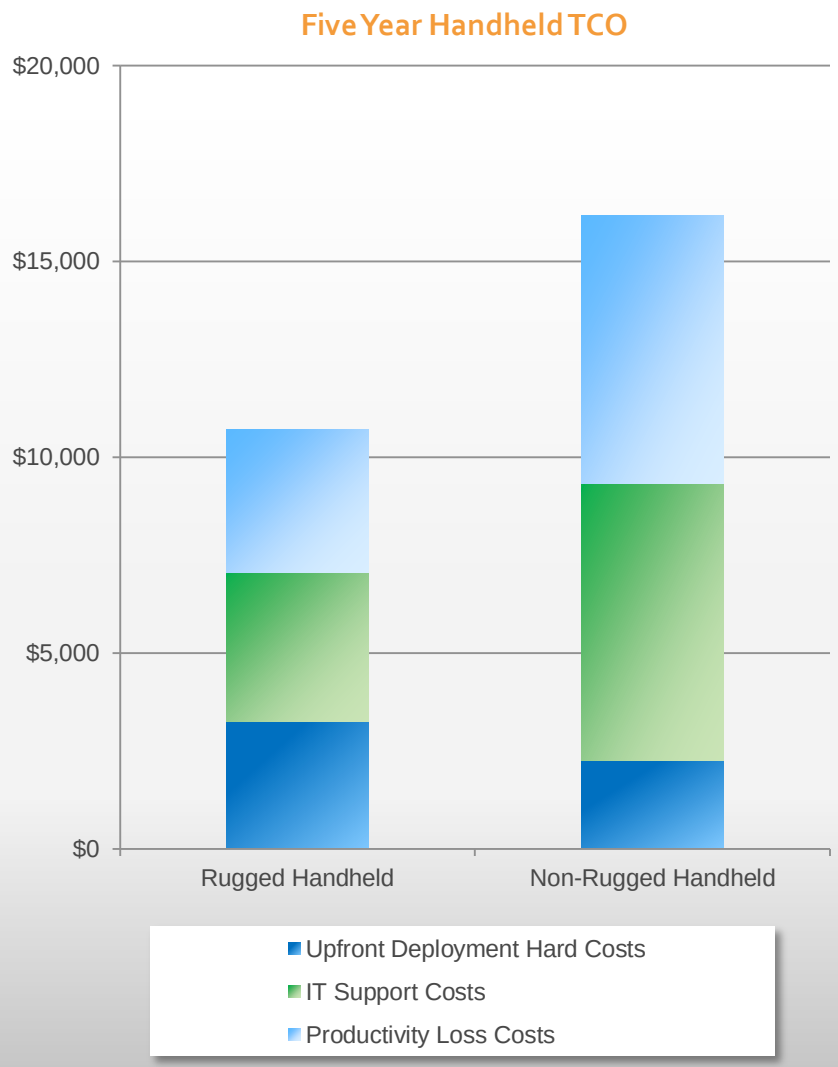
Tablets are not new to many frontline mobile workflows – especially in areas such as field sales, field service and inspection oriented applications.

Enterprises are aggressively evaluating the use of tablets to support many use cases – especially in customer facing and customer engagement environments. Many of these initiatives are focusing on non-rugged devices, particularly Apple's iPad and Android-powered tablets.

Post deployment costs as percent of overall TCO:

- Rugged tablets: 89%
- Non-rugged tablets: 62%

Handheld TCO for Line of Business Applications



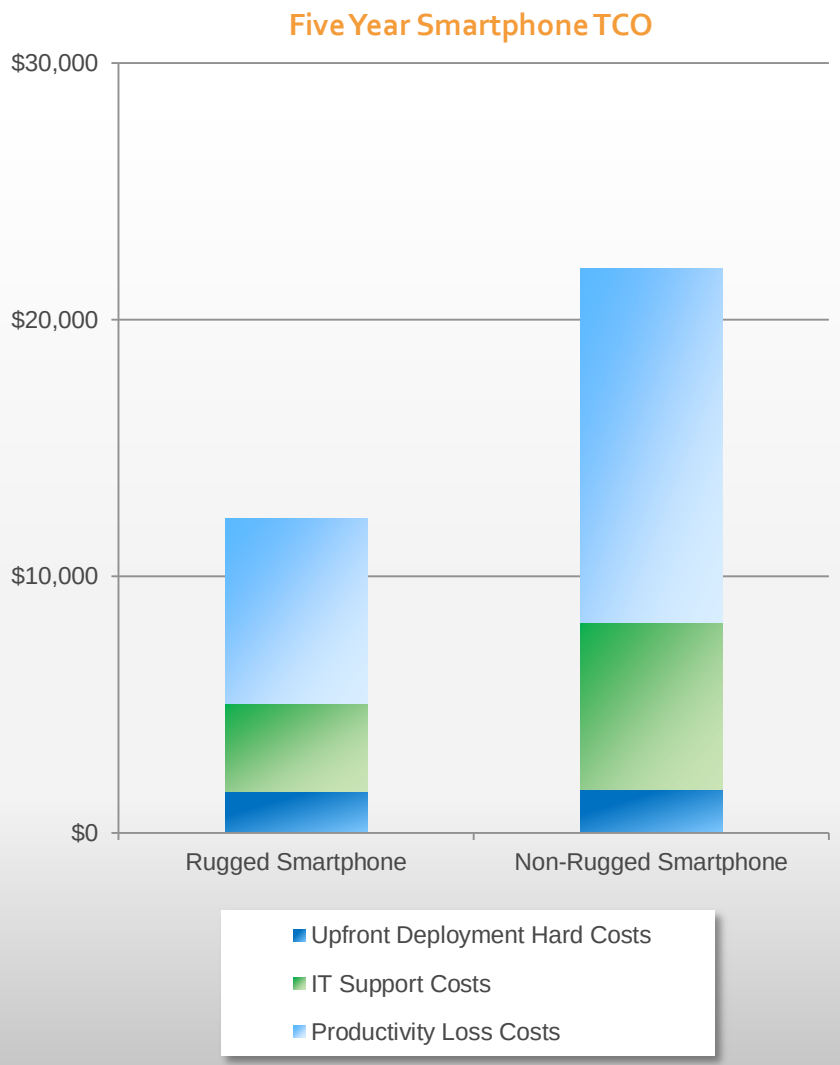
The rugged handheld device is one of the most pervasive rugged devices deployed – especially for data collection application.

Although there are some non-rugged handheld devices still available on the market, most of the competition is coming from smartphones.

Post deployment costs as percent of overall TCO:

- Rugged handheld devices: 70%
- Non-rugged handheld devices: 86%

Smartphone TCO for Line of Business Applications



The use of smartphones by enterprise mobile workers is virtually pervasive. The increase in functionality and performance of these ultra portable devices combined with the expanding wireless network coverage present a powerful value proposition.

Smartphones are being used by enterprises in place of previously deployed rugged handheld devices and also in support of entirely new workflows.

The emergence of the 'enterprise smartphone' and greater focus by smartphone vendors on 'ruggedizing' their devices are creating a new category that will appeal to many enterprise end users. However, these are expected to be highly competitive and price sensitive markets.

Post deployment costs as percent of overall TCO:

- Rugged smartphones: 86%
- Non-rugged smartphones: 92%

Appendices

I. Scope & Methodology

II. License Terms & Conditions

III. Detailed market data is provided in a separate Excel spreadsheet.

Project Overview: Professional Services

Background & Objectives

- VDC's Mobile TCO for Line of Business Applications series spans two volumes that provide TCO analysis of mobile devices and the impact of MDM solutions for line of business applications.
- This study was designed to update our previous mobile device TCO analyses and measure the impact of the increased use of consumer technologies for line of business applications.
- VDC defines line of business applications to span field service and field sales, warehouse management, manufacturing shop floor control, retail shop floor control, public safety, healthcare service providers and others.
- Line of business mobile workers are typically classified as blue and/or grey collar task workers.

Methodology/Demographics

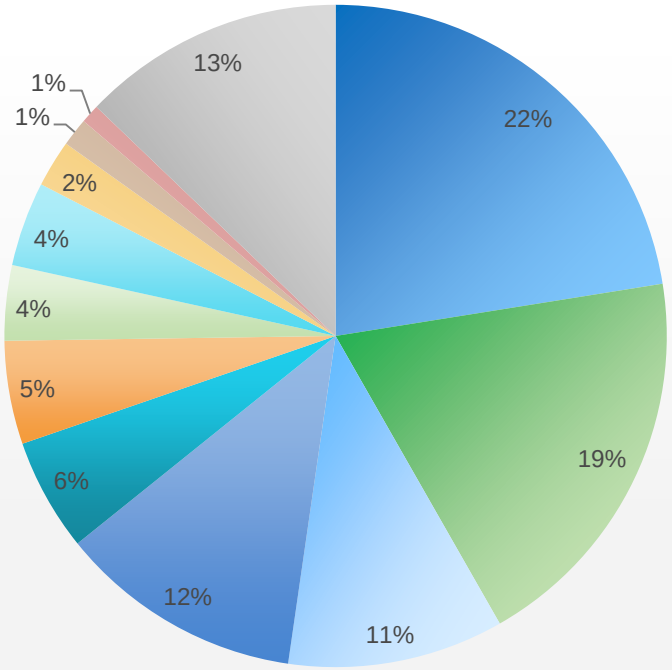
- 215 qualified completes via a web-based survey
- <1000 employees: 56%
- >1000 employees: 44%

Qualifications & Requirements

- IT and LOB executives (manager level and above)
- Involvement in the purchase/approval process of enterprise applications and services.

Industry Detail

Respondent Demographics: Industries Represented



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AutoID & Data Capture

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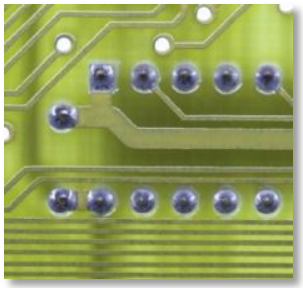

M2M Embedded Hardware Platforms

MEET THE TEAM

M2M Embedded Software & Tools

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Enterprise Mobility & Connected Devices

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Ways to Work With Us

Our market research is the basis for the many other ways that VDC can help you to grow your business. Our clients rely on us to provide actionable insights that support their most important strategic initiatives including: corporate development projects, opportunity assessments and lead generation programs.

About the Team

David Krebs

Vice President, Mobile & Wireless Practice

David has more than 10 years experience covering the markets for enterprise and government mobility solutions, wireless data communication technologies and automatic data-capture research and consulting. David has extensive primary market research management and execution experience to support market sizing and forecasting, total cost of ownership (TCO), comparative product performance evaluation, competitive benchmarking and end user requirements analysis. David is a graduate of Boston University (BSBA).

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Senior Analyst, Mobile & Wireless Practice

Eric is a market research and consulting professional specializing in the design, analysis, and delivery of project-based research. Over the past 15 years, Eric has worked with a wide array of firms across a number of industries, leading quantitative and qualitative research in areas such as innovation in enterprise software, supply chain risk management, manufacturing operations/ automation, and IT spending research. Eric holds a Bachelor of Science in Finance from Boston University.

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Balca Korkut

Analyst, Mobile & Wireless Practice

Balca supports all of the Mobile & Wireless practice's major research programs and is a contributor on many custom research and consulting engagements. Her work includes coverage of enterprise mobility hardware, software and services, delivery models including managed services for enterprise mobility solutions, and more. Balca holds a B.S. in Manufacturing Systems Engineering from Sabanci University in Istanbul, Turkey and a M.B.A. from University of Massachusetts Boston.

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Analyst, Mobile & Wireless Practice

Britt supports syndicated and custom research projects, as well as consulting engagements, focused on enterprise mobility solutions. Prior to joining the Mobile & Wireless Practice, she conducted research around embedded platforms, mobile hardware and multicore computing in VDC's Embedded Hardware & Systems Practice. Britt graduated summa cum laude from Babson College with a BS in business administration. Her coursework included studies in global supply chain management, marketing, and applied quantitative modeling.

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