NUFFIELD TECHNOLOGIES

Consumer vs Enterprise

Why choosing consumer devices for your business might cost you more than you think



Executive Summary

Mobile phones and tablets are essential to a growing number of jobs, and are often critical to business operations. This means that it is absolutely necessary to make the right decision when it comes to choosing which devices to invest in for your workers. When you are considering investing in or replacing your business' mobile devices, you may feel overwhelmed by the thousands of devices on the market. However, before considering make and model, your first decision is whether to choose enterprise-grade rugged devices or consumer-grade devices.

Consumer devices may appear to be the cheaper option, but the lower upfront cost of your initial purchase can hide a raft of hidden costs further along the line. It is vital to consider both upfront (hard) and hidden (soft) costs to calculate the total cost of ownership of a mobile device. This will ensure you are making a sound investment. Although upfront costs of rugged or enterprise mobile phones and tablets may be higher, the longer term costs are far lower than those of consumer-grade mobile devices. This white paper will help you understand all of the factors that affect total cost of ownership for mobile devices. It will enable you to make the right decisions when investing in mobile technology for your business.

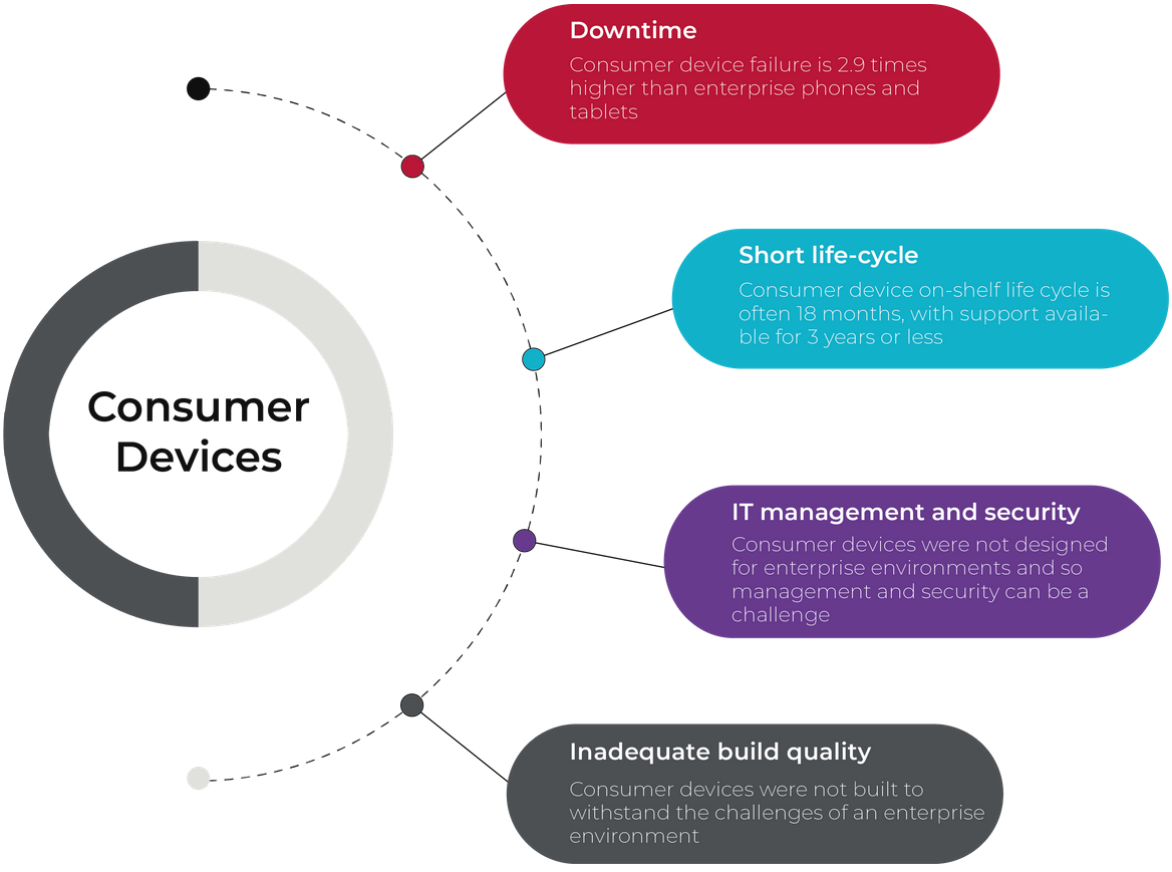
Mobile Devices: True Cost and Benefits

More and more businesses are investing in mobile technology to improve workforce productivity. Businesses cite increasing revenues, improving real-time decision making and competitive differentiation as drivers for this shift to mobility[1].

Equipping workers with mobile phones or tablets can result in measurable benefits to your business. When team members have the tools they need to do their jobs well it can result in:

- Time savings
- Reduction in mistakes
- Fast access to information wherever they are
- Improved employee engagement
- Increased customer satisfaction

With such high rewards at stake, the decision of which mobile phones and tablets are best suited to your environment is critical. Many businesses select consumer mobile devices, focusing only on the lower upfront purchase cost. However, this decision does not take into account reasons why consumer devices often fail in enterprise environments[1]:



What is Total Cost of Ownership?

It is not easy to understand the full cost and benefits of mobile devices, particularly when a large proportion of the costs emerge over time. In order to establish true return on investment it is helpful to determine Total Cost of Ownership (TCO). TCO is a financial calculation that enables you to assess the overall cost of investing in mobile technology, including both upfront (hard) and hidden (soft) costs.

Hard Costs

Hardware

- Mobile platforms
- Accessories
- Peripherals

Software

- Upfront fees
- Licence fees
- Development costs

System design and integration

- Upfront fees
- Licence fees
- Development costs
- Integration costs

Soft Costs

Training

- Initial
- Ongoing

Operational

- System maintenance
- 3rd party technical support
- Internal technical support
- Upgrades & Application management

Downtime

- Lost productivity
- Employee morale
- Lost revenue
- Hardware repair
- Replacement
- Brand / Reputation damage

Over time, the soft costs associated with the use of consumer grade technology in tough environments can add up. In fact, VDC research shows that over 50% of the total costs of using a mobile phone or tablet in an enterprise environment are the result of lost worker productivity due to device failure[1].

When mobile devices are dropped, screens can be particularly vulnerable to damage and cost up to £326.44 to repair[3].

Leading Causes of Consumer Mobile Device Failure[2]



Dropped devices



Liquid exposure



Excessive temperatures

Prior to purchase, it is essential for managers to consider the total cost of ownership of mobile devices in order to make sound investment decisions.

Consumer Devices for Enterprise

Whilst consumer devices are often not suited to enterprise environments, some manufacturers have attempted to overcome the build quality challenges by providing a 'rugged' case. Although this can enhance the level of external protection offered, cases alone cannot make a mobile device rugged. Internal components are still vulnerable to drops and cannot withstand the elements. Cases can cause a range of problems that can counteract the productivity gains associated with a mobile workforce, and can even damage the device.

The Problem with Cases

- Make device harder to use
- Difficult to charge in case
- Damage to charging points from regular plugging in
- High quality cases can be expensive: approx £50 per device
- Damage device by causing condensation

Some organisations tackle the issue by budgeting for shorter life cycles of consumer devices and factoring in replacement costs. However, it is vital to assess cost over a longer time period to ensure the calculations stack up. Costs caused by the disruption of replacing devices also need to be considered. When the annual failure rate for consumer-grade devices in harsh environments is 36%, these costs can quickly add up[4]. In addition to the financial cost, the environmental cost of disposing of large quantities of electrical waste is a key concern. When these factors are taken into account, the case for consumer devices often falls flat.

E-Waste - A Mounting Pile of Rubbish

The International Telecommunications Union predicted that 877 million mobile phones would be manufactured in 2020[5]. This is coupled with a continuous rise in waste mobile devices or e-waste[6]. Around 40 million tons of e-waste is produced annually, and this figure is increasing by 3-4% each year[7]. Waste mobile phones and printed circuit boards are classified as hazardous[8]. The majority of this e-waste ends up in landfill, leaching toxic substances such as lead and brominate flame retardants into the environment. E-waste is a threat to both ecosystems and human health[9].



The Rugged Debate

Although consumer devices may be suitable for some businesses, many environments such as retail, factories, warehouses, engineering, healthcare and the military need more robust mobile devices. This is where enterprise or rugged mobile phones and tablets step in.

Rugged or consumer: what's the difference?

Rugged devices are specifically designed to withstand more challenging environments. Their durability is underpinned by two tests:

Ingress Protection (IP) Testing

Assesses the environmental protection offered by a device's casing. IP ratings consist of two numbers; the first shows protection against dust, and the second shows protection against liquids. The higher the number, the greater the level of protection. IP68 is the highest protection rating, with IP54 being the minimum level required for a device to be considered rugged. Many industries consider IP65 to be suitable as this is full protection against dust and water spray.

MIL-STD-810G Testing

Measures resilience to environmental stressors including temperature, rain, humidity, sand, salt, fog, drops, shocks and altitude. Rugged devices must pass all of these tests. Ruggedness is not just a durable exterior, the internal hardware of the device must be fully rugged too.

The right mobile device for the job

The key to choosing the best mobile phones and tablets for your business is to match the device with the environment and the tasks that will be performed[1]. The challenges faced in an enterprise environment vary greatly from a consumer scenario.

Environmental challenges

Even though an environment may not be considered harsh, heavy usage by workers who are on the go makes devices very susceptible to drops. For example, getting in and out of vehicles is a prime time for drops to happen. It is essential to consider your use scenario prior to investing in mobile devices.

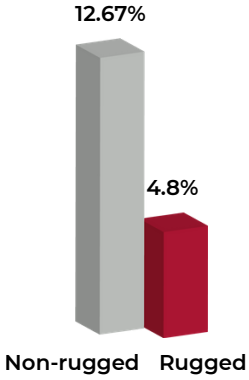


Why Rugged?

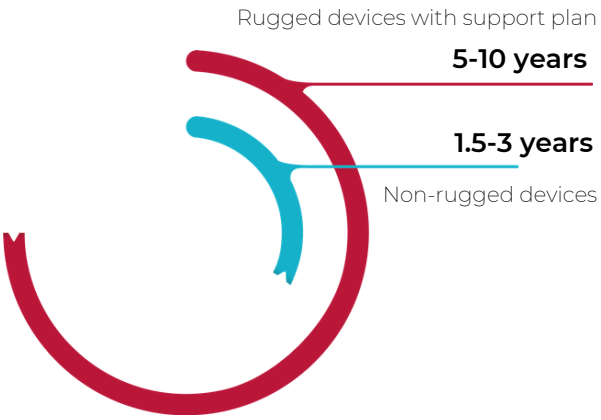
Designed to last

Rugged devices are tested to withstand the demands of enterprise environments. They are resilient against vibrations, temperature extremes, and exposure to liquids and dust. Consumer devices fail up to 2.9 times more often than rugged phones and tablets[1], often with disastrous consequences for productivity, efficiency, revenue and customer service. A rugged device that is chosen to match the requirements of your business is likely to last up to 3 times longer than a consumer device[10].

Annual Failure Rates of Non-Rugged vs. Rugged Mobile Devices[1]



Lifecycle of Non-Rugged and Rugged Mobile Devces[2]



Service and repair

Lower failure rates of rugged devices mean lower repair and replacement costs, along with minimising the disruption that these can cause. When things do go wrong, rugged devices are designed to allow for repairs. Manufacturers are geared towards the needs of enterprise, and many offer bespoke support plans for up to 10 years. These fixed price plans allow for certainty over future costs. Devices can be repaired or replaced within a timeframe that suits your organisation and mitigates disruption. These repair routes keep your devices in service longer, cutting costs and reducing e-waste.

OS and Software for enterprise

Most rugged devices use Windows® or Android™ mobile operating systems which are ideally suited for enterprise due to their ease of use and integration with enterprise applications. The majority of enterprise software is built for Android or Windows and so time and costs are reduced when integrating existing systems. If you don't already have software in place, rugged device manufacturers understand the needs of enterprise and many have developed business apps that can be tailored to your workflow.

Accessories and Peripherals

Integration

Capabilities such as barcode and RFID scanning, mobile printing, vehicle mounting, and batteries that can be replaced during shifts are often required in enterprise environments. It is sometimes possible to add-on these hardware components to consumer devices; however the risk of problems increases with each piece of equipment added. An increased failure rate means further downtime for your business. These features can be built into rugged devices, reducing risk of failure and ensuring the mobile solution is future proof for different use cases that may evolve in your business.

Backward Compatibility

Rugged mobile device accessories and peripherals, such as cradles and chargers, are usually designed to be backward and forward compatible. They can be used with legacy hardware and newer upgrades, so that they remain in service beyond the initial lifecycle of the mobile device. This means that once invested in, they do not need to be replaced when newer devices are purchased.

Designed for Enterprise

Rugged device features are designed to boost productivity. For example, whilst consumer device cameras can read some barcodes, scanning speed will be affected. In contrast, rugged devices with in-built barcode scanners enable fast-paced, high volume scanning from distances over 15 metres.

Battery life

For mobile workers, battery life is absolutely critical. If a remote worker's device battery does not last their shift, they could lose a whole day. Rugged device batteries often have higher capacities than consumer equivalents, and many rugged devices allow a 'hot swap.' This means batteries can be swapped out without powering down the device, minimising downtime and effectively eliminating charging time.

Charging

Rugged devices are often accompanied by charging solutions which avoid the need to plug cables into the device. These solutions are backward and forward compatible and can be mounted in vehicles. They avoid damage to device charging ports caused by regular insertion of cables.

Device and app management

Rugged devices are designed for enterprise-volume use and so are often equipped with Mobile Device Management (MDM) software that enables centralized and streamlined deployment, management and support of your mobile devices. Troubleshooting can be carried out in real time and remotely, and updates can be pushed when the time is right for your business. These features reduce device downtime and keep support costs low.

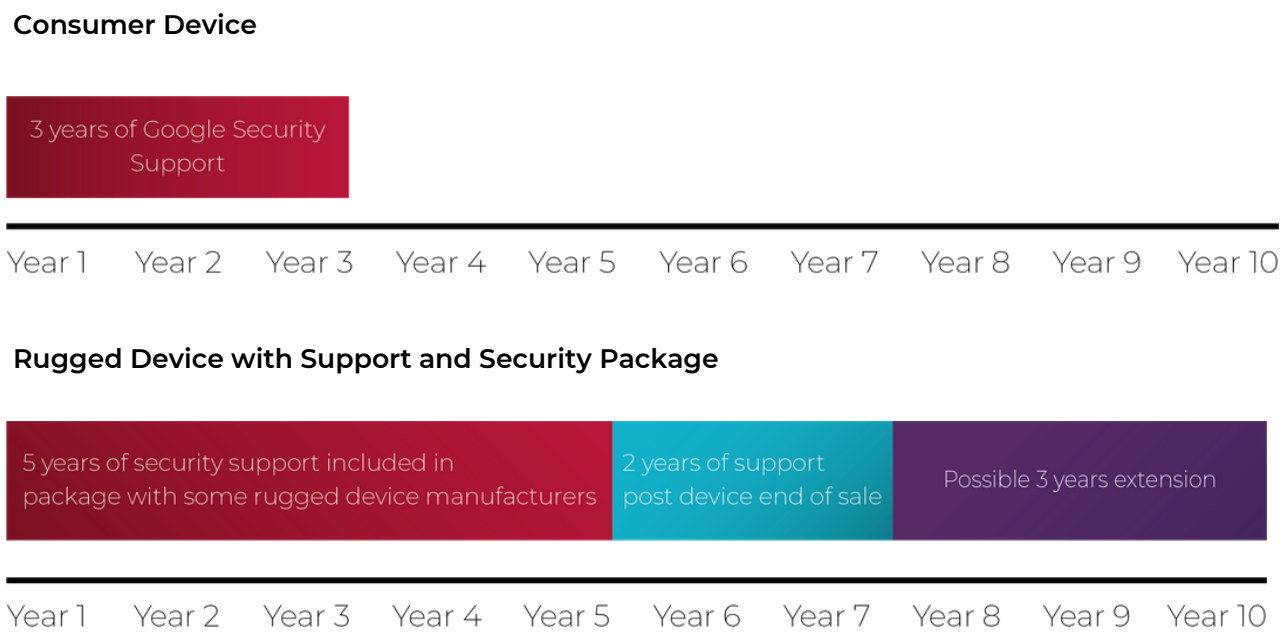
Security

Mobile devices that are not supported with security updates are not secure. The majority of consumer devices are typically only supported for 18 months to 3 years. Consumer Watchdog has estimated that 2 in 5 Android devices are no longer receiving vital security updates from Google[11]. This leaves them open to malware and other security risks. On average, security breaches can cost UK small businesses £11,000 per incident[12]. In addition, total cost of ownership dramatically increases if all devices must be replaced simultaneously when consumer device security updates cease. Many rugged device manufacturers offer support and security updates for up to 10 years so your devices stay in service for as long as possible.

Enhanced Security

Some environments require devices that can be 'locked down' so that only the job at hand can be completed. This means users cannot access any settings or apps outside of the primary use of the device. Some rugged device manufacturers and third parties provide an extra software layer that locks down devices by default if needed.

Android Security Support: Consumer vs. Rugged Devices



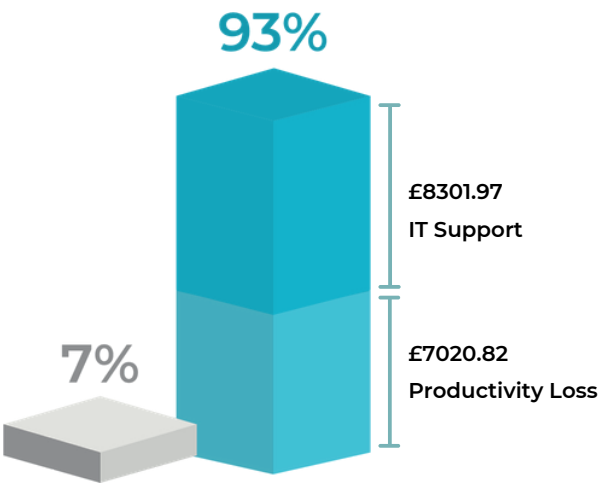
The Verdict: Rugged or Consumer

Enterprise devices are more reliable, less expensive to operate and better equipped than consumer devices.

VDC research shows that rugged devices have a 42.5% to 60.5% lower annual total cost of ownership than non-rugged devices when supporting line of business applications[1]. In their analysis of total cost of ownership, the VDC took into account cost of upfront acquisition, deployment, training, support and productivity loss caused by downtime. VDC Research expanded their study to total cost of ownership over 5 years and the results were clear cut.

TCO of Non-Rugged and Rugged Mobile Devices Over 5 Years[1]

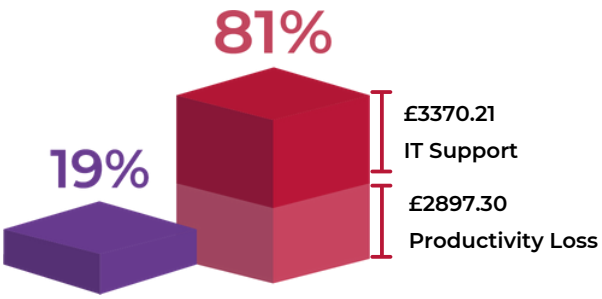
Non-rugged handheld devices



Hard costs 7% - £1137.16
Soft costs 93% - £15,322.50

Total- £16,459.66 per device

Rugged handheld devices



Hard costs 19% - £1503.48
Soft costs 81% - £6267.89

Total - £7,771.36 per device

Although it is clear that the upfront hard cost of rugged devices is higher, this is counterbalanced by the soft costs associated with consumer devices. When IT support and productivity loss costs are taken into account, rugged devices have a 52.7% lower total cost of ownership than consumer devices over 5 years.

Choosing the Right Mobile Device

How Do I Calculate Total Cost of Ownership?

Many businesses find themselves making large investment decisions about mobile technology without a clear understanding of cost and impact over time. Whilst upfront, hard costs can be clearly established, calculating soft costs can be more complex. This is where a TCO Calculator can come in useful. Zebra Technologies have created a TCO Calculator and Reporting Tool that businesses can work through with Zebra device resellers to establish both hard and soft costs over time.

This tool enables you to directly compare two devices, adding information on expected lifecycle and your own use case. It provides detailed results by cost category and cost year, as well cumulative project costs and considerations beyond TCO. The report also details underlying assumptions made in the calculation. If you are looking to invest in mobile technology and would like a detailed TCO calculation, contact us on info@nuffieldtechnologies.com.

8 questions to ask
before investing in mobile devices for business

With so many options available it can be difficult to choose the right mobile devices for your business. This checklist of questions to ask, alongside a Total Cost of Ownership calculation will ensure you make the best investment decision for now and for the future.

1. Will the device realistically withstand the conditions it will be used in? Consider drops, extreme temperature ranges, prolonged periods of storage, rough handling, dust, fluids.

2. Is the device optimal for the tasks it will be used for? Does it need to be capable of long range scanning or capture barcodes in confined spaces? Does it have the necessary wireless capability such as Bluetooth® or RFID?

3. Is the device capable of connecting to required hardware i.e. mobile printers?

4. Can the device be administered and managed through configuration of the Operating System software and/or firmware rather than modification of physical hardware?

5. Is the device secure and capable of maintaining data privacy?

6. Can the device be supported and repaired by the supplier under a commercial support arrangement?

7. Does the device use an Operating System that is supported by the supplier for the expected life cycle of the device?

8. Will my developers and third party independent software developers have adequate programming (API) access?

Conclusion

The massive range of mobile devices on the market makes it difficult for business owners to decide which device is the best investment for their workers long term.

	Consumer Mobile Devices	Rugged Mobile Devices
Hard costs per device over 5 years (2018)[1]	£1137.76	£1503.48
Soft costs per device over 5 years (2018)[1]	£15322.50	£6267.89
Annual failure rate[1]	12.6%	4.8%
Lifecycle[10]	1.5 - 3 years	5 - 10 years

Consumer mobile devices risk more downtime and productivity loss for your business. Rugged devices are designed to survive longer in enterprise environments. Support, security and software features extend the life cycle of the device and enable you to take control of your mobile platform. When investing in mobile devices, it is essential to factor in Total Cost of Ownership of the device. This not only includes upfront costs but also ongoing costs such as training, support, maintenance, and downtime. When these costs are taken into consideration, each rugged device costs £ 8689.04 less than consumer devices over 5 years.

To find out more about how Nuffield Technologies can help you make the best decision when investing in mobile technology, get in touch with us via info@nuffieldtechnologies.com. We can work with you to assess your environment and workflow requirements, and undertake a detailed Total Cost Analysis to give you the confidence to select the right devices for your business.

About Nuffield Technologies

Nuffield Technologies specialise in mobile computing and data capture for enterprise and public sector organisations.

Our end-to-end services cover mobile device procurement, development and security. We can help your business with:

- Procuring Enterprise and Rugged mobile hardware
- Developing mobile, web and desktop applications
- Implementing data capture solutions
- Deploying Android technology in security critical environments
- Service, repair and support

We keep businesses on the go with flexible mobile solutions that are perfectly tailored to your environment.

Call us on +44 1202 665885

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References

1. VDC Research Group, Inc. December 2018. “Total Cost of Ownership Models for Line of Business Mobile Solutions.” Enterprise Mobility. https://www.vdcresearch.com/Coverage/emob/reports/18-Total-Cost-of-Ownership.html. Study results were published in USD and have been converted to GBP using average USD/GBP exchange rate calculated for 2018 at time of study (1.3349)

2. Krebs, D. 2013. Mobility in Manufacturing and Logistics: Investment Acumen for Next Generation Mobile Solutions. https://www.optiscangroup.com/doc/articles/VDC_Whitepaper_Field_Operations_a.pdf

3. Which? 2020. “How to repair your smartphone.” Which? https://www.which.co.uk/reviews/mobile-phones/article/mobile-phone-repair-cheapest-way-to-fix-iphone-or-android

4. Krebs, D. 2005. “Enterprise Mobility TCO: When Rugged Makes Sense.” Insight.

5. ITU. 2015. “ICT Facts and Figures.” ITU. https://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2015.pdf

6. Sarath, P., Bonda, S., Mohanty, S. & Nayak, S. K. 2015. “Mobile phone waste management and recycling: Views and trends.” Waste Manage. 46, 536–545. https://www.sciencedirect.com/science/article/abs/pii/S0956053X15301227?via%3Dihub

7. Compare and Recycle. 2019. “E-Waste Is Destroying Our Planet: Here Is What You Can Do to Break the Cycle.” Compare and Recycle. https://www.compareandrecycle.co.uk/blog/e-waste-day-2019

8. Chen, Y., Chen, M., Li, Y. et al. 2018. “Impact of technological innovation and regulation development on e-waste toxicity: a case study of waste mobile phones.” Scientific Reports 8, 7100. https://doi.org/10.1038/s41598-018-25400-0

9. Noon, M. S., Lee, S.-J. & Cooper, J. S. 2011. “A life cycle assessment of end-of-life computer monitor management in the Seattle metropolitan region.” Resources, Conservation and Recycle. 57, 22–29. https://www.sciencedirect.com/science/article/abs/pii/S0921344911001972

10. Zebra. 2016. Zebra’s Consumer Vs Enterprise Brief. https://www.zebra.com/content/dam/zebra_new_ia/en-us/campaigns/os-migration/find-the-right-devices/consumer-vs-enterprise-technical-brief-en-us-0203.pdf

11. Which? 2020. “Void Android: More than one billion Android devices at risk of hacking attacks.” Which? https://press.which.co.uk/whichpressreleases/void-android-more-than-one-billion-android-devices-at-risk-of-hacking-attacks/

12. Hiscox. 2020. Hiscox Cyber Readiness Report 2020. Hiscox https://www.hiscox.co.uk/cyberreadiness.



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