
Mobile Computing Checkpoint

The present and future of flexible working

Dale Vile and Andrew Buss, June 2011

Introduction

The last decade has seen a significant increase in adoption of laptop and notebook PCs in business. As specs have increased and prices have come down, even users with limited mobility needs have often migrated from fixed desktop machines to a laptop/docking station combination. In addition, 3G and WiFi enabled smart phones have broken into the consumer mainstream, further fuelling their use in a business environment. And, of course, a lot of attention is now being paid to the emerging tablet (a.k.a. 'slate') form factor, which has caught many people's imagination.

Against this background, we examine the present and future shape of the client computing landscape in the business environment, with a particular emphasis on mobile working, based on an online survey of 664 IT and business professionals completed in May 2011.

Key findings

Tales of the laptop PC's death are greatly exaggerated

Full function PCs are the most important client device for business computing today and the view is that this importance will actually increase, not decrease, in the context of mobile working over the coming three years. Continued price and power/performance improvements look set to encourage broader laptop (including notebook) PC adoption.

Smart phones are an important second device, with tablets emerging as an optional third

The role of smart phones in business is now beyond question, with their importance anticipated to continue growing as a laptop companion. While tablets may play a critical role in some scenarios, they are likely to represent a 'nice to have' third device for more general professional use, at least in the short to medium term.

Increased adoption creates increased expectation in terms of device and support capability

Despite the enthusiasm for the latest mobile equipment, shortcomings in capability and therefore areas for improvement are evident. This includes device side requirements such as battery life, along with facilities to help manage devices and the information held on them. Within this, security is a particular area of focus for further development.

Infrastructure to enable multi-device support is key to success

The use of two mobile devices will become normal, with some anticipating professionals using three or more pieces of kit. Capabilities to make applications, services and information available coherently across devices, including middleware, synchronisation and self-provisioning solutions are important here. Some are considering the role of 'the cloud' in this.

Consumerisation is real, and steps need to be taken to prepare for it

We already see the use of personal equipment for business purposes, and awareness of the need to support it safely, cost effectively and securely is increasing. Lack of support or attempts to block consumerisation will simply drive activity 'underground' with unpredictable consequences. By the same token, there is a need to better manage personal use of corporate devices.

The study upon which this report is based was independently designed and executed by Freeform Dynamics. Feedback was gathered via an online survey of 664 IT and business professionals from the UK, USA, and other geographies to provide a market snapshot of views and activity. This report was sponsored by Intel.

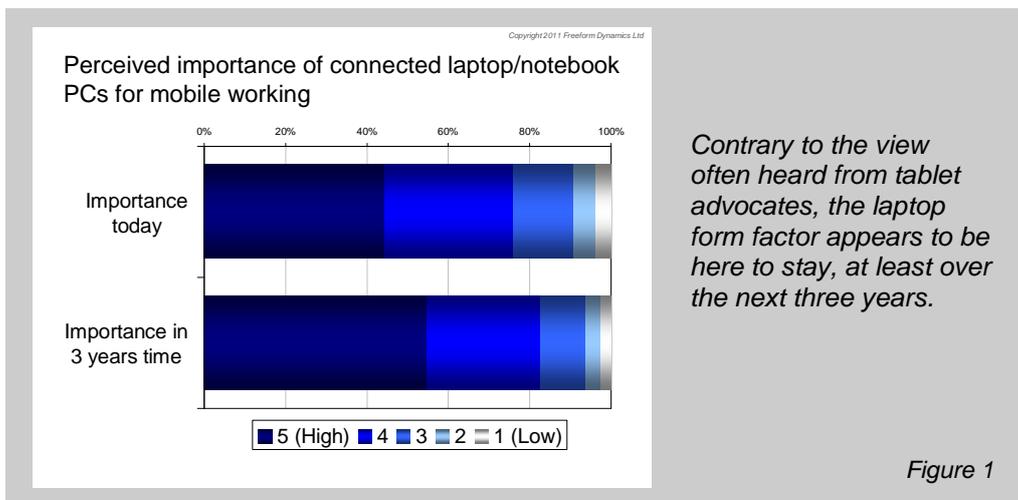


The mobile PC goes from strength to strength

The relevance of laptop personal computers based on Windows, OS/X or Linux has been called into question on a couple of occasions over the past decade. The first time was when handheld mobile devices such as the BlackBerry and its followers began to grow in popularity for business use. The notion was that while on the road, small form factor devices would be adequate to meet most people's needs, meaning the role of the laptop would gradually diminish over time.

More recently, as a result of the iPad and its followers, a very similar discussion has started around the tablet form factor. Again, the notion is that as these rise in popularity, the traditional laptop will be replaced by mid-sized touch screen devices.

Participants in our survey, however, do not anticipate the decline of the PC for mobile working in the short to medium term. Indeed, over the coming three years, they expect its importance to actually increase rather than decrease (Figure 1).



While this finding may come as a surprise to some, it shouldn't. Just as the display capabilities of handhelds precluded their role as a laptop replacement for the majority of users, the tablet's potential is constrained by its own physical limitations. In this case, it's predominantly input related. Early experiences suggest that tablets are best thought of as content consumption devices, more convenient in many scenarios than a laptop for this purpose, and therefore of benefit to many users, but not as comfortable, efficient and effective for anything but the most casual of content creation.

Meanwhile, a combination of price/performance and power/performance improvements means laptops are becoming even more relevant. Whether it's high speed machines for serious demanding use on a nomadic basis, or highly efficient notebooks with an all-day battery life, the traditional constraints of this form factor are gradually being removed making it ever more practical in a growing range of business scenarios.

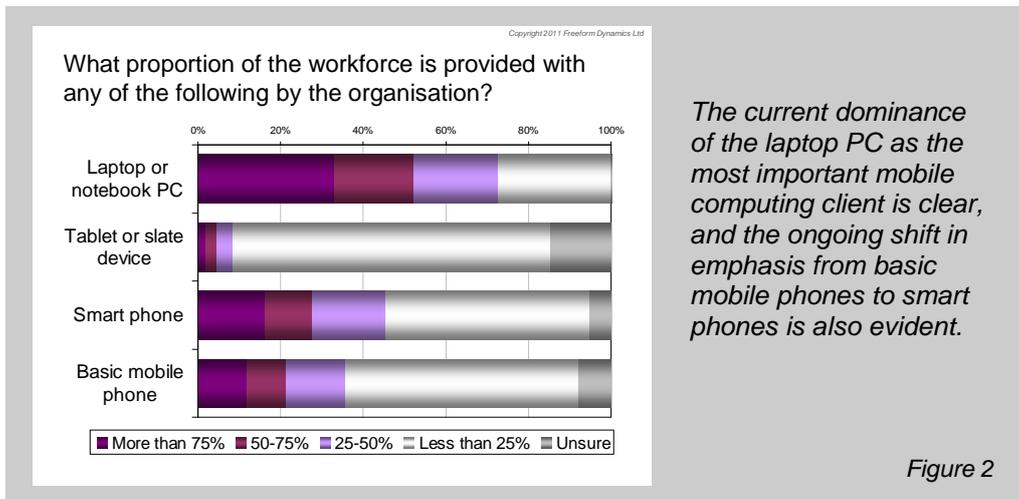
Companion devices are already playing a key role

So if the mobile PC is here to stay as the cornerstone of mobile working, what other equipment will be used alongside it?

A useful starting point to consider this question is the device mix in use today. Firstly we should take a minute to touch on the methodology used in the study reported here. Data was gathered via a Web survey executed on a popular IT news site. Respondents were invited to provide us with their views of how mobile and flexible working would evolve. We would therefore expect the resulting sample to be skewed towards those with more of an interest or need in this area. The upshot is that some of the stats we present should not be taken as an absolute representation of the IT and business community as a whole.

That said, this kind of data is great for looking at the relative emphasis of different types of perception and activity, and arguably provides more of an indication of things to come as

respondents are, on average, likely to be more 'advanced' and/or 'progressive' in their thinking compared to the broader market. Bearing this in mind, it is interesting to see the mix of devices reported at the moment, with the laptop PC dominant, as we would expect, and a clear shift in emphasis from basic mobile phones to more advanced smart phones (Figure 2).

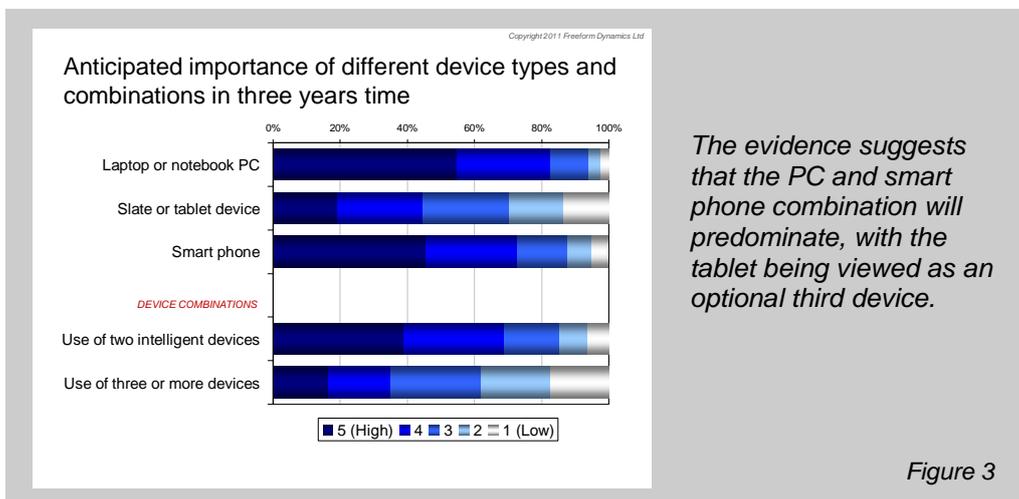


As smart phones become more pervasive in the consumer space and unit prices to businesses continue to come down, we expect this transition from the basic mobile phone to continue.

At the moment, despite the impressive start of the iPad that is reflected above, tablets have yet to make a big impact in business in relative terms. This will change as more options with different characteristics at different price points emerge, but what is the role of the tablet likely to be?

The tablet emerges as a 'nice to have'

Looking ahead three years, the participants in our study feel that tablets will be important, but not as important as PCs and smart phones (Figure 3).



We can also see from this chart that while most see a need for mobile workers to use two devices, there is significantly less emphasis on the need to support more. Based on earlier responses, we know that in a two-device solution, one of those devices is likely to be a PC. We can also be pretty confident that a small form factor device for telephony use will generally be required, and as we have seen, this will increasingly be a smart phone.

Pulling all this together, the overriding conclusion is that the PC and smart phone may generally be thought of as the 'must have' devices to support mobile working, whereas tablet devices represent more of a 'nice to have' option.

Of course there will be exceptions to this, particularly when we look beyond the general requirements of mobile professionals to more specific industry needs. We anticipate the tablet form factor finding its place as the primary device for many application needs in areas such as field service, logistics, healthcare, and so on.

We must also bear in mind that category lines will often be challenged as equipment manufacturers continue to innovate. Telling the difference between a small tablet and large smart phone could be difficult, for example, especially if they both run the same operating system and support interactive voice and video. Hybrid devices, e.g. tablet/notebook convertibles, and 'separates' based solutions, e.g. a tablet with a keyboard accessory, will further blur the lines.

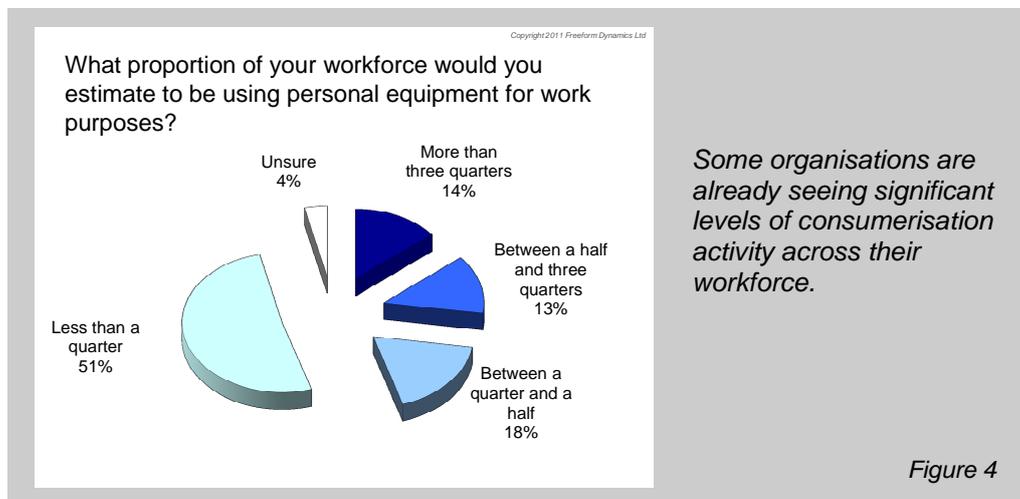
Nevertheless, based on the evidence we have at the moment, a higher spec device with good input capability (typically keyboard and mouse) coupled with an application-enabled phone will probably form the foundation for meeting most core business needs.

But that's just the business perspective, which is not the only one that matters. We must also consider the views and actions of individual employees, which provide another route for technology such as smart phones and tablets to enter the organisation.

Consumerisation is real, and is a two-edged sword

The same equipment businesses might consider to deal with mobile working needs is nowadays also generally available in the High Street. Indeed when you look at the uptake of new technology options, including mobile devices, consumer adoption is typically ahead of business use.

This has led to the phenomenon of 'consumerisation', which is basically about employees using their own equipment, typically procured from personal funds or on expenses, for work purposes. In some organisations, consumerisation is already widespread with one in four of our respondents estimating that more than half of their employees are actively using personal equipment to solve their individual computing needs (Figure 4).



This leads us to the question of who exactly is interested in using their own equipment for work, and some of the comments received from respondents provide a clue to this.

Some, for example, point to the younger contingent – the so called 'Generation Y':

"Some of our [younger] guys like to have the latest and greatest toys. We support them with that, because we used to be like that at their age and career stage and frankly, got rather annoyed being told we couldn't do that."

"Gen Y coming into the workforce will expect to be able to use their own devices"

We then see groups such as field based workers (sales and service), tech savvy workers (engineers, IT staff, etc) and temporary staff (e.g. contractors) called out.

However, the most prominent correlation highlighted is between personal device use and the seniority and/or income of the employee. Here is just a sample of many similar responses to the question of which types of user are most likely to be driving the consumerisation trend:

"The requests to use their own equipment generally come from the higher paid and 'executive' staff."

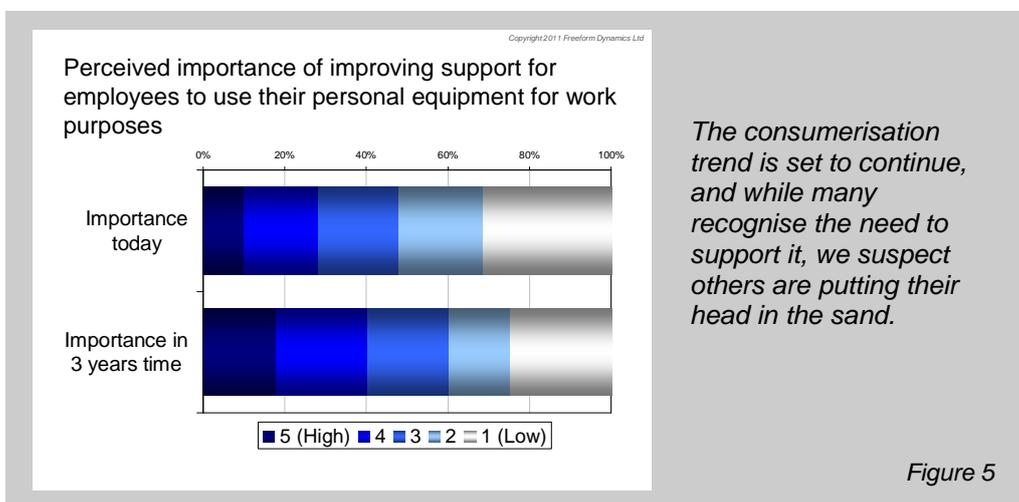
"Management and the people who can afford or see prestige in owning and 'showing off' such devices."

"Managers, generally, tend to be technophiles, even though they often lack the specific knowledge to properly configure such devices."

"One executive gets the latest device, and all of them have to have it. Then the demands start for IT to support it."

"At the executive level, people are used to getting what they want."

Given the comments relating to VIP interest and influence, and the inevitable expectation of IT backing that stems from this, it makes sense that respondents in our study foresee a need to improve support arrangements in this area (Figure 5).



While the trend is clear, whether consumerisation is viewed as a good or bad thing varies considerably.

Some comments received are very positive, such as:

"Good idea: 1) Motivational, 2) Exposes organisation to latest ideas and techniques"

"It helps drive innovation in processes within the business."

"Encouraged and highly preferred ... helps to reduce costs."

However, many point out practical concerns in relation to consumerisation around security and management in particular:

"Bad idea, most users lack very important security skills and knowledge, and too many personal devices are wide open."

"I am strongly against it. I am responsible for IT security here, and I cannot control personal equipment like I can corporate hardware."

"Ideally, no personal devices would be allowed - it's a total nightmare to manage, and introduces a whole load of security considerations."

"IT can't support an army of consumer grade personal machines with inconsistent warranties and service agreements"

Some make the point that consumerisation should not be necessary, and that the imperative is to provide employees with the equipment they need to do their jobs in the first place:

"I see no use for this in a well-run organisation. If the device is mission critical it should be provided by the organisation - otherwise it is a 'good to have' but not imperative. A well run org will respond to new technology and provide it to their people if beneficial."

"If it's needed for work it should be bought by the company, easier to keep track of, maintain and fewer issues when things go wrong (breakages etc)"

Within the respondent feedback, however, we also see lot of realism and pragmatism:

"Allowing employees to use remote working from their own devices has fuelled a huge demand. Whilst the flexibility it offers has been welcomed there are always a few who abuse the facility, and it is sometimes difficult to quantify the cost saving or identify any increased productivity."

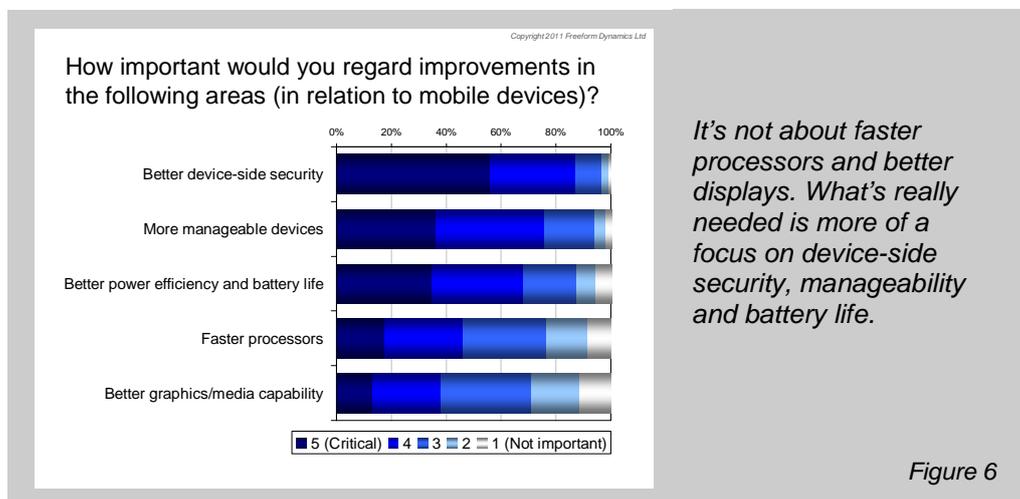
"As long as the critical data infrastructure can be kept reasonably secure, it is fine to allow this. I believe that this will become inevitable over time anyway."

"I am not particularly happy about it but it is almost impossible to avoid in an always-connected environment. You have to play the hand you are dealt and work the infrastructure to be as resilient as possible."

The debate about the pros and cons of consumerisation will no doubt rage on over the coming months and years. In the meantime, whether mobile technology is provided by the organisation or the employee, one of the biggest considerations is where advances need to be made in order to support mobile working safely and cost-effectively.

Devices need to improve in some key areas

When it comes to mobile equipment capabilities, the biggest area in which improvements are judged to be necessary is device-side security – e.g. access control, data encryption, and malware protection (Figure 6).



Given the comments we were looking at earlier, and the relatively rudimentary level of security capability offered by many devices, this prioritisation is understandable. So too is the emphasis placed on the inherent manageability of devices, which is another important aspect of what we might term 'enterprise readiness' from an IT perspective.

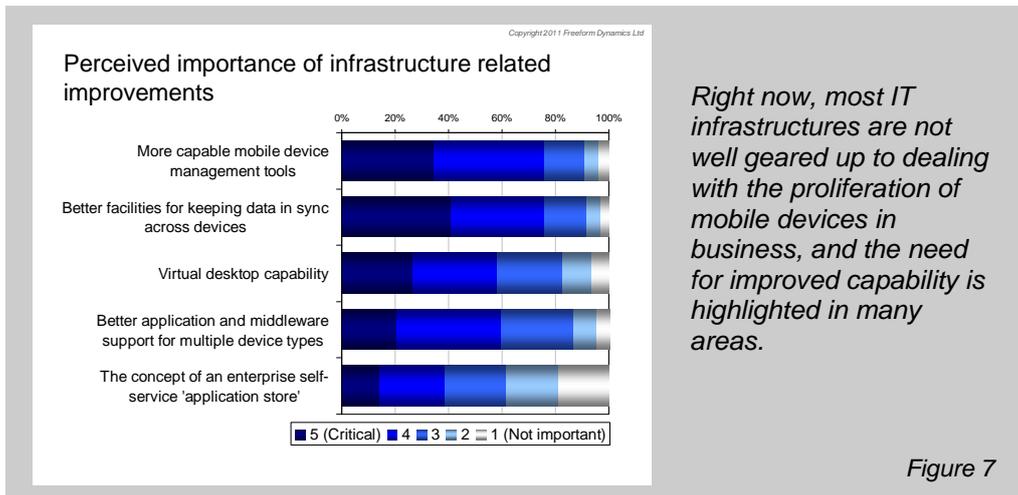
From the business user perspective, we then see power management and battery life called out in relation to smartphones and tablets. While some devices deliver better than others, far too many still struggle to deal with scenarios requiring a charge to last even a single active working day.

At the other end of the spectrum, we see lower emphasis placed on processor speed and display capability. This is undoubtedly because these have been consistently tracking ahead of business

requirements, which are typically more modest than the needs of the consumers upon which manufacturers focus most of their efforts. The chances are that any device capable of meeting consumer expectations around gaming, video and entertainment in general will comfortably handle anything that may be thrown at it in the context of business applications.

Most IT departments are not yet fully prepared

Turning to the infrastructure side of the equation, two high priority areas for improvement are better device management tools, and improved data synchronisation facilities (Figure 7).



Many IT related problems occur when something changes, so being able to manage devices and the software and data on them in a consistent and, as far as possible, automated manner, is a key requirement. While plenty of options are available to manage laptops as part of the broader PC estate, and the latest generation machines are inherently more manageable, we know from other research that many IT departments are not currently taking full advantage of what's available. The onus here is primarily on IT and business professionals to take action.

The story with smart phones and tablets is different, however. Right now, while some specialist solutions exist and the main management suite vendors have basic functionality in place, options are not nearly as mature and capable as they are in the PC management space. The onus in this area is therefore on the supplier community to further develop their solutions.

Another area requiring significant further development is that of data synchronisation. It would be nice to think that all information required and manipulated by mobile users could be centrally stored and accessed over the network on demand, but despite the significant build-out of cellular networks, the reality is that a connection cannot always be guaranteed. And even when a connection is possible, issues of bandwidth and latency often constrain what's practical or desirable from a user experience and cost perspective (e.g. when users are roaming on cellular).

As the use of multiple devices that are intermittently connected becomes the norm, the synchronisation question comes into sharp focus. Without solutions to keep all devices in sync with each other and with network resident data stored in the data centre or cloud, problems will arise around information fragmentation, consistency and completeness that could have a real productivity and business integrity impact.

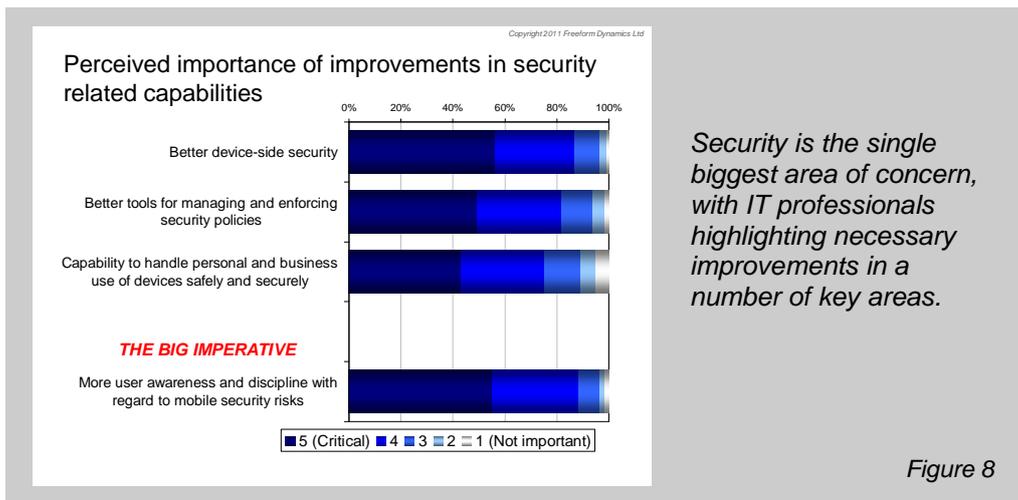
Right now, the majority of business mobile device use, particularly in relation to execs, managers and general professional staff, is centred on email, contacts, calendar and 'office' documents. As expectations and requirements broaden, however, we can expect to see demand for mobile access to other applications. This is behind the desire we see for improvements in desktop virtualisation and middleware. Contrary to popular belief, solutions emerging here are increasingly able to support offline operation to deal with the aforementioned connectivity constraints.

We also see a growing interest in self-service 'application stores' that are now the norm in a consumer context, though quite what form these will take in the enterprise has yet to be seen.

Security remains the Achilles heel of mobility

Within the freeform feedback gathered in this study, i.e. the comments volunteered by respondents in their own words, the word 'security' is mentioned time and time again. Security has historically always been a concern with mobile technology of any kind. Any device leaving the safe physical confines of the organisation, where IT has both visibility and control, represents a risk. This is especially true if that device holds sensitive data and/or is capable of connecting to the corporate network and applications.

The rapidly increasing use of small form factor devices, the proliferation of device variants, and the clear trend towards consumerisation, are highlighting the concerns even further. IT professionals are less than fully confident of current capability to manage this, making security in general the most prominent area in which improvements are seen to be necessary (Figure 8).



We have already mentioned the need for better device-side security, e.g. in the form of stronger access control, data encryption capability, and ultimately malware management. While viruses and other malware threats may not be seen as a huge issue at the moment, this will inevitably change over time as a 'target rich' environment is created for the bad guys.

A specific risk with mobile technology use is the inconsistent application of security policy. It is no good, for example, having rigorous access controls for sensitive data in place when it is sitting on the corporate network, then having copies of that data wide open on a mobile device.

Beyond data-centric security, a need exists to consider what's safe when a device attempts to connect to the network. User authentication is an obvious requirement here, which will often shine the spotlight on identity and access management. But you might also want to restrict what can be done over a public network depending on how secure the device and connection are deemed to be.

And all of this is complicated by the blurring of the lines between business and personal use of devices. This is not just in the context of consumerisation, but also in relation to employees using company equipment for personal purposes. Virtualisation and storage partitioning approaches have a role to play here, but we see a distinct shortfall in both solutions and best practice in this area at the moment.

The reality, though, is that you can only go so far with technology and IT-centric protection. The ignorant, careless or malicious user will always find ways to circumvent the security measures put into place, even if it's simply copying data onto an insecure device, using default or easy to guess PINs, or pulling up sensitive data on the screen while sitting on the train for everyone around to see.

The big immediate imperative for most organisations, as indicated on the above chart, is therefore to raise the level of security awareness and discipline within the workforce. Hard as this is, it is arguably doubly important while we are waiting for the industry to catch up in some areas and for the corporate infrastructure to be strengthened.

Discussion and Conclusion

The end user computing domain, especially with regard to mobility, is one of the fastest moving in the technology industry. This is creating huge opportunities in mainstream business to potentially drive step-changes in efficiency and effectiveness. The rate of innovation, however, together with rapidly changing user behaviour, makes planning and prediction extremely difficult:

"It's going to be more interesting (order of magnitude changes) as people become more comfortable with tech and its usage in their personal lives."

"Ha! 18 months ago, the iPad didn't exist. We have no idea what 3 years will bring."

"Keeping up with all this stuff is a job in itself while trying to keep the existing business systems running smoothly."

Perhaps the most pertinent advice against this background is to make sure you are prepared for change, even though you might not know what it will look like, as summed up by this respondent:

"We feel that the change will continue and unexpected technology will appear as it has in the past. Therefore it will be necessary to expect the unexpected and be prepared to adapt to things that are not yet even in the pipeline."

Many of the areas that need attention in terms of device and infrastructure related capability have already been discussed earlier in this report. One thing we haven't covered is the potential role of another big area of development in the industry - cloud computing. Given that cloud services tend to come into their own when secure remote access is important (service providers are better able to facilitate this than most businesses), this is an obvious question. Some respondents, such as the ones quoted below, are therefore already looking to the cloud:

"I think that 'cloud' computing and shared online spaces will be more important in 3 years' time although we haven't got any plans for it as of yet."

"Due to a variety of factors, including the multitude of devices, as well as dispersed staff, we are driving much of our infrastructure to the cloud. This has a net result of helping with cross-platform compatibility, amongst other things."

Whether you buy into the argument that cloud computing will totally transform IT delivery or not (which is debatable), developments in this area will undoubtedly create both opportunities and challenges as we look at the way mobile working and user behaviour will evolve over time.

But picking up on the reference to behaviour here, a mobile working strategy or programme cannot be based on technology and services alone. Safe exploitation of the potential is highly dependent on people, policy and process too.

In this respect, clarity is needed on the division of responsibility between business and IT management. While those in the IT department have an important enabling and advisory role to play, they cannot, and should not, take responsibility for user related policy and behaviour. This is a business management issue, and policies need to be defined and enforced to prevent users taking unilateral control of IT related decisions. The risk we need to manage here is that users often don't know what they don't know, and can easily end up creating security, compliance and support related problems – and costing the company a lot of money.

With this in mind, mobile working is one area in which it is imperative for IT and business professionals to work together collaboratively. In larger environments in particular, a more structured governance framework to enable objective policy setting and decision making may also be necessary.

One thing for sure, however, is that the journey has hardly begun, so we'll leave you with one last thought from a respondent that summed everything up quite nicely:

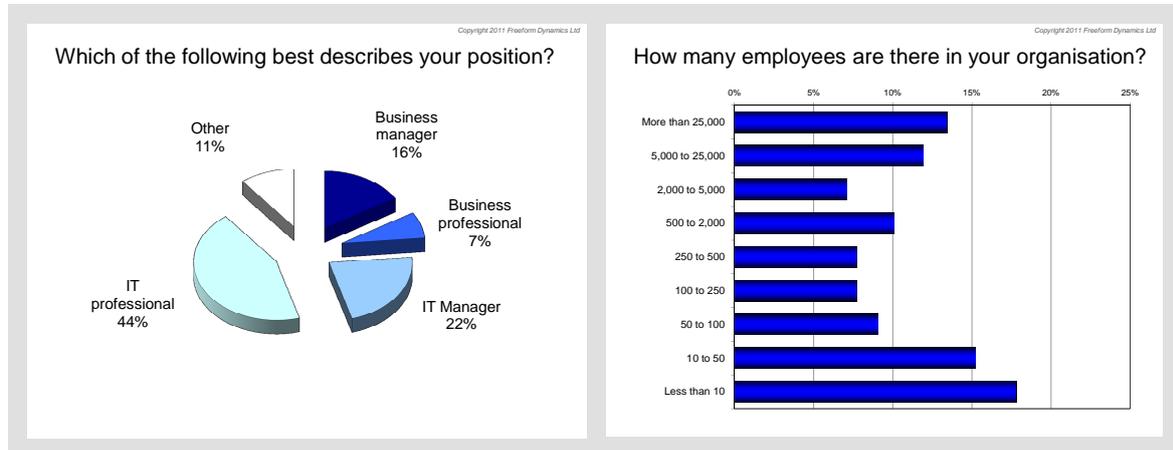
"We have a long way to go."

All that remains is for us to thank those who participated in our research. With the benefit of your insights, we have hopefully helped others to think through this exciting but challenging area.

Appendix: Study Sample

Feedback was gathered via an online questionnaire published on *The Register* news and information site (www.theregister.com). The respondents, totalling 664, were IT and business professionals representing a good cross section of job functions, and working in a range of different industry sectors.

The composition of the sample by role and organisation size was as follows:



In terms of geography, 48% were from the UK, 20% were from the USA, with the remainder from a spread of other countries around the world.

A note on methodology

The web survey approach used in this study is subject to the 'self-selection' principle, which basically means that people with a greater knowledge of or interest in the topic are more likely to have responded. The end result is a sample bias, which in this case means that the results presented are likely to be skewed towards organisations that are more advanced or progressive when it comes to mobile working.

Such self-selection does not undermine the analysis we have presented here as we have focused on the relative emphasis of different perceptions and types of activity. Indeed, in fast moving areas it is often useful to investigate the views and behaviour of those that are ahead of the curve. It does, however, mean that it would be inappropriate to regard any of the statistics we have used as a representation of the absolute level of need or activity across the business community as a whole.



About Freeform Dynamics

Freeform Dynamics is a research and analysis firm. We track and report on the business impact of developments in the IT and communications sectors.

As part of this, we use an innovative research methodology to gather feedback directly from those involved in ITC strategy, planning, procurement and implementation. Our output is therefore grounded in real-world practicality for use by mainstream IT professionals.

For further information or to subscribe to the Freeform Dynamics free research service, please visit www.freeformdynamics.com or contact us via info@freeformdynamics.com.



About Intel

Intel pushes the boundaries of innovation so our work can make people's lives more exciting, fulfilling, and manageable. And our work never stops. We never stop looking for the next leap ahead — in technology, education, culture, manufacturing, and social responsibility. And we never stop striving to deliver solutions with greater benefits for everyone.

For more information, visit: www.intel.com

Terms of Use

This document is Copyright 2011 Freeform Dynamics Ltd. It may be freely duplicated and distributed in its entirety on an individual one to one basis, either electronically or in hard copy form. It may not, however, be disassembled or modified in any way as part of the duplication process.

The contents of the front page of this document may be reproduced and published on any website as a management summary, so long as it is attributed to Freeform Dynamics Ltd, and is accompanied by a link to the relevant request page on www.freeformdynamics.com. Hosting of the entire report for download and/or mass distribution of the report by any means is prohibited unless express permission is obtained from Freeform Dynamics Ltd.

This report is provided for your general information and use only. Neither Freeform Dynamics Ltd nor any third parties provide any warranty or guarantee as to the suitability of the information provided within it for any particular purpose.