Management Summary

A phenomenal rise in the adoption of smartphones, tablets and other desirable devices in our personal lives has educated employees on the possibilities for exploiting modern technology in a business setting. Some are even motivated to bring their own solutions to work. Given this, many pundits predict that the direction of corporate IT will increasingly be defined by end users. But does this make sense?

Key points

End user computing is no longer just about the Wintel desktop
While Windows PCs still perform an important role in most businesses, a recent research study in which input was gathered from 660 IT and business professionals highlighted the growing importance of other types of end user technology. Most of those participating in the study are seeing rising adoption of both mobile devices and alternatives to Windows such as the Mac. Furthermore, the majority report the use of multiple devices by individual users.

Users are finding their voice, and even looking to take control
Business and operational needs still dominate when it comes to defining the end user computing agenda, but the influence of user preferences and desires is not far behind, and is growing rapidly. Many employees wish to use the same type of solution for work as they do in their personal lives to exploit the benefits of comfort and familiarity. Beyond this, almost all study participants report activity or demand in relation to BYOD or independent acquisition of devices by business units.

Disharmony between IT and users is creating cost and risk
Users say that more freedom and flexibility over the technology they use enhances productivity and innovation, and frequently complain that IT teams are too restrictive and stand in the way of progress. IT professionals, on the other hand, say that users too often put fashion ahead of utility, and that it’s unreasonable to expect support to be provided for devices that are just not suitable. Many are also concerned about business risk factors such as security, compliance and data protection.

The imperative is to create the right kind of environment
A growing understanding exists of what’s required to enable greater end user flexibility in a safe, efficient and effective manner. Changing demands can be met through the appropriate use of virtualisation, mobile application frameworks and the right kind of management tools. Centralisation of data, application execution, and/or policy management and control is a key principle to apply, as is making sure that an inclusive approach is taken that spans the traditional desktop/mobile divide.

Balancing business, user and IT interests is key to success
As you further develop your end user computing capability it is necessary for all interested parties to have an appropriate say when defining and prioritising requirements. From a people and politics perspective, users should not always get their own way and business execs need to resist setting unhelpful precedents with their personal tech. Senior managers also need to appreciate that achieving greater flexibility is not just a case of ‘IT lightening up’. Investment is necessary if both the business and employees are going to enjoy the benefits of modern technology.

About this Report

The research upon which this report is based was independently designed and analysed by Freeform Dynamics Ltd. Data was gathered via an online survey executed in collaboration with a mainstream IT news site. 660 responses were gathered from business and IT professionals across a range of industry sectors, geographies and organisation sizes. The study was sponsored by VMware.
Introduction

There was a time when end user computing largely revolved around Wintel PCs deployed and managed by the IT department. The kind of equipment provided to an employee would typically be determined by a combination of business and operational needs. Wherever possible, standardisation would be enforced to make securing, administering and supporting the environment easier and more efficient.

If this still describes your world then you should try to enjoy it while it lasts. A recent research study in which 660 respondents provided input (Appendix A) signalled very clearly that the nature of end user computing is evolving rapidly.

In the remainder of this report, we will explore the changes taking place and their impact on IT systems, policies and processes. We’ll then look at how best to respond to short term requirements in order to lay the right foundations for the future.

Key trends and developments

You will already be familiar at one level or another with most of the changes taking place in relation to end user computing. The challenge is often finding the time to stand back and consider the significance of what’s happening in more precise terms. We’ll therefore begin our exploration of this fast-moving area with a walkthrough of some important trends and developments.

Mobility and device proliferation

Advances in communications technology and infrastructure, including WiFi, cellular and broadband networks, have made remote and mobile connectivity a practical reality for businesses today. The rise of mobile devices such as smartphones and tablets has then allowed much more convenient exploitation of this connectivity. These two sets of developments have conspired to create a world in which an ‘always on’ experience is already taken for granted by many business users.

And the trends are set to continue.

Wired and wireless networks will inevitably provide higher speeds and better coverage, while mobile equipment will become even more usable and accessible, with new form factors emerging periodically. All this points to continuous online connectivity becoming increasingly normal, with users often accessing applications and services through multiple devices. Indeed, this is already the case for many of those contributing to our research, as illustrated by the following participant quotes:

“We are seeing more mobile working and a more diverse range of devices.”

“It’s now about access to data on any device wherever you are.”

“The days of being sat at a desk tied to a single PC are coming to an end.”

This is just a small sample of many similar comments gathered during the research that highlight how end user computing has moved on from its Wintel-centric roots. While the Windows PC might still be relevant – indeed it remains essential to the operation of most businesses – other devices are becoming important.
The evidence for this is pretty clear when we look at the range of solutions study participants say are being adopted in their organisations (Figure 1).

If you are not already seeing these dynamics, the chances are that it is only a matter of time. If your organisation is reliant on a field-force of any kind, e.g. sales, service or logistics personnel, the economics of connecting people via smart mobile devices will be too compelling to resist for long, particularly for very process-centric activity. Workflows can be streamlined and administrative overheads slashed.

But even if you don’t have this kind of need, you would be unusual if you weren’t being lobbied by business managers and professional staff pushing to take advantage of the latest devices and services, which brings us to another important trend.

The rise of user influence

Not surprisingly, the research confirms that business and operational needs still dominate when it comes to driving the evolution of end user computing. However, it is also clear that another set of influences to do with user preferences and desires is now firmly in play in many organisations (Figure 2).

Furthermore, the voice of the user seems to be getting stronger (Figure 3).

These dynamics are largely driven by trends in the consumer space. Highly usable and extremely desirable smartphones, tablets, notebook computers and hybrid devices, often based on cutting edge technology, are now very accessible through...
consumer outlets. Use of such equipment in home and personal lives educates users on the potential of modern technology in the workplace, as well as creating strong preferences. If someone uses a particular device or operating system in a personal context, they are likely to prefer the same solution for work. Brand and image have an influence too.

Some of the commentary gathered in the research underlines these trends:

“More and more staff want to use something they are familiar with.”

“Users are now demanding specific brands.”

And resisting the user voice is hard or even impossible when senior managers are the ones making the demands. Sometimes IT teams just have to give way:

“The directors all asked for iPads, so they got them.”

“Cost is no barrier between senior execs and the devices they want.”

But it doesn’t stop with users pressing for their preferences to be taken on board.

**From influence to unilateral action**

With the rate at which new and ever more desirable devices appear on the market, it is unrealistic to expect even the most willing of IT teams to keep up with evolving user preferences and demands in relation to company equipment. Users are therefore increasingly looking to take control and act unilaterally to get what they want. This includes the adoption of personal equipment for work purposes, a practice referred to as ‘Bring Your Own Device’ (BYOD). It also includes the procurement of company devices via business unit budgets or expense accounts.

From an IT service delivery perspective, it’s not so much about who buys or owns the equipment, it’s more the fact that it is entering the organisation independently of the IT department, potentially bypassing existing policies and controls.

This kind of activity is not confined to mobile devices. Indeed the scope of unilateral adoption of technology by end users may surprise you. From a hardware perspective it cuts across smartphones, tablets, notebooks and even desktop computers. Software and services are then pulled through with the devices, including third party development, e.g. the marketing department commissioning mobile apps (Figure 4).

**Figure 4**

*Do you see a significant amount of user or business driven adoption of the following independently of the IT department?*
Looking at this chart, we must be careful not to infer the depth of activity. In practice, unilateral adoption of technology currently tends to be limited to certain groups or types of users[1]. The point, however, is that the majority of businesses are seeing a level of activity that can be regarded as ‘significant’, which essentially means it’s too much to ignore. And, of course, the trend is unlikely to reverse.

### Increasing disharmony and resulting risks

The last major trend we’ll consider - increasing disharmony between users and IT - is really the consequence of other developments we have been discussing. Here is just a sample of the many comments we received during the research in relation to this:

- “If a decent sized IT department can’t support iOS, Android and Windows, maybe the dudes doing the work should apply for new jobs.”
- “As an employee, I see the lack of flexibility as a negative indicator of the organisational culture; it is symptomatic of an organisation with an oppressive IT environment.”
- “Upper management has OK’d BYOD, ignoring input and warnings from IT, but users are mostly clueless about their real needs. Some devices will just not work in our environment, then people get angry when we can’t fix it.”
- “End users and business management have lost any understanding of security and responsibility in the rush to be seen as fashionable.”

Picking up on this last comment, the rifts opening up can easily fracture traditional control and management mechanisms. This then creates disjoints, mismatches or ambiguity in relation to who is responsible and accountable for business critical requirements such as security, data protection and support. When users make decisions unilaterally, for example, IT is often still held responsible for managing risks, or that responsibility becomes fragmented or ill-defined (Figure 5).

This comment from a study participant sums up the problem very succinctly:

> “Ownership and control are increasingly decoupled from responsibility and accountability, but with little or no recognition or appreciation of the risks this decoupling creates.”

Even if the situation in your organisation hasn’t reached the level of disharmony some are obviously experiencing, the trends are clear and irreversible. Whatever your starting point, a review of your current capability and approach is therefore likely to be required, along with the development of a strategy and plan to create an environment that is better suited to the future.
Formulating a strategy and plan

We have so far majored on the mobile dimension as this is the aspect of end user computing that has been developing most rapidly. As mentioned earlier, however, we mustn’t forget that PC’
's, or more broadly the ‘desktop estate’ (i.e. desktop and notebook computers, and associated software), will remain important to the business for a long time to come.

Having said this, it is also important to appreciate that the lines between desktop and mobile computing are already starting to blur. Highly portable and power-efficient x86 notebook PCs and Macs, for example, are now encroaching on the ‘instant-on’ territory that looked for a while to be dominated by pure tablets. Meanwhile, tablets based on high-end mobile chipsets from manufacturers like ARM, Qualcomm and Apple are coming in the opposite direction. With detachable keyboards or Bluetooth keyboard accessories, these devices are now able to do the job that many notebook PCs did in the past. At the time of writing, we are then seeing the rise of the ‘phablet’ – the super-sized smartphone that essentially doubles as a small tablet – along with a whole range of so called ‘hybrids’ or ‘convertibles’.

As time goes on, it will become more difficult to distinguish between different classes of device, and even if you did settle on a categorisation scheme at a single point in time, it wouldn’t be long before the next innovation undermined it. Against this background, trying to maintain a distinction between desktop and mobile doesn’t make a lot of sense, so your end user computing strategy needs to embrace all classes of device, including the ones that don’t yet exist.

But how far should such a strategy go?

Ideal capability

Most of the participants in our research say their ideal end user computing environment should be able to accommodate pretty much all combinations of device and connectivity options. Some, however, shy away from total flexibility and the mixing of business and personal activity on the same device, or at least they say that it’s unrealistic to expect such things to be supported (Figure 6).

Figure 6
How important would you regard the following to be in your ideal end user computing environment?

DEVICE AND ACCESS FLEXIBILITY

Users should be able to use pretty much any type of device to access business applications, services and data, across any type of network from any location

Users should be able to use the same device(s) to support both business and personal activity, regardless of who owns that device (i.e. the user or the business)

INTEGRATED AND SMOOTHED IT

Security and compliance policy should be defined once, then be automatically applied everywhere, taking the device, app, data, network and user’s location into account

The Wintel upgrade cycle should be a thing of the past as the environment would naturally accommodate multiple types and generations of hardware and operating systems
Even if you don’t subscribe to the idea of total flexibility, trends in mobile and remote working mean you will inevitably have to support a greater range of devices, software, services and networks to one degree or another. Consistent with this is the strong consensus that risk factors such as security and compliance need to be handled in a consistent and context-sensitive manner.

The observation that two thirds of study participants clearly want to get away from the traditional Wintel upgrade cycle is also understandable. Periodic upgrades and migrations in relation to the desktop are expensive and disruptive, so anything that can be done to smooth things out is obviously going to be welcome. Perhaps more pertinent is the point that an episodic approach to keeping a much more diverse portfolio of devices up to date is likely to be unsustainable.

A possible point of reference here is the relatively smooth and continuous upgrade process that is often experienced in the world of cloud computing. Device vendors and mobile operators are clearly trying to emulate this already, even if they don’t always get it right. Being realistic, however, the brutal pace of change in the end user technology space means your infrastructure will need to be able to tolerate multiple generations of devices and operating systems, and it’s important to factor this into your strategy and plans.

**Tactics and solutions for success**

Of the specific tactics that may be employed to help meet the strategic needs we have been discussing, centralisation is one of the most important. This does not necessarily mean a complete shift to server-based computing in which the device becomes little more than a terminal onto central systems. Such an approach may be appropriate in some cases, but in practice you can be a lot more selective about which elements or activities are centralised. The three main options here are centralised data, centralised execution and centralised management (Figure 7).

There is no right or wrong answer to the mix of centralisation tactics you should employ. In fact, the approach you take may vary depending on the type of user, class of device, type of connection, or even the specific application or data being accessed.

A range of technologies are available to help with this. These include desktop and application virtualisation solutions, mobile application frameworks that allow local apps to interoperate with back-end services through appropriate APIs, and various types of management tools.
From a tooling perspective, mature solutions have been available for a long time to deal with the management of desktop estates, but in recent years we have seen the emergence of tools aimed more at the mobile part of the equation. Mobile device management (MDM) was the first to appear, aimed at the control and administration of physical equipment and operating systems. Then came mobile application management (MAM), which typically included some MDM functionality, but shifted the emphasis to management of apps and services. The latest acronym to appear is MEM. This stands for ‘mobile enterprise management’, the idea being to pull all of the threads together and enable a more holistic comprehensive approach.

The problem is that the jargon sometimes masks what’s important in terms of specific capability. During the research we therefore focused on some of the key enabling functions, and found that the importance of these is broadly acknowledged (Figure 8).

More forward-thinking vendors in the market have recognised the need to bring desktop related infrastructure and tools together with solutions and techniques that have emerged more recently in the mobile space.

Such functionality, together with trying to reduce or constrain device, software and service diversity where appropriate, can help to deal with some of the risk and support concerns expressed earlier. However, an insightful comment from one of our study participants raises an interesting question:

“I see a case for extending mobile management tools to cover desktops and laptops in the future”

This goes back to the challenge of it becoming increasingly more difficult to distinguish between desktop and mobile devices, and it therefore being important that your environment is able to operate across the traditional boundaries. It also speaks to a need to handle personally owned desktop and notebook class computers that are increasingly being used for business. The issues here are very similar to those that initially came to the fore in a mobile context.

Fortunately, more forward-thinking vendors in the market have recognised the need to bring desktop related infrastructure and tools together with solutions and techniques that have emerged more recently in the mobile space. Whether this is achieved through acquisition and integration or by extending existing solutions doesn’t matter that much. What’s most important is enabling a comprehensive and joined up approach to developing, deploying, securing, operating and supporting end user computing capability.

In order to figure out what you need from the latest solutions, however, you have to take stock of where you are today.
Assessing the gap

A good place to start assessing your current situation is with the desktop estate. About a quarter of our research sample say this is modern and up to date, with the remainder telling us that a significant amount of older equipment is in place. Around one in ten then indicate a serious aging problem, with the estate already approaching obsolescence (Figure 9).

![Figure 9](image)

This mixed picture is consistent with a range of inhibiting factors conspiring in various combinations to slow investment over recent years (Figure 10).

![Figure 10](image)

While you can’t see it from this chart, the data behind it tells us that refresh activity has been impaired by at least one of the factors listed in over 80% of cases.

Looking at the specific inhibitors themselves, we can be sure from the commentary we saw earlier that ‘Other competing priorities’ includes redirection of funds and resources away from the Windows desktop to drive the mobile working agenda. The following comments, however, reinforce the fact that many have been deterred from major desktop upgrades simply because of the uncertain cost/benefit:

- “The essentials of word processors and spreadsheets have not changed for 10 years. Why is there a need to upgrade?”
- “The question asked is why we need to change when the company is already doing OK with what it has.”
- “Large scale spend and disruption simply to change the version of Windows in use has little business benefit.”
- “Unless Microsoft makes a radical change in the way it delivers Windows, I expect its use to slowly drop off as PC applications are replaced by web applications, cloud services, etc.”
Despite concerns about the value and practicalities of investing in Windows upgrades, a significant question when assessing the capability gap is how well the end user computing environment is currently able to cope with device diversity. One of the obvious factors here is growth in the use of alternatives to desktop Windows such as the Mac and Linux, but most organisations seem to be doing reasonably well in managing this. However, the majority are struggling to implement a coherent approach across mobile platforms, and across the traditional mobile/desktop boundary (Figure 11).

Put all this together with escalating demands around mobile working and the growing expectations of freedom and flexibility, and fewer than one in three regard what they have in place as a good foundation for the future (Figure 12).

If some of the gaps we have highlighted apply to your organisation, an essential part of your plans and activities will be building a business case for improvement.

**Drivers for investment**

While justifying those onerous desktop upgrade projects is clearly a problem for many, the case for enhancing end user computing capability in its broader sense is more easily made. It’s arguable, in fact, that users are already helping to make the business case for better facilities through their lobbying and unilateral actions.

Getting to specifics, when asked about compelling arguments for investing in a more suitable infrastructure and approach for the future, respondents in our study came up with a range of different points. Some of the most frequently mentioned drivers are not surprisingly related to risk management, though more positive motivations such as better enabling productivity and innovation come through strongly too:

“The main drivers are security, cost, and productivity.”

“We need to invest to ensure security and data protection.”

“It’s mainly about improving flexibility and increasing productivity.”
“Allowing people to use the technology that suits them is an essential enabler of business productivity.”

“Innovation is a priority for growth, and flexibility in tools enables that innovation.”

Homing in on the more commercially oriented themes (beyond risk management), more quantitative analysis confirms that workforce productivity is at the top of the list of drivers for investment, closely followed by cost reduction stemming from reduced operational overheads (Figure 13).

In addition to the above, some argue that it’s now mandatory to offer desirable devices and/or a BYOD programme to recruit and retain good staff. The research confirms that there is probably a trend in this direction, but claims of candidates universally refusing jobs because they are not allowed to use their personal iPhone for work may be somewhat exaggerated (Figure 14).

In fact, some respondents made the opposite argument in relation to BYOD:

“In fact, some respondents made the opposite argument in relation to BYOD:

“If you expected anyone to use their own devices for work in our organisation, they would be shocked and horrified.”

“For many people, ‘separation’ of work and personal is important.”

The truth is that feelings on matters such as this are likely to depend on the makeup and culture of your workforce, and may even vary across it. In any event, just because someone wants something doesn’t mean they should have it. This brings us onto the importance of balancing interests when looking to drive improvements.
Final thoughts and advice

It’s very easy to discuss trends, implications, gaps and solutions, particularly when you have the luxury of looking at the kind of research we have presented in this report. It’s even relatively straightforward to define the high level components of a strategy and plan. It’s hard, however, putting it all into practice. This is not because the technology to help isn’t available or is difficult to implement, even though it’s still maturing in some areas. The big challenges stem from people and politics.

At the highest level, the key to success lies in balancing three sets of interests that often compete with each other (Figure 15).

![Figure 15](image)

End user computing activity is influenced by three sets of interests that need to be balanced

But achieving the right balance frequently relies on the interested parties exercising discipline, accepting constraints and/or making other adjustments.

Users shouldn’t always get their own way

One of the trends we discussed at the outset is the way in which users are becoming more informed, opinionated and influential. This is a positive development in general as users have first-hand knowledge of what it takes to do their jobs well. Taking their views on board therefore makes good business sense.

However, users often have a very parochial sense of need, and are sometimes guilty of focusing on their individual requirements at the expense of team or company level performance.

While some argue that the users’ view should be the one that matters the most, this is a very dangerous principle to work on. As one research participant put it:

“Individual needs and wants must come second to solutions being fit for purpose, cost effective and secure. Looking cool and liking the device, while nice, is not exactly what the shareholders are interested in.”

So, don’t fall into the trap of assuming that user and business interests are the same.
Schizophrenic execs must take responsibility

One of biggest problems in the end user computing space is the dual personality often exhibited by executives.

As senior business managers they quite rightly emphasise the importance of business performance and effective risk management. As part of this, they press the IT team hard to deliver a good level of service and support, keep costs under control, and make sure security, compliance and data protection requirements are properly dealt with in relation to electronic information.

However, when it comes to end user computing, the exec’s alter-ego too often kicks in – that of the impatient and demanding user. Enchanted by the latest desirable technology, they become deaf to IT input that they don’t want to hear, e.g. when it’s pointed out that their request for access to sensitive information from an unsupported device undermines their previous directives. The risks then escalate as the policy exception sets a precedent for the broader workforce, or the exec’s enthusiasm, together with lobbying from within the business, results in an ill-thought out BYOD initiative that undermines IT’s ability to keep company assets safe.

So, business execs must take time to consider the dependencies and act more responsibly than many are today. It’s unreasonable to expect IT to deal with new and changing demands without providing them with the funds to invest in the necessary systems and processes. And it really doesn’t make sense to remove control and authority from the IT team without first clarifying who then becomes responsible for enforcing security and compliance. Let’s be clear that these are not IT problems, but fundamental business issues.

IT teams need to get assertive too

Some IT professionals are clearly in denial about the trends that are unfolding. However, in a world where so many lines are blurring - between desktop and mobile, personal and business, and the data centre and cloud services - attempting to retain total control over everything the user touches is futile over the longer term. We are already seeing instances of BYOD in highly regulated industries such as financial services and the public sector, for example, so even the argument that privacy, security and compliance can’t be dealt with effectively is disappearing rapidly.

Having said this, it’s not at all nice if you are working in an IT department that’s already stretched and underfunded, and are being asked to accommodate more user freedom and flexibility. There’s no shortage of technology and techniques to help, but it takes time, effort and budget to put the relevant solutions in place, none of which may be available.

If this situation sounds familiar, the answer is not to resist the pressure but to escalate the issue. As mentioned earlier, the discussion needs to be recast from an IT to a business problem. As part of this, senior managers may need to be educated that it’s not just a case of ‘IT lightening up’ - there are investment decisions to be made.

So, rather than letting users, managers and pundits continue to paint IT professionals as the killjoys standing in the way of freedom and progress, get political and become more assertive. Beyond this, we have some final recommendations for ensuring a structured approach to getting you and the business onto the right course.
Tips and tricks for success

Organisations vary in their objectives, current situation and the constraints that apply to their business, but here are some general tips that should be helpful to most:

- **Accept the inevitable**
  Whether you or your users buy into the concept of BYOD or not, it is still necessary to accept that mobility, device diversity, and increased user influence are inevitable as time goes on. Better to prepare for it than try to resist it.

- **Get educated**
  Ideas and technology in the end user computing arena are developing rapidly and you need to be up to speed. Things that were too complex, too expensive, or even impossible just a year or two ago are now often practical and affordable.

- **Understand where you are**
  It’s easy to let a few noisy individuals spook you into thinking that there is a huge mountain to climb. Look more precisely at who is asking for what, however, and you’ll probably find that most urgent demands are coming from minority groups.

- **Prioritise**
  Based upon your assessment of demands, how they are spread, and how easy they are to meet, you can start to prioritise. Don’t assume that you need to solve a particular group’s problems all at once. You can get users to prioritise too.

- **Get senior management on board**
  It’s generally more productive to approach senior managers with proposals rather than problems or hypotheticals. Output from the previous steps should allow you to present a rough cut plan and secure the necessary air cover.

- **Negotiate to buy yourself time**
  User frustration often stems from what they perceive to be a total absence of movement. A good trick is therefore to buy yourself time by offering capability or flexibility that’s relatively easy to deliver, and asking them to wait for the rest.

- **Flush out the longer term plan**
  If you follow the above steps, you should be in a good position to spend time on your longer term strategic plan. This will involve setting and agreeing more precise objectives, and defining your technology and process roadmap.

- **Don’t rely on technology alone**
  Technology can form the foundation for building a future proof end user computing environment, but you will also need to put relevant employee policies in place. This may require collaboration with business managers and HR.

- **Use your suppliers**
  Given the pace of change, working through the necessary detail can seem quite daunting. Through helping a wide range of clients, suppliers accumulate a great deal of knowledge and insight, and are usually more than willing to share.

We hope these tips and tricks, and our broader discussion in this report, have at least stimulated some useful thoughts in this highly dynamic and interesting area. All that remains is for us to wish you luck as you redefine your own end user computing strategy and plans.
References and further reading

The following research reports and papers are available for free download from the Freeform Dynamics website (www.freeformdynamics.com).

1. **The End User Security Jigsaw**  
   Completing the puzzle for your organisation

2. **Freedom without Anarchy**  
   Empowering your users while keeping control

3. **Controlling Application Access**  
   A network security and QoS perspective

4. **Storage Anywhere and Everywhere**  
   Dealing with the challenges of data fragmentation

5. **End User Computing: A Management Perspective**  
   Executive Briefing Guide
Appendix A: Research sample

The study upon which this report is based was designed, executed and interpreted on an independent and objective basis by Freeform Dynamics Ltd. Data was gathered from 660 respondents via an online questionnaire hosted on a popular IT news and information website. The study was completed in April 2014.

The sample distribution was as follows:

**Sample by job function**

- Business director/manager
- Business professional
- Business consultant/advisor
- IT director/manager
- IT practitioner
- IT consultant/advisor
- Other

**Sample by geography**

- United Kingdom
- United States
- France
- Germany
- Other

**Sample by number of employees**

- More than 5,000 employees
- 1,000 to 5,000 employees
- 250 to 1,000 employees
- 50 to 250 employees
- 10 - 50 employees
- Under 10 employees

**Sample by industry sector**

- Engineering / construction
- Central / local government
- Energy / utilities
- Financial services
- High tech
- Media / entertainment
- Medical / health care
- Professional / trade services
- Research / educational
- Retail / distribution
- Telecommunications
- Travel and transport
- Other

**Limitations of methodology**

As with all online research, self-selection of respondents into the survey means there is a possibility of the data being skewed towards those who are more advanced with the topic or have more of an interest in it. Please bear this in mind when looking at specific percentages shown on the charts.
About Freeform Dynamics

Freeform Dynamics is an IT industry analyst firm. Through our research and insights, we aim to help busy IT and business professionals get up to speed on the latest technology developments, and make better informed investment decisions.

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