

VICTORIA UNIVERSITY OF WELLINGTON
Te Whare Wananga o te Upoko o te Ika a Maui



From Users to Choosers: the Change in Employee Technology Expectations

MMIM592

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February 2012

Submitted to School of Information Management, Victoria University of Wellington in partial fulfilment of the requirements for the degree of Master of Information Management.

“If you put fences around people, you get sheep.”

W. McKnight, 1887-1978, former CEO 3M Corporation

Abstract

This research looks at the motivation for using non-sanctioned technologies within a business context; that is, using Information Technology (IT) systems other than those provided (or approved) by the IT department. In this research, the non-sanctioned IT systems of primary interest are the internet based applications, but also includes personally owned hardware devices such as laptops, tablets and smartphones.

This qualitative study used the key informant approach to gain an understanding of the subject using a semi-structured interview format.

The results show that employees in knowledge based roles are choosing their own technology tools when they believe that they give them better functionality or flexibility over those offered and approved by the traditional IT department.

Graduates and other millennial employees are found to be using non-sanctioned systems more frequently than older workers; millennials are also far more likely to use whatever application or device they want, regardless of the source or what corporate IT policies stated.

The use of these non-sanctioned technologies should be a source concern to IT management because many of these can circumvent the organisations security and data management governance policies, giving the potential for data loss or unwanted exposure, regulatory compliance failure or have undesirable legal implications.

The results also suggest that IT departments do not have the resources to keep up with the rate of change in technology. At the same time, the users of their services are able to obtain technology solutions from a range of other sources. This may mean a change in the role of the IT department as it loses its position as the technology gatekeeper.

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1. Introduction

This research looks at the motivation for using non-sanctioned technologies within a business context; that is, using Information Technology (IT) systems other than those provided by (or approved by) the IT department. In this research the non-sanctioned IT systems of primary interest are the internet based applications (sometimes referred to as Web 2.0 applications) but also includes personally owned hardware devices such as laptops, tablets and smartphones.

This topic has its roots in the consumerisation of technology; ties into cloud based computing; the blurring of lines between work and home; the globalisation of technology services; and the proliferation of free web based computing applications which do everything from electronic mail, to collaboration, as well as voice and video conferencing.

Edward Tufte (cited in Bisbort, 1999) observed there are only two industries that refer to their customers as “users”, information technology and drug dealers. Some industry commentators are suggesting that with consumerisation this is changing, and rather than “users”, “choosers” or “consumers” is a much more fitting title. For IT departments, this change could mean loss of ownership of organisational technology resources and gives cause to question the value that the IT department provides to an organisation.

It is expected that the non-sanctioned use of these sorts of technologies would be a source of some concern to the IT profession and company management because many of these applications can effectively circumvent the security and data management governance policies, giving the potential for exposure in data loss, regulatory compliance failure or have unwanted legal implications. Additionally as these services become widely popular and their functionality develops, the role and purpose of the traditional IT department must also change. The extension of this consumerisation may mean that the corporate IT department

could become just one of the suppliers of information systems to their corporate users and will need to compete with external providers for relevance and supply of services (Baguley, 2011).

In a recent industry study conducted by market research company International Data Corporation (IDC) (Gens, Levitas, & Swgal, 2011) they found that whilst 40% of IT decision makers say they permit employees access to corporate information from employee owned devices, in fact 70% of employees say that they do so. This would point to the IT department having limited visibility to what is happening within their domain. The same research showed that the use of these personally owned devices is increasing.

1.1 A Review of the Key Concepts

Since the introduction of the personal computer into the workplace, the IT department typically provided all the technology for employees and the technology employees got (from IT) was better than anything affordable on the street or in the home. Over the past five or so years, this has turned around. Lasher (2010) cites a 2005 survey which asked respondents to rate their home computer facilities compared to those provided by their employers. 75% of the respondents said their own personal computer facilities were as good as or superior to those in their workplace. Attaching non-approved, nonstandard or personally owned devices to a company's network has long been discouraged but there is a precedent of this being supported inside most organisations. Senior executives have often used non-standard technology as status symbols, a trend that has been increasing (Sullivan, 2009; Botelho, 2010) and this has cascaded down to less senior members as the devices have become much more affordable and functionality has increased.

The millennial generation (the generation born after 1980) have grown up with consumer technology, playing with toys containing embedded computer chips. As these millennials enter the workforce, they bring an expectation of anytime, anywhere access to information blended through personal and business use. Cudd & Anderson (2010) argue that this generation is confident in selecting and managing the technology they use. These digital natives, Cudd & Anderson (ibid) suggest, often know as much about technology as the staff who are employed to manage an organisation's technology infrastructure. While the depth of this knowledge is debatable (Jibyollee, 2009), there is no denying their familiarity with the use of technology and the expectation of choice. Millennials can be indifferent to IT policies and restrictions they don't perceive are appropriate or valid. In a survey commissioned by Symantec (Kapuria, 2009), 69% of millennials said that they used whatever device, software, or web site they wanted to in the workplace, regardless of what company policy permitted.

With this familiarity of technology and choice, it could seem trivial for an employee, dissatisfied with the flexibility of their organisations Lotus Notes or SharePoint collaboration tools, to use freely available web based tools such as DropBox, or Google Docs, bypassing the company's servers and moving corporate data outside the organisation, effectively circumventing the governance and services of the IT department. Similarly, commercial enterprise grade "Software as a Service" products can be implemented in the same manner, requiring only a credit card and an internet browser.

1.1.1 Consumerisation of IT

The term consumerisation first gained popularity in 2001 when it was used by Douglas Neal and John Taylor (Clevenger, 2011, p. 22) as a description for how information technology innovation is emerging in consumer based technology, with the expectation that it would

eventually migrate into business organisations. This leads to a convergence of the IT and consumer electronics industries and a shift in the focus of IT innovation from large businesses to the home.

1.1.2 Bring Your Own Device

Bring Your Own Computer, Bring Your Own Technology, or Bring Your Own Device (BYOD) is the adoption of user owned devices into corporate setting. The employee brings their personal computing device into the office and connects it to the corporate network to perform their job function and then takes this device home for use there (Andersen, 2008; Banks, 2010; Botelho, 2010; Cudd & Anderson, 2010; Graham, 2011).

While BYOD often refers to personal computers, it is smartphones and tablet devices that are currently more likely to be used in this context (Gens, Levitas, & Swgal, 2011; Dimensional Research, 2011).

When connected to the corporate network the employee might install the required applications onto their device (if compatible) or access corporate applications through a browser, or use some sort of virtualisation layer such as a virtual desktop infrastructure, streamed applications, or some other thin client solution to access the corporate applications.

Allan Davies, CIO at Australian logistics company Dematic, found that although nearly half of his staff said that they saw benefits in a BYOD scheme, when it came to implementation few staff were prepared to spend their own money, believing this to be the responsibility of the employer (Banks, 2010). The question of who pays for the hardware seems to be organisation dependant. Australia's Suncorp does not pay for or subsidise hardware under their BYOD program (Foo, 2011); however Citrix and Kraft do (Graham, 2011). Citrix

elected to provide a very generous three yearly stipend of US\$2100 to cover purchase and warranty costs. It is noted, however, that Citrix stands to benefit from BYOD programmes as a vendor in this area so this subsidy may be self-serving rather than benevolent.

Some organisations who have funded devices that have then been gifted to employees have suggested that in this way the employee's takes better care of the devices than if it was company property. The analogy given that "no one washes a rental car" would seem particularly apt, especially in reference to smaller portable devices like smartphones and tablet computers.

1.1.3 Cloud Computing

Cloud computing is a relatively new term for a long held goal of utility computing (Parkhill, 1966 cited in Armbrust, et al., 2009). It has been suggested that the name "Cloud Computing" was coined from the cloud symbol that's often used to represent the Internet in flowcharts and diagrams (WhatIs.com, 2010). The term "Utility Computing" comes from the "pay for what you use" model which resembles how electricity, fuel and water are consumed, with little thought for how it is produced.

The term cloud computing can be given to anything that involves delivering hosted services over the Internet. Cloud computing abstracts the details of the service from the users, who no longer have need for expertise in, or control over, the technology infrastructure that supports the service they consume. In a business context, cloud computing allows an organisation to pay for only as much capacity as is needed and to bring more capacity online when required. This variable capacity is often referred to as "elasticity". One of the major advantages of cloud computing is the economies of scale that can be afforded to the construction of extremely large datacentres. These datacentres hold tens of thousands of computers and can

purchase hardware, power and network bandwidth for 1/5 to 1/7 of the prices offered to a medium sized (hundreds or thousands of computers) datacentres (Armbrust, et al., 2009).

The services provided on a cloud platform are broadly divided into three categories: Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS) and Software-as-a-Service (SaaS). It is the Software as a Service model that is of most interest to this study as this is one of the channels through which non-sanctioned applications enter an organisation. SaaS can be referred to as "on-demand software" which is often leased on a monthly or annual basis and where the software and its associated data are hosted centrally.

As an example of the interrelationship between these systems, the file synchronisation service "Dropbox" uses Amazon's Simple Storage Service (S3) for storage (Dropbox, 2012). Effectively this is a SaaS application using an IaaS platform and a third party Cloud provider.

1.1.4 New Business Models

The growth of the internet and internet based businesses have created a platform for new and unique business models which enable applications and services to be provided to the public at no or low cost. A non-exhaustive list of these models includes:

Freemium software (where Freemium is a portmanteau of "free" and "premium") is a business model based on having a large number of customers who use a product or service at no cost, while a smaller number pay for a premium version that provide additional features or benefits. Dropbox, Google Apps, Boxie, Skype and Evernote are examples of products that use this business model.

Advertising supported software allows companies to give away their product or service as their revenue is generated by placing targeted advertising within their product. Google has

built their vast empire using this approach. Similarly, Facebook has taken the same path, growing a vast customer base and creating potentially a hugely valuable company while giving away a free service. This approach brings up a number of interesting moral issues. It has been observed by a number of industry commentators that, with this model, the customers are not those using the software or service, the customers are the advertisers. The people using the services are themselves the product the company sells (Elgan, 2009; Coletti- Iasta, 2012; Solon, 2011; Newman, 2011).

The “Grow and IPO” or grow to sell model is where the business plan is to get big or get popular fast, without concern for profitability. With a view to then listing on the stock market or being acquired by some other larger organisation looking for an edge or to remove a competitor. Amazon is an example of this model, founded in 1995, it didn’t make a profit until the end of 2001, although it had gone public in 1997 making its founder a billionaire.

1.2 Knowledge Gap

Parts of this topic, such as cloud computing, have been the subject of much academic focus. However as the combination of consumerisation, cloud computing, and freely accessible software is a relatively new phenomenon there is currently a limited amount of published academic literature available. While academic literature is still short of coverage, the industry press is much the opposite, with almost every technology vendor and technology publication providing varying opinions on this subject. Whilst it is easy to discredit some of this as being largely self-serving, as it is often sponsored by companies who have much to gain by the trend, it could be argued that the general undercurrent points to a transformation and that the industry views this as a major change in the status quo.

It is hoped that this research will contribute to knowledge in this area.

1.3 The Value of this Research

The uptake of user selected devices and applications could signal a profound change to the role of corporate IT services and may have a major impact on those who make their livelihood in this area. For this reason it is anticipated that this research will be of primary interest to IT practitioners in management and strategy roles and those that have a focus on IT security and governance. It may also be of interest to an academic audience in the areas of consumerisation and the uptake of utility based computing.

1.4 The Research Question

The primary objective of this research is to determine why and under what circumstances employees would ignore corporate IT policies and instead use technologies of their own choosing.

The research question for this study is:

“What motivates the use of non-sanctioned IT applications as business tools?”

1.5 Structure of this Document

The next section of this document contains a review of relevant industry literature in the area of consumerisation and the underlying motivation for its use. The subsequent section consists of a detailed description of the research methodologies used in this study and justification for the research methods chosen. The findings are discussed next and are presented based on the

structure of the interview questions. A discussion section looks at these findings and examines the implications they have on the structure and role of the IT department and the risks and benefits of this brings. Finally this report concludes with a summary of the major findings and the implications that they may have. It also contains a brief discussion on the known limitations of this study.

2. Industry Literature Review

While there has been a great deal of academic focus on the use of many of the technological aspects of this study such as cloud computing and Web 2.0 applications, there is a paucity of published academic literature on the effects of consumerisation and cloud computing on the function, structure and future of the IT department, particularly in respect to their non-sanctioned use. The technology industry however has been quick to pick up on the trend. It would seem in the last 12 months every CIO magazine and vendor marketing publication contains articles with various views on consumerisation along with advice on how IT departments should be adapting to meet these trends. In addition to these articles, there have been numerous industry funded market research studies such as those from Unisys (Gens, Levitas, & Swgal (2011), CSC (Moschella, Neal, Opperman, & Taylor, 2004), Dell KACE (Dimensional Research, 2011) and Symantec (Kapuria, 2009). There is even a mainstream conference – “The Consumerisation of IT in the Enterprise Conference & Expo” to be held on March 2012 in San Francisco (CITE, 2012). With this amount of practitioner focus it may follow that these trends have caught the attention of industry because they are viewed as a source of competitive advantage or some perceived risk. This section looks at this practitioner literature for insight into this consumerisation trend as the motivation for the use of non-sanctioned IT systems.

Many knowledge workers have largely free access to a huge variety of internet based tools and information. This freedom gives them the ability to create their own technology environments by picking the tools that they find most suitable or most efficient. Many employees found that web based tools, such as Google search, to be more useful than many of their company’s internal services and online databases (Moschella, Neal, Opperman, & Taylor, 2004).

Knowledge workers provisioning technology, outside the control of the IT department has been referred to as “Technology Populism” (Keitt, 2010). Davenport (2011) suggests that the freedom knowledge workers have to select the tools that best fit their needs and working style is analogous to the example of trades people, contractors, hair dressers or chefs who have long used their own equipment because of the perceived better fit, better quality or work independence. Computing platforms and systems can be viewed as the knowledge worker's tools and as each person's individual needs vary, so do the tools they prefer to use (Gruman, 2012).

There is also an increasingly porous barrier between professional and personal lives, where employees can often be found doing their work from home and tending to their personal affairs in the office. In an IDC study 50% of respondents reported using consumer technologies to conduct work while on holiday (Gens, Levitas, & Swgal, 2011, p. 5). With the boundaries between work and home becoming blurred it is easy to see how the use of technological tools could become blended between them. Dimensional Research (2011) found that of the 750 respondents they surveyed, 87% said their employees use personal devices for work related purposes, ranging from email and calendaring to texting to Customer Relationship Management (CRM) and Enterprise Resource Planning (ERP). 80% said that employees use personal smartphones and 69% said personal computers are brought into the workplace by employees.

A study commissioned by Symantec and conducted by market research company Applied Research-West (Kapuria, 2009), measured millennial workers perceptions and expectations regarding their use of new technologies in the workplace to compare those results with their older colleagues. The study found that millennial workers had quite different attitudes regarding the use and adoption of technology in the work environment, when compared to their older colleagues. Millennial workers access web based applications much more

frequently at work than other workers and less than half of them said they would only use company issued devices or software. Over two thirds of them said they would use whatever application or device they wanted regardless of the source or what corporate IT policies stated. The study further found that millennials readily stored corporate data on personal devices such as personally own computers, USB sticks and smartphones.

Brown states that extensive research supports the notion the usefulness and ease of use are primary drivers of user intention to adopt new technologies (Brown, Massey, Montoya-Weiss, & Burkman, 2002). However with consumerisation, Clevenger (2011) makes the observation that the sociological model developed by Rogers (1995) to describe the technology adoption lifecycle no longer applies. In the Rogers model, technology products are adopted in a bell curve pattern; the initial adopters of a product are Innovators, after which come the Early Adopters, then the Early Majority, the Late Majority, and finally the Laggards. Clevenger suggests that with consumerisation there is no technology adoption lifecycle for the enterprise. When the technology is being brought into an organisation by its end user, they have a solution that they are already familiar with and have adopted in a personal capacity so there is no need for training or ramp up.

Consumerisation will cause a transformation in the structure of the IT department, according to industry analyst Mark Cecere (Kark, Cameron, Cecere, & Fen, 2011). He states it will see business units take a more prominent role in building IT strategy and purchasing technology, with the traditional IT department taking a lesser role. Where today's IT workers are the architects of business technology, in the future, they will be its consultants. Where today's roles are "doing" - building, purchasing and maintaining systems, tomorrow's roles will become more customer centric, where IT staff will be tasked with providing strategic direction and guidance.

Consumerisation may also cause an increase in the IT department workload (Gens, Levitas, & Swgal, 2011; Dimensional Research, 2011), if IT departments are called on to support the multiple operating systems and variety of different hardware platforms that could be brought into the work environment.

While it may be easy to picture these free tools being used by deskbound office workers, these changes can be seen across a number of industries. For example a group of Japanese medical researchers held a medical teleconference about thoracic surgery using only free internet software (Obuchi, Shiono, Shimada, Kaga, Kurihara, & Iwasaki, 2011). Rather than book and wait to use the expensive teleconferencing facilities provided by their organisations, they held their own series of five teleconferences showing high-resolution surgical video movies using a combination of Skype, USTREAM, and Dropbox.

In summary, the review of the practitioner literature has shown that there is the ability for employees to craft their own technology environment if they choose to and if they have the need to. It has shown that a large number of employees are using their personally owned hardware in the workplace. It was demonstrated that the emerging millennial workforce were more likely to adopt whatever technology they feel is most appropriate, regardless of what any formal company policy might state. It has shown that these personally selected tools can be quickly integrated into the workplace, as the user is already familiar with their function. Finally it has been shown that consumerisation may result in a changing role for the IT department, where it will transform from “doer” to advisor.

While these findings describe an environment that would support and nurture using technology solutions that the user chooses for themselves, there doesn't seem to be any literature that describes the personal motivation for doing so. It is this motivation that is the subject of this study.

3. Methodology

This section starts with a description of the philosophical approach taken in this study. It then describes the justification for the method of research design. It then covers the participant selection and questioning techniques and concludes with a description of the data collection and analysis process.

3.1 Philosophical Approach

This research will adopt a pragmatic approach philosophically, where pragmatism is the philosophy of common sense (Shields, 1998). Mingers (2004) describes pragmatism as a practical activity that seeks to find useful knowledge rather than trying to understand the true nature of the world. In a pragmatic approach doubt is resolved through reasoning and the use of common sense and then tested in action. Johnson & Onwuegbuzie (2004) describe pragmatism as a “mixed method” as it draws on characteristics from both positivist and interpretivist philosophies. It is felt that this philosophic position is well suited to a topic that is hoped to have direct application for IT practitioners and is exploratory in nature.

3.2 Research Design

As the research looks at relatively new phenomenon, it is exploratory in nature. Exploratory research is often conducted because a problem has not been clearly defined, as yet, or its real scope is still unclear as it is in this case.

This research looks at the personal motivation of using applications and systems provided by consumerisation. For this reason qualitative research has been used to gain an in depth understanding of human behaviour and the reasons that govern such behaviour. The

“discover, seek to understand and describe” questioning lends itself to a qualitative research approach (Creswell, 1994, p. 71; Punch, 2005). Qualitative studies aim to provide an understanding of complex psychosocial issues and are most useful for answering humanistic “why?” and “how?” questions (Marshall, 1996, p. 522).

One of the major differences between qualitative and quantitative research approaches is that qualitative approaches typically involve purposeful sampling, while quantitative approaches usually involve probability sampling (Sandelowski, 1995, p. 180). As a result, smaller but focused samples are more often appropriate than larger samples and therefore, in this instance, only nine participants were used.

3.3 Research Participants

The Key Informant Technique (also known as “judgement” or “purposeful sample” method) was used to select research participants. In this method the researcher selects the most productive sample to answer the research question (Marshall, 1996). A key informant is an expert source of information.

The principle advantage of this method is the quality of data that can be obtained in a relatively short period of time. To obtain the same amount of information and insight from in-depth interviews with a random sample from a community may not produce quality information and can be prohibitively time consuming (Lincoln & Guba, 1985).

A potential weakness of this approach is that with a smaller number of participants, the sample is less likely to represent, or even understand, the majority view of the population they are representing. All of the respondents selected work directly in Information Technology. It was expected that these participants would have much more flexibility in the

manner in which they worked when compared to say a bank teller, or call centre worker where their roles are highly prescribed.

Selecting participants involved creating a framework of the variables that might influence an individual's contribution and was based on the researcher's understanding of the research area. Marshall (1996, p. 523) describes this as a more “intellectual strategy” than a simple random demographic; however it is likely to be more pragmatic than intellectual.

Participants were recruited who were known to use non-sanctioned tools within their organisation and who were in roles that might offer a broader view to give an organisational perspective of the use of these tools. It was hoped to use a chain-referral sampling (or snowballing) approach to participant recruitment, where each participant is asked to suggest who else could provide an insight into the topic. This approach, while potentially useful in providing a broader view, was found to be of limited practicality in this study due to the time taken and the lack of success of each chain link. The approach was therefore supplemented with further direct requests to individuals known professionally, or personally, to the researcher. In the end, nine individuals agreed to assist with all directly involved in the Information Technology industry. These respondents were aged between 35 and 50 and all had a minimum tenure of 15 years in the technology industry. Three of the respondents were located in Auckland and the remainder were based in Wellington, New Zealand.

The roles of the participants were as follows:

1. Technology architect for a government department (Wellington)
2. Security manager for a government department (Wellington)
3. Technology architect for a bank (Wellington)
4. Technology architect for an electrical utility (Wellington)

5. Technical consultant for an IT vendor (Auckland)
6. Technical consultant for an IT vendor (Auckland)
7. Enterprise architect for an IT vendor (Auckland)
8. Architect for an IT outsourcer (Wellington)
9. Entrepreneur and business consultant (Wellington)

3.4 Data Collection

Interviews were conducted using a semi structured process. Six simple questions were used as a basis for exploring the subject with respondents encouraged to take the conversation in any direction they felt was valid. One of the features of interviewing, when respondents are encouraged freely to “tell their story”, is that it elicits statements which can then be analysed to reveal additional insight (Crouch & McKenzie, 2006, p. 486).

The questions asked were as follows:

1. What are the applications being used?
2. How are they being used?
3. Why are these applications used?
4. Are they better than those provided by IT?
5. Who is using them?
6. Where and when are they being used?

The length of these interviews varied from around 20 minutes to one hour depending on how much each respondent had to contribute. These interviews were recorded on the researcher’s cellular phone (Samsung Galaxy Mini). Even though interviews were conducted in private meeting rooms, rather than public places in order to minimise background noise, the quality of the cell phone recording was at times poor and using a better quality, or purpose made recording device, may have been a better option.

3.5 Data Analysis

The audio recording of each interview was transcribed for analysis. It was originally intended to use computer assisted qualitative data analysis software to support the coding of the transcripts. However it was determined that the learning curve to understand the functions of these applications was too long, so a manual coding method was used instead.

The manual coding followed the thematic content analysis process (Burnard, 1991) where the researcher identifies and groups common themes from the text, in order to distinguish key categories or constructs. These constructs are the abstractions that “describe a phenomenon of theoretical interest” (Edwards & Bagozzi, 2000) and are presented in the next section of this report.

4. Findings

This section looks at the interview findings and presents these in relation to the six interview questions.

4.1 What are the applications being used?

A wide range of applications were reported to be in use or had been used when circumstances required them. The mostly widely used was electronic mail (email), with both Microsoft's Hotmail and Google's Gmail being popular. Other web based email systems were also in use, including web based interfaces to local Internet Service Provider (ISP) email platforms.

Also widely reported was file sharing and file synchronising applications which allow documents and other files to be made available across multiple platforms and shared with other people. DropBox was the most widely used, but a range of others such as Box, SugarSync, DriveHQ and SkyDrive were also mentioned.

A range of collaboration type tools were also in use, such as Google Docs which is a browser based office suite (similar to Microsoft Office). Google Docs allows multiple participants to edit a document simultaneously. Also in this collaboration area were chat, voice and video calling tools, where products such as Google Chat, MSM Messenger, and Skype were widely cited.

The other broad area where non-sanctioned tools were found was in the note taking, journaling and meeting memo area. Evernote, Astrid To-Do and SpringPad were mentioned. All of these applications synchronise data to a cloud service making the information available across a number of platforms.

Of particular note was one respondent's report that a business unit had completely bypassed the IT department and purchased an enterprise grade customer relationship management system (Salesforce.com) which is delivered via web browser and was purchased on a "pay as you go" basis.

All respondents, except one, reported that they were using their personally owned devices for work tasks. In all cases these were smartphone and tablet type devices.

Two respondents commented that when the iPad first came into their organisations, the IT department would not allow their use and corporate electronic mail was not permitted on them, due to security concerns. In response the iPad owners simply set up a rule, in their corporate mail systems to forward all incoming mail to an external Google Gmail account and used this as their mail system while on their iPads.

4.2 How are they being used?

The email services were used primarily as a file transport platform either to bypass rules around maximum document size or so they could be available at another location such as at the employee's home to allow documents to be worked on outside business hours.

One respondent who was responsible for information security described what happened when he tried to block access to the Hotmail website:

"I very shortly got a visit from the general manager of [department] who said that Hotmail was the corporate tool they were using to do [department] work from home. They were emailing stuff to their home accounts, working on it and sending it back."

The file sharing tools were used in a similar way to replicate information across multiple devices both inside and outside the organisation. Many of these tools support a variety of platforms such as web browsers, personal computers, tablets and smartphones and these file sharing tools were used to replicate information across a number of these devices.

One example given was electrical engineers working in remote locations where there was no possibility of a data connection. Dropbox was used to replicate documentation, schematics and plans so they were available in the field. This organisation reported that after a period of use in the field, a subscription was purchased which allowed for greater storage capacity and that the use of Dropbox was gaining formal recognition and approval.

Additionally, file sharing tools were being used to share documents with individuals and groups outside the organisation, such as contractors and vendors to support ad hoc and informal teaming and project collaboration. Similarly, the communication applications, such as Skype and Instant Messaging, were used to interact with groups both inside and outside the organisation. Skype, in particular, was described as the “common denominator” for desk to desk video conferencing and was used despite the organisation’s large and expensive investment in teleconferencing facilities.

Tablet and smartphone devices were being used for mobility and portability. It was noted that these devices were primarily used for consuming content rather than creating, with the exception of short emails and meeting notes.

4.3 Why are these applications used?

In all cases respondents said that use of these tools occurred when the tools and systems provided by the IT department did not meet their needs or when they were more convenient than those provided for them.

One respondent felt that the tools provide by his IT department were no longer satisfactory for him to do his job and so he replaced these with his own. He stated:

“... the IT organisation’s boundaries, which are not business friendly and who are, to my mind, stuck in the past, stuck in those old security boundaries.....The restrictions put on me by [company IT department] are stopping me doing business.”

Another respondent expanded on this, with a similar perspective:

“I think that there is a thing going on in the market that means that the internal IT department is becoming the dinosaur in the organisation rather than, as it used to be, a source of innovation and ‘let us help you do new thing’. Now they’re actually trying to prevent the influx of a whole range of technologies and ubiquitous devices. That’s a battle that they’re actually, inevitably, going to lose.”

In some cases these unsanctioned applications started on the smartphones and tablet devices that are personally owned and managed and then “migrated” into the work environment and onto company owned personal computers for convenience. One example given was a respondent who used Evernote on their iPad to take meeting notes. These notes were then synchronised, via the Evernote cloud service, to his corporate provided personal computer, where he had also installed Evernote so he could reference them at a later time.

One respondent commented that their company’s remote access solution took eight minutes to pass through all the relevant security checks, to allow a remote laptop onto the corporate network. He contrasted this with the use of a tablet device that was “instantly on” and much more convenient to use. He further noted that corporate IT was constrained by formal

solution life cycles and accounting practices. He said that everyone knew the remote access solution was inconvenient. However it was not due for replacement for another two years and so would not be addressed until then.

The value of the convenience factor was also reinforced with the “instant on” nature of tablet based system supporting “task sipping” or “work snacking”, where the few minutes in between meetings, or other obligations, can be utilised to review and respond to email or attend to other tasks.

When asked about compliance with organisational IT governance policies, two distinct responses emerged. Some respondents said they were more concerned with getting their jobs done efficiently and stated that ‘the end justifies the means’ and thus they ignored formal policy when it did not fit their requirements. These same respondents admitted to “self-policing” their use, making a judgement call on the types of data that was appropriate to use in non-sanctioned applications. Other respondents said that there was a certain amount of leeway to interpret governance policies and felt the classification of the type of information they dealt with made the use of these systems acceptable.

4.4 Are they better than those provided by IT?

In some cases, these free tools can provide a much better level of functionality than what the internal IT department could provide. An example one respondent gave was with Google’s Gmail service which provides a 7 GB mailbox for no cost when the internal IT department only permitted a mailbox a fraction of the size – a 200 MB mailbox.

Respondents said they found simple tools like internet searches could be more useful than many of their company’s internal knowledge bases and online databases.

In general, respondents said that it wasn't so much that these non-sanctioned were better than those provided by the IT department, but more that they offered greater variety and flexibility and were being developed at a much faster rate.

4.5 Who is using them?

All of the respondents could be described as being knowledge workers with a large amount of freedom in how they approach their work. All could be described as having outcome based, rather than task based, roles. The respondents that provided visibility into their organisations all commented that, as far as they could tell, using these sorts of tools was largely confined to employees with the same sort of work freedom. They gave examples that call centre workers, bank tellers, and other "front line staff" did not have the opportunity nor were required to move past the tools provided by their employer. One respondent commented: "*They [task workers] don't have the leeway to be creative in their roles.*"

A number of respondents reported that new graduate employees were far more likely to use applications of their own choosing than older employees. They commented that graduates are bringing these tools "with them" from university or personal use and expect to keep using them. One respondent in the banking industry commented that he had been involved in the exit interviews of graduates in the technology area, who had decided to leave the bank after a short tenure. He stated that some had left, in part, because of dissatisfaction with the IT tools provided and could not understand: "*Why can't I use the latest technologies? Why can't I use the latest versions of software?*"

While the use of these non-sanctioned systems may be more prevalent with younger workers, one respondent reported that the older electrical engineers in his organisation were also quick

to embrace these technologies once they were aware of what was available, through seeing the graduates bringing them into the organisation.

4.6 Where and when are they being used?

There was no particular physical location or environment reported as having more or less use of non-sanctioned system. The workplace, in the field, at home and while on holiday were all mentioned. These non-sanctioned systems are being used when the tools provided by IT did not exist or when other systems offer a more flexible solution.

In the example described previously, where Hotmail was used to transport document to the employee's home to be worked on after hours, that organisation did not provide employees with a laptop computer or any remote access into the organisation's systems. In this case these individuals had little option, except to create their own solutions to meet their work requirements. The respondent did not know if this practice ceased after these staff members were provided with both a laptop computer and remote network access.

4.7 Other Findings

When asked if they had concerns about security of data stored in the cloud, a number of respondents said that they were "self-policing" to determine what sort of data would be appropriate for this sort of storage. One respondent commented that it was appropriate for him to store data in the cloud. Because of his technical knowledge he thought that he was better placed to make an informed assessment of the risk. However, he doubted the ability of less technically competent workers to make similarly balanced decisions.

Other respondents suggested that storing data in the cloud was no more risky than using USB keys or portable hard drives and that most security breaches were shown to be caused by insiders so they did not perceive that their actions would create any more risk exposure.

One unexpected side effect of trying to secure personal devices also came to light. One government agency had enforced a complex password requirement, onto personally owned devices, if they wished to receive corporate email. This was an alphanumeric password of eight characters or longer using the same complexity requirements as the office personal computer. When two staff members found themselves caught up in the Christchurch earthquake, which struck on 22nd February 2011, they were unable to unlock their cell phones due to personal shock and the stress of the situation. The organisation in question is now re-evaluating their security policies on personally owned devices.

The next section of this document looks at these findings and discusses their implications.

5. Discussion

This section looks at the findings presented in the previous section and discusses their implications.

The self-policing of these non-sanctioned systems must be a cause for concern for those tasked with IT governance. The storage of organisational data in some unknown location in the cloud raises a large number of security, data discovery, regulatory compliance and data governance concerns. When using these services, neither the consumer nor their IT department has any management control of the underlying cloud infrastructure. The consumer needs to rely on the service provider to ensure that the operating system, server hardware, network connectivity, storage and security capability are built in an appropriate manner (Sasikala, 2011).

While many cloud based services identified in this study, might appear to be more reliable and secure than anything an IT department could develop, they are not without their risks. Dropbox suffered a security glitch due to a programmer's error (McCullagh, 2011) which allowed access to any customer's data without requiring a password. It was also accused of misleading its customers about the level of security it applies to stored data (Schwartz, 2011).

Facebook users found that three years after deleting photographs from their personal pages, these were still available online inside a third party Content Delivery Network (CDN) system that Facebook used to distribute its processing load around the globe (Cheng, 2012).

Another concern with the use of these unmanaged systems is with the longevity of the organisations behind them. One such example is the social networking site "Friendster". Created in 2002, this predated both MySpace and Facebook and, at its peak, had over 115 million registered users. Soon overtaken by newer and more popular rivals, Friendster was

sold off in 2009 to a Malaysian computer gaming company, along with all its rich user profiles and personal data (Richter, 2012). The value, ownership, and future for this personal information is, to date, unclear.

When data is stored in some unknown location in a cloud and distributed in multiple unconnected systems, which are tied to the individual rather than the company, it becomes very difficult for an organisation to determine what information it has and who has it. Should the user who created the data leave the company or be somehow incapacitated this data can be lost to the organisation.

An example of the sort of issues that can be faced managing data on these new platforms can be illustrated through one government agencies attempt to better utilise their executives time by providing them with iPads to read email and other company documents. As this platform was primarily designed for the consumer market, there is no concept of any enterprise level of identity or data management. In this case, every executive with an iPad needed to sign up for an Apple iTunes account (a media player program, which is designed for downloading and playing digital music and video files) and use this to download and manage company documents.

For all these concerns, however, perhaps a more important and relevant question could be to consider whose data is it anyway and whether it should be the IT department's role to police organisational data? It may be much more appropriate to stop treating this as an IT policing issue and, instead, treat it as a business risk management question and put the ownership of this risk back into the businesses units that creates the data.

Another finding was the differing responses between organisations to this consumerisation. Government agencies seem to retain a “Command and Control” mentality where they seek to regulate and restrict these developments. The commercial entities appear to have taken a difference approach; they have tried to support and develop these changes to provide an improved working environment. These organisations have taken to educating, rather than controlling staff, in order to make them aware of the risks that are associated with using any type of IT system. The same organisations are also adopting some of these new web based systems after seeing the advantages they can bring and are now legitimising their use; the formal adoption of DropBox for remote field engineers being an example.

It is difficult to believe that the “command and control” approach will be a viable long term strategy. However, it is noted that many New Zealand government agencies must operate under security parameters set by the Government Communications Security Bureau (GCSB), so it is very possible they do not have the mandate to create an environment that could support and utilise these new technologies to their advantage.

There is also a growing disconnect between what technology employees use and what their employers think staff are using. It seems that knowledge workers are moving to adopt and use consumer technologies faster than IT departments realise (Gens, Levitas, & Swgal, 2011, p. 1). In many cases, the IT departments only know what unapproved technologies are being used in their environment through anecdotal evidence. At a functional level, they cannot “see it” happening through any sort of network management tools, as many of these applications have been designed to work in a web browser or alternatively they use a generic transport protocol such as those used by standard web browsers to give a simple path out through the corporate firewall. Many of these use an encrypted communication channel, the same protocols used by a web browser so the contents of the communication cannot be seen at a

network level. There is recognition from the respondents that IT is powerless to stop the use of these systems.

Perhaps the most interesting finding from this study was the view that the IT department cannot keep pace with changing technology. There seems to be a general sense of pessimism in the technology department's ability to cope with the pace of change and therefore the IT department's value is being eroded. What is probably most revealing from this observation is that all the respondents are in New Zealand's IT industry. This is a telling reflection on their own professional status.

One respondent commented that often he thought that employees performed their roles “... *in spite of the IT department, not with IT.*” Another described how a whole department in their organisation had effectively abandoned the IT department and created their own IT capability. Another respondent stated that he was seeing business units circumvent the IT department and going directly to IT vendors for technology solutions. He said: “[IT] *needs to be as [cost] competitive as if they were an external entity; otherwise business will just circumvent them*”.

Yet another respondent said that “*We [the IT department] have got more work than we can focus on*” and that they were looking at ways to offload lower value information technologies tasks back to the end user. For them, consumerisation offered the opportunity to “outsource” the management and ownership of IT systems to their users.

This lack of capacity to keep pace with changing technology could signal the start of a downward spiral for the IT department. If the IT department only has capacity to focus on operational tasks, with no scope for supporting or developing innovations, its value to the organisation will decrease. This decrease may prompt business units to look outside the organisation for technology innovation reducing the value of the IT department which in turn reduces its resourcing.

6. Conclusion

This research sought to discover what motivates employees of an organisation to use technology in the workplace, outside that provided to them by their employers IT department.

It showed that employees in knowledge based roles, who had a degree of flexibility as to how they went about their job function were choosing their own technology tools when they believed they gave them better functionality or flexibility than those offered and approved by the traditional IT department. In some cases the IT department was aware that the solutions they have provided did not meet with the needs of the employees but were constrained by project lifecycles and budgets.

Graduates and other millennial employees were found to be using non-sanctioned systems more than older workers as many brought these technologies with them as they entered the workplace.

The risk to the organisation of employees using these non-approved technologies is that the organisation may lose control of its data, which can be lost or unintentionally exposed.

The results also conveyed a view that IT departments do not have the resources to keep up with the rate of change in technology. At the same time, the users of their services are able to obtain technology solutions from a range of other sources. This may cause a change in the role of the IT department, where it loses its position as the technology gatekeeper. IT functions, such as purchasing and creating technology strategy, may move into the business units which would bring technology and business processes closer together.

6.1 Limitations of this Research

It is noted that all the respondents in this study were directly involved in the IT industry. Whilst this was considered advantageous as they were positioned to give a broader view of the use of non-sanction technologies rather than just from personal experience, it is acknowledged their views do not include other important actors considered in this research such as non-technical knowledge workers and technical workers in non-IT professions.

Similarly too, the use of non-sanctioned tools by millennials formed an important part of the findings and discussion in this research. However they were not directly represented in the respondent sample.

It is also acknowledged that this study has taken place at a time of global economic weakness. The resourcing constraints of the IT department described in this study may not be present in more favourable economic conditions.

Due to these limitations these findings may not be transferrable across other organisations, industries or occupations.

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