Consumerization of Information Technology Drivers, Benefits and Challenges for New Zealand Corporates

MMIM592: Research

by

Palash Kanti Sen

Student ID: 300216366
Supervisor: Dr. David Mason

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

24th February, 2012

Abstract

Consumerization of Information Technology (IT) is a trend where people bring in personal technologies to work. This research reports on the state of this trend in corporate New Zealand (NZ) and concentrates on three areas, its drivers, benefits and challenges. In a qualitative approach, data was collected through interviews and a focus group discussion. The responses reveal that the corporate challenges of consumerization exceed the benefits, and not many complete and affordable solutions for the businesses are available. Most important risks identified are around protecting sensitive corporate information and meeting legal obligations. Recent economic downturn is a further contributory factor affecting the budgetary and resource decisions at the workplace. The research observed the trade and market-research journals, exhibitions, and seminars, are supporting and influencing IT decision makers on their constant lookout for latest developments in this area. As the responses were not bound by set questionnaires, a large number of unique viewpoints were elicited through the research, which does not appear in existing publications. The study also finds consumerization in NZ is at an early stage, and little research has been done on it.

Keywords: Consumerization of IT, Technology Populism, Web 2.0, Enterprise 2.0, Organisationalization

Paper type: Research paper

Acknowledgements

Thanks to the participants for their support and cooperation. Special thanks to Dr. David Mason for his guidance and constructive criticism at all stages of the research.

Table of Contents

List of Figures and Tables

1. Introduction

Workplace Information Technology (IT) is changing. Traditionally, enterprise IT has been the centre of growth and innovation (Moschella, 2011). However, with the wide scale adoption of smart mobile-devices, cloud computing, social media, and technologies rooted in consumer offerings, enterprises are facing transformation in their interaction with customers, partners, suppliers, and in ways employees use technologies to do their job (Blount, 2011). The frontiers of innovation in information technology are shifting away from the corporate space into the consumer space (Bernnat, Acker, Bieber, & Johnson, 2011), power is decentralising from executive C-suites to employees, from companies to customers, and from monopolists to markets (Fraser & Dutta, 2008). This transformation is popularly expressed as the 'Consumerization of IT'. The phrase was first coined in 2001 by researchers John Taylor and Douglas Neal of Computer Sciences Corporation (CSC) Leading Edge Forum (Bless, Alanson, & Noble, 2010). Its Forrester equivalent is 'Technology Populism' (Josh & Ted, 2010).

This paper investigates the state of 'Consumerization of IT' in corporate New Zealand (NZ) and concentrates on three areas, its drivers, followed by its benefits and challenges on NZ corporates.

Bernnat, et al. (2011) presumes 'Consumerization of IT' was initiated around 1990s with the creation of the World Wide Web; however, Malik (2011) believes it commenced post dot-com meltdown of 2001 as the key driver of Web 2.0 and Enterprise 2.0 movements. Ferguson (as cited in Clevengar, 2011) indicates this trend is happening for ages, and Finnie

(as cited in Clevengar, 2011) claims it has been evident for around 20 years, beginning with the advent of personal computers. Two of the early examples of consumerization of IT specified in literature are:

- Investing their own money, the first personal computers were bought by employees of large organizations who didn't want to wait their turn for time-share access to the central system (Madden, 2011).
- In mid-1980s, the very first Macs and Laser-Writers penetrated enterprise departments against the tightly locked-down policies of the IT department who refused to support them (Slootman as cited in Clevengar, 2011).

2. Research Question

The main question this research attempts to answer is: "What are the drivers, benefits, and challenges of 'Consumerization of IT', with respect to corporate New Zealand?"

The question is pursued using the following underlying questions:

- What is consumerization of IT?
- What is driving it?
- What are its corporate benefits and challenges?

3. Literature Review

3.1. Consumerization of IT

3.1.1. Definition: Consumerization has been described as a macro-level business trend that covers multiple topics (Kvanzant, 2009). Numerous viewpoints on its definition are evident. For some, it is a growing trend for new information technology to emerge first in the consumer market and then spread into business organizations (Woodward, 2011), for others, it is a trend where business users make ultimate choice on devices, applications, and services they use to get their work done ('Microsoft Corporation', 2011). Unisys (2010) defines it to

be the trend that is surprising and challenging IT organisations when workers invest personal time and money, to use various products to get their job done. D'Archy (2011) explains, as home technology becomes as capable and cost effective as its enterprise equivalents, consumerization is the migration of consumer technology (which includes electronic devices, platforms, and applications) into enterprise computing environments.

In recent times consumerization has gained prominence with the sharp rise of consumer smart-phones, media tablets, and internet applications, which have been intentionally excluded by many companies' IT policies (D'Archy, 2011).

3.1.2. Often not fully understood: Some publications explicitly cautioned that consumerization of IT is often not fully understood. For example:

- It is often underestimated in its magnitude when equated with workplace initiatives like BYOD ('Bring Your Own Device') or BYOT ('Bring Your Own Technology') (Madden, 2011). It is in fact a lot deeper and far-reaching than BYOD as:
  - It touches upon enterprise use of applications with consumer roots (e.g. FaceBook, Twitter) and extends to a wide range of employee-facing (internal) and customer and partner-facing (external) business-processes (Gens, Levitas, & Segal, 2011).
  - In addition to devices, it is also about increasing user-control and interaction with IT resources (Blount, 2011). "Any change in control within an organization often has a ripple effect across IT and this trend will illustrate this in spades." (Blount, 2011, p.7).
- Embracing consumerization is far more profound than implementing a pretty interface on a decade-old enterprise application, or adopting an easy-to-use SaaS application (Golden, 2011). It is about recognising the fading boundary between workplace and the wider world; allowing end users to engage with your systems can transform business relationships and economics (Golden, 2011). It is also "a phenomenon that opens up a whole new world of commerce and communication for enterprises of all types" (Gens, et al., 2011, p.20).

- In addition to 'technology', consumerization is also about the penetration of consumer-oriented 'behaviour' into the realm of Enterprise IT (Kvanzant, 2009). The introduction of consumer 'behaviour' in the enterprise is what impacts businesses the most and it will consequently redefine the way technology is built, deployed and used within IT (Kvanzant, 2009).

3.1.3. Awareness and Recognition: Further to what 'Consumerization of IT' is, a measure of 'awareness' comes across from a global survey conducted by International Data Corporation (IDC), which derives that IT is relatively 'unaware' of the trend as they underestimate the use of personal devices in workplace by more than 50% (Gens, et al., 2011).

3.2. Drivers

Quite a few factors have been identified from literature, which interrelate and induce each other to drive 'Consumerization of IT'. These are listed in Table-1 and discussed further in the same chronology. Each of these factors is marked with:

- A reference number, for the findings/discussions to link back to the identified factors, and
- A recognition-level of high, medium, and low. The recognition-level roughly indicates a combination of the frequency of appearance of a factor, and the comparative emphasis of the narratives.

Reference	Drivers Identified	Recognition
General, Industry-Wide		
3.2.1.	Broadband Ubiquity	Medium
Consumer Devices		
3.2.2.	Consumer Devices as Disruptive Technology	High
3.2.3.	Processing Power of Consumer Devices	Medium
3.2.4.	Usage Factor of Consumer Devices	Low
3.2.5.	Form Factor of Consumer Devices	Medium
3.2.6.	Affordability Factor of Consumer Devices	Medium
3.2.7.	Ecological Factor of Consumer Devices	Low

Reference	Drivers Identified	Recognition
Consumer Applications		
3.2.8.	Consumer Applications driving Consumerization	High
3.2.9.	Attractive Licensing models	Medium
3.2.10.	Collaboration and Social Computing Tools	High
Consumer Behaviour		
3.2.11.	Blurring of work and home	High
3.2.12.	Increasing mobility of customers and employees	Medium
3.2.13.	Workplace expectation of customers and employees are changing	Medium
Corporate Factors		
3.2.14.	Externalization of businesses, cloud computing and partner eco systems	Medium
3.2.15.	Employees from younger generation and digital natives	Low

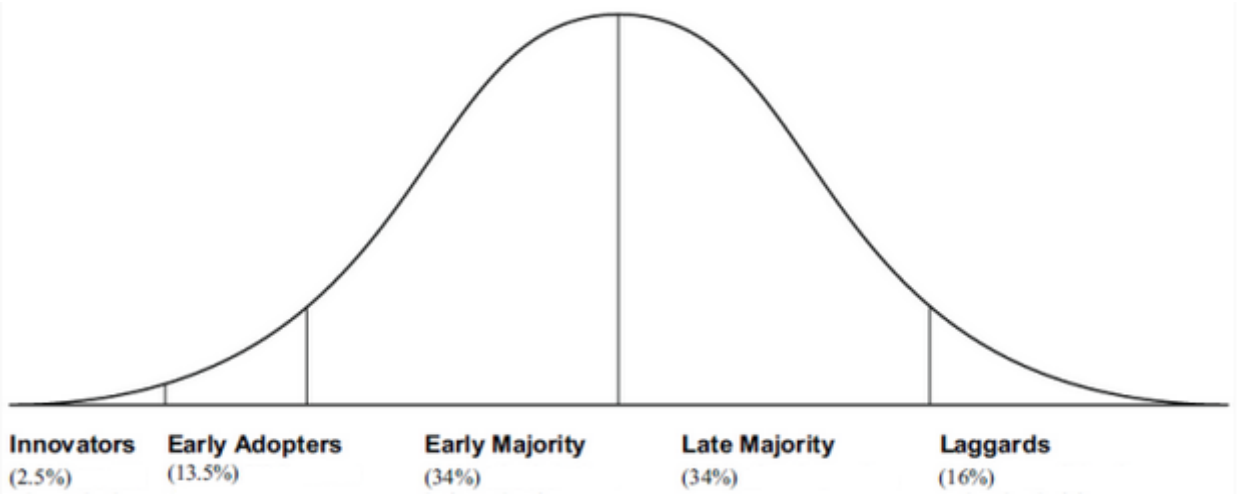
Table–1: Identified drivers of 'Consumerization of IT' from literature.

General, Industry-Wide (3.2.1): Broadband ubiquity has been marked as a key driver for consumerization of IT as it enables consumers with fast, continuous and reliable access to the internet, to be equally connected both at home and at work (Bless, et al., 2010). When broadband became pervasive, it facilitated information-sharing through nearly limitless sources in all areas of life, and fundamentally changed the evolutionary path of information technology (Bless, et al., 2010).

Consumer Devices (3.2.2 to 3.2.7): As indicated in Table-1, several studies (Blount, 2011; D'Archy, 2011) indicate the sharp growth of consumer devices (like smart-phones and tablets) as a key driver for 'Consumerization of IT'. 80% of IT leaders in a recent market survey conducted by IDC indicate the business executives are expecting them to support consumer devices in the enterprise (Gens, et al., 2011). The advent of iPad has been marked as an "incredibly disruptive technology" (Clevengar, 2011, p.31), and Ferguson (as cited in Clevengar, 2011, p.24) qualified "the iPhone followed by the iPad has made 'consumerized IT' the new normal". The traction of iPhone from 0 percent to 80 percent adoption in Fortune 100 companies between June-2008 and June-2010, demonstrates the powerful impact of this

trend (Clevengar, 2011). IPad has been adopted by 50% of the Fortune 100 companies, within 90 days of its release (Clevengar, 2011).

An interesting aspect about iPad and iPhone with regards to the technology life cycle was pointed out by Clevengar (2011). Uptake of new technology products in organisations traditionally follows a 'Technology Adoption Life Cycle' pattern (see Figure-1), characterised by a bell curve with five parts: 'innovators', 'early adopters', 'early majority', 'late majority' and 'late laggards' (Clevengar, 2011). A key factor about iPad and iPhone when brought in by the end user into the workplace is it does not have any 'Technology Adoption Lifecycle', or even a training phase (Moore as cited in Clevengar, 2011). Moore (as cited in Clevengar, 2011, p.26) believes the cause is "a pent-up demand based on decades of retro user interfaces and user experiences".



Figure–1: Technology Adoption Life Cycle Model (Clevengar, 2011).

The processing power, form factor, and affordability of consumer devices, are recognised with similar emphasis in existing literature. First, the growing power and ubiquity of these new consumer-devices often make them perform better than the older office desktop PCs, especially when the vast difference in price is considered (Blount, 2011). Most consumer devices are powerful enough to run applications, which were traditionally designed for desktop and portable computers (Thompson, 2010). Secondly, iPad elevated user

expectations by changing form factors for information consumption and dissemination, to serve the needs of a discerning consumer (Jain, as cited in Clevengar, 2011). A few articles (Golden, 2011) associated the ease of use, attractive interfaces, intuitive functionalities, and contextual capabilities of modern consumer devices, as an escalation factor for 'Consumerization of IT'. Thirdly, the increasing affordability of consumer devices has been identified as the primary reason that equipped end users to adopt consumer technologies and to work around IT when necessary (Dulaney as cited in Clevengar, 2011).

On the usage factor of consumer devices, Bass (as cited in Clevengar, 2011), indicated that iPad is best served in its ability to assist information 'consumption' rather than information 'creation'. As it is difficult to create information using iPad, it is hardly used in organisational daily processes; hence the iPad's penetration in Fortune 100 by 50 percent in 90 days can be considered to be an overstatement (Bass as cited in Clevengar, 2011).

The increasingly small footprint of consumer devices is another reason for new markets opening up for them (Blount, 2011). This is in line with Gerzema and D'Antonio (2011), who believe the post-recession consumer is increasingly appreciating eco-friendly businesses, especially those who care about their impact on communities, and is investing in making things better.

Consumer Applications (3.2.8 to 3.2.10): Clevengar (2011) asserted that for consumerization, the transformative shift is as much about software as it is about hardware. An exponentially growing demand is prevalent for high-quality applications that can equally 'consume' and 'add value' to data when needed (Bass, as cited in Clevengar, 2011). The constant growth of 'App store' and the 'long tail' of mobile-apps is altering mindset of corporate employees, people expect software-applications for anything, and the same expectation transfers into workplace (Anderson as cited in Clevengar, 2011). For corporate IT, this means the custom-built softwares will constantly be compared with hundreds of other applications the users are exposed to, with similar standard of usability and intuitive functionalities (Clevengar, 2011).

The purchase and payment methods in the consumer market are simpler than the traditional licensing models followed in enterprises (Woodward, 2011). Unlike the older licensing approach, where a payment is made before the business starts gaining value from the software, consumer targeted vendors often employ the 'Freemium' business model (Woodward, 2011). Under this model a tool is distributed for free into the mass market, in anticipation that some of the users will pay to upgrade to the premium version with enhanced features (Woodward, 2011).

Collaboration and social computing tools have been marked as a prominent driving factor for consumerization. Social network technology is correlated with business innovation, expanding markets, increased revenue opportunity, and its adoption by employees and customers as a core factor for consumerization of IT (Prete et al., 2011). Some articles (D'Archy, 2011) mark it as the number-one driver. Sharing user-generated content via social websites over the internet is driving the increased use of team collaborative applications (Woodward, 2011). The power and scope of social media outlets is being relied on by the new generation workforce for both their personal and work life (Blount, 2011).

The emergence of web-2.0 post dot-com meltdown in 2001, transformed the internet into a networked platform, with cloud computing, social networking, and mobile computing (Fraser & Dutta, 2008). However, the social media sites only soared up in global web rankings around 2005, when MySpace and FaceBook entered the market (Fraser & Dutta, 2008). Big players started moving into the marketplace, like Google (purchased YouTube for $1.65 billion) and Microsoft (paid $240 million for 1.6% of FaceBook) (Fraser & Dutta, 2008). As of January, 2012, there are 800 million users enrolled in FaceBook alone (FaceBook, 2011). Describing the power of mass collaboration, Don Tapscott the co-author of Wikinomics believes that the FaceBook generation will wipe out the command control infrastructure in business today ('Global Mobility Network', 2008).

Consumer Behaviour (3.2.11 to 3.2.13): A highly recognised factor among publications is the blurring of the boundaries between work and home. The desire of people to work the way they live, using the Internet to facilitate relationships and communication, is the heart of

consumerization (D'Archy, 2011). Users often check work emails late at night and update personal websites during the day (Thompson, 2010). Employees often take advantage of consumer offerings at work, like logging onto social network pages, and perform work functions during off-hours (Prete et al., 2011). The office computer is often accompanied by portable computers, slates, and smart-phones ('Microsoft Corporation', 2011). A growing demand has been noted from users asking for corporate information and applications on devices that are heavily used in their personal life (Blount, 2011).

Both Gens, et al. (2011) and Prete et al. (2011) mark the mobility of customers and employees as a key driver for consumerization. As the boundaries between professional and personal lives are redefined, the definition of workplace as we knew it is changing with it ('Microsoft Corporation', 2011).

The workplace expectation of customers and employees are changing as a growing intolerance is eminent with relatively long approval cycles, limited support and antiquated devices in workplace (Blount, 2011). This is further escalated with the easy availability of consumer applications, devices and services, which are affecting employee expectations from the IT departments (Blount, 2011). Employees as business users are often choosing consumer technologies and services at workplace, to get their work done ('Microsoft Corporation', 2011).

Corporate Factors (3.2.14 and 3.2.15): The externalization of businesses, cloud computing and partner eco systems are key drivers for consumerization (Blount, 2011). As organisations strive to reduce cost without compromising the quality of their core business, a drive has been noticed to adopt cloud based services, in addition to outsourcing or off-shoring their non-core functions (Blount, 2011). An increasing deployment of partner eco-systems with complex network of distributors, suppliers, as well as strategic and technology partners, are helping corporations to extend their businesses far beyond the traditional confinements of IT (Blount, 2011). Similarly, Prete et al. (2011, p.2) suggested the use of "increasingly credible public cloud computing and software-as-a-service (SaaS) options to enable consumer-facing business services and mobile applications".

Finally, as the young and new tech-savvy employees emerge into the workplace, they "are demanding the right to use all the innovative new devices at their disposal, both to do their jobs and to maintain their always connected lifestyles" (Bernnat, et al., 2011, p.2). This trend is likely to increase over the next decade as the majority of the employees will be digital natives (Bernnat, et al., 2011).

3.3. Corporate Benefits

Table-2 is a list of identified corporate benefits of consumerization in a similar structure to the previous section (3.2).

Reference	Benefits Identified	Recognition
3.3.1.	Accelerates Business Growth	High
3.3.2.	Productivity through Employees bringing in New Technology	Medium
3.3.3.	Employee Productivity through Trust	High
3.3.4.	Cost Benefits	Medium

Table–2: Identified benefits of 'Consumerization of IT' from literature.

3.3.1. Accelerates Business Growth: Consumerization of IT accelerates the rate of business change by reducing traditional cost, geographic and technological barriers to experimentation and innovation Moschella (2011). Similarly Ehrlich (as cited in Clevengar, 2011) stated consumer devices like smart-phones and tablets can be game changers for an enterprise as they provide an opportunity to speed up business decisions and individual productivity. The combination of social media growth, emerging adoption of cloud computing, and widespread business use of consumer devices, offer new channels for business growth, increased efficiencies, and improved convenience for users (Blount, 2011).

3.3.2. Productivity through Employees bringing in New Technology: Due to consumerization, employees bring in latest technologies into the workplace earlier than it otherwise would have happened (Clevengar, 2011). This means better tools for communication and integration, and can consequently be a source of competitive advantage (Clevengar, 2011).

3.3.3. Employee Productivity through Trust: Although corporate managers often restrict access to internet and social media worrying about potential loss of productivity, recent studies have shown that judicious use of internet can in fact increase productivity (Bernnat, et al., 2011). Trusting employees is important, and not only should they be allowed to do their jobs better, they should also be supported in doing so (Finnie, as cited in Clevengar, 2011). "Ongoing consumerization of IT initiatives can help demonstrate their relevance to employees and increase their trust and goodwill." (Bernnat, et al., 2011, p.5).

3.3.4. Cost Benefits: The consumerization of IT has the potential to reduce capital expenditure as employees use their own personal devices to do work (Bernnat, et al., 2011). Market survey reveals IT organisations expressed unawareness about workers investing their own money and time into various consumer products to get their jobs done at work (Unisys, 2010). Worley (2010) observed, apart from reducing IT cost as employees use their personal technology, the increasing mobility of the workforce can significantly lighten office cost expenses over a period of time.

3.4. Corporate Challenges

Table-2 is a list of identified corporate challenges of consumerization in a similar structure to the previous sections (3.2, 3.3).

Reference	Challenges Identified	Recognition
3.4.1.	Cost Constraints and Uncertain Cost Boundaries	Medium
3.4.2.	Security Challenges	High
3.4.3.	Challenges in Support and Control	High
3.4.4.	Challenges around Evolving Relations and Expectations	High
3.4.5.	Changing Policy Needs	Medium
3.4.6.	Regulatory Obligations	Medium

Table–3: Identified challenges of 'Consumerization of IT' from literature.

3.4.1. Cost Constraints and Uncertain Cost Boundaries: One of the reasons for unwillingness to allow personal devices within corporate firewalls is the added support and maintenance costs by corporate IT departments (Bernnat, et al., 2011). 80% of the

respondents in a market survey statistics by IDC believe consumerization of IT will definitely increase IT workload (Gens, et al., 2011). With employees acquiring equipment and services directly**,** budgeting and procurement models will be challenged as well, as firms cannot control how much they spend on IT (Moschella, 2011). Hence, the cost of the increased complexity caused by more heterogeneous computing environments remains a risk (Bernnat, et al., 2011).

3.4.2. Security Challenges: While Consumerization of IT brings flexibility and freedom for users, it is also associated with a lack of control and security challenges in an enterprise (Blount, 2011). Preventing data leakage gets difficult, inadvertently or otherwise; probability of virus, worms and hackers infiltrating the office network increases in parallel (Bernnat, et al., 2011). As business transactions move over to mobile devices, enterprises are being challenged to rapidly change "business service web interfaces, step up identity and access control strategies, and develop strategies for accommodating unpredictable Internet and cell phone connect quality." (Prete et al., 2011, p.2).

Negligence on security measures can result in loss of reputation; substantial cost is associated with business downtime, along with potential violation of regulatory obligations to protect sensitive information (Blount, 2011). Highly publicised incidents of employees propagating rumours and bad news have made many managers wary of allowing consumer-oriented technologies like social networking into the workplace (Bernnat, et al., 2011).

3.4.3. Challenges in Support and Control: Consumerization signifies IT responsibility to stretch far beyond its firewall, to support users and their unique-access devices (Blount, 2011). It is difficult for corporations to control device-usage, application-usage, and most importantly, to monitor the flow of corporate information and intellectual property beyond the company's walls (D'Archy, 2011). Decision making will become more 'democratic' or 'chaotic', as users' technology adoption will not be restricted by the directives of the IT group (Blount, 2011). Instead, the users will be driving the IT requirements (Blount, 2011).

A global survey conducted by IDC released a report which states that IT is struggling to lead the trend, and most IT professionals mark themselves low in their ability to support the consumer technologies (Gens, et al., 2011).

3.4.4. Challenges around Evolving Relations and Expectations: Five types of evolving relations were identified:

(i) Change in Business IT Relationship: One of the most far reaching impacts of consumerization of IT is the change in relationship between IT and the business (Blount, 2011). With a position of greater flexibility with users, the relationship of IT with business managers will deepen (Blount, 2011). The boundaries of IT services will become more and more transparent, IT will become more technologically agnostic and will transform from a mere gatekeeper of technology to a business enabler (Blount, 2011). Furthermore, consumerization drives individual choice, empowerment and responsibility, which flattens the reporting structure of the firm from a top-down vertical alignment (Moschella, 2011).

(ii) Change in Technology Adoption Pattern between Industries: The relative technology adoption patterns between industries are being affected by consumerization with the rise of wide and dissimilar security and risk management profiles between industries (Moschella, 2011). This bodes significant impact on business leadership and competitive advantage for businesses (Moschella, 2011).

(iii) Change in Consumer Vendor Relationship: Consumerization drives a virtuous cycle of user search and vendor publishing as it empowers people with powerful capabilities to index and search websites to find solutions to their needs (Kvanzant, 2009). This is unlike 20 years ago when the flow of information about work-related technology confided with the vendor and a limited number of business personnel (Kvanzant, 2009). It is a shift in the relationship between the vendor and the consumer (Kvanzant, 2009).

(iv) Change in Business to Customer Relationship: The standard of expectation of consumers using the web is changing, which entails higher customer-centric attitude from firms to keep

up with the competition; this implies a transformation in the business-customer relationship (Moschella, 2011). It also requires firms to be more transparent (Moschella, 2011).

(v) Change in Employee Needs and Talent Retention: Implementing innovative technology policies along with end-user technology is proving vital from talent recruitment and retention perspective (D'Archy, 2011). According to a study by Unisys in 2010, a majority of employees indicate the presence of latest technology tools and associated support is a deciding factor for them in taking up a job (D'Archy, 2011). New employees while keen to innovate and compete in a fast-changing technology era, are often surprised to learn the locked-down operating systems and legacy softwares they are equipped with in their workplace (D'Archy, 2011). It is a challenge to motivate new generation workforces, who are accustomed to various state of the art consumer devices and are always connected to online social networks (Blount, 2011). For this reason, providing an IT environment that embrace ongoing consumer-IT initiatives can help companies demonstrate their relevance to employees, increase their trust and goodwill, and will have an advantage to hire and retain young talent (Bernnat, et al., 2011).

A change in the required aptitude of employees has been observed by Moschella (2011), as consumerization will necessitate people not only to be skilled in their jobs, but also on the use of relevant IT. There will also be a growing demand for Internet savvy knowledge workers who can navigate the complex ecosystems of social media (D'Archy, 2011). Also as the control of corporate-brands shifts to online-conversations beyond corporate jurisdiction, employers will value employees who are influencers in their social networks (D'Archy, 2011).

3.4.5. Changing Policy Needs: Policy needs around consumerization of IT "must be adaptive, dynamic, and responsive to many changing elements within organizations: technological, policy based, or cultural" (Lamy & McQuire, 2010, p.4). Companies must accommodate flexibility in policies both around adaptable work-arrangements and the use of technologies (D'Archy, 2011). For support policies, enterprises should look at how devices

will be updated, and the likely costs for supporting these devices ('Microsoft Corporation', 2011).

The following is a list of few factors identified by 'Microsoft Corporation' (2011), to consider while developing support policies at the workplace:

• The platforms to be supported, and their versions	• The browsers to support
• Whether standard images are to be enforced and the methods for applying them	• Responsibility of device support
• Whether hardware refresh cycle will be enforced	• Peripherals needed for support
• What happens when a device is lost or stolen	• Backup in case a device breaks
• How to decommission the device at the end of its life	• Minimum device specifications

Table–4: List of factors to consider for support policies ('Microsoft Corporation', 2010).

3.4.6. Regulatory Obligations: As employee-owned equipment and third-party services turn critical for business operations, consumerization changes the legal liability environment of an organisation (Moschella, 2011). Employees using personal devices at work increase the risk of violating licenses and copyrights (Bernnat, et al., 2011). With reduced control over consumer devices, applications, and employee behaviour, CIOs are concerned with multiple laws and regulations organizations must abide by (Bernnat, et al., 2011). One of the examples is the Sarbanes-Oxley Act that puts the responsibility on certain companies to closely monitor their financial and accounting activities, and in some cases to monitor data access and store all e-mail traffic (Bernnat, et al., 2011).

4. Methodology

4.1. Research Approach

Many exiting market-researches (Gens, et al., 2011; see also Bless, et al., 2010) deduce their findings from objective responses acquired through survey questions on a global scale, to formulate market-trends and predictions on consumerization of IT. This approach poses a risk as the questions may not necessarily be interpreted in line with the resulting factors

being measured (Mason, Tideswell, & Roberts, 2006). "By using questionnaires, complex human behaviour is reduced to numbers, but there is an inevitable trade-off between the precision of numerical analysis and the richness of content analysis" (Mason, Tideswell, & Roberts, 2006, p.192).

This research uses New Zealand corporate employees as respondents and adopts a face-to-face, verbal, interviewing methodology. It directly asks participants what 'Consumerization of IT' means to them, its drivers, and its corporate significance from their working experiences. The dialogues between the researcher and the participants were aimed to be dialectic in nature to transform ignorance and misapprehensions into more informed consciousness (as advised by Guba & Lincoln, 1994). The results are as perceived by the participants rather than being derived from objective answers to survey questions.

'Triangulation' is a term commonly used to denote various cross-examination mechanisms to research findings (Hammersley & Atkinson, 1983). Various forms of triangulation are prominent, to improve quality control and representativeness of the study, (Denzin, 1970; Allwright & Bailey, 1991). As this research uses different 'methods' for the same object of study, it accomplishes a 'between-method' 'methodological-triangulation' as described by Brannen (1992).

4.2. Data Collection

For the primary source of information the researcher conducted nine one-on-one interviews, followed by one focus group interview with five participants.

4.2.1. Participant Selection: Nine New Zealand personnel who have corporate experience with information technology were selected for one-on-one interviews. A mixture of private and public sector employees were chosen for wider variety of responses.

For the focus group, a range of Master of Information Management (MIM) students from Victoria University were selected, all working in various New Zealand organisations. Once again a good mix of personnel were picked to get a broad range of organisational

perspectives in one go. The selection ensured none of the participants were work-colleagues and all of them were acquainted with the student identity of each other. This was to ensure that they feel comfortable in sharing their unbiased organisational experiences in a group.

4.2.2. Interview and Focus Group Questions: Based on the constructs that came out from the literature review, the research identified three areas of investigation. For both the interview and the focus group discussion, the research questions were loosely structured and were suited to the flow of the discussion and the participant's response.

Areas of Investigation	
1.	Where and how did the participants hear about 'Consumerization of IT'?
2.	Identifying the main drivers of 'Consumerization of IT'.
3.	Identifying the corporate benefits and challenges around 'Consumerization of IT'.

Table–5: Areas of Investigation for interviews and focus group.

At the end of each discussion session, opinion was asked on selective IDC survey-results from Gens, et al. (2011) mentioned in the literature review (sections 3.1.3 and 3.4.3). These responses were aimed to intersect and cross-validate the findings in the above three areas.

4.2.3. Interview and Focus Group Process: For all one-on-one interviews and the focus group discussion, the process started by securing written consent from the participants, as par the Human Ethics Committee (HEC) guidelines. Open-ended questions were asked from the identified areas in investigations (section 4.2.2), and the narrative was recorded using a voice recorder. For the most part, discussions were allowed to progress freely with minimum interruption from the interviewer. A reflective interviewing style was used with occasional 'floating prompt' questions as suggested by McCracken (1998). Towards the end, if the identified areas appeared not adequately covered, selected constructs from literature review were lightly hinted one at a time, to ensure completeness. These are the 'planned prompt' questions as suggested by McCracken (1998). However, when asking these questions, care was taken to count in possible participant bias, due to interviewer clueing in, as indicated by Myers & Newman (2007).

4.2.4. Data Collection Timeframe: All of the interviews and the focus group discussion were conducted between August to November, in the year 2011.

4.2.5. Data Analysis Process: Data from the interviews and focus groups were transcribed, followed by a thorough analysis to find the major constructs. The main themes were searched and validated, first within each interview and focus group, and then across all the interviews and the focus group, as suggested by Thompson (1997). The emerging constructs were then classified similar to the structure of the literature review (section 3).

Next each major classification of literature review was cross-compared with that of the findings. Many of the findings were discussed further in the 'Discussions' (section 6).

4.2.6. Demographics: Participant demographics are as below:

- The male respondents were slightly more than the females (57.14% versus 42.86%).
- 60% responses represented private sectors in New Zealand; 40% represented public sectors.
- 41.18% responses represented IT services industry; remaining 58.82% represented non-IT services.
- Majority of the respondents were older than 35 years (78.57% versus 21.43%).

5. Findings

The findings have been classified under sections similar to the literature review. The sources of the quoted responses have been denoted in brackets in the format: ([participant]-[data gathering method]), where,

- [participant] denotes
  - Information Technology personnel: IT
  - Information Management personnel: IM
- [data gathering method] denotes
  - Focus Group: FGp

- Interview: Int

5.1. About Consumerization of IT

Majority of the respondents (around 64%) were aware of 'Consumerization of IT' long before receiving the information sheet about this research (see Appendix-A). They knew it over the last 18 to 24 months with the industry research articles and trade journals as their main source of information. "*I'm in the email list of Gartner and few other journals like the Information Management Daily*" (IM-FGp). Many subscribe to these journals as an active part of their job role. "*...when we grapple with issues like consumerization, one of the roles I play is to inform our IT experts on what the external world is doing ... I attend Gartner conferences and am a regular subscriber of Forrester, Gartner, Ovum, etc.*" (IM-Int).

Remaining participants were unaware of the specific term, but could easily relate their work-experiences with the information-sheet. "*I know the company policies for using Gmail, connecting external devices to office network, and for logging remotely from home to work*" (IT-FGp).

Only few (14.3%) asked further explanation to validate their understanding from the researcher.

More than half the respondents (63%) disagreed with the measure of 'awareness' that has been stipulated by IDC (section 3.1.3). Three main reasons were noted:

- IT is more aware. "*IT-sector of an organisation is exceptionally well informed as the knowledge of upcoming trends, network over the IT industry. They get to see the whitepapers first, they're invited to the exhibitions first, and they get to the seminars first. They also have an inherent interest in IT development, that's their profession."* IM-Int.
- Being aware and being active are different. "*Awareness is a twofold thing, as you can be aware but if you don't do anything about it, you gradually lose sight. Although IT personnel are informed about the market developments, they haven't played with these technologies, so they have gone no further... ICT is extremely busy given the effects of*

economic downturn" (IM-Int). The economic downturn has been discussed further in sections 5.4.3 and in 6.4.

- It's not Information Technology but Information Management: "*Making (or not making) an IT decision around consumerization falls under Information Management (IM), it is not an Information Technology (IT) issue.*" (IM-FGp).

5.2. The Drivers

Table-6 is a synopsis of the major drivers identified from the participants, discussed in the rest of this section. They are listed in a structure similar to the literature review section. The recognition-level in this case is based on the participants' response.

Ref.	Drivers Identified	Recognition	Literature Review Comparison
General, Industry-Wide			
5.2.1.	Telecommunications-Infrastructure and General Affordability	High	Supersedes 3.2.1 (Broadband Ubiquity), and 3.2.6 (Affordability Factor of Consumer Devices)
Consumer Devices			
5.2.2.	Consumer Devices as Disruptive Technology	High	In line with 3.2.2
5.2.3.	Processing Power of Consumer Devices	Medium	In line with 3.2.3
5.2.4.	Usage Factor of Consumer Devices	Low	In line with 3.2.4, but limited usage can be a positive factor.
5.2.5.	Form Factor of Consumer Devices	High	In line with 3.2.5, but high as opposed to medium
		3.2.6: Affordability Factor of Consumer Devices, superseded by 5.2.1	
5.2.6.	Ecological Factor of Consumer Devices	Low	Not mentioned (3.2.7)
5.2.7.	Always-on feature of Consumer Devices	High	*New factor*
Consumer Applications			
5.2.8.	Consumer Applications driving Consumerization	Medium	In line with 3.2.8., but medium as opposed to high

Ref.	Drivers Identified	Recognition	Literature Review Comparison
5.2.9.	Attractive Licensing models	Low	Not mentioned (3.2.9.)
5.2.10.	Collaboration and Social Computing Tools	High	In line with 3.2.10, but few do not relate to Consumerization
Consumer Behaviour			
5.2.11.	Blurring of work and home	High	In line with 3.2.11, but few indicated it always was like this.
5.2.12.	Increasing mobility of customers and employees	Medium	In line with 3.2.12.
5.2.13.	Workplace expectation of customers and employees are changing	Medium	In line with 3.2.13.
5.2.14.	Fashion, Status and Curiosity	Medium	*New factor*
Corporate Factors			
5.2.15.	Externalization of businesses, cloud computing and partner eco systems	Medium	In line with 3.2.14, but some do not relate cloud-computing to Consumerization
5.2.16.	Employees from younger generation and digital natives	Medium	In line with 3.2.15.
5.2.17.	Average age of Leadership	Medium	*New factor*

Table–6: Identified drivers of 'Consumerization of IT' from participants.

General, Industry-Wide (5.2.1): Instead of 'broadband ubiquity' mentioned by Bless, et al. (2010) (section 3.2.1), the research participants pointed out "*the inherent pervasiveness of the availability of connection mechanism and its dramatic drop in unit price year on year is the main driver of consumerization.*" (IM-Int). Not much literature is explicit about the telecommunications-infrastructure along with the growing affordability of 'all' consumer technologies and services, being a core driver.

Bless, et al. (2010) explained, PDA (Personal Digital Assistant) and smart-phones were existent in the early 90s, but did not develop into the consumer space before broadband access became common. A respondent similarly stated "*The adoption rates of people using iPhones, using conventional networks like GSM* [Global System for Mobile Communications], *are exceptionally high in North America, but not as high in NZ. The*

reason cannot be the device, as it is the same in both places. The reason is the availability of telecommunications-infrastructure being available and accessible in a cost effective manner." (IM-Int). Here the respondents and literature are in unison that the network infrastructure has a huge role in driving consumerization.

However, it was further explained that common infrastructure and affordability are linked with many other factors of consumerization: "*The rate of diffusion of iPhone is intricately linked to a certain critical mass of telecommunications facilities being available…similarly Twitter's popularity is linked to free SMS…cloud's affordability is the reason why everybody is touched by cloud in recent days"* (IM-Int).

Consumer Devices (5.2.2 to 5.2.7): All the research participants mark consumer devices as an extremely 'disruptive technology'. This is consistent with literature (section 3.2.2). "*The increased proliferation of personal iPhones and tablets in the personal usage space is definitely the most important factor to drive consumerization.*" (IM-Int). Similarly, discussions around the 'processing power' (section 3.2.3) and 'form factor' (section 3.2.5) received parallel importance both by the participants and in literature**.**

- Processing Power: "*A lot of business people both in public and private sector, have more computing power on their personal devices than at work.*" (IM-FGp).
- Form Factor: "*One of the biggest innovations that underpin iPad is that they hit that critical size of a screen that gives you the satisfaction you want. Laptop was getting there, with net-books. But iPad eliminated keyboard, which to most people is unnatural and quirky. Net-book was not right on the money when it came to keyboard and also on how long it stays on charge.*" (IM-Int).

On the 'usage factor' (section 3.2.4), majority of the respondents (65%) were in line with literature that modern consumer devices are more suitable for information consumption than information creation. "*I recently purchased an iPad, and I don't think it is a business tool for information creation.*" (IM-FGp). "*For creating a 35 page complex document, I'm sure that not even the most advanced iPad or tablet user will attempt that." (IM-Int).* However, unlike

literature, quite a few respondents mentioned this is not necessarily a negative factor. *"Most of human tasks are not about entering huge amounts of text.*" (IM-Int).

The 'ecological factor' of the consumer devices (section 3.2.7), was not mentioned by any of the research participants.

The always-on feature of consumer devices is a new factor that did not become apparent in the literature review. While half of the respondents said any device (including laptops and desktop PCs) can be a consumer device, the other half quite specifically termed consumer devices as "*something that you carry and is always on. It's a form-factor that as you carry, it doesn't have to be turned on and off, or a cover doesn't have to be open.*" (IM-Int).

Consumer Applications (5.2.8 to 5.2.10): The proliferation of 'consumer applications' received similar importance from the respondents and literature (section 3.2.8): "*I've witnessed plenty of cases in New Zealand, both private and public, where employees and even business departments resort to consumer applications*" (IM-FGp). Attractive licensing models like "Freemium" mentioned in literature (section 3.2.9), did not come up during data collection.

Also in line with literature (section 3.2.10), most of the participants (79%) indicated "s*ocial media is an important example of consumer technologies affecting organisations.*" (IM-FGp). However, a few respondents indicated otherwise. "*We have policies and guidelines around Social Media, it is essential, but that doesn't cover what we need to do for consumerization, so I won't necessarily relate them together*" (IM-Int).

Consumer Behaviour (5.2.11 to 5.2.15): As with literature (section 3.2.11), majority of the participants (86%) considered the 'fading separation between work-life and home-life' as a big driver of consumerization. "*We moved away from absolute pure separation of personal and professional time with the growth of consumer devices*" (IM-Int). However, some participants (14%) mentioned that this always was the case, and did not notice any change over the last 5 years. "*As employees we are responsible for protecting the company… we*

always had the flexibility to do personal things from work and vice versa, it hasn't changed… it always was like this." (IM-Int).

In line with literature (sections 3.2.12, and 3.2.13) almost half the respondents agreed that both the 'increasing mobility of customers and employees' and 'employees adopting consumer technologies in the workplace' are escalating consumerization in office-space.

- "*The moment you have a mobile consumer device, you can unshackle work from a fixed place…I can sit at home and do all my work…I only need to attend my meetings.*" (IM-Int).
- "*IT is not providing me with what I need to do my job efficiently, so I find it myself.*" (IT-FGp).

A new factor emerged that literature does not talk about. Almost half of the respondents indicated, the procurement of consumer devices are not always based on technical needs of an individual, but also driven by behavioural elements like 'fashion, status and curiosity'. "*The selection of who gets a device is not always driven by purpose.*" (IM-Int).

Corporate factors (5.2.15 to 5.2.17): In accordance with the literature review (section 3.2.14), the emergence of 'partner eco-systems, outsourcing and externalization of businesses', came up in various ways from the respondents. For example, a few talked about ongoing initiatives in their workplace to outsource certain business-functions to external vendors: "*we have embarked on projects to outsource our customer relationship management to third-party vendors…*" (IM-Int).

A majority of the respondents (64%) indicated 'cloud computing' is a key driver as "*many consumer offerings are based on cloud services*" (IM-Int). On the other hand, some disagreed seeing that "*planning around consumerization of IT is entirely different from that of cloud computing*" (IM-Int).

In line with literature (section 3.2.15), many respondents (21%) mentioned the 'emergence of younger generation of employees' as a contributing factor for consumerization in workplace.

"*The younger generation is technologically savvy compared to their predecessors, they are more accustomed to the use of technology in their personal lives, and hence they bring in the same attitude and expectation into the workplace.*" (IM-Int).

Related to the younger generation workforce, a new driver was identified: the 'average age of leadership' in an organisation. "*The average age of leadership is a big driving factor for adoption of newer technologies in a company. It is a vital factor, particularly when New Zealand is concerned*" (IM-Int). This has been discussed further in the 'Discussions' (section 6.2).

5.3. Corporate Benefits

Table-7 is a list of the major benefits identified from the participants and has been listed in a structure similar to the previous section (5.2).

Ref.	Benefits Identified	Recognition	Literature Review Comparison
5.3.1.	Accelerates Business Growth	High	In line with 3.3.1
5.3.2.	Productivity through Employees bringing in New Technology	Low	Not mentioned (3.3.2)
5.3.3.	Employee Productivity through Trust	Medium	In line with 3.3.3, but medium as opposed to high. Few warned on loss of productivity.
5.3.4.	Productivity through Employees bringing in Consumer Behaviour and Skills	High	*New factor*
5.3.5.	Standardisation Enforced by Consumer Vendors	Medium	*New factor*
5.3.6.	Finding Newer Skills through Social Networking Websites	Low	*New factor*
5.3.7.	Cost Benefits	Low	In line with 3.3.4, but low as opposed to medium.

Table–7: Identified benefits of 'Consumerization of IT' from participants.

5.3.1. Accelerates Business Growth: In accordance with literature (section 3.3.1), a majority of the research participants (71%) agreed that taking initiatives around

consumerization of IT can 'accelerate business growth' in multiple ways. For example: "*information consumption for executives can be simplified, and prompt decisions can be made irrespective of the person's location.*" (IM-Int).

5.3.3. Employee Productivity through Trust: In line with literature (section 3.3.3), half of the participants (57%) believes consumerization can assist 'employee productivity through a better trust relationship with the employer'. "*When our organisation allowed us to use the external social media websites including communities, blogs, document sharing sites, and trading communities, it accelerated turnaround time to find solutions to problems.*" (IT-FGp). However, few (14%) warned about the potential negative side: "*I've seen people doing FaceBook throughout the day without doing any work… over time others may join in, hence it can encourage social loafing*" (IT-FGp).

5.3.2. Productivity through employees bringing in new technologies mentioned in the literature review (section 3.3.2), did not come up in the data collection process.

5.3.4. Productivity through Employees bringing in Consumer Behaviour and Skills: This is a new factor was brought up by the respondents, which did not appear in literature. It's not only the technology, but employees bringing in new behaviour and skills can improve productivity as well. "*As people become more IT savvy consumers, they acquire certain skills in their social settings. When the same people come to work, they bring in those efficiencies and innovative approaches of dealing with the problems in the workplace, which the organisations can gain from.*" (IM-Int).

5.3.5. Standardisation Enforced by Consumer Vendors: Another point emerged from a few respondents wherein certain consumer vendors can indirectly enforce standardisations in workplace and across industries. "*More and more organisations are talking about enterprise search. It essentially means putting Google-like search across all your information, which incidentally Google and its competitors sell… a classic consumer phenomenon, and that jumped into organisations.*" (IM-Int). This did not appear in literature.

5.3.6. Finding Newer Skills through Social Networking Websites: The third new factor identified by some respondents, is that in addition to the traditional websites for job search, employees are often 'finding newer skills through social networking websites'. "*We already know about the job search websites, but many of the social networking sites are being used for finding skills from the market…*"(IT-FGp).

5.3.7. Cost Benefits: In line with literature (section 3.3.4), a few respondents (14%) mentioned cost reduction is possible by New Zealand businesses if employees purchase their own devices. **"***There is a tension in my organisation* [public sector] *on having to reduce expenditures. If the organisation really has to cut costs, then we shall check the option if our employees are happy to buy their own devices. It is for us to work out if that is convenient for them and then can cut down cost on desktops or laptops, or whatever devices we otherwise provide.*" (IM-Int).

5.4. Corporate Challenges

Table-8 is a list of the major challenges identified from the participants and has been listed in a structure similar to the previous sections (5.2, 5.3).

Ref.	Challenges Identified	Recognition	Literature Review Comparison
5.4.1.	Immaturity of Consumer Technologies	High	*New factor*
5.4.2.	Cost Constraints and Uncertain Cost Boundaries	Medium	In line with 3.4.1
5.4.3.	Economic Downturn	High	*New factor*
5.4.4.	Security Challenges	High	In line with 3.4.2
5.4.5.	Challenges in Support and Control	High	In line with 3.4.3
5.4.6.	Challenges around Evolving Relations and Expectations	Low	Not mentioned (3.4.4).
5.4.7.	Changing Policy Needs	Medium	In line with 3.4.5
5.4.8.	Regulatory Obligations	High	In line with 3.4.6, but high as opposed to medium

Table–8: Identified challenges of 'Consumerization of IT' from participants.

More than half of the respondents (57%) talked about consumer technologies being too immature to be embraced appropriately by New Zealand organisations. "*There is more incentive for consumer technology vendors to 'Organisationalize' than for the organisations to 'Consumerize'*." (IM-Int). This is a major area that overlaps with many of other challenges mentioned, but nothing directly comes out from the literature review. Hence this has been presented as a new factor and discussed in detail in section 6.4.

Discussions around 'cost constraint', and 'uncertain cost boundaries' were equally stressed by both literature (section 3.4.1) and the research participants.

- Majority of the respondents (86%) mentioned cost as a prohibitive factor for consumerization of IT initiatives. "*It's not a question of capability, but whether the companies are ready to invest in this area and come up with infrastructures and policies to support consumerization.*" (IT-FGp). One respondent pointed out: "*We have YouTube blocked at work as they do not want to pay for that kind of huge bandwidth.*" (IM-FGp).

  Another interviewee believes it's not just about consumerization but about the attitude to technology as well. "*For many organisations, technology is still a necessary evil and they focus on how can they minimise the cost of IT; that drives a lot of the thinking.*" (IM-Int). However, the point around reducing office cost expenses due to increasing mobility of workforce, as mentioned in literature, was not mentioned in the interviews and focus group discussion.

- Some of the respondents (21%) mentioned uncertain cost boundaries as a big challenge to embrace consumerization of IT. "*If companies allow people to use their own devices, then where do the cost responsibilities lie? If the device breaks, who buys the new one? The individual may not be able to afford the next device. Is that acceptable? If not, should that be in the employment contract?"* (IM-Int).

Majority of the research-participants (73%) pointed out the recent 'economic downturn' as a major obstacle to take initiatives around consumerization. This did not become salient from existing literature. "*Post-recession, budget allocation has become restrictive; hence it is extremely difficult to take initiatives in that direction*" (IM-Int).

As with literature (section 3.4.2), all the respondents (100%) mentioned 'security' as the biggest challenge posed by consumerization of IT. "*Security is the crux of the matter…*" (IM-Int). The respondents also talked about the potential detrimental effect on organisations if security is compromised. "*The cost associated with a non-secure environment is beyond our comprehension*" (IM-FGp). Some respondents mentioned: "*the reputational damage that can be done is quite significant.*" (IM-Int). Many of the security challenges are linked with the 'immaturity of consumer technologies', discussed in 6.4.

As in existing literature (section 3.4.3), almost all of the respondents (93%) were explicit about the difficulty in 'support and control of the consumer devices and applications'. "*The challenge is: if we start providing devices and we can't control or administer these centrally, the workload of looking after them will get exponentially more difficult, more expensive and more time consuming.*" (IM-Int). Around the support issue, many of the respondents were uncertain about support obligations. Most of the respondents (93%) agreed with the IDC findings (section 3.4.3), that IT is lagging behind in their ability to support consumer technologies. Two reasons came out from the responses.

- "*As a society, New Zealand adopts technologies later than other countries. We're laggards.*" (IM-Int).
- "*IT is extremely busy given the effects of the economic downturn*" (IM-Int).

Many of the support and control challenges are linked with the 'immaturity of consumer technologies', discussed in 6.4.

None of the 'challenges around evolving relations and expectations' (section 3.4.4) directly came up in discussions with the research participants.

In keeping with literature (section 3.4.5), majority of the participants agreed on 'the need for robust policies' to cater for consumer technologies. "*You have to acknowledge consumerization is going to take over, so we have to determine what sort of guidelines or policies to put in place to support it.*" (IM-Int). None of the organisations claimed to have comprehensive policies for accommodating BYOD/BYOT technologies yet, even though few mentioned ongoing initiatives in that direction. One respondent specified "*many*

elements of using consumer technologies will automatically be covered by existing code of conduct we have in place" (IM-Int).

In line with literature (section 3.4.5), meeting '<u>regulatory obligations</u>' emerged as a major impediment from the respondents. "*There are issues around the privacy of information; if personal data-items are collected and consumed through the cloud, now we don't quite know how many hops the data make, as it reaches the end-user. As it hops from one place to another, it falls under different jurisdictions. This is a big problem for the government agencies, as they want to ensure that data privacy is not being compromised.*" (IM-Int).

6. Discussions

6.1. High-level Comparison of the findings with literature

Table–9, Table–10, and Table–11 are high-level comparison of the findings with literature on drivers, benefits and challenges respectively. The comparison noted if there is a change in overall recognition-level of the factors. The factors are sorted firstly with the dissimilar items appearing before the similar ones, followed by the recognition-level of the factors from the findings. The next three sections further discuss some of the drivers, benefits and challenges in detail.

Literature			New Zealand Participants		
Ref.	Drivers Identified	Recognition	Ref.	Drivers Identified	Recognition
Different					
3.2.1.	Broadband Ubiquity	Medium	5.2.1.	Telecommunications-Infrastructure and General Affordability	High
3.2.6.	Affordability Factor of Consumer Devices	Medium			
3.2.5.	Form Factor of Consumer Devices	Medium	5.2.5.	Form Factor of Consumer Devices	High
		New Factor ➔	5.2.7.	Always-on feature of Consumer Devices	High
3.2.15.	Employees from younger generation and digital natives	Low	5.2.16.	Employees from younger generation and digital natives	Medium
		New Factor ➔	5.2.17.	Average age of Leadership	Medium
		New Factor ➔	5.2.14.	Fashion, Status and Curiosity	Medium
3.2.8.	Consumer Applications driving Consumerization	High	5.2.8.	Consumer Applications driving Consumerization	Medium
3.2.9.	Attractive Licensing models	Medium	5.2.9.	Attractive Licensing models	Low
Similar					
3.2.2.	Consumer Devices as Disruptive Technology	High	5.2.2.	Consumer Devices as Disruptive Technology	High
3.2.10.	Collaboration and Social Computing Tools	High	5.2.10.	Collaboration and Social Computing Tools	High
3.2.11.	Blurring of work and home	High	5.2.11.	Blurring of work and home	High
3.2.3.	Processing Power of Consumer Devices	Medium	5.2.3.	Processing Power of Consumer Devices	Medium
3.2.12.	Increasing mobility of customers and employees	Medium	5.2.12.	Increasing mobility of customers and employees	Medium
3.2.13.	Workplace expectation of customers and employees are changing	Medium	5.2.13.	Workplace expectation of customers and employees are changing	Medium
3.2.14.	Externalization of businesses, cloud computing and partner eco systems	Medium	5.2.15.	Externalization of businesses, cloud computing and partner eco systems	Medium

Literature			New Zealand Participants		
Ref.	Drivers Identified	Recognition	Ref.	Drivers Identified	Recognition
3.2.4.	Usage Factor of Consumer Devices	Low	5.2.4.	Usage Factor of Consumer Devices	Low
3.2.7.	Ecological Factor of Consumer Devices	Low	5.2.6.	Ecological Factor of Consumer Devices	Low

Table–9: Drivers: High-level comparison of findings with literature.

Literature			New Zealand Participants		
Ref.	Benefits Identified	Recognition	Ref.	Benefits Identified	Recognition
Different					
	New Factor ➔		5.3.4.	Productivity through Employees bringing in Consumer Behaviour and Skills	High
3.3.3.	Employee Productivity through Trust	High	5.3.3.	Employee Productivity through Trust	Medium
	New Factor ➔		5.3.5.	Standardisation Enforced by Consumer Vendors	Medium
3.3.2.	Productivity through Employees bringing in New Technology	Medium	5.3.2.	Productivity through Employees bringing in New Technology	Low
	New Factor ➔		5.3.6.	Finding Newer Skills through Social Networking Websites	Low
3.3.4.	Cost Benefits	Medium	5.3.7.	Cost Benefits	Low
Similar					
3.3.1.	Accelerates Business Growth	High	5.3.1.	Accelerates Business Growth	High

Table–10: Benefits: High-level comparison of findings with literature.

Literature			New Zealand Participants		
Ref.	Challenges Identified	Recognition	Ref.	Challenges Identified	Recognition
Different					
	New Factor ➔		5.4.1.	Immaturity of Consumer Technologies	High
3.4.6.	Regulatory Obligations	Medium	5.4.8.	Regulatory Obligations	High
	New Factor ➔		5.4.3.	Economic Downturn	High
3.4.4.	Challenges around Evolving Relations and Expectations	High	5.4.6.	Challenges around Evolving Relations and Expectations	Low
Similar					
3.4.2.	Security Challenges	High	5.4.4.	Security Challenges	High
3.4.3.	Challenges in Support and Control	High	5.4.5.	Challenges in Support and Control	High
3.4.1.	Cost Constraints and Uncertain Cost Boundaries	Medium	5.4.2.	Cost Constraints and Uncertain Cost Boundaries	Medium
3.4.5.	Changing Policy Needs	Medium	5.4.7.	Changing Policy Needs	Medium

Table–11: Challenges: High-level comparison of findings with literature.

6.2. The Drivers

6.2.1. Dissimilar Factors:

The 'common telecommunications infrastructure with the increasing affordability of connection mechanism' (section 5.2.1) is a broader factor than both 'broadband ubiquity' and 'affordability of consumer devices' as mentioned in literature (sections 3.2.1 and 3.2.7). "*The underlying transformation of telecommunications networks is not just a technological transformation but a commercial transformation as well…a fantastic device or a fantastic service is meaningless without an affordable and pervasive communication in-between, hence it is the glue that holds it altogether*" (IM-Int).

Except for subtle references (like Jain as cited in Clevengar, 2011, p.31; or Bernnat, et al., 2011, p.5), not many articles talk about the 'always-on' identified as a factor by the respondents. As explained by a participant, "*a conventional computer or even a laptop is not 'on' all the time, even if you carry it. So the defining characteristic of a consumerized device is being active and alive at all times. It is that characteristic which has made it consumerized. It is like a pen as you carry it all the time and it is active; there is no notion of turning on or turning off a pen.*" (IM-Int).

The second new driver that came up in the findings (section 5.2.16) is the 'average age of leadership'. "*If the average age of leadership is younger, you'll have more people closer to the digital natives; so the resistance to experimenting will be much lower and hence they'll have a much greater propensity to adapt to consumer developments.*" (IM-Int). On the same line another participant remarked: "*Even though we have a CEO and an exec team who are ready to embrace new stuff, I've perceived the newer members of the exec team coming aboard understand technology lot better than what we do and they are keen to introduce newer things*" (IM-Int).

This factor is particularly noteworthy for New Zealand, as: "*NZ is an ageing society; hence the average age of leadership will not come down. If you look at the average age of the*

board members and chief executives, it'll be around the 50s and the 60s. If you compare that with another society where average age comes down, I'd suggest that everything else remaining same, the business adoption of consumer technology will be greater for the later. New Zealand is driven by primary sector industries unlike societies driven by the technology industry. On an average, the leadership in technology companies is younger because technology is a younger discipline. Hence for New Zealand it is an interesting thing to measure." (IM-Int). Following this discussion this paper could not find any existing research on average age of leadership.

The third new driver that emerged from the discussions (section 5.2.13) is the 'fashion, status, or curiosity' factor. Almost half of the respondents mentioned consumer devices are not necessarily procured on the technical-needs of an individual, but is also driven by behavioural elements like fashion, status and curiosity. One of the interviewees explained, "*in an organisation, if* you *see someone is holding an iPad, chances are high that the person is either senior or very high, and it does not necessarily mean that they are the best people whom iPad will make more productive.*" (IM-Int). Another respondent explained even further: "*There are subtle means to express position and status, and is true of all societies. So when smart-phone came out it was the senior people in the companies who got them first. It then gets passed down to the subsequent levels. So in the device chronology, iPad comes first, then BlackBerry, and the one after that may be the G-63s. This is what status symbol is: the selection of who gets a device is not always driven by purpose.*" (IM-Int).

The relative recognition of the 'form-factor of consumer devices' and 'employees from younger generation and digital natives' is slightly higher than what came out in the literature review.

On the other hand, 'the proliferation of consumer applications**'** received slightly lower recognition from the respondents. Various examples were cited around employees choosing consumer applications to do their job, in most cases without the knowledge of IT. The examples varied from individuals using small utility applications, to groups using custom-built spread-sheets over access databases and Skype for business conferences, to business

units subscribing to MYOB packages to manage financials totally disjoint from company's accounting software. "*In one of the agencies I'm working with, people use Gmail instead of company-email.*" (IM-Int). "*One of my clients, a marketing department of a public sector company started using Flicker to store lots of images and lots of data around it.*" (IM-FGp).

Even though 'attractive licensing models' like "Freemium" discussed in literature review (section 3.2.10), were not explicitly mentioned by the research participants (section 5.2.8), the respondents cited use of various products like Flicker, Skype, LinkedIn, etc., which uses the Freemium model quite heavily (Tversky, 2011).

6.2.2. Similar Factors:

About 'consumer technologies being disruptive' (sections 3.2.2 and 5.2.2), one of the participants mentioned the sale of smart-phones exceeding the sale of PCs in 2010: "*I believe it is possibly in quarter 3 or 4*" (IM-Int). The news article by Menn (2011) cited IDC to confirm smart-phones did surpass the sale of PCs in the fourth quarter of 2010. 'Kendo UI Team Blog' (2011) did some further investigation to ascertain the sale of smart-phones not only exceeded PCs in 2010, but remained ahead throughout the entire year of 2011.

Even though the relative recognition of 'collaboration and social computing tools' remained high both among the participants and literature, a few mixed responses were noted on whether social networking is a core part of consumerization (sections 3.2.11 and 5.2.7). One of the comments indicate consumer devices are driving the popularity of social networking to new heights: "*the recent popularity of social computing is a side effect of the availability of smart-phones, as people use their mobile devices to make updates to their FaceBook… only a limited number of people do it through their desktops/laptops.*" (IM-Int). On the other hand, a participant mentioned: "*businesses have now accepted the presence of social networking in work environments, but haven't yet got used to the consumer devices*" (IT-FGp).

Similarly while most of the publications and respondents recognised 'blurring of work and home' as a strong factor for consumerization (sections 3.2.12 and 5.2.10), some participants perceived the work-life balance didn't change over a long period of time and hence cannot be attributed to consumerization (5.2.10).

In the same way, even though the 'externalization of businesses, cloud computing and partner eco systems' came up in various conversations (sections 3.2.15 and 5.2.14), the mention of cloud computing received a mixed-response. Some indicated, "*cloud-computing definitely helps reduce the price of goods and services, which makes it easier to consume and increase popularity; hence it is one of the factors.*" (IM-Int). Conversely some said "*cloud-computing is something that you need to drive efficiency and cost savings, not sure if it is necessarily driving or making consumerization… so I wouldn't link that*" (IM-Int).

There were no noted disagreements from the participants with literature on 'processing power of consumer devices', 'increasing mobility of employees and customers', and about 'the changing workplace-expectation of customers and employees'. On the third factor a further example was provided: "*an entire business unit of a large government organisation started using SalesForce.com to manage contacts and relationships, as the IT systems could not provide anything satisfactory to our needs.*" (IM-FGp).

On 'usage factor of consumer devices', Bass (as cited in Clevengar, 2011) marks the difficulty in creating information effortlessly as a drawback for its full-fledged organizational use (section 3.2.5). However, the same feature has been observed as a positive factor by the respondents (section 5.2.4). "*Previously industry worked on the basis that most of us are information producers, but actually we are mostly information consumers. Only a minor proportion of the human industry produces information, particularly written information.* " (IM-Int). Another respondent explained further, "*one of the needs of the senior executives is to be informed about the whereabouts of the industry. Hence reading magazines and newspapers is important for them. With iPad, reading newspaper is a breeze; it also eliminates the need to carry documents and books for senior executives to make use of narrow time slots in-between their busy work-schedules.*" (IM-Int).

Finally, while exploring the 'ecological factors', the apparent muteness on increasingly smaller footprint of consumer devices was investigated further. It was found that Devinney, Auger, and Eckhardt (2011), contradicted the findings of Gerzema and D'Antonio (2011) (mentioned in section 3.2.7) in a review, and suggested that the emergence of a true ethical consumer-base is a long way from being a reality. Hence the silence from the respondents may indicate that people are not too influenced on the ecological elements of consumer technology.

6.3. Corporate Benefits

6.3.1. Similar Factor:

A similarity in emphasis is noted among the respondents with literature that consumerization of IT is 'accelerating business growth' in organisations (sections 3.3.1 and 5.3.1). "*Tablets for example are friendly devices and can enhance richness of interaction between employees-in-the-field, with our customers. Various graphs can be drawn up instantaneously, items can be drawn down, photographs can be shown, returns can be demonstrated, and feedback can be generated all at one go.*" (IM-Int).

6.3.2. Dissimilar Factors:

Literature and most of the respondents agreed that consumerization can improve employee productivity through better trust relationship with the employer (sections 3.3.3, and 5.3.3). Management theories as early as the '60s suggested keeping a positive view of staff, instead of assuming them as indolent and irresponsible (see theory X and theory Y by McGregor, 1960). Bernnat, et al. (2011) mentioned increase in productivity with moderate internet use (section 3.3.3), and social networking in particular has been found to increase productivity by as much as 9% (Fahmy, 2009). On the other hand, a few participants indicated some employees can appear to be spending excessive time on the internet, especially on social networking sites. Over time others may join in and persuade a social loafing culture. While these behaviours are more linked to employee motivation issue, some latest findings

suggests online social networking like FaceBook and Twitter can be more difficult to resist than cigarettes and alcohol (Epstein, 2012).

Possible 'cost benefit' from consumerization in organisations (section 5.3.7) was hardly mentioned by the respondents. Also, 'productivity increase through employees bringing in new technologies' as mentioned in literature did not come up (sections 3.3.2. and 5.3.2.), even though many provided examples of 'employees bringing in new technologies' driving consumerization (sections 3.2.13, and 5.2.13).

Three entirely new factors cropped up (sections 5.3.4, 5.3.5, and 5.3.5), which are non-existent in the explored literature. Additional explanations from the respondents are noted below:

- 'Productivity through employees bringing in consumer behaviour and skills': "*A consumer IT-savvy employee is potentially more productive, not to mention the so-called digital natives who run their lives by technology. They don't even print airline tickets and expect to turn out on the check-in desk and scan their phone.*" (IM-Int).
- 'Standardisation enforced by consumer vendors': **"***Few years ago, organisations used variety of ways to look for information. Today people have become so used to Google search that it is often unproductive to ask employees to use other forms of search mechanisms in their office environment.*" (IM-Int).
- 'Finding newer skills through social networking sites': "*Sites like LinkedIn and FaceBook are being used to find consultants, contractors, especially jobs which are in high demand.*" (IT-FGp).

6.4. Corporate Challenges

Quite a few challenges came out strongly at the data-collection stage. Hence these are discussed item-wise as below, in the order of importance that came out from the participants.

6.4.1. Immaturity of Consumer Technologies: 'Immaturity of consumer technologies' is a big challenge identified from the participants that prohibits New Zealand corporates to initiate appropriate measures around consumerization. This came out quite strongly from data collections, but nothing substantial appears in literature. The only mention of this is: "we're still learning what the iPad's true potential is within the enterprise, and sometimes we have to experiment with what's possible in order to discover what really works best." Clevengar (2011, p.168).

As indicated in the findings (section 5.4.1), many respondents feel it is still early days and the next phase of growth in consumer technologies will be through the corporates. More than half of the respondents (57%) pointed out that there are big incentives for consumer vendors to 'Organisationalize', or in other words, to mature and fit into the organisation space: "*there is more incentive for consumer-technology-vendors to 'Organisationalize' than for the organisations to Consumerize.*" (IM-Int). As explained by an interviewee, "*more people can afford devices through their workplace than by themselves. Hence the consumer market will soon reach its saturation point and corporate space will have to be their next phase of growth.*" (IM-Int). There are rumours reported that RIM's new 'BlackBerry London' may be a close contender in this space (Niu, 2011).

Control: Many believe "*the consumer technology vendors will be doing themselves a big favour if they do provide some ability for organisations to control these devices.*" (IM-Int). Control over the consumer devices is the biggest barrier to 'Organisationalize': "*Blackberry recognised they've to give organisations some control in order for the device to be used by businesses.*" (IM-Int). Another respondent explained, "*BlackBerry spread like wildfire, and they were able to surpass Nokia. They identified the potential in the corporate market, and resolved the ability-to-control barrier without even being asked. So, whoever picks that up in the tablet industry can make a similar breakthrough.*" (IM-Int).

It was also pointed out that "*some vendors are offering packages and deals, whereby if you engage their services they'll sell you a central-administration kit for these tablets, with*

added cost to the package. Unfortunately these are not cost effective yet, and you also carry the risk of getting locked in, to Apple-infrastructure…" (IM-Int).

Price: One of the respondents believed the prices of iPads and tablets are bound to come down in the near future: "*The price of laptop did not drop due to more consumers, but due to its massive adoption in organisations, which allowed industries excessive inventory. The same will happen for iPads. Today you can buy a laptop cheaper than most tablets, but inherently a laptop is significantly a more powerful computing device. This can't go on for ever.*" (IM-Int).

Too expensive to sustain support: Two of the respondents observed iPads are costly to support in an enterprise: "*when an IPad breaks you've throw it into bin and get another one. So an organisation having 100 iPads will have to maintain 10 extra iPads, which organisations can justify for $200 devices but not for $1000 devices*". (IM-Int).

Robustness**:** Some of the respondents mentioned the robustness of the new iPad devices is still untested: "*we do not know how robust these devices are yet. I would like to suggest that an iPad is not as rugged as an iPhone as you'd open your phone if it is raining, but not your iPad.*" (IM-Int).

Uncertain about Security**:** Uncertainties were expressed on how the security of consumer technologies will mature. "*On RIM's BlackBerry security, quite a lot of countries want the ability to look into the BlackBerry communications especially because of the terrorists' network interchanging SMS… again Apple keeps things locked, but Samsung with Android, keeps things quite open… so on one hand the world wants openness, and then on the other hand you expect that in the likes of Samsung the organisations will drive in and structure their security, it is a bidirectional movement, not sure how it'll progress…*" (IM-Int). Further to this discussion, the research identified an ongoing debate around the security on open source softwares. Android being an open source is often associated with lower security as hackers have access to the source software (Noyes, 2011). This line of thinking is commonly termed as 'security through obscurity', and are mainly propagated by closed-source vendors;

in reality it is just the opposite as vulnerabilities in open source softwares are fast identified and closed (Noyes, 2011).

6.4.2. Regulatory Obligations: "*Adopting consumer technologies gets increasingly complicated with the number of legal obligations a company has to abide by.*" (IM-Int). Literature mainly indicates the Sarbanes-Oxley Act, which requires companies "to have adequate internal control structures and procedures for financial reporting, as well as maintaining all audit or review work papers for a period of 5 years. Companies are prohibited from altering, destroying, mutilating, concealing, covering up or falsifying records." (OnlineSecurityServices, 2011, para-1). Any publicly owned companies in the United States, including the wholly-owned subsidiaries, and all publicly traded non-US companies doing business in US, must comply with the Sarbanes-Oxley Act (OnlineSecurityServices, 2011). Private companies preparing for their initial public offerings may also need to comply with certain provisions of the Act (OnlineSecurityServices, 2011).

The respondents indicated, there are more regulations for NZ companies to abide by, than just the Sarbanes-Oxley Act (sections 3.4.6 and 5.4.7). "*We are talking about the Official information Act* [1982], *the Public Records Act* [2005], *Public Finance Act* [1989], *Privacy Act* [1993] *and the Data Protection Laws, Electronic Transactions Act* [2002], *Companies Act* [1993], *and various Government and Digitisation Standards. I can perceive massive problems around Information Lifecycle Managements, particularly for government agencies, and businesses who deal with them.*" (IM-FGp). Additionally, the paper found quite a few other legal needs NZ companies must consider, like: (i) copyright issues and potential application of New Zealand Open Access and Licensing Framework (NZGOAL), (ii) the need to care for the Fair Trading Act 1986, if the online services and social media are used as a channel for commercial activities, and (iii) compliance with procurement rules, authentication rules, conflicts of interest, issues that me arise under the Guidelines for the treatment of Intellectual Property Rights in ICT contract, etc. ('Government Information Services', 2011).

Most respondents do not understand what exactly these rules and regulations imply, even though they are aware of their presence, and their potential implication on storing and maintaining electronic information. For example, one mentioned: "*no, I'm not aware of the exact Act that prohibits storing public information outside New Zealand jurisdiction*" (IM-Int).

6.4.3. Security Challenges: Security challenge as in exiting literature (section 3.4.2) is probably the most discussed item, and it also indicated by all the respondents as a vital element of consumerization (section 5.4.4).

Moschella (2011) suggests the responsibility of creating new governance around risk and security challenges cannot be a sole responsibility of IT. The employees must be made aware of the risks as consumer oriented IT becomes the norm (Bernnat, et al., 2011). Similarly, multiple (87%) respondents suggested: "*security is more an IM* [Information Management] *issue instead of an IT issue*" (IM-FGp). To a large extent, security-obligation lies with the user and it is essential to ensure people are trained on security. "*It is a problem when people who don't know how to use these devices properly end up having them… it's a matter of education, cause it's obviously a powerful thing that you got in your hands now*" (IM-Int). Another respondent similarly commented: "*Security should be around people not devices*" (IM-FGp).

Literature recommends careful planning of security controls and processes, especially around identity and access management capabilities, like strong user authentication, identity lifecycle management, web access management, information encryption, etc. (Blount, 2011). With decreasing standardisation of user interactions and transactions, taking note of both the content of the requested data, along with the context of the data being requested (like location, time of day, recent user activity, etc.) will become essential consideration for security access (Blount, 2011). While various security approaches are available the following table lists the major controls suggested by Blount (2011) for protecting critical IT assets.

Encryption of the data on the device	Controls relating to access and use of IT systems, applications, and information
User authentication (strong passwords, inactivity time-outs, maximum failed login attempts, etc.)	Role management
Device wipe	Privilege clean-up
Device management to configure device security, and to push policy to the device	Requests for access to certain assets
Test of applications—most device vendors required formalised testing and certification of applications to minimize malware potential	User activity reporting/entitlement usage
Anti-malware products	Access certification
	Segregation of duties, violation identification and correction

Table–12: List of security controls for protecting IT assets (Blount, 2011).

In the data collection stage, security planning generated lots of discussions. The participants demonstrated that they are acquainted with multiple technological mechanisms around security. Some of these are exemplified in the table below:

Remote destruction of data	Locking it remotely	Smartcards
Display tokens like RSA-Secure-ID tokens	Secure Virtual Desktop on USB	
SAML (Security Assertion Mark-up Language) to secure mobile communications is gradually becoming a standard		

Table–13: Few technological options around security.

6.4.4. Challenges in Support and Control: Although a vast majority of the participants agreed with literature about the challenges to support and control (section 5.4.5), the viewpoints that came out are not homogeneous:

- "*How do we do capacity planning? How can we plan software updates when a big chunk of office hardware is owned by users?*" (IM-Int).
- "*As a CIO if I say 'yes, I can support you', people will expect a certain degree of robustness about the support, which implies I need to access the administration aspects, cost aspects, security aspects, and then trade that off with potential productivity that I may have.*" (IM-Int).

- "*Support involves multiple issues: there is management issue, a cost to fix issue, and because most of the users using these devices are senior people, you can't ignore them either, so there is an urgency issue*" (IM-Int).

6.4.5. Economic Downturn: Except for subtle references (see for example Finnie as cited in Clevengar, 2011, p.24) the literature review does not consider economic downturn as a challenge-factor for consumerization of IT. It only came out in the data collection (section 5.4.3): "*For any of the consumerization of IT initiatives whether it is a policy change or infrastructure upgrade, we need to allocate time and money. With the whole recession and funding situation both in the private and public sector, organisations cannot invest in the consumer devices that consumers are wanting to utilise.*" (IM-Int). When asked if this is specific to New Zealand, it was pointed out: "*economy is hurting globally hence it is not specific for New Zealand.*" (IM-Int).

6.4.6. Changing Policy Needs: In spite of a shortage of BYOD policies in NZ corporates (section 5.4.7), many organisations have social networking policies in place. In November 2011, the ICT Strategy Group released documents on high level guidance for government agencies when deciding for Social Media in a communications, community engagement or policy consultation context ('Government Information Services', 2011). Quite a few have policies around cloud computing, and various governance guidelines for dealing with external providers. A participant from a service-sector mentioned that their organisation provides consulting service on social networking and cloud computing policies. In October 2011, New Zealand Computer Society (NZCS) has come up with a set of cloud code of practice in consultation with significant cloud computing vendors in Wellington ('New Zealand Computer Society', 2011). Various initiatives were noted in NZ organisations around migrating out of legacy applications, virtualisation, and raising security standards.

6.4.7. Cost Constraints and Uncertain Cost Boundaries: Even though both the respondents and literature stressed on this challenge (sections 3.4.1 and 5.4.2), it has a slightly lower recognition from the participants when compared to all other factors that came up.

6.4.8. Challenges around Evolving Relations and Expectations: As opposed to a high emphasis in literature (section 3.4.4), these challenges hardly came up in the discussion sessions (section 5.4.6). This investigation infers these have not yet become prominent to the New Zealand participants, indicating New Zealand is at an early stage of consumer evolution.

6.5. Overall Findings

For NZ personnel, the market-research articles and trade journals form the main source of information about consumerization (section 5.1). Additionally, more than 80% of the drivers, benefits, and challenges identified in literature, were brought up by the respondents. This strongly suggests a strong influence of existing publications on NZ personnel, which includes the IT decision makers.

The responses recorded in data-collection, reveals 97% coverage of the discussion topic, which demonstrates an exceptionally high awareness of 'Consumerization of IT' amongst NZ personnel. This is also reflected in the response of the participants when they disagreed with the IDC findings that IT is unaware about consumerization (sections 3.1.3 and 5.1).

While the likeness of the responses with literature is high on drivers and challenges, it is relatively low on the organisational benefits of consumerization (66% and 60%, versus 25%). Also a general drop in relative recognition of benefits is noted among all the factors marked dissimilar by the respondents compared to literature (see table-9). This shows in contradiction to literature, the relative importance given on benefits by NZ participants is lower than the drivers and challenges.

The respondents identified two new factors for every five factors that came out from the publications (42%). This is a considerable gap considering (i) consumerization is still in its early days in New Zealand (section 6.4.1) and (ii) the limitations of this investigation (section 7). Not only does this signify limits of published literature, but also reveals an area of opportunity for similar investigative-analysis.

This paper came across a shortage of publications in NZ around consumerization. Incidentally that was brought up in an interview discussion. "*Lack of research publications is not necessarily an indicator of actual activities happening; instead it is a function of the research focus of a country. NZ has research focus on things like dairy, but not on information and communication technologies as in the United States, or even Australia.*" (IM-Int). No further evidence comes across within the scope of this investigation to confirm reasons for NZ-literature gap.

There are more challenges faced by corporate decision makers around 'Consumerization of IT' compared to the perceived benefits. Among them 'security' issues ranks the top of the list with 'regulatory obligations', 'support and control', and coping with the 'economic downturn' following close behind. 'Immaturity of consumer technologies' and 'regulatory obligations' are examples of challenges, which fall beyond organisational capability.

7. Challenges and Limitations of the Research

Quite a few limitations have been identified with this research.

- The research has been conducted by a single researcher. Hence it limits the analysis to the perception of one individual and does not fulfil an 'investigator triangulation' (as suggested by Denzin, 1970).
- The research deals with limited data, collected from only 14 participants (section 3.2.1) within a short timeframe of 4 months (section 3.2.4). Hence it does not fulfil a complete 'data-triangulation' as suggested by Denzin (1970).
- The researcher's knowledge about the topic and background as an information technology professional can potentially instil an implicit bias in interpreting and understanding the participant discussions.

8. Conclusion

A tension and uncertainty was detected around increasing consumer technologies and behaviour in NZ workplace, with the information technology decision makers constantly evaluating the best course of action to adopt. More than what appears in literature, the analysis of the responses reveal the corporate challenges of consumerization far exceeds the associated benefits, especially with a shortage of comprehensive choice of cost-efficient solutions for businesses to invest into. The major issues include coping with the security and regulatory challenges the businesses must abide by to meet their commitments. Unavailability of all-around affordable solutions and absence of peer organisations serving as exemplars were detected. The IT decision makers are on the constant lookout on the developments around consumerization, by subscribing to several market-research articles, trade journals and by attending numerous exhibitions and seminars. Tight budgetary and resource constraints of post-recession economy also add to the challenge to justify cost-effectiveness on big initiatives. The loosely structured dialectical interviewing methodology was not bound by pre-defined questionnaires; hence a large number of unique viewpoints emerged, which do not appear in existing publications.

NZ professionals are unclear on how to protect sensitive information the organisations are obligated to, without a command-control infrastructure, which many literature predict will be abolished by consumerization of IT. Many suggest, while numerous changes as predicted by consumerization are inevitable, the consumer technologies will ‘Organisationalize’ long before the control-structure reaches the breaking point. The consumer vendors will invest in returning control back to businesses, to sustain their next phase of growth, and devices like iPad will transform into an affordable, popular and robust business device. If that be the case, New Zealand organisation’s reputation of being ‘slow adaptors of technology’, may ironically prove astute.

9. Direction for Future Research

The investigation revealed consumerization is in its early days in NZ, and the literature review shows little qualitative research has been done around NZ organisations. More research with a bigger set of interviewees and focus groups will develop the subject further. It is an area that demands more exploration, on wider variety of parameters, not only on organisations and people dealing with information technology, but also on others who are indirectly affected by this trend. It must be noted that many of the new factors and variances detected in this paper, including the recognition-level of the drivers, benefits and challenges, are specific to New Zealand. Hence care must be taken to pass on the findings to other countries, which may have different cultural norms and laws of the land.

10. Bibliography

Allwright, D., & Bailey, K.M. (1991). *Focus on the language classroom: an introduction to classroom research for language teachers*. Cambridge University Press: Cambridge, New York, Melbourne, Madrid, Cape Town, Singapore, Sao Paulo.

Bernnat, R., Acker, O., Bieber, N., & Johnson, M. (2011). Friendly Takeover, The Consumerization of Corporate IT. *booz&co.* Retrieved 12th August, 2011, from http://www.booz.com/media/uploads/Friendly_Takeover.pdf.

Bless, E., Alanson, M., & Noble, C. (2010, July). Consumerization: What is in Store for IT? *Intel-Maritz* [IMR Position Paper]. Retrieved 17th September, 2011, from http://i.dell.com/sites/content/business/solutions/whitepapers/en/Documents/intel-imr-consumerization-wp.pdf.

Blount, S. (2011, August). The consumerization of IT: security challenges of the new world order. *CA Technologies* [Technology Brief]. Retrieved 19th September, from http://www.ca.com/us/~/media/Files/TechnologyBriefs/Consumerization-of-IT-Tech-Brief.pdf.

Brannen, J. (1992). Combining qualitative and quantitative approaches: An overview. In J. Branner (Ed.), *Mixing methods: Qualitative and quantitative research* (pp. 3-37). Aldershot: Avebury

Clevengar, N. (2011). *IPad in the Enterprise: Developing and Deploying Business Applications*. John Wiley and Sons: Indianapolis.

D'Archy, P. (2011). CIO strategies for consumerization: The future of enterprise mobile computing. Retrieved 12th august, 2011, from http://marketing.dell.com/Global/FileLib/hp_microsite/dell-consumerization.pdf.

Denzin, N. (1970). *Sociological Methods: A Sourcebook*. Aldine Transaction: United States.

Devinney, T., Auger, P. & Eckhardt, G.M. (2011, February 22). Values vs. Value. *Strategy+Business, Issue 62*. Retrieved 22nd October, 2011, from http://www.strategy-business.com/article/11103?gko=03d29.

Epstein, J. (2012). FaceBook and Twitter are more addictive than cigarettes or alcohol, study finds. *FoxNews.com.* Retrieved 13th February, 2012, from http://www.foxnews.com/scitech/2012/02/06/facebook-and-twitter-are-more-addictive-than-cigarettes-or-alcohol-study-finds/.

FaceBook (2011). *Statistics*. Retrieved 20th January, 2012, from http://www.facebook.com/press/info.php?statistics.

Fahmy, M. (2009, April 2). FaceBook, YouTube at work make better employees: study. *Reuters.* Retrieved 13th February, 2012, from http://www.reuters.com/article/2009/04/02/us-work-internet-idUSTRE5310ZH20090402.

Fraser, M. & Dutta, S. (2008). *Throwing sheep in the boardroom: how online social networking will transform your life, work and world*. [Books24x7 version] Available from http://common.books24x7.com/toc.aspx?bookid=29493.

Gens, F., Levitas, D., & Segal, R. (2011). 2011 Consumerization of IT Study: Closing the "Consumerization Gap". *IDC-IView Content* [Sponsored by Unisys]. The multimedia content can be viewed at http://www.unisys.com/iview.

Gerzema, J., & D'Antonio, M. (2011, February 22). The Power of the Post-Recession Consumer. *Strategy+Business, Issue 62*. Retrieved 22nd October, 2011, from http://www.strategy-business.com/article/00054?pg=all.

'Global Mobility Network'. (2008). Knowledge Management and Enterprise Social Networking. February, 12th 2011 from http://www.thesmartworkcompany.com/pdf/KMESN.pdf.

Golden, B. (2011, August 16). What 'consumerization of IT' really means to CIOs. IT World Canada. Retrieved 18th August, 2011, from http://www.itworldcanada.com/news/what-consumerization-of-it-really-means-to-cios/143749

'Government Information Services'. (2011). Social Media in Government, High Level Guidance. Department of Internal Affairs. Retrieved, 14th February, 2012, from http://webstandards.govt.nz/assets/Social-Media-in-Government-High-level-Guidance-final.pdf.

Guba, E.G., & Lincoln, Y.S. (1994). Competing paradigms in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of Qualitative Research* (Vol. 1, pp. 105-117). Thousand Oaks, CA: Sage.

Hammersley, M. & Atkinson, P. (1983). *Ethnography: principles in practice*. London: Routledge.

Josh, B., & Ted, S. (2010). *Empowered: unleash your employees, energize your customers, transform your business*. [Books24x7 version] Available from http://common.books24x7.com/toc.aspx?bookid=36280.

'Kendo UI Team Blog'. (2011, December). Smartphone shipments outpaced PCs in ALL of 2011 [Web Blog]. Kendo UI. Retrieved 11th January, 2011, from http://www.kendoui.com/blogs/archive/11-12-20/smartphone_shipments_outpaced_pcs_in_all_of_2011.aspx.

Kvanzant. (2009, October 29), Consumerization of IT, Part One. Solarwinds [Web Log]. Retrieved 21st May, 2011, from http://whiteboard.solarwinds.com/2009/10/29/consumerization-of-it-part-one.aspx.

Lamy, L. & McQuire, N. (2010, October). The Consumerization of IT: How Are CIOs Managing the Complexity? *European Desktop and Workplace Life-Cycle Services: Insight, vol. 1* (IDC #LM55S). Retrieved 19th November, 2011, from http://www.unisys.com/unisys/common/download.jsp?d_id=1120000970006410112&backurl=/unisys/ri/report/detail.jsp&id=1120000970006410112.

Madden, B. (2011, June 02). The consumerization of IT: Why most vendors get it wrong, and why it's a real challenge today (Part 1) [Web Log]. Retrieved 12th August, 2011, from http://www.brianmadden.com/blogs/brianmadden/archive/2011/06/02/the-consumerization-of-it-why-most-vendors-get-it-wrong-and-why-it-s-a-real-challenge-today-part-1.aspx.

Malik, P. (2011, July 15). Consumerization of IT-Time for IT to wake up. *TechRawr, the future is now!* [Web Log]. Retrieved 31st August, 2011, from http://techrawr.blogspot.com/2011/07/it-is-no-doubt-that-modern-world-is-in.html.

Mason, D.M., Tideswell, C., & Roberts, E. (2006). Guest Perceptions of Hotel Loyalty. *Journal of Hospitality & Tourism Research, 30* (2), 191-206. DOI: 10.1177/1096348006286364.

McCracken, G. (1988). *The Long Interview*. New York: Sage Publications.

McGregor, D. (1960). *The Human Side of Enterprise*. New York: McGraw-Hill.

Menn, J. (2011, February). Smartphone shipments surpass PCs. *ft.com.* [New Article]. Retrieved 11th January, 2011, from http://www.ft.com/cms/s/2/d96e3bd8-33ca-11e0-b1ed-00144feabdc0.html#axzz1DQNdT4kR.

'Microsoft Corporation'. (2011, April). Strategies for Embracing Consumerization. Retrieved 15th September, 2011, from http://download.microsoft.com/download/E/F/5/EF5F8B95-5E27-4CDB-860F-F982E5B714B0/Strategies%20for%20Embracing%20Consumerization.pdf.

Moschella, D. (2011, June 23). What the Consumerization of IT means to your business, ten messages for CXOs. *LeadingEdgeForum* [Web Log]. Retrieved 12th August, 2011, from http://lef.csc.com/blog/post/2011/06/what-the-emconsumerization-of-item-means-to-your-business-ten-messages-for-cxos.

Myers, M. and Newman, M. (2007). The Qualitative Interview in IS Research: Examining the Craft. *Information and Organization. 17* (1), 2-26.

Prete C. D., Levitas, D., Grieser, T., Turner, M.J., Pucciarelli, J., & Hudson, S. (2011). IT Consumers Transform the Enterprise: Are You Ready? An IDC White Paper sponsored by CA Technologies. Retrieved 13th August, 2011, from http://www.ca.com/~/media/Files/whitepapers/signature-research-idc-whitepaper-final.pdf.

'New Zealand Computer Society'. (2011). NZ Cloud Code of Practice–Terms of Reference. Retrieved, 14th February, 2012, from http://www.nzcloudcode.org.nz/wp-content/uploads/2011/11/Cloud-Code-ToR-final.pdf.

Niu, E. (2012, January 06). How RIM May Pull Off a Turnaround [News Article]. Retrieved 24th January, 2012, from http://www.dailyfinance.com/2012/01/06/how-rim-may-pull-off-a-turnaround/.

Noyes, K. (2011). Is Android Less Secure Than iPhone? Um, No. *PCWorld Business Centre*. Retrieved 24th January, 2011, from http://www.pcworld.com/businesscenter/article/216733/is_android_less_secure_than_iphone_um_no.html.

OnlineSecurityServices. (2011). Sarbanes-Oxley Compliance. Retrieved 27th January, 2012, from http://www.onlinesecurity.co.nz/sarbanes_oxley.html.

Tversky, O. (2011, August 14). The democratization of the enterprise. *Gigaom.* Retrieved 13th February, 2012, from http://gigaom.com/cloud/the-democratization-of-the-enterprise/.

Thompson, C. J. (1997). Interpreting Consumers: A Hermeneutical Framework for Deriving marketing Insights from the Texts of Consumers' Consumption Stories. *Journal of Marketing Research 34* (November), 438-455.

Thompson, H.H. (2010). Consumerization and Security, Effective Security Practices Series. Microsoft. Retrieved 30th March, 2011, from http://download.microsoft.com/download/E/F/9/EF9F24B7-DB49-44D4-8F6A-A49D5020B8B8/Consumerization_Final.pdf.

Woodward, A. (2011). The Consumerization of IT: A Major Opportunity For Collaboration Applications. *IDC #LT53T, Volume: 1, European Business Analytics and Social Platforms.* Software and Services: Insight.

Worley, C. (2010). How Can You Prepare for the Consumerization of IT? *McAfee* [Editorial Brief]. Retrieved 30th March, 2011, from http://www.mcafee.com/us/resources/solution-briefs/sb-how-can-you-prepare-for-the-consumerization-of-it.pdf.

Unisys. (2010). Unisys Consumerization of IT Benchmark Study (no. 10-0190). Retrieved 15th august, 2011, from, http://blog.unisys.com/files/2010/06/10-0190-CIT-SUMMARY_web1.pdf.

11. Appendix-A: Information Sheet for Interviews and the Focus Group

Project title: **Consumerization of Information Technology, drivers, benefits and challenges for New Zealand Corporates.**

The proposed research is a part of my Masters of Information management from Victoria University of Wellington. Victoria University requires all participants to a research to be fully informed about the research and acknowledge their consent before research commencement.

The research is on Consumerization of IT, which describes the trend for new information technology to emerge first in the consumer market and then spread into business organizations. In recent days this phrase is fast gaining interest, with the sharp growth of personal consumer devices (like smart phones and tablets), combined with the massive popularity of social media (vehicle for networking, broadcasting and collaborating), and also due to the rising trend of cloud-based services and partner eco-systems.

With the help of the study-participants, the research explores the penetration of Consumerization of IT in New Zealand, and its impact on the corporate Information Technology (IT) Systems.

In as part of this research, focus groups will be conducted with the participants.

Please note:

- In the reporting no individuals or organizations (the individuals affiliate to) will be identifiable, as that is not relevant to the research.
- The interaction between the participants will be recorded with a digital recorder. Only the researcher and the supervisor will have access to the raw data. All data relating to this research will be stored securely and destroyed after two years.
- Participants can receive a copy of the researcher's final report on request.
- Researchers are required to obtain written consent from each person participating in the focus group discussion.
- The combined data may be presented at a conference or used in a journal article. These may be stored in a Victoria University repository and be available online. All data will be aggregated so that no individual or organisation (the individuals affiliate to) could be identified.
- There is no practical way you can withdraw from audio recording, so once the group has started, you cannot withdraw your consent. However you are under no obligation to answer all the questions.
- You are requested to keep the matters discussed in the group confidential.
- This research has been approved by the Ethics Committee of the School of Information Management.

Any questions about this research can be directed to the Palash Kanti Sen, at senpala@vuw.ac.nz or my supervisor Dr. David Mason, at david.mason@vuw.ac.nz (phone: 04-463 7435).