STATE OF ICT IN BERMUDA

2014/15

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SAMPLE/METHODOLOGY

Residential Statistics

1. Department of Statistics – December 2014
   400 households in Bermuda were interviewed.
   The sample was randomly selected.
   The margin of error for this segment is +/– 4.9%.

2. E-Commerce Residential Technology Benchmarking Research – February 2015
   400 Bermuda residents aged 18 years and older were interviewed.
   The sample was weighted to be representative of Bermuda's population with respect to gender, age, and nationality.
   The margin of error for this segment is +/– 5%.

Corporate Statistics

1. E-Commerce Corporate Technology Benchmarking Research – February 2015
   200 Business professionals aged 18 years and older were interviewed.
   The sample was representative of Bermuda's business community with respect to small, medium and large companies.
   The margin of error for this segment is +/– 7%.

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INTRODUCTION

The purpose of the Department of E-Commerce's *State of ICT in Bermuda* report is to assess the prevalence of Information and Communication Technologies (ICT) in Bermuda, from an infrastructure, usage and skills perspective. Given the rapidly changing nature of technology and its potential impact and implications for Bermuda and its residents, regular and in-depth quantitative data regularly is gathered.

Many of the indicators used are consistent with those used by the International Telecommunication Union's (ITU) in the *Measuring the Information Society* Annual Report, which requires that certain ICT indicators be reported annually. Other indicators used are also consistent with those of leading international organisations such as the World Economic Forum and their *Networked Ready Index* (NRI) Framework, the Economic Intelligence Unit's *Digital Economy Readiness Rankings* and the *Partnership on Measuring ICT for Development* Core ICT Indicators.

ICT indicators track the state of a country's digital economy and progress by assessing elements such as infrastructure and penetration rates and the use of ICT by individuals and organisations. These indicators also can show a jurisdiction's ability to innovate or leverage technology to benefit society or the economy.

This analysis of the Bermuda ICT landscape is designed to continue using the benchmark developed over time, against which to compare progress, spot shortcomings and identify new trends and opportunities. The report provides information for policy makers, businesses, organisations, educational institutions, technophiles and others, to assist with decision-making and forward planning. Although we do introduce new questions in respect to developments in the technology landscape, we employ comparisons between 2010, 2012, and 2014/15 where possible.

Highlights in the 2014/15 report include:

- 99% of businesses have Internet access
- 89% of households have access to the Internet
- 98% of residents use the Internet from any location at least once a week
- 93% of businesses uses technology for business-to-business interactions, such as procurement, inventory control and payments
- 89% of businesses use technology for business-to-consumer interactions, such as facilitating payment, sales and providing information
- 82% of businesses use technology for business-to-government interactions, such as payroll tax, immigration and social insurance
- 85% of households owned a smartphone
- 78% of residents owned a wifi or Internet ready device, such as a tablet or e-reader

- 63% of residents shop online with overseas merchants
- 22% of residents shop online with local merchants
- 60% of businesses have a corporate social networking presence

RESIDENTIAL FINDINGS

Attitudes toward Technology

In 2014/15, one new question was added to identify evolving attitudes related to Bermuda's adoption of new products and services in order to remain competitive. Ninety-six percent (96%) of residents indicated their agreement that such adoption was important for Bermuda. Ninety percent (90%) of residents agreed that having a strong knowledge of technology was essential in getting ahead today, while eighty-five percent (85%) believed that technology helped them to be more creative or innovative.

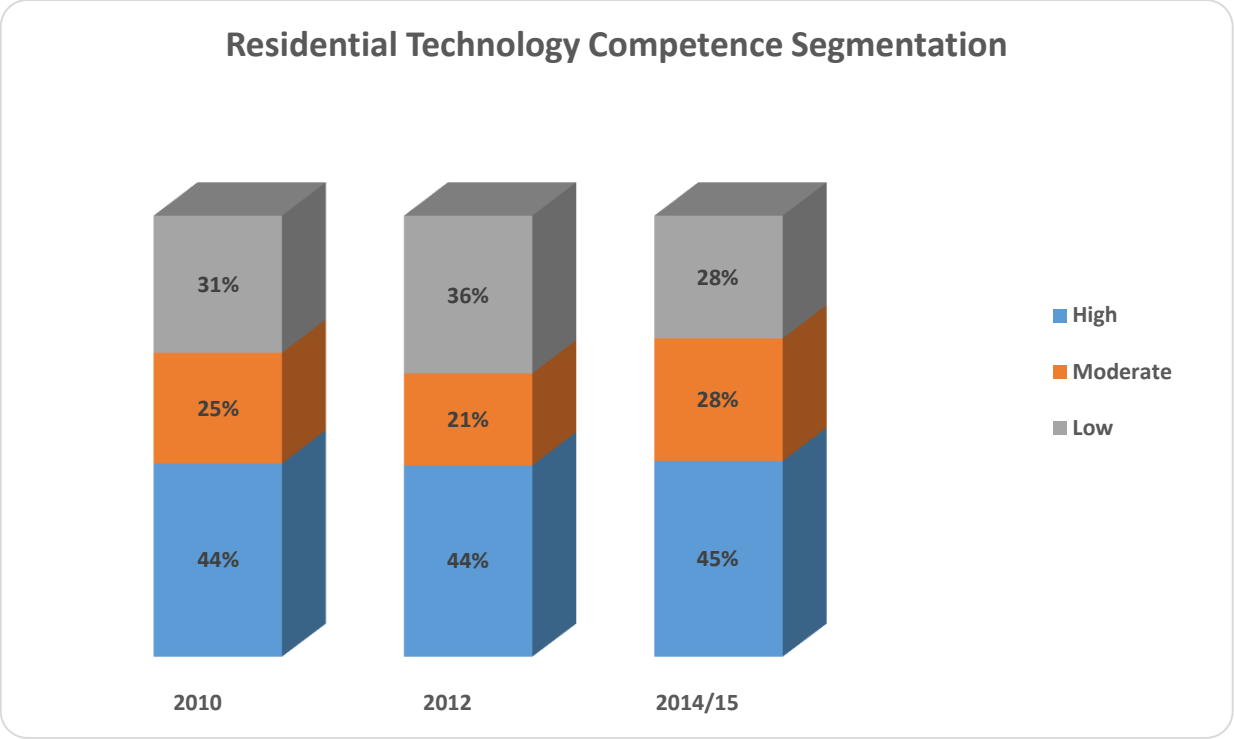
Attitudes Toward Technology: Percent of Agree Strongly/Agree Somewhat *Responses*			
	2010	2012	2015
It is important for Bermuda to continue adopting new technology products and services in order to remain competitive.	n/a	n/a	96%
In order to compete in the global economy, Bermuda must continue to meet or exceed global technology standards	97%	97%	94%
Having a strong knowledge of technology is essential in getting ahead today	92%	95%	90%
Technology helps me to be more creative or innovative	n/a	90%	85%
I like to be among the first to adopt new products and technologies	43%	54%	66%
n/a = research question not included during the particular period.			

When asked why technology was important, the top response was that it was the way of the world and that we could not survive without it. Residents believed technology was an essential tool and that it allowed them to communicate with family and friends. Ultimately, technology makes life easier.

Overall Technology Competence

Residents were asked to rate their level of expertise regarding 29 technology areas related to general computing, Internet usage, cellphones, smartphones, and other technologies. Based on these ratings, residents were classified as having either low, moderate, or high technological competence based on the number of areas for which they expressed a high level of expertise (9 and 10 ratings on a 1 – 10 scale).

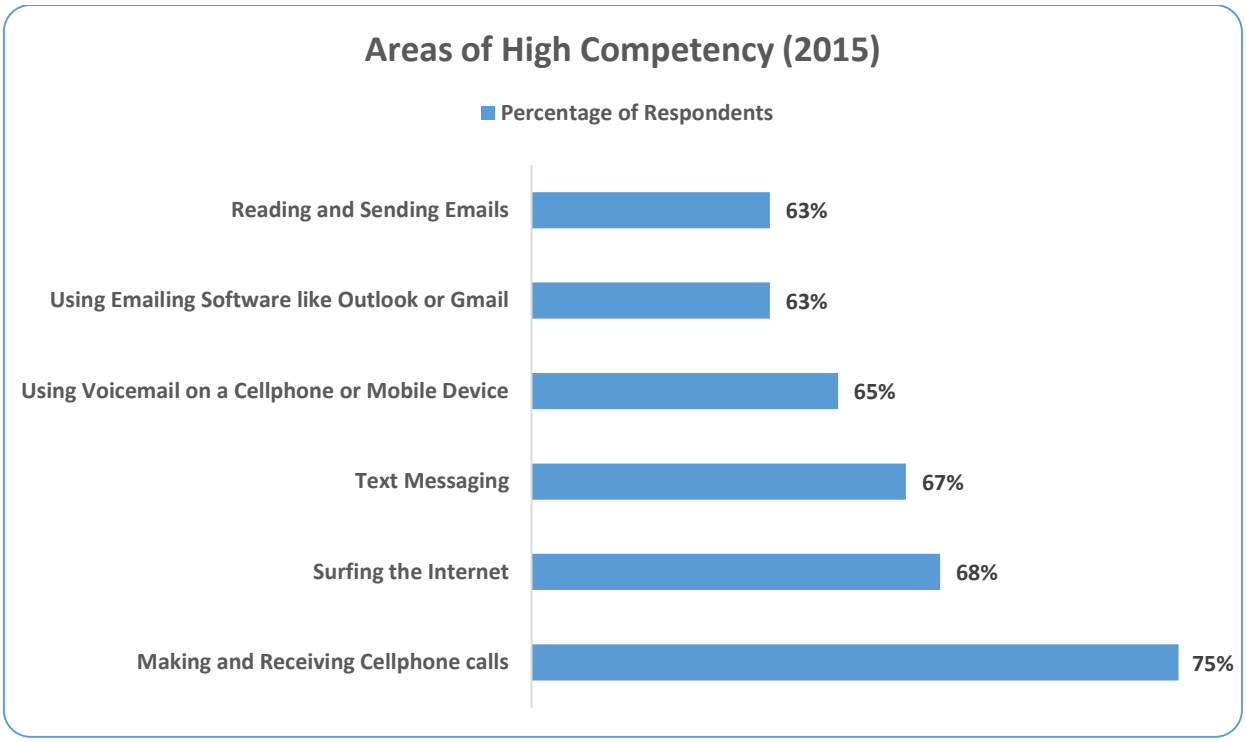
Twenty-eight percent (28%) of residents rated themselves as having low competence, twenty-eight percent (28%) as having moderate competence, and forty-five percent (45%) as having high competence.



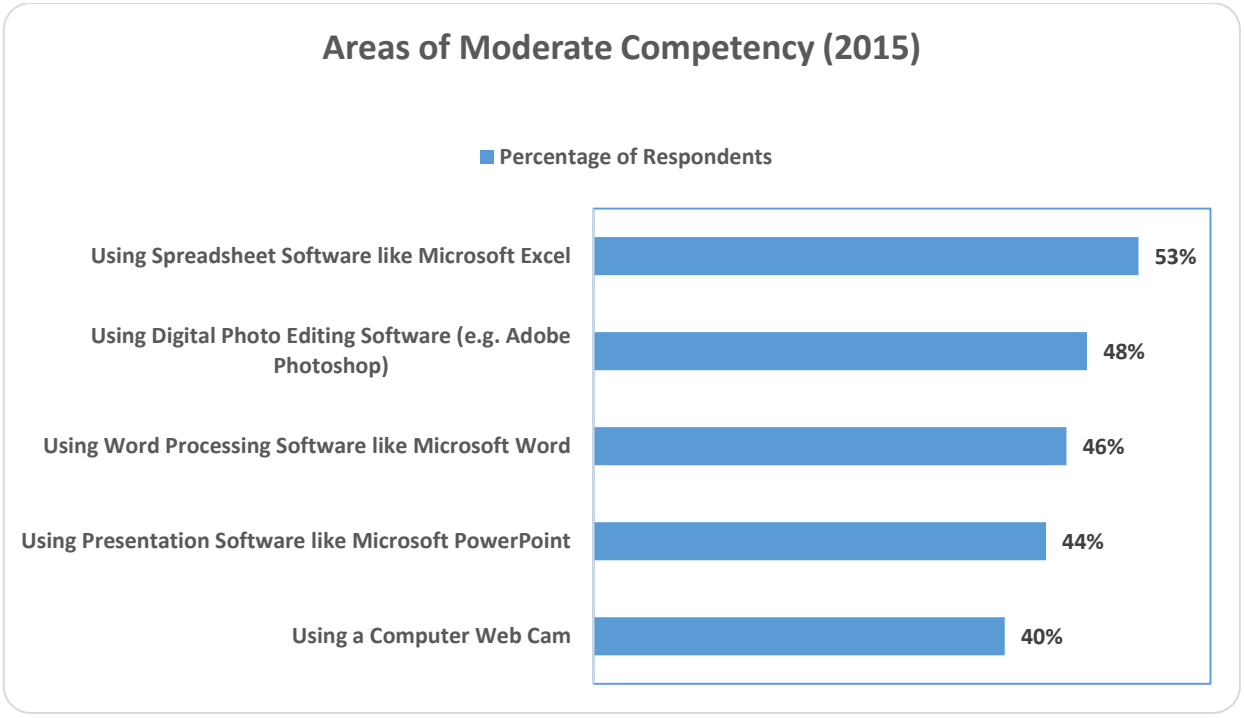
It is worth noting the significant shifts that occurred within the competence levels. Namely, seventy-three per cent (73%) of Bermuda's residents reported a moderate to high level of ICT competence, versus sixty-five percent (65%) in 2012 and sixty-nine percent (69%) in 2010.

Also, there was an eight percent drop (8%) in those who rated themselves as having low competence between 2012 and 2014/15. This may have been the result of the proliferation of personal devices, including smartphones and tablets, as they both perform many computer-like functions and have enhanced computing powers.

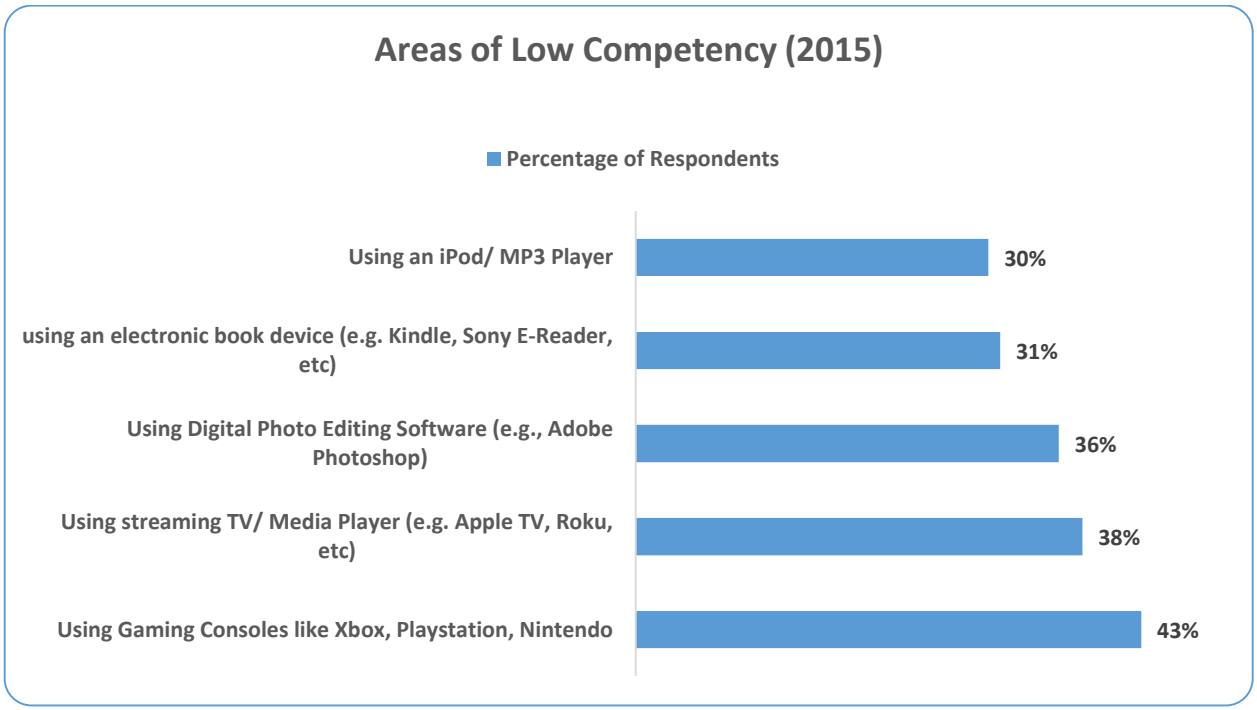
The areas where residents expressed a high degree of competency are shown in the chart. The top areas included: making and receiving cell phone calls, surfing the Internet, and text messaging.



The areas where residents expressed a moderate degree of competency are shown in the chart. The most-often mentioned areas included: using spreadsheet software, digital photo editing software, and word processing software.



The areas where residents expressed a low level of competency are reflected in the chart. The most-frequently mentioned areas included: using gaming consoles, using streaming media devices, and digital photo editing software.

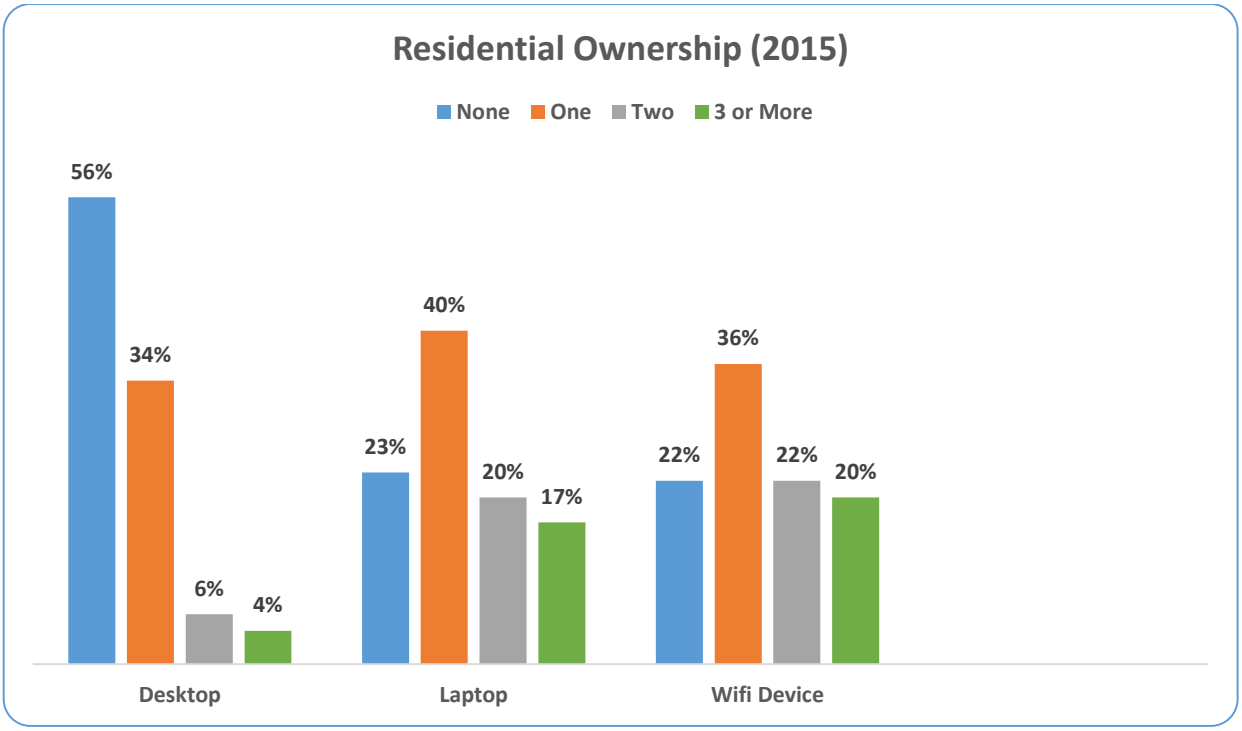


Ownership & Purchasing Habits: Computers, Mobile phones, and Other Internet-Ready Devices

Ownership

Bermuda continues to have a high computer ownership rate for residents (85% in 2014 vs. 90% in 2012), with the most popular Wifi or Internet-ready devices being tablets, e-readers, and smartphones.

There was a further decrease in the proportion of residents who owned a desktop computer (44% vs. 53% in 2012 and 62% in 2010) and an upsurge in laptop ownership (77% vs. 71% in 2012 and 78% in 2010). Seventy-eight percent of respondents also reported owning a Wifi device, the most popular of which were tablets and e-readers (78% vs. 54% in 2012 and 52% in 2010).

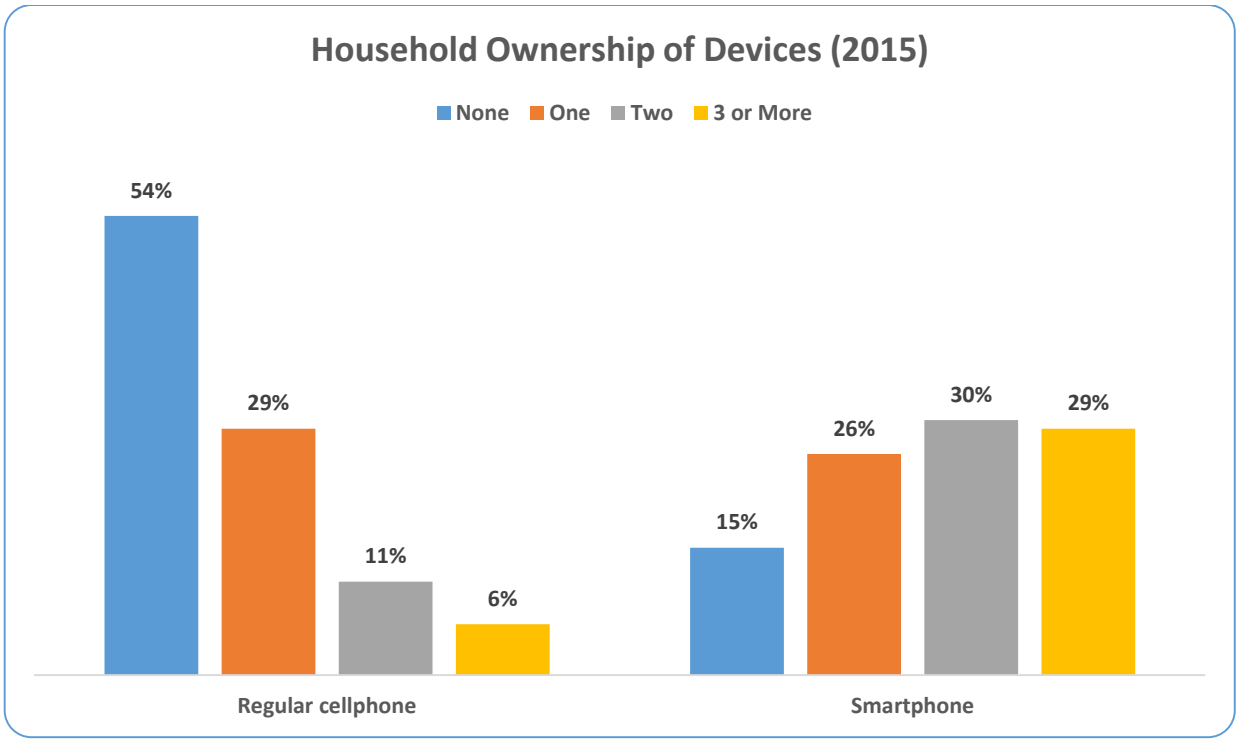


Looking at other technologies, the most popular items owned by households continued to be televisions (96% vs. 98% in 2012), radios (86% vs. 90% in 2012) and digital cameras (71% vs. 69% in 2012).

Technology items owned by residents			
	2010	2012	2015
TV	n/a	98%	96%
Radio	n/a	90%	86%
Digital Camera	82%	69%	71%
High Definition compatible TV	47%	49%	62%
iPod or MP3 Music Player	64%	49%	55%
Game Console Like Xbox 360, Playstation 3, Nintendo Wii,	51%	43%	43%
LED TV	n/a	20%	38%
Streaming video player such as Apple TV, Sony, Roku or Boxee, G-Box, Amazon Firestick	n/a	10%	34%
DVR Cable Service (e.g. TVO)	18%	25%	31%
3D TV	n/a	n/a	6%
4K TV	n/a	n/a	0%
n/a = research question not included during the particular period.			

Regarding telephony, eighty-nine percent of households (89% in 2014 vs. 95% in 2012) owned a mobile phone. Making the distinction between regular cellphones and smartphones yielded the following results:

in 2015, the number of households that owned a smartphone device continued to increase (85% vs. 78% in 2012 and 76% in 2010) while regular cell phone ownership continued to decrease (46% vs. 50% in 2012 and 63% in 2010).



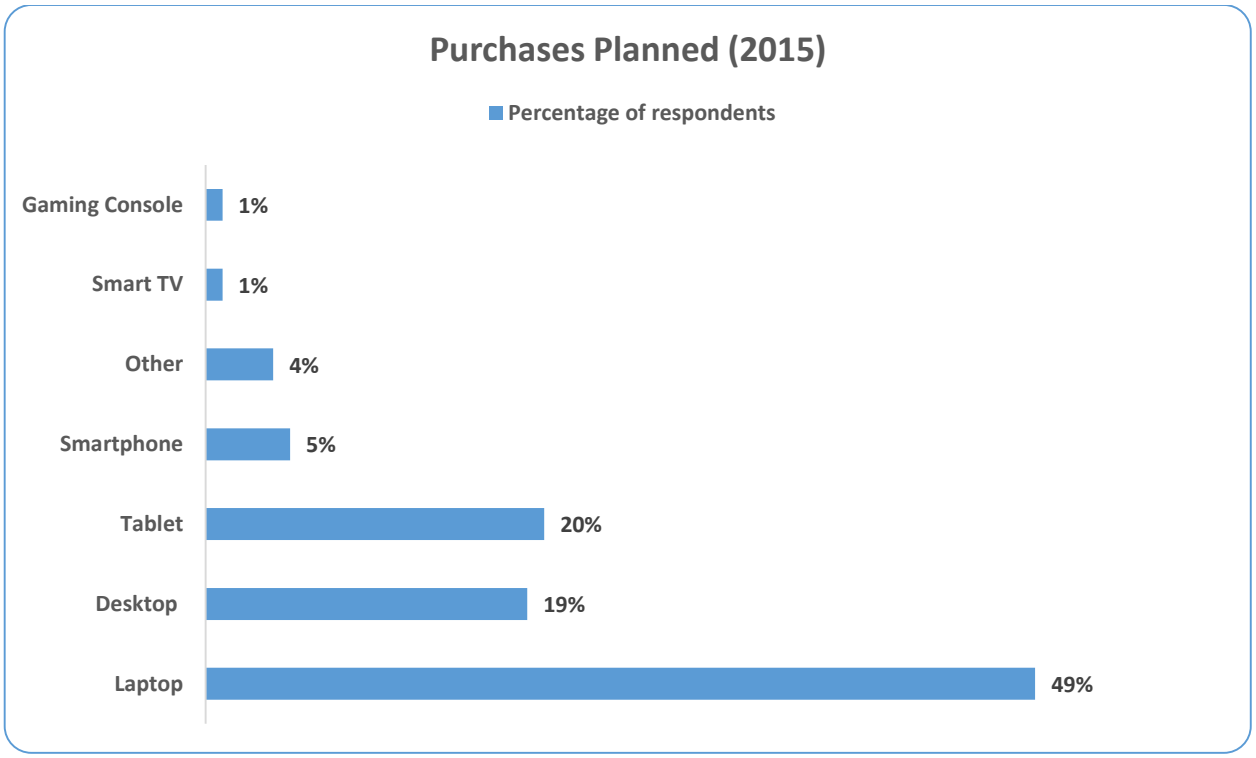
Ninety-six percent (96%) of residents reported that at least one household member that used a tablet, laptop, desktop, cellphone, or smartphone. Nineteen percent (19%) of respondents reported one household member using a device, thirty-two percent (32%) of households reported two members, and twenty-four percent (24%) of households reported three members.

Twenty-two percent (22%) of resident using devices ranged between 1 to 17 years of age, seventy percent (70%) of were between 18 to 64 years old, and nine percent (9%) were over sixty-five.

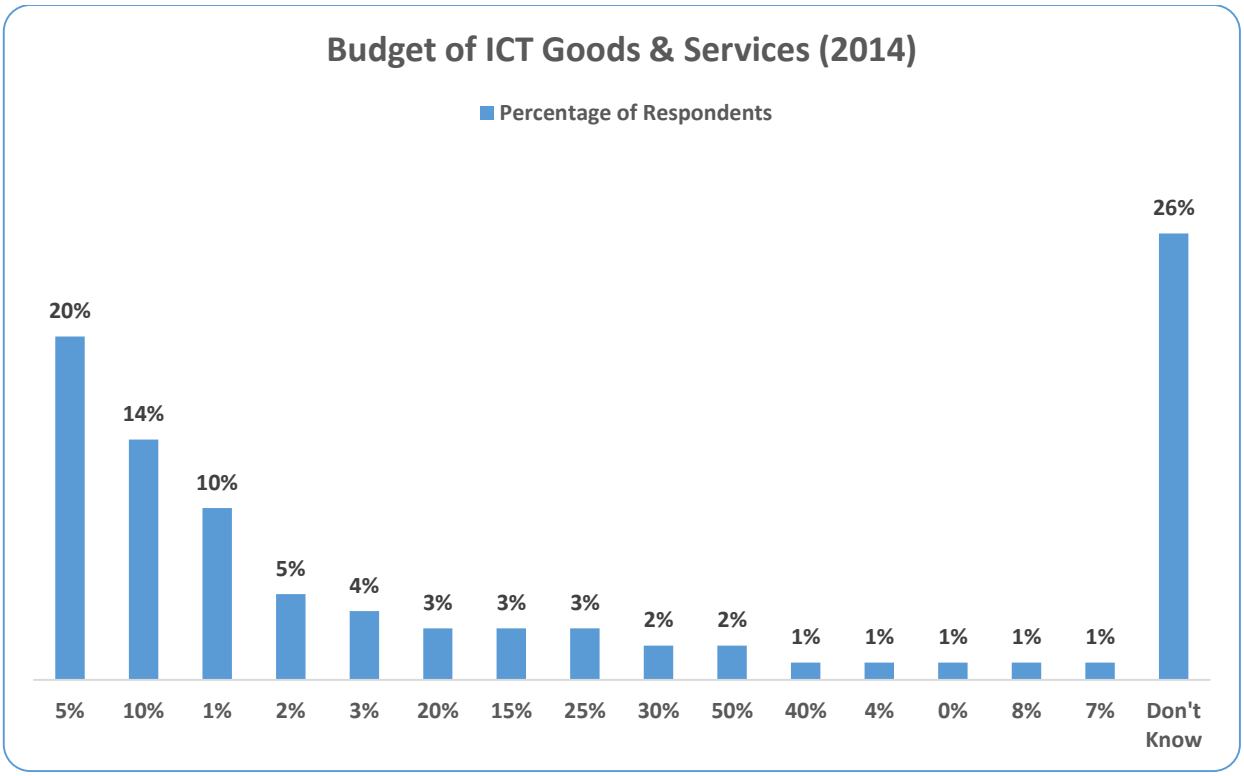
When asked about cellphone networks, forty-seven percent (47%) of residents said that they operate on 3G or 3G+ Networks while forty-one percent (41%) mentioned CellOne's 4G network.

Purchases and Upgrades

Twenty-three percent (23%) of residents were likely to upgrade to a new computing device within the next six months, with the top computing devices to upgrade to being laptops (half of all upgrade plans) and tablets (20% of all upgrade plans).



In terms of expenditure, ten percent (10%) of residents estimated that the amount they spent on ICT goods, relative to their household budget was one percent (1%), while twenty percent (20%) estimated the proportion to be five percent (5%) of their household budget and fourteen percent (14%) of residents estimated it to be ten percent (10%).



Online ICT-related purchases were on a rebound, with twenty percent of residents saying that they purchased IT equipment locally (20% in 2015 vs. 14% in 2012 and 22% in 2010). The most popular IT equipment purchased locally were mobile devices (both cellphones and smartphone devices), followed by computers (laptops and desktops) and tablets. Residents explained that they purchased IT equipment locally because of the accessibility, ease, and convenience afforded locally, in addition to local customer service.

Twenty-two percent of residents said that they purchased IT equipment abroad (22% in 2015 vs. 12% in 2012 and 31% in 2010), with the most popular IT equipment purchased overseas including tablets, followed by desktops and laptops. Factors driving making purchases of IT equipment abroad included pricing and selection.

Forty-three percent of residents said that they purchased IT equipment both locally and abroad (43% in 2015 vs. 38% in 2012 and 35% in 2010). They based their decision on such criteria as service, price, selection, and convenience.

Whether purchase IT equipment locally, abroad or both			
	2010	2012	2015
Locally	22%	14%	20%
Abroad	31%	12%	22%

Both	35%	38%	43%
Don't Know /Refused	12%	36%	15%

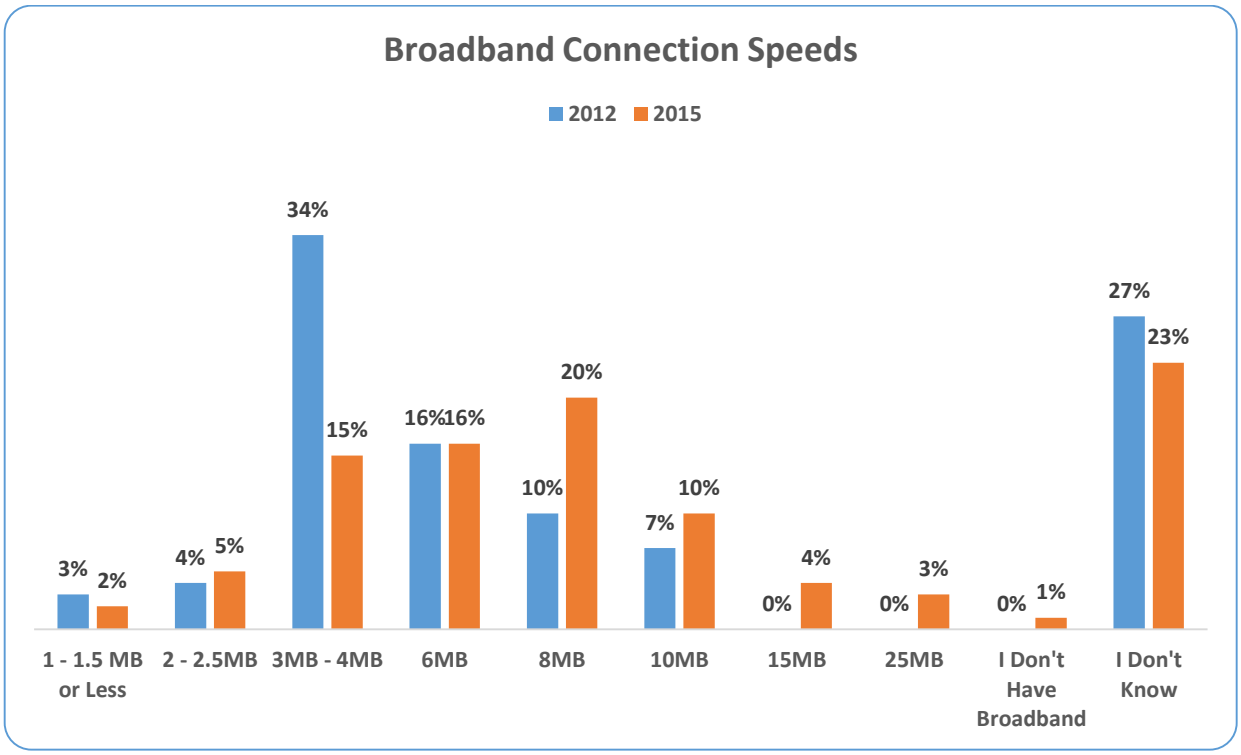
Overall, residents quantified their annual spending on IT-related products, showing a slight rebound overall ($3,527 in 2015 vs. $3,279 in 2012, down from $4,726 in 2010):

Computer, Mobile and Internet Usage

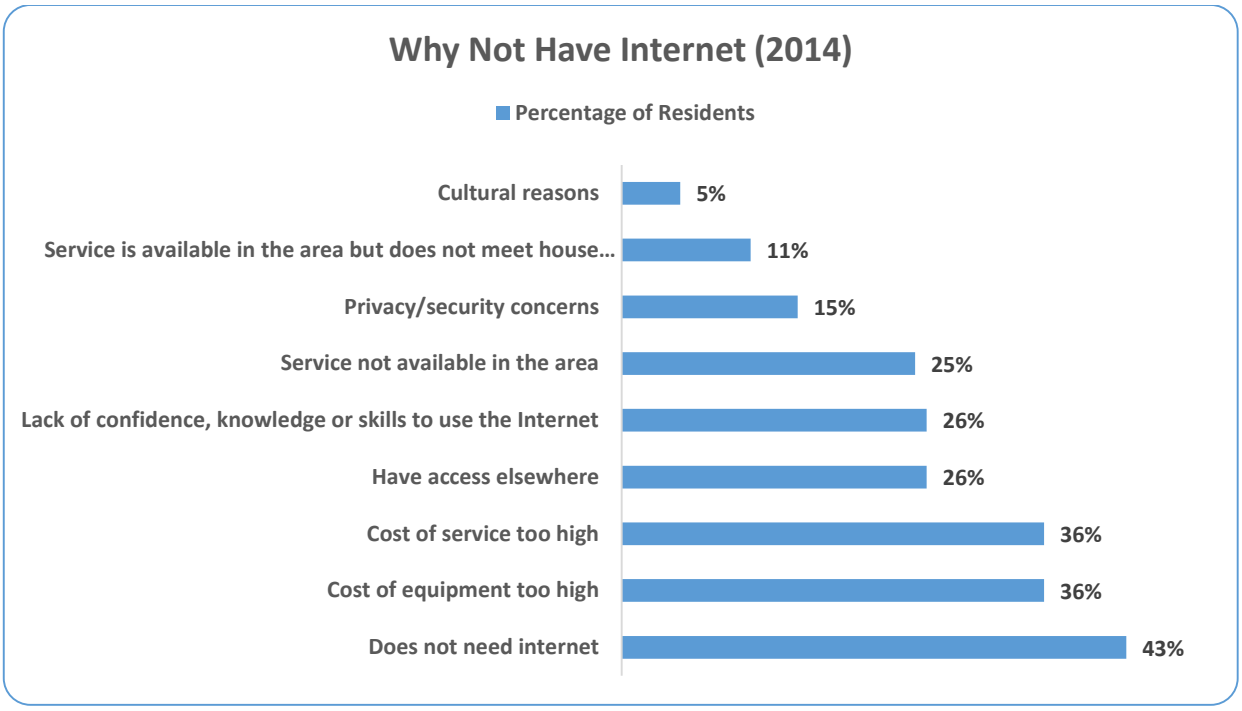
Computer Use

Eighty-nine percent of households reported having Internet access (89% vs. 90% in 2012 and 92% in 2010).

Fixed broadband saw an increase (86% vs. 79% in 2012 and 59% in 2010), while mobile broadband through portable modems fluctuated (24% vs. 10% in 2012 and 29% in 2010) and narrowband increased (6% vs. 2% in 2012 and 5% in 2010). Sixty-eight percent (68% vs. 67% in 2012) of residents use speeds of 3MB or above with seventeen percent use speeds equal to or higher than 10MB (17% vs. 7% in 2012).



The most frequently-mentioned reasons why households did not have Internet were that it was not needed (43%), that the cost of the equipment (36%) and of the service (36%) was too high.



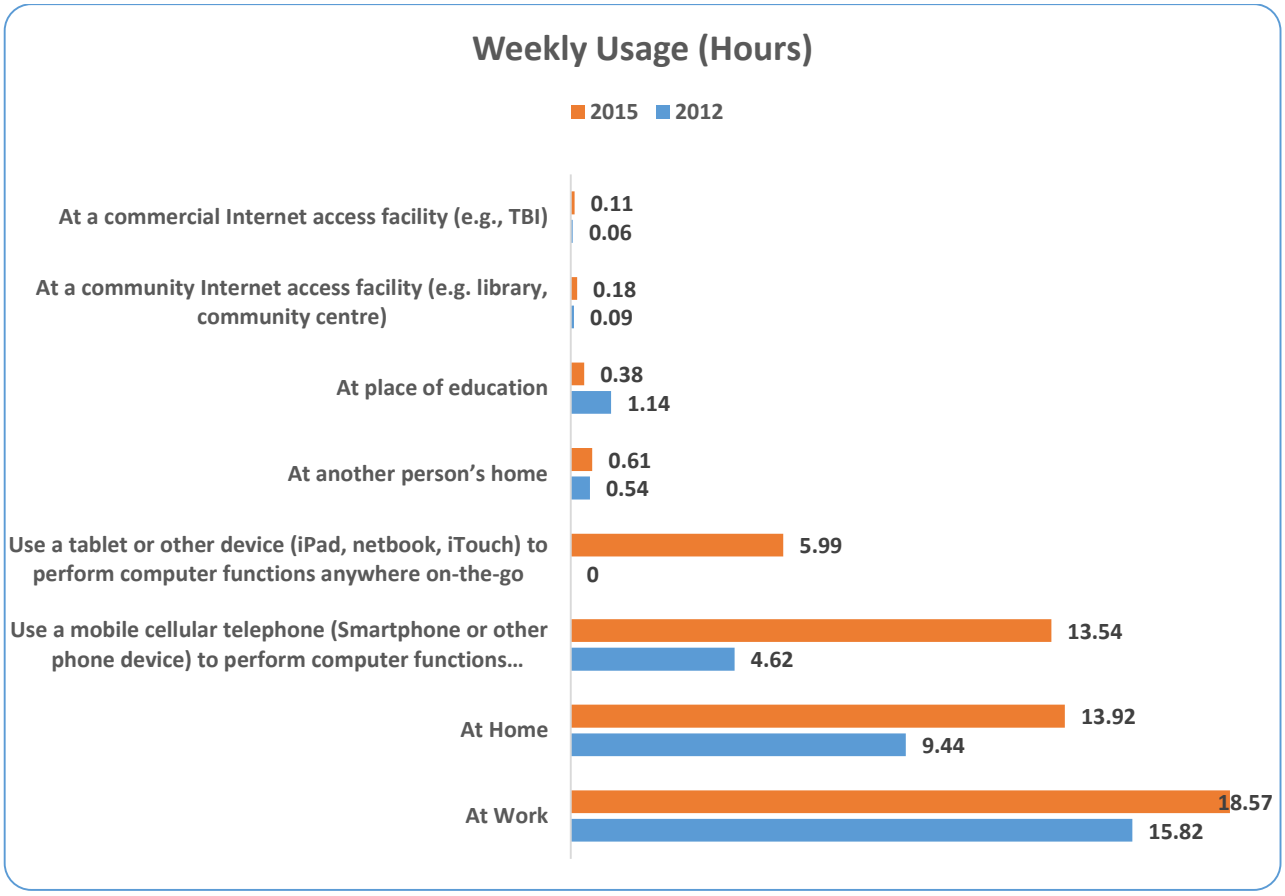
Eighty-six percent (86%) of residents used the Internet via their home, sixty-six percent (66%) at their place of work. In mobility, sixty-nine percent (69%) of residents used the Internet via their mobile cellular telephone, and fourty-seven percent (47%) used the Internet via another mobile wifi-ready device. Residents spent an average of 13.92 hours a week using a computer at home (9.44 hours in 2012 and 10.9 hours in 2010).

When asked about the specific activities performed on the internet, ninety-two percent (92%) of residents specified email uses, while eighty-eight percent (88%) declared using the internet for research on goods and services, and eighty-two percent (82%) mentioned Internet banking.

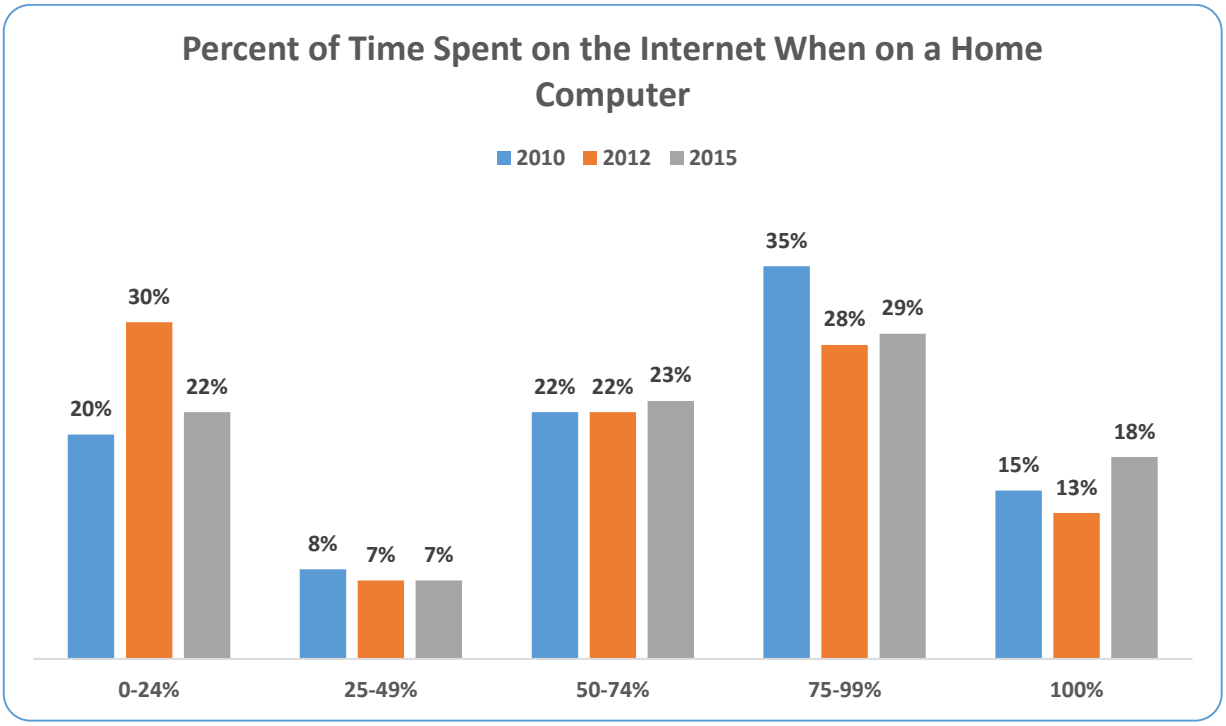
Internet activities performed by residents (2015)			
Sending or receiving email	92%	Watching web television	40%
Getting information about goods and service	88%	Listening to web radio	39%
Internet banking	82%	Accessing chat sites, blogs, newsgroups etc.	37%
Services related to travel/accommodation	76%	Participating in professional networks	35%
Seeking health information	76%	Uploading self/user-created content to a website	32%
Reading/downloading online newspaper/magazine etc.	74%	Looking for a job/sending or submitting job application	29%
Participating in social networks	69%	Using software run over the Internet to edit text documents	26%
Streaming/downloading images, movies etc.	66%	Local online shopping	22%
Overseas online shopping	63%	Doing a formal online course	18%

Telephoning over the internet/VOIP	61%	Managing personal/own homepage	17%
Getting information from general Government organisations	61%	Making an appointment with a health practitioner via a website	16%
Downloading software/applications	58%	Selling goods or services	13%
Using storage space on the internet to save documents etc.	54%	Blogging: maintaining/adding content to a blog	10%
Using online local Government services	48%	Posting opinions on civic/political websites	9%
Consulting wikis, online encyclopaedias etc.	47%	Taking part in online consultations/voting to define civic issues	7%
		Online gambling or sports betting	6%

Forty percent of residents declared that they used online government services (40% vs. 41% in 2012 and 47% in 2010) which was a decrease from previous years. Of those, the most popular service was TCD, followed by Payroll Tax and Land Tax.



Seventy per cent (70% in 2015 vs. 63% in 2012 and 72% in 2010) of residents used the Internet over half the time they were using their computers at home.



The most-often mentioned computer-related activities are listed in the table below

Computer-related activities performed by residents in last three months (2014)	
Sending or receiving email	92%
Getting information about goods and services	88%
Internet banking	82%
Services related to travel/accommodation	76%
Seeking health information	76%
Reading/downloading online newspaper/magazine etc.	74%
Participating in social networks	69%
Streaming/downloading images, movies etc.	66%
Overseas online shopping	63%
Telephoning over the internet/VoIP	61%
Getting information from general government organisations	61%
Downloading software/applications	58%
Using storage space on the internet to save documents etc.	54%
Using on-line local Government services	48%
Consulting wikis, online encyclopedias etc.	47%
Watching web television	40%

Listening to web radio	39%
Accessing chat sites, blogs, newsgroups etc.	37%
Participating in professional networks?	35%
Uploading self/user-created content to a website	32%
Looking for a job/sending or submitting job application	29%
Using software run over the internet to edit text documents etc.	26%
Local online shopping	22%
Doing a formal online course	18%
Managing personal/own homepage?	17%
Making an appointment with a health practioner via a website	16%
Selling goods or services	13%
Blogging: maintaining/adding content to a blog	10%
Posting opinions on civic/political websites	9%
Taking part in online consultations/voting to define civic issues	7%
Online gambling or sports betting	6%

Cellphone & Smartphone Use

When asked about usage of cellphone or smartphone features, eighty-three percent of residents mentioned taking pictures (83% vs. 72% in 2012 and 61% in 2010), eighty-one percent mentioned text messaging (81% vs. 74% in 2012 and 71% in 2010), seventy-three percent mentioned emailing (73% vs. 59% in 2012 and 56% in 2010), seventy-three percent mentioned sending pictures to others (73% vs. 64% in 2012 and 54% in 2010) and seventy-one percent of respondents mentioned using the Internet (71% vs. 59% in 2012 and 55% in 2010).

Cellphone or Smartphone features used by residents				
	2010	2012	2015	Daily
Taking pictures	61%	72%	83%	35%
Text messaging	71%	74%	81%	50%
Emailing	56%	59%	73%	47%
Sending pictures to others	54%	64%	73%	28%
Accessing the Internet	55%	59%	71%	47%
Messaging Software (Please specify in next question)	45%	39%	70%	57%
Social Networking applications (e.g. Facebook, Twitter, Pinterest etc.)	40%	43%	57%	40%
Playing games	44%	39%	55%	25%
Purchasing/downloading applications	36%	42%	50%	8%
Streaming TV and Movies	n/a	n/a	35%	8%
Purchasing goods or services online	27%	27%	33%	6%
Online banking	26%	28%	33%	6%
Using peer to peer technology (e.g. Blackberry PINS)	40%	37%	31%	13%

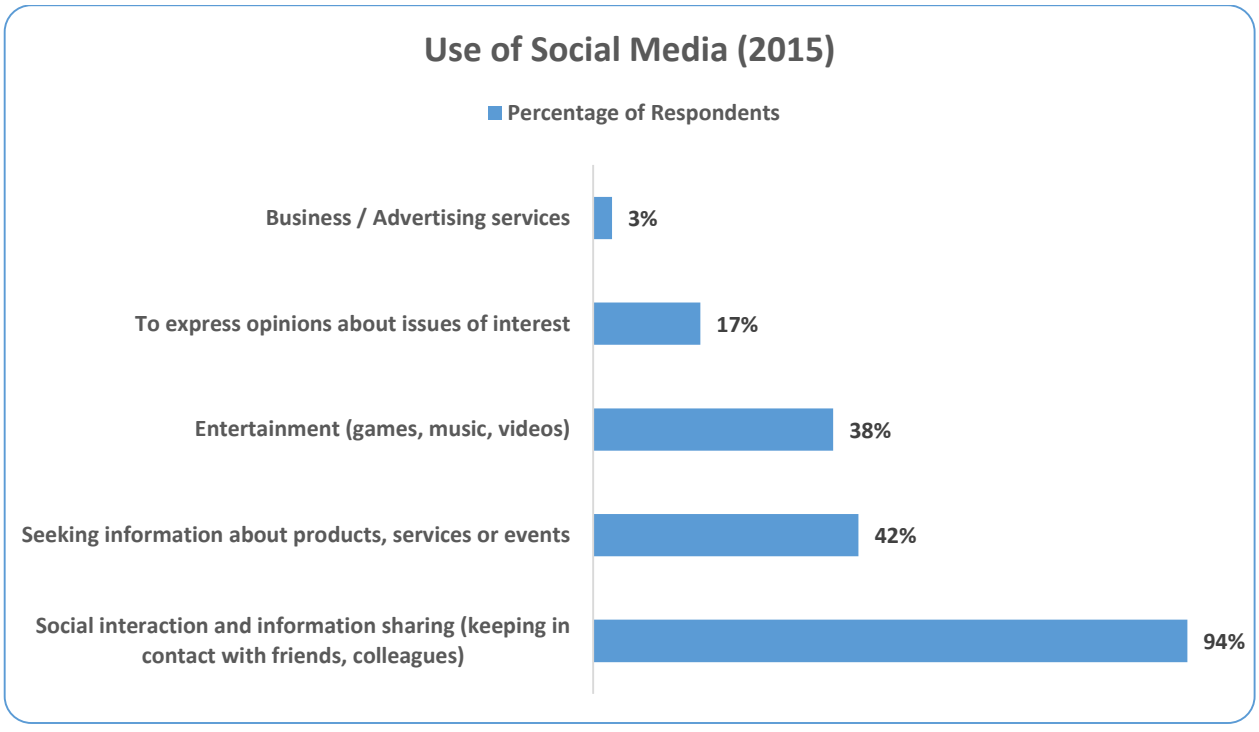
Using Navigation Software (GPS)	20%	26%	28%	3%
Bill payment	24%	22%	27%	4%
Using a barcode or QR code reader	n/a	23%	23%	1%

The most popular features used were downloaded apps, calendar, radio/music, and weather. The most popular messaging software used by residents was WhatsApp, followed by Blackberry Messenger and Facebook Messenger.

Social Networking and Websites

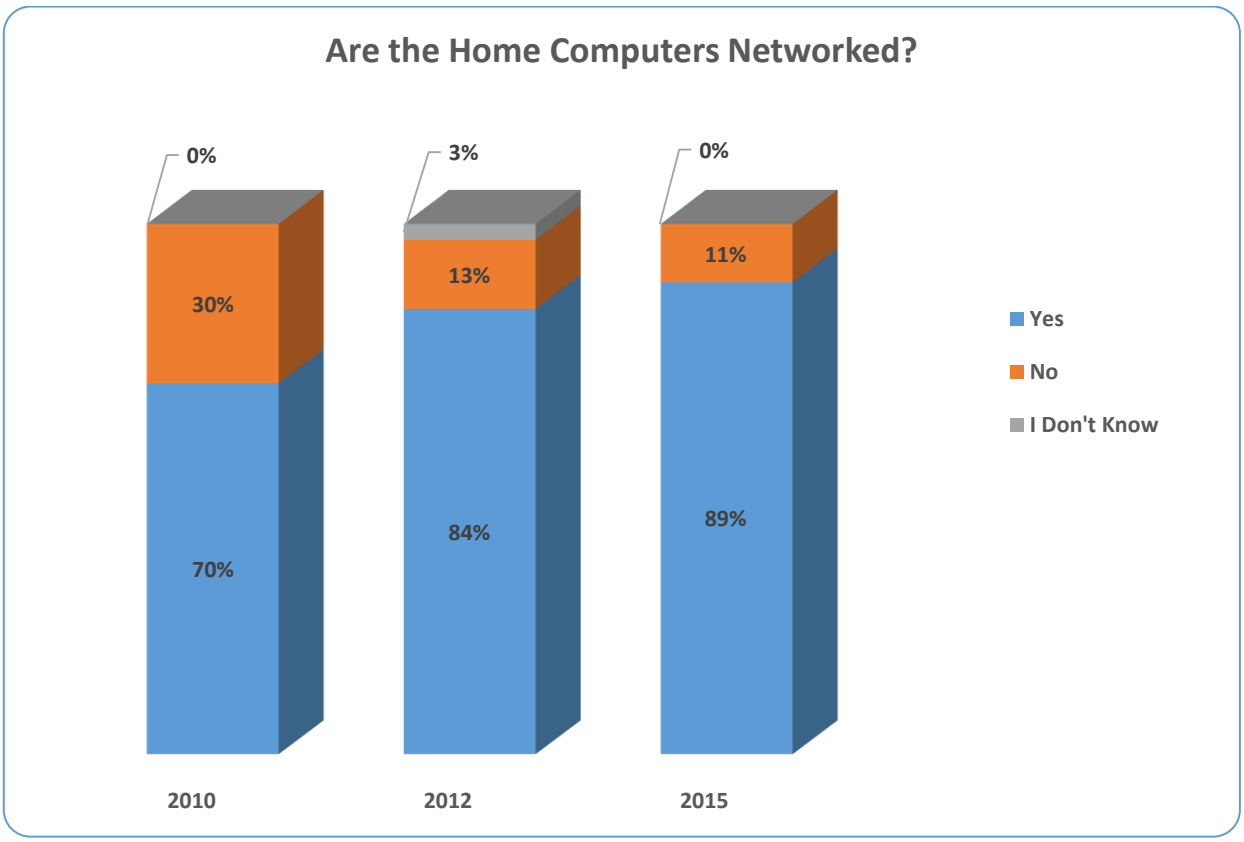
Sixty-nine percent of residents (69% in 2014 vs. 52% in 2012) said that they used social networking sites while fifty-seven percent (57% in 2015 vs. 43% in 2012) reporting that they used social networking applications on their smartphones.

Ninety-four percent (94% in 2014 vs. 52% in 2012) of respondents reported using social networking for the purposes of social interactions and information sharing, while forty-two percent (42%) use such applications to research products, services, or events and thirty-eight percent (38%) use it for entertainment.



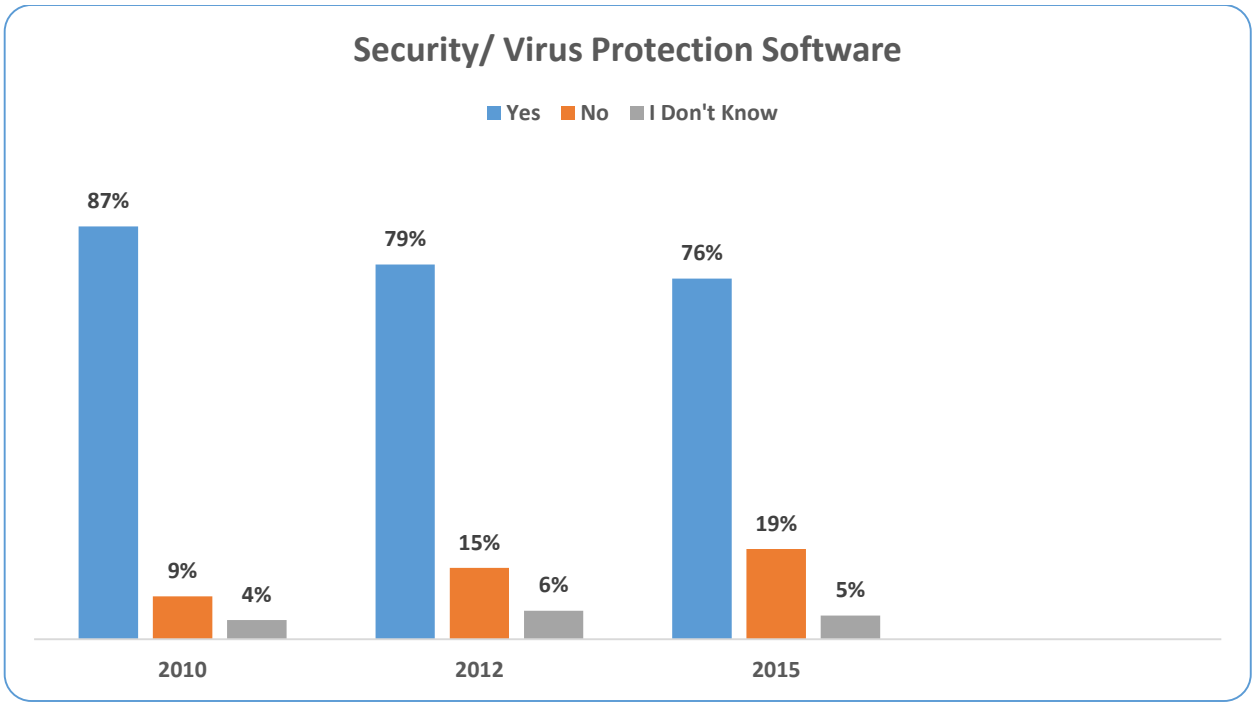
Internet Safety

Eighty-nine percent (89% vs. 84% in 2012 and 70% in 2010) of residents who owned more than one computer reported having a residential computer network, ninety-five percent of which were wireless (95% vs. 94% in 2012 and 77% in 2010). Consistent with 2012 numbers, ninety-four percent of those wireless networks (94% vs. 88% in 2010) were secure. For eighty-nine percent of respondents, all of their devices could gain access to the Internet (89% vs. 84% in 2012 and 70% in 2010.)

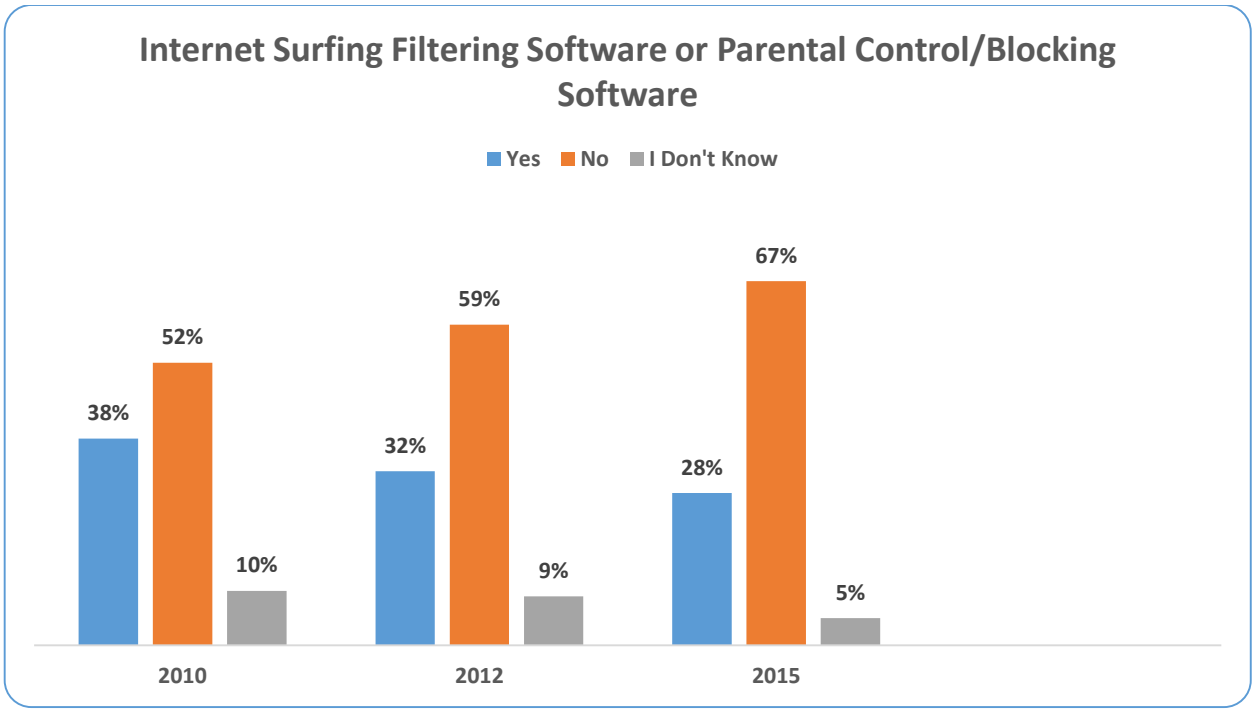


Seventy-eight percent of respondents protected their devices (78%) with a security feature and of those, seventy-nine percent (79%) mentioned using a password. Other security mechanisms include I-Touch, hard drive encryption, finger swipe security, and Touch ID.

Two marked decreases concerned different security methods. One such decrease reflected the fact that only seventy-six percent of residents had security/ virus protection software installed on their computer (76% vs. 79% in 2012 and 87% in 2010).



The other drop was evidenced by the fact that only twenty-eight percent had Internet surfing filtering software/ parental control/ blocking software installed on their computer (28% vs. 32% in 2012 and 38% in 2010).



Cybertips.bm

Twelve percent (12%) of residents were familiar with Cybertips.bm, with 45-54 year-olds being the most likely to be familiar with it.

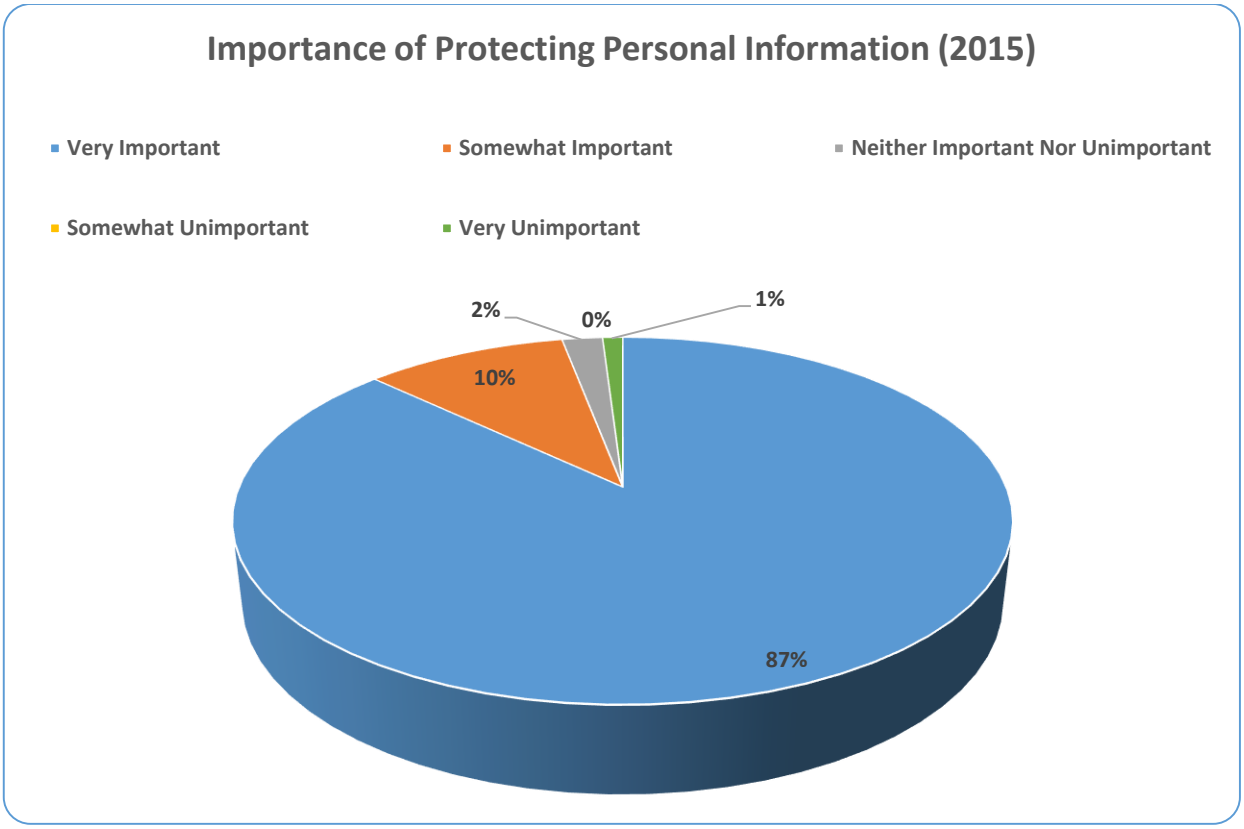
Familiarity with Cybertips.bm								
	TOTAL (2015)	Male	Female	18-34	35-44	45-54	55-64	65+
Familiar with Cybertips.bm	12%	15%	10%	3%	17%	24%	9%	9%
Unfamiliar with Cybertips.bm	88%	85%	90%	97%	83%	76%	91%	91%

When asked about the kind of information residents would find most useful on Cybertips.bm, most respondents ranked Internet safety tips first, followed by information on fraud protection and tips on parental control.

Sixty-two percent (62%) of residents felt that the Internet is secure in Bermuda (and that percentage was consistent throughout age ranges) while sixteen percent (16%) disagreed. The most common reasons mentioned by the latter group made mention of all the incidents reported/heard of so far such as recent hacks at Target (Target Brands, Inc.), Arnold's (Arnold's Family Market), etc.

Percent of residents who believe that the Internet is secure in Bermuda								
	TOTAL (2015)	Male	Female	18-34	35-44	45-54	55-64	65+
Yes	62%	65%	60%	64%	58%	74%	65%	50%
No	16%	21%	12%	10%	18%	15%	24%	18%
Don't Know	21%	15%	27%	26%	24%	11%	11%	32%

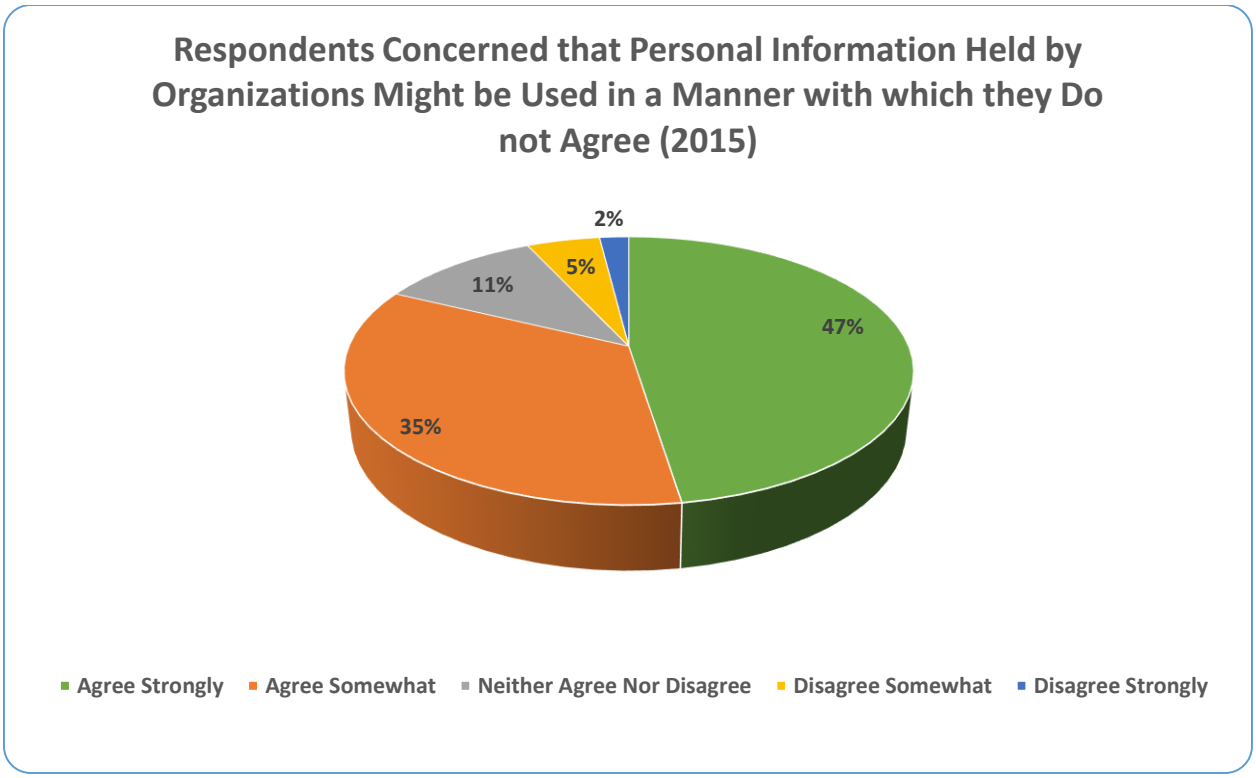
Ninety-seven percent (97%) of respondents believed that it was important to protect personal information both online and offline, and that high percentage was consistent throughout age ranges.



Importance of Protecting Personal Information (2015)							
	Male	Female	18-34	35-44	45-54	55-64	65+
Top 2 *	**98%**	**95%**	**95%**	**97%**	**100%**	**100%**	**90%**
Very Important	85%	88%	82%	79%	93%	100%	81%
Somewhat Important	14%	7%	13%	18%	7%	0%	9%
Neither Important Nor Unimportant	1%	4%	4%	1%	0%	0%	7%
Somewhat Unimportant	0%	0%	1%	0%	0%	0%	0%
Very Unimportant	1%	1%	0%	1%	0%	0%	3%

Eighty-three percent (83%) of residents were concerned that personal information was held by organisations might be used in a manner with which they would disagree.

** Top 2 adds up the number of "Very Important" and "Somewhat Important" responses.*



Percent concerned about the use of their personal information by organizations (2015)							
	Male	Female	18-34	35-44	45-54	55-64	65+
Top 2	81%	84%	78%	84%	87%	84%	82%
Agree Strongly	44%	50%	40%	31%	59%	57%	55%
Agree Somewhat	36%	34%	38%	53%	28%	27%	27%
Neither Agree Nor Disagree	11%	10%	15%	10%	7%	6%	12%
Disagree Somewhat	5%	4%	6%	4%	5%	6%	3%
Disagree Strongly	3%	1%	2%	1%	1%	3%	3%

When asked about specific concerns, most often listed were credit card fraud (87% in 2015 vs. 80% in 2012 and 78% in 2010), identity theft (82% in 2015 vs. 78% in 2012 and 77% in 2010), and data breaches (81% in 2015 vs. 79% in 2012).

Concern over Internet safety issues (2015)			
	2010	2012	2015
	TOP 2	TOP 2	Top 2
Credit card fraud	78%	80%	87%
Identity theft online	77%	78%	82%
Data breach	n/a	79%	81%
Someone hacking into your personal computer/ privacy	79%	81%	80%
Internet luring of minors/your children	80%	81%	79%
Computer viruses	n/a	77%	74%
Phishing	65%	76%	70%
Email scams	n/a	n/a	68%
Cyber Bullying	65%	71%	67%
Sexting	n/a	n/a	60%
n/a = research question not included during the particular period.			

Takeaways

Mobile is where it is

Far from being considered and acquired as a luxury, technology is an essential tool in our day to day lives. Mobile phones are increasingly used for much more than mere telephony. The increase in mobile device ownership of smartphones and Internet-ready devices, and subsequently in the subscription to data plans, shows the continued evolution of the market. In the future we may see the increase in wearable technologies.

Mobile technologies are very popular among Bermuda's residents. Their use includes tasks that were once exclusively tied to the home or office computers: communications, banking, shopping, research, etc. Additionally, despite the economy over the last few years, most Bermuda residents own a mobile technology and use it with the internet. This includes the adoption of mobile applications that enhance the use of the device post-purchase. These activities mirror what is happening in many jurisdictions around the world.

Technology at Home

Technology is also a major component of our home life in Bermuda. Most households own more than one device and they often have more than one member using a combination of tablet, laptop, desktop, smartphone, and/or cellphone. Users are of all ages, with some as young as one year old. This has implications on networking technologies within households, internet speeds and usage expectations as we are continuously doing more online. As we begin to see more of the 'Internet of Things' with appliances and other devices being connected to home networks, residents need to understand the implications relative to security, costs and networking requirements.

Technology Competence: the Island's Seniors

Within our sample, nine percent (9%) of respondents using devices were over sixty-five years of age. When asked to rate their technology competence, twenty-eight percent of the island's seniors rated themselves as moderately competent (28%) while three percent rated themselves as highly competent (3%). In answering more detailed questions in that regard, the areas with the highest competency were cellphone calls (44%), emailing (35%), voicemail use (32%), internet surfing (32%), and online banking (22%). As technology continues to enhance and enable businesses, it is important to encourage and support technology education and skills development in the senior population.

CORPORATE FINDINGS

Attitudes and Overall Technology Competence

Companies overwhelmingly agreed that in order to compete in the global economy, Bermuda must continue to meet or exceed global technology standards (99% vs. 100% in 2012 and 92% in 2010). They also indicated that technology helped their firm to be more creative or innovative (95% vs. 94% in 2012), and that having a strong knowledge of technology is essential to a firm's success today (96% vs. 92% in 2012 and 87% in 2010).

Areas that saw a drop in the responses rated:

- the companies' openness to technology training (85% vs. 92% in 2012),
- the companies' commitment to having the best technology products for its employees (73% vs. 86% in 2012), and
- the companies as early adopters of new products and technologies (44% vs. 59% in 2012).

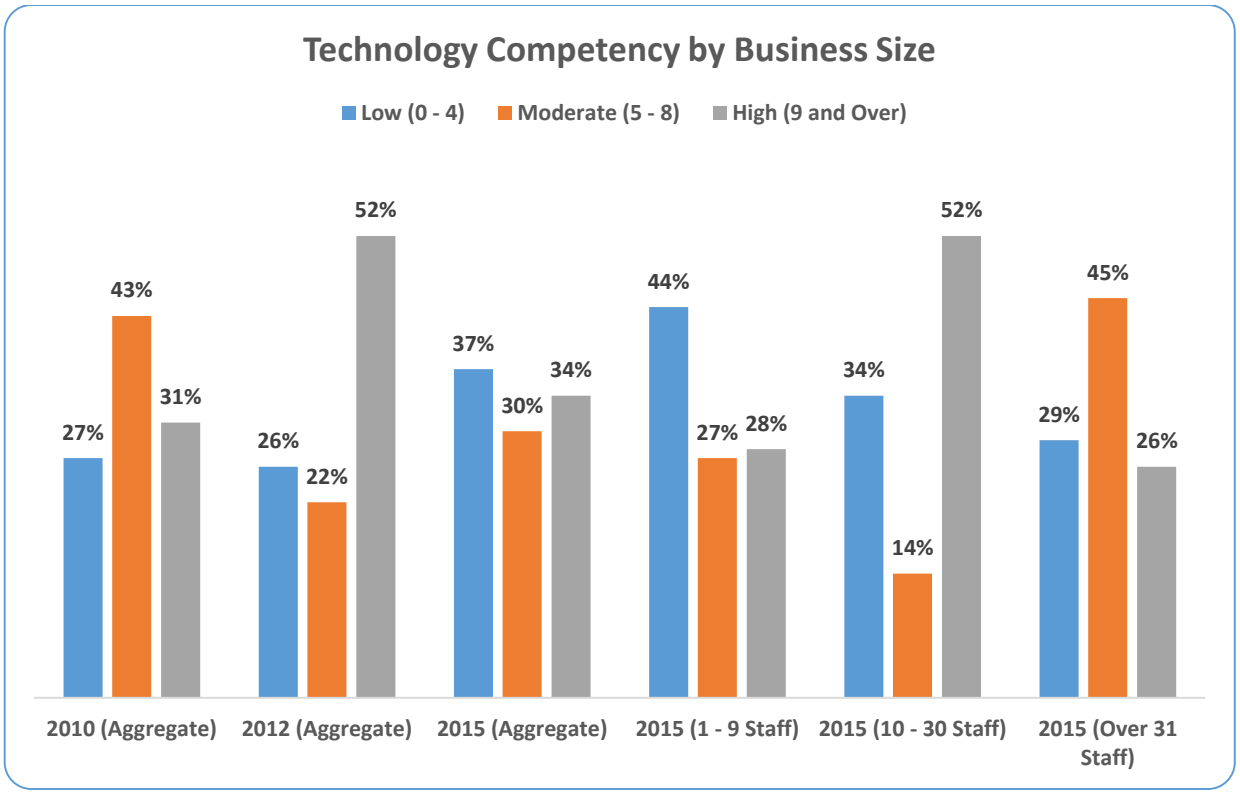
Attitudes toward technology: Percent of Agree Strongly/Agree Somewhat responses			
	2010	2012	2015
In order to compete in the global economy, Bermuda must continue to meet or exceed global technology standards	92%	100%	99%
Having a strong knowledge of technology is essential to a firm's success today	87%	92%	96%
Technology helps my firm to be more competitive and innovative	n/a	94%	95%
Most employees in my firm are open to technology training	83%	92%	85%
My firm is committed to having the best technology products for its employees	70%	86%	73%
My firm is usually one of the first on the Island to adopt new products and technologies	43%	59%	44%
n/a = research question not included during the particular period.			

Respondents were asked in what ways technology was most important to their firms. The top three responses were that technology facilitated communication, allowed for more efficiency, and was key for Internet and specific software needs.

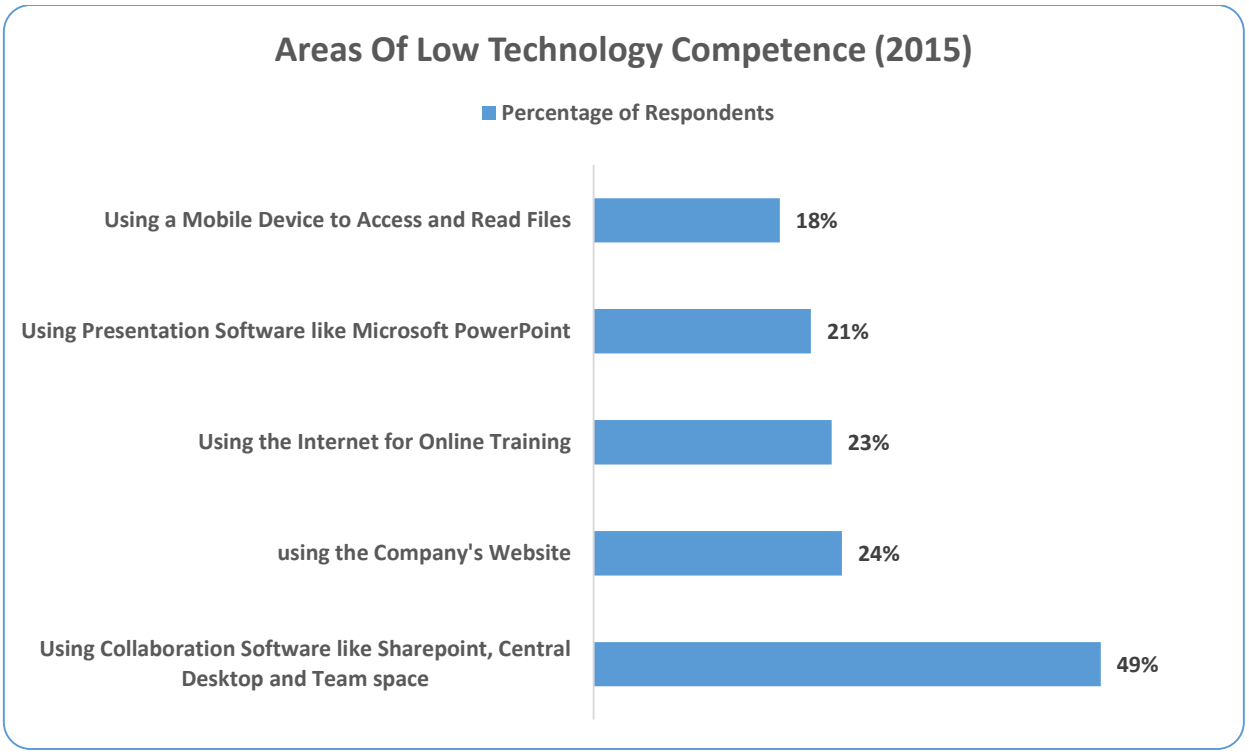
Technology competence

Professionals were asked to rate the expertise of the average employee at their firm regarding general computing, Internet usage, cellphones, smartphone devices, and other technologies. Based on these ratings, the respondents' firms were classified as having either low, moderate, or high technological competence based on the number of areas for which they expressed a high level of expertise (9, 10 on a 1 – 10 scale).

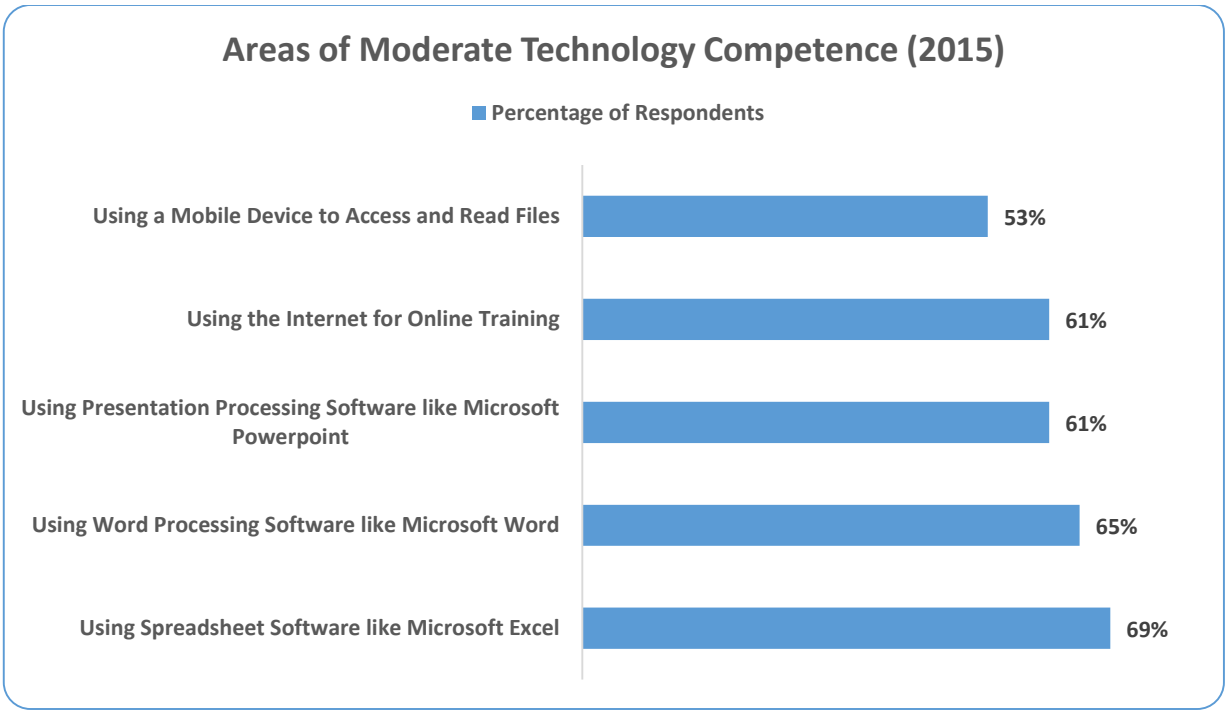
Sixty-four percent (64% vs. 74% in 2012 and 74% in 2010) of employees in businesses were in the moderate or high technological competence categories.



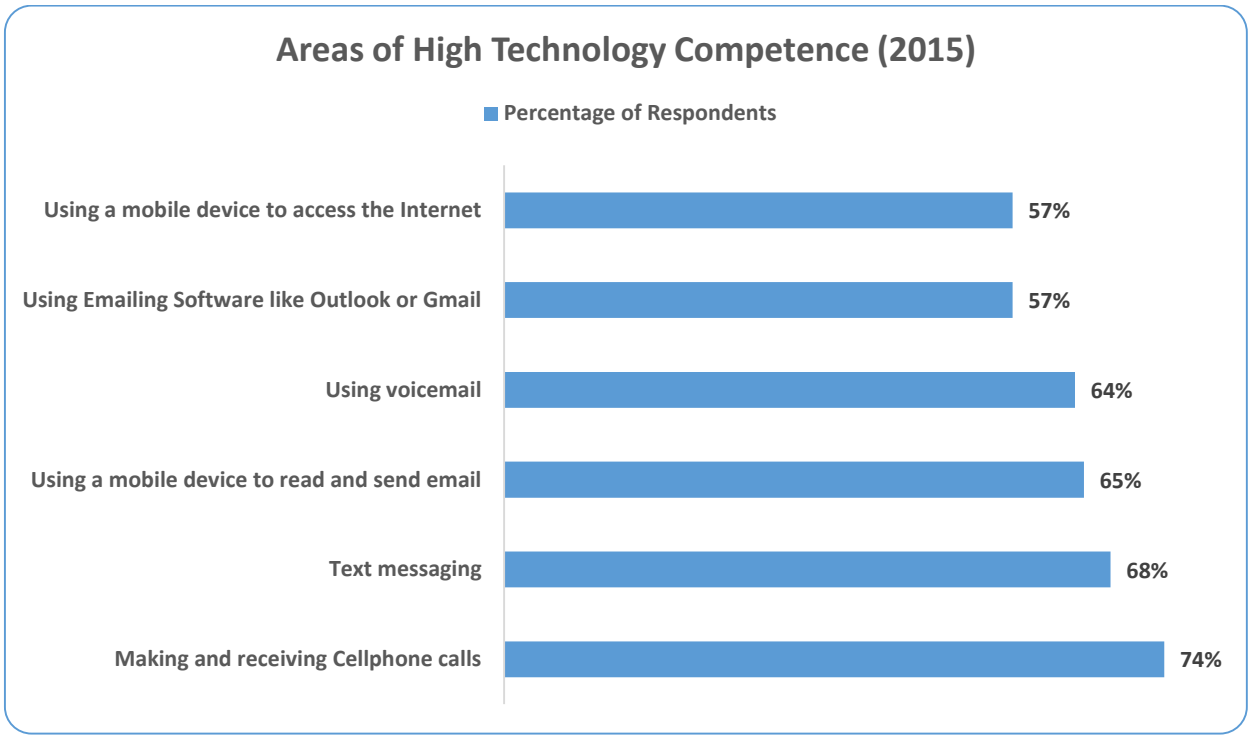
The areas with the lowest degree of competency (i.e., most respondents gave a 0 to 3 rating) are shown below and included using spreadsheet software, presentation software, using the internet for online training and using collaboration software.



Technology areas with a moderate degree of technology competency (i.e. most respondents gave a 4 to 8 rating) are shown below. They included using company websites, using word processing software, using a mobile device to access and read files and using a VOIP.



Areas where businesses showed a high degree of competency (most respondents gave a 9 or 10 rating) are shown below. They included making and receiving cellphone calls, text messaging, using a mobile device to read and send emails and using voicemail.



Computer, Mobile and Internet Usage

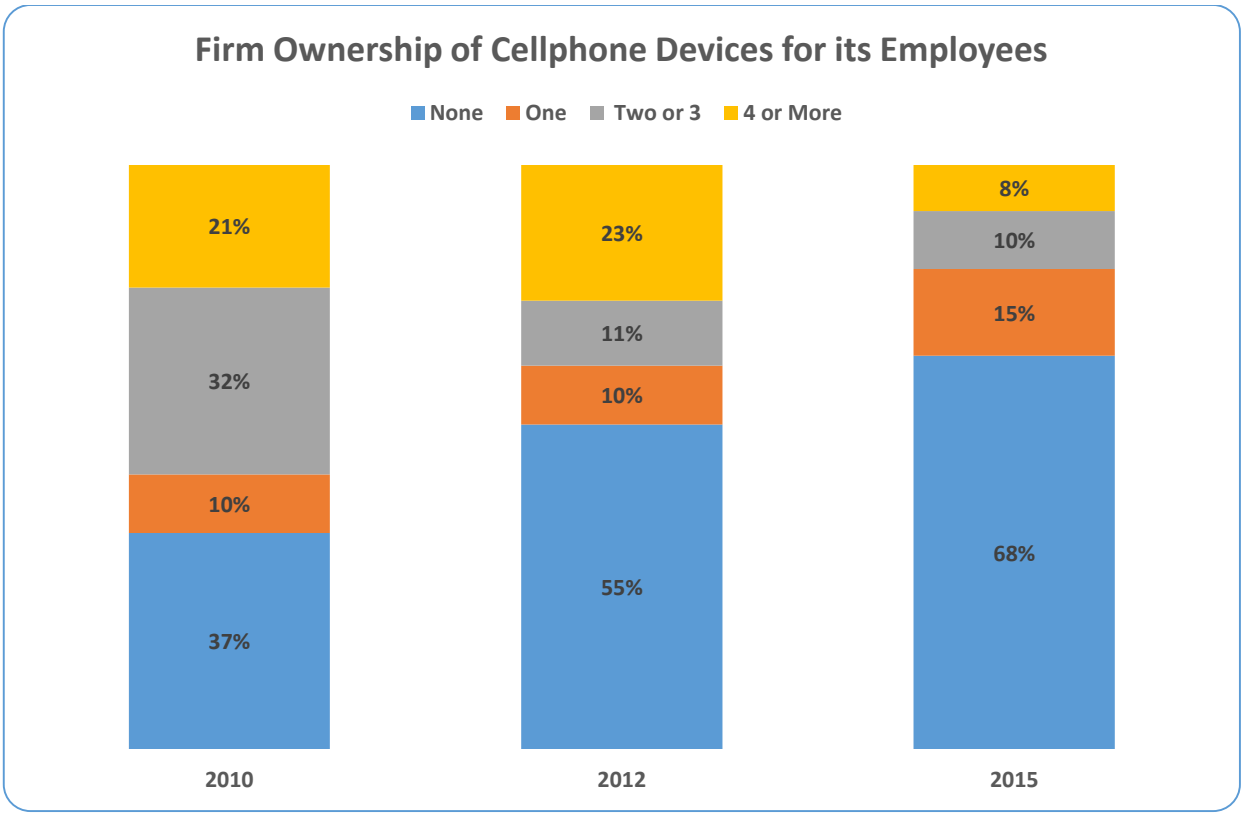
Computer Ownership

Similar to previous years, eighty-four percent of responding companies owned laptops (84% vs. 83% in 2012 and 88% in 2010) while ninety-eight percent owned desktops (98% vs. 98% in 2012 and 99% in 2010). The most popular tablet owned by businesses was the iPad.

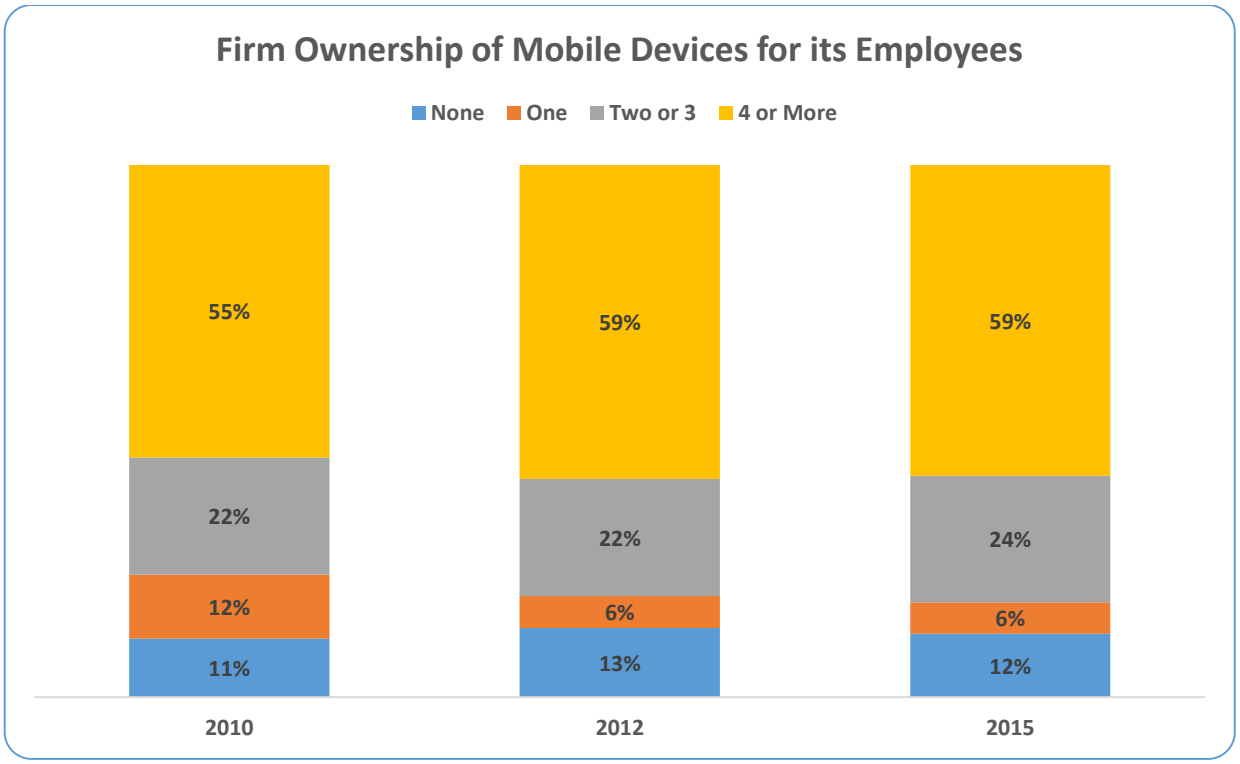
Forty-eight percent of companies owned wifi or Internet-ready devices (48% vs. 48% in 2012 and 47% in 2010).

Mobile Device Ownership

Overall, cellphone ownership declined to thirty-three percent (33% vs. 44% in 2012 and 63% in 2010), from a mean number of five (5) cellphones in 2010 to seven (7) in 2012 and then down to two (2) in 2014/15.



Regarding smartphones, ownership remained relatively stable at eighty-nine percent (89% vs. 87% in 2012 and 89% in 2010) from nineteen (19) smartphones in 2010 and 2012 to seventeen (17) in 2014/15.

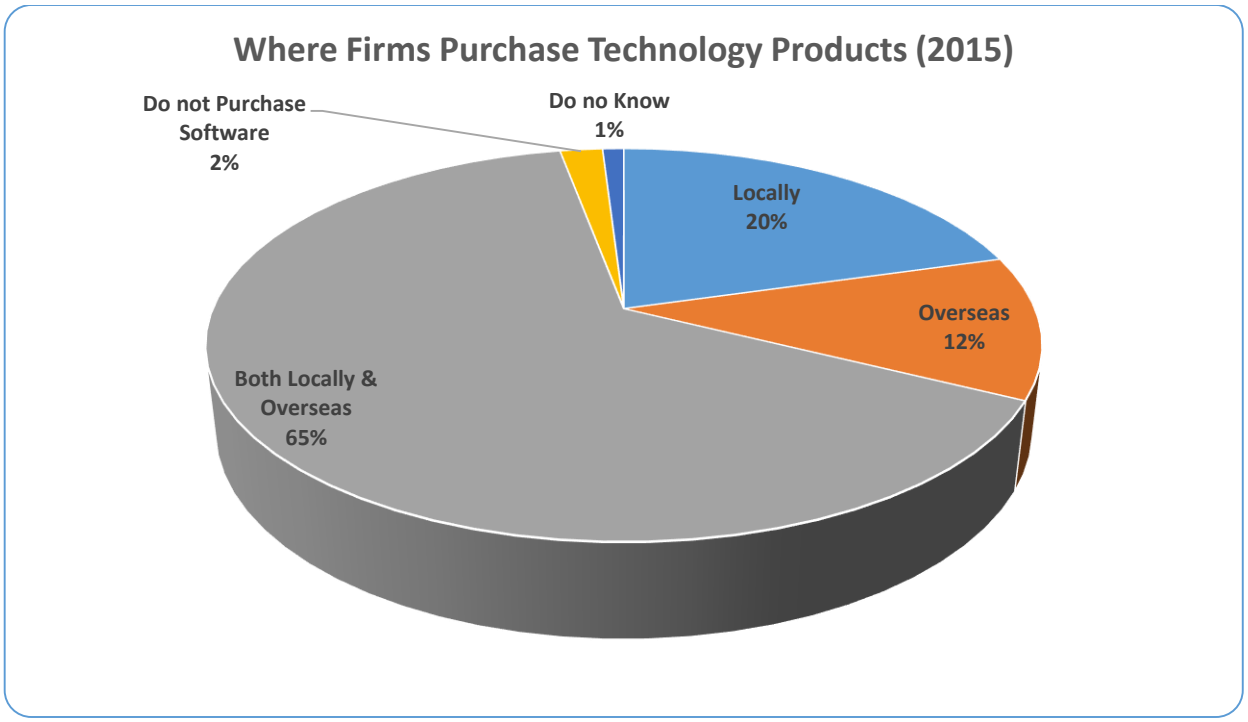


Purchases and Upgrades – Technology products

Thirty-nine percent (39%) of Bermuda's firms planned to upgrade to new computing devices in the next six months, with desktops and laptops leading the list of planned purchases. The intention to upgrade increased with the size of the companies (33% of responding small businesses, 30% of medium-sized businesses, and 51% of large businesses planned to upgrade.)

Twenty-one percent of companies (21%) made their purchases of technology products locally, and that was comprised of twenty-eight percent (28%) of the small employers, twenty-two percent (22%) of the medium-sized companies, and ten percent (10%) of the large companies surveyed. Twelve percent of respondents (12%) planned to make their purchases overseas, which was comprised of fifteen percent (15%) of the small employers, eight percent (8%) of the medium-sized companies, and ten percent (10%) of the large companies surveyed.

Sixty-six percent (66%) of businesses would use a combination of jurisdictions, which was comprised of fifty-four percent (54%) of the small employers, sixty-four percent (64%) of the medium-sized companies, and eighty percent (80%) of the large companies surveyed.



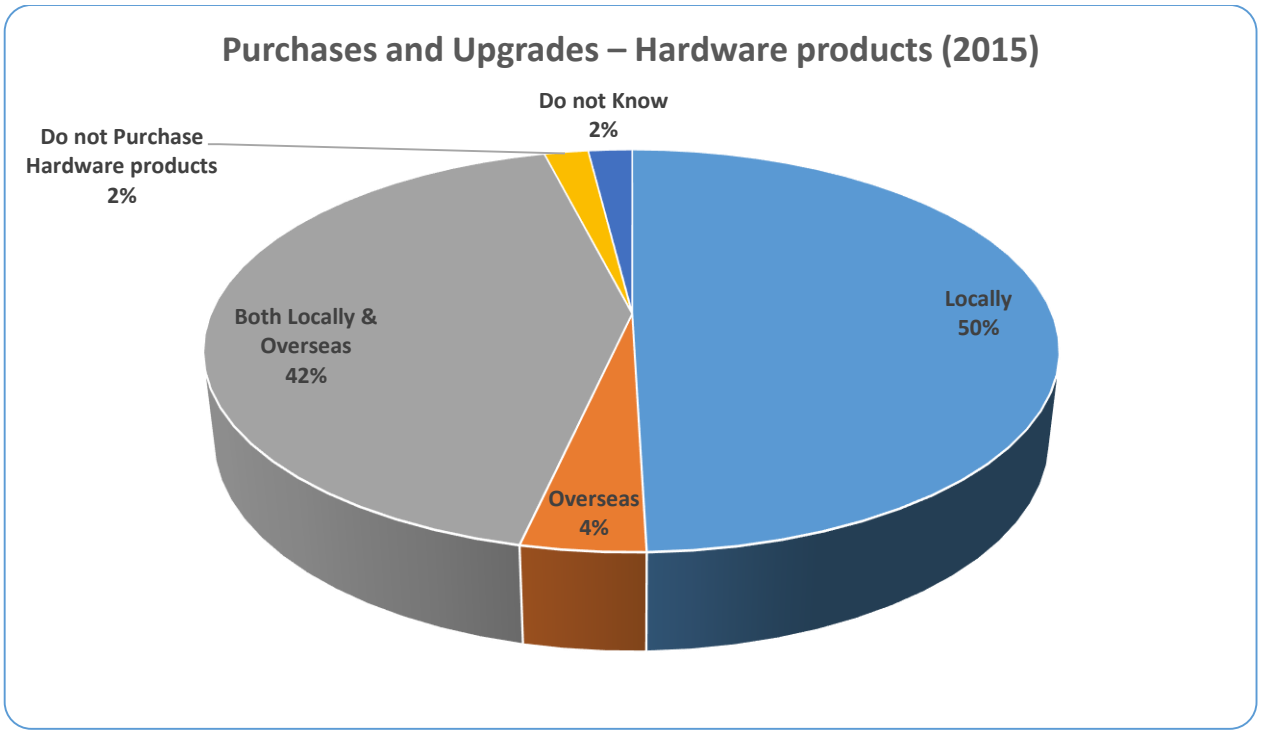
Respondents explained that they purchased IT equipment locally for reasons such as convenience, service and support, and in order to support Bermuda. Reasons for making overseas purchases included pricing, the fact that the company itself was a global organization, and the fact that the desired products themselves were not available locally.

Purchases and Upgrades – Hardware products

Half the respondents (50%) said that they purchased hardware products locally, and that was comprised of sixty-two percent (62%) of the small employers, fifty percent (50%) of the medium-sized companies, and thirty-six percent (36%) of the large companies surveyed.

Only four percent of the respondents (4%) said that they purchased hardware products overseas, and that was comprised of six percent (6%) of the small employers, six percent (6%) of the medium-sized companies, and five percent (5%) of the large companies surveyed.

Forty-three percent of the respondents (43%) said that they purchased hardware products both locally and overseas. That was comprised of twenty-seven percent (27%) of the small employers, forty-two percent (42%) of the medium-sized companies, and fifty-seven percent (57%) of the large companies surveyed.



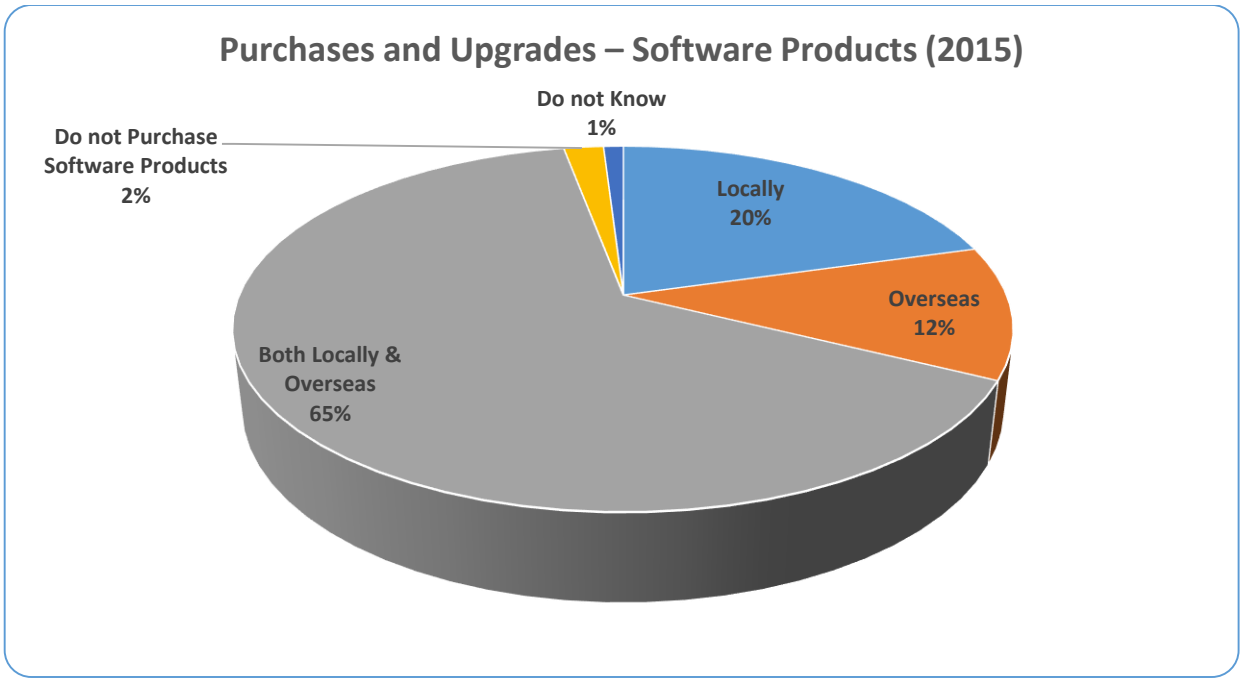
Again, the decision-making process was driven by pricing and variety for overseas purchases, and by convenience, the availability of service and support, and warranty benefits for local purchases. Companies also said that they purchased hardware products locally to support Bermuda.

Purchases and Upgrades – Software products

Only a fifth of the respondents (21%) said that they purchased software products locally, and that was comprised of twenty-eight percent (28%) of the small employers, twenty-two percent (22%) of the medium-sized companies, and ten percent (10%) of the large companies surveyed.

Twelve percent of the respondents (12%) said that they purchased software products overseas, and that was comprised of fifteen percent (15%) of the small employers, eight percent (8%) of the medium-sized companies, and ten percent (10%) of the large companies surveyed.

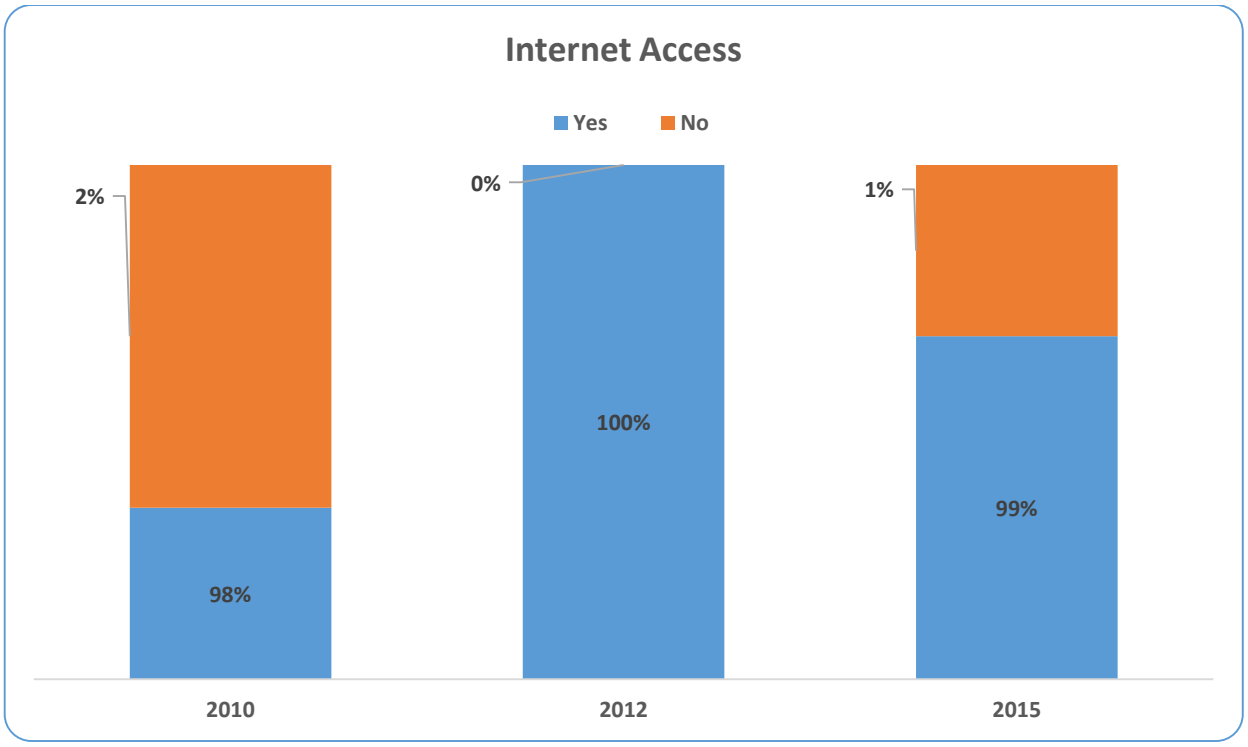
Two thirds of the respondents (66%) said that they purchased software products both locally and overseas. That was comprised of fifty-four percent (54%) of the small employers, sixty-four percent (64%) of the medium-sized companies, and a notable eighty percent (80%) of the large companies surveyed.



Not surprisingly, the decision-making process was driven by pricing and the unavailability of the needed products locally for overseas purchases, and by convenience and the availability of service and support for local purchases. Companies also said that they purchased software products locally to support Bermuda.

Internet Access

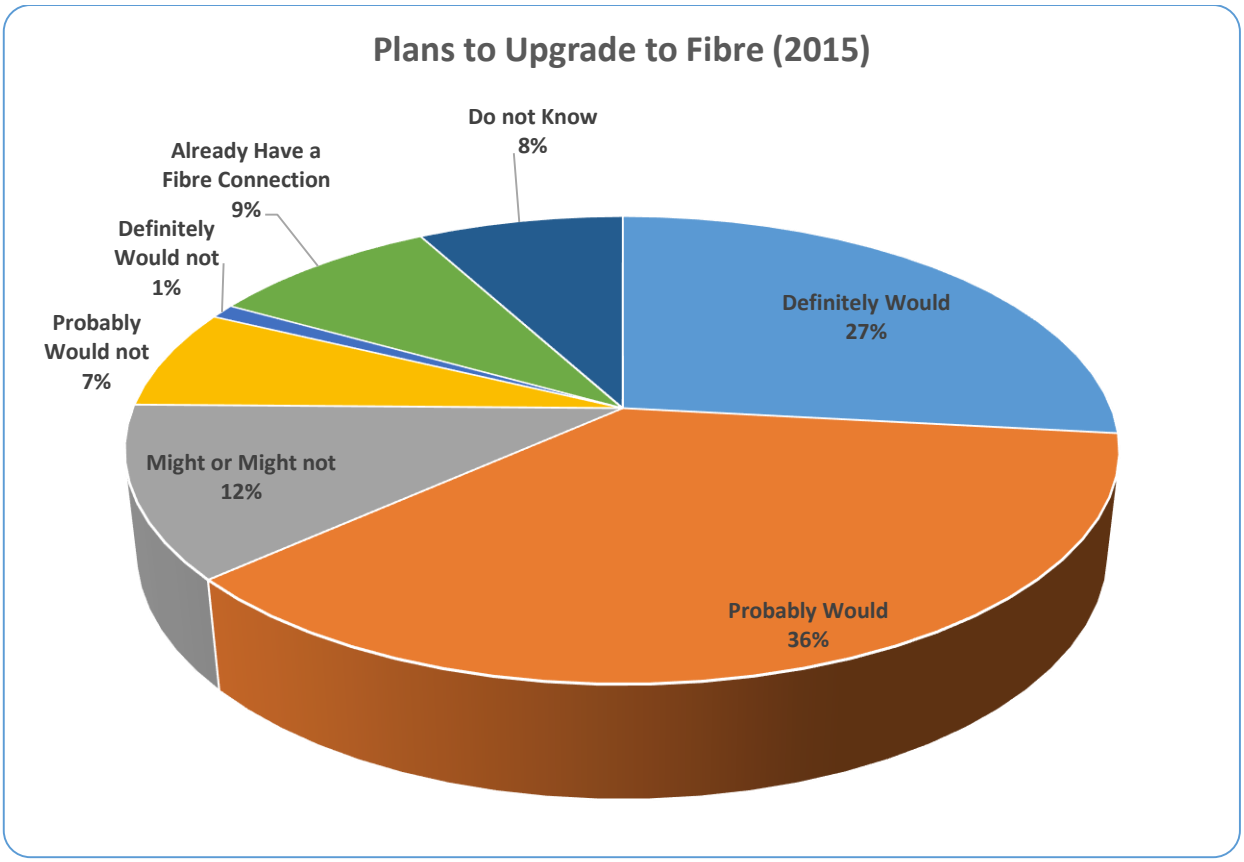
Similar to prior surveys, most companies reported having Internet access (99% vs. 100% in 2012 and 98% in 2010). That high percentage was consistent across the board, regardless of company size.



The most popular broadband connection speeds ranged from 3MB-4MB to 10MB (a total of 59% of responses) and included speeds up to 100MB. In 2012, the most popular speeds ranged from 3MB-4MB to 8MB (a total of 71% of responses), and in 2010 they ranged from 1-1.5MB or less to 3MB-4MB (a total of 72% of responses).

Broadband connection speeds used by firms			
	TOTAL (2010)	TOTAL (2012)	TOTAL (2015)
1 – 1.5MB or less	22%	1%	1%
2 – 2.5MB	19%	1%	4%
3MB – 4MB	31%	33%	12%
6MB	4%	24%	13%
8MB	3%	14%	18%
10MB	0%	11%	16%
15MB	0%	0%	2%
25MB	0%	0%	8%
Other (please see below)	0%	3%	12%
I don't have broadband	0%	0%	1%
Volunteered: Don't Know	21%	13%	14%

Two thirds of companies said that they would probably or definitely upgrade to a fibre optic connection in the future (64% vs. 33% in 2010). This 2014/15 result was consistent across the board, regardless of company size.



Corporate Use of Technology and the Internet

Technology Use

The average employee spent 29 hours a week on a computer, down from a consistent 30 hours in 2012 and 2010.

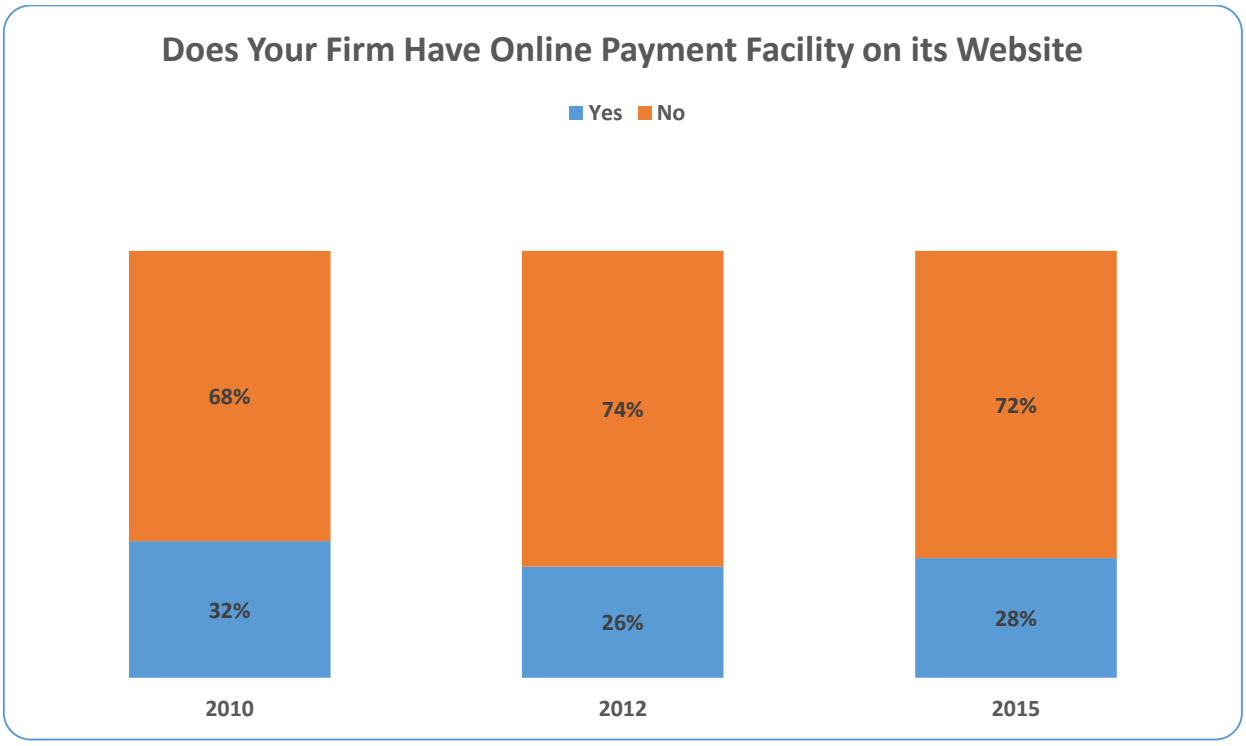
When using computers at work, fifty-nine percent of employees spent less than half of their time on the Internet (59% vs. 54% in 2012 and 72% in 2010).

Similar to 2012, the most popular applications that employees used on their smartphone devices included e-mail, Internet access, text messaging, and messaging. Businesses, on the other hand, reported wanting to see other applications developed such as inventory and sales applications, as well as applications that provide access to product and consumer information.

Most companies continued to report that they used technology for purposes of internal systems (96% vs. 97% in 2012 and 78% in 2010), business to business (93% vs. 95% in 2012 and 92% in 2010), business to consumer (89% vs. 90% in 2012 and 79% in 2010), as well as business to government (82% vs. 86% in 2012 and 77% in 2010).

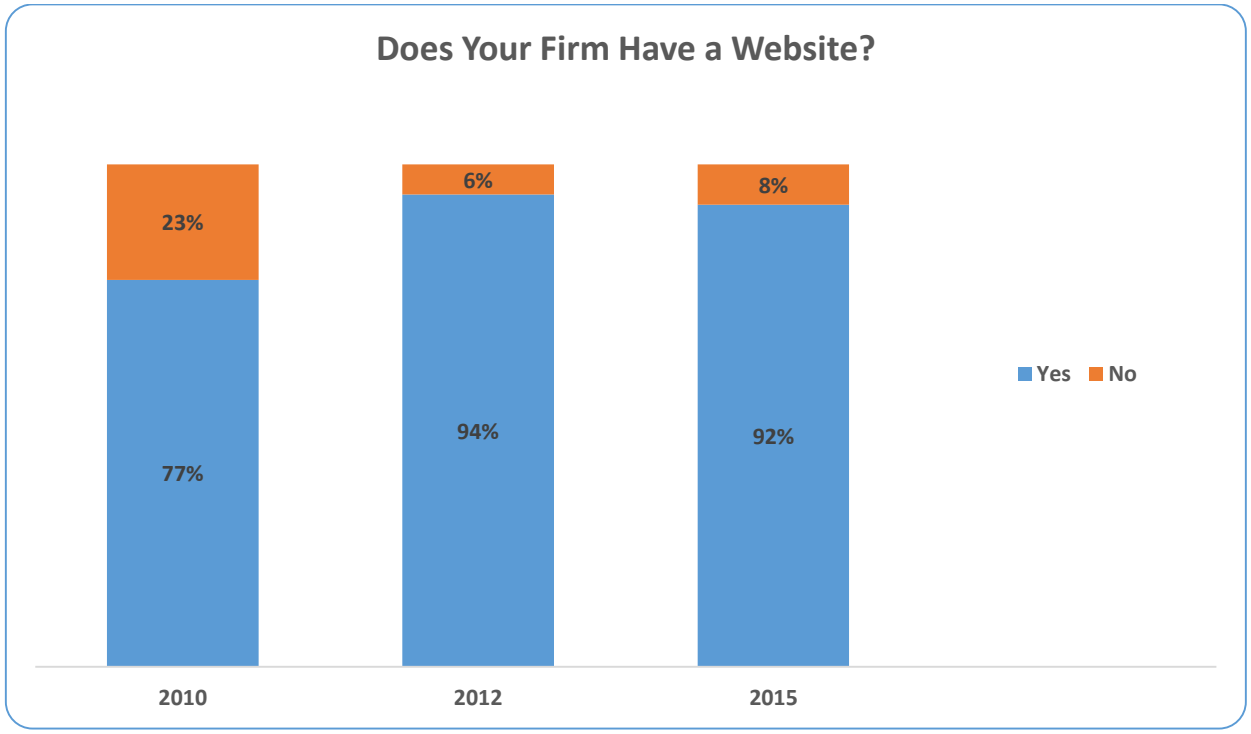
Areas Where Firms Use technology			
	TOTAL (2010)	TOTAL (2012)	TOTAL (2015)
Internal Systems (financial systems, HR, payroll & propriety)	78%	97%	96%
Business to Business (inventory control, procurement, contracts, payment & invoices)	92%	95%	93%
Business to Consumer (facilitating payment, sales & providing product/service information)	79%	90%	89%
Business to Government (Payroll tax, Immigration & Social insurance)	77%	86%	82%

Twenty-eight percent of the businesses (28% vs. 26% in 2012) offered an online payment facility. Among them, twenty-eight percent (28%) were of the small businesses surveyed, twenty-two percent (22%) were of the medium-sized, and thirty-one (31%) were of the large companies surveyed.



Websites

The vast majority (92% vs. 77% in 2010) of companies surveyed, particularly large and medium-sized businesses, had a company website. Smaller companies were less likely to have one.



Fifty-one percent reported having a .bm site (51% vs. 63% in 2012 and 54% in 2010). These domains were owned by forty percent of small business (40%), fifty-four percent of medium-sized businesses (54%), and forty-seven percent of large businesses (47%).

Types of websites that firms have						
	TOTAL (2010)	TOTAL (2012)	TOTAL (2015)	Small (1-9)	Medium (10-30)	Large (31+)
Another type of site (see below)	2%	3%	4%	1%	4%	6%
No site	22%	8%	10%	25%	4%	2%
.bm	54%	63%	51%	40%	54%	47%
.com	21%	28%	37%	33%	40%	45%
Don't Know	-	1%	-	-	-	-
Note - 6 businesses had a .bm and a .com site. One business had a .org site.						

Thirty-seven percent had a .com site (37% vs. 28% in 2012 and 21% in 2010). These domains were owned by thirty-three percent of small business (33%), forty percent of medium-sized businesses (40%), and forty-five percent of large businesses (45%).

Social Networking Presence

Sixty percent of responding companies had a social networking presence (60% vs. 44% in 2012 and 13% in 2010). These were composed of forty-two percent of small business (42%), seventy-four percent of medium-sized businesses (74%), and seventy-one percent of large businesses (71%).

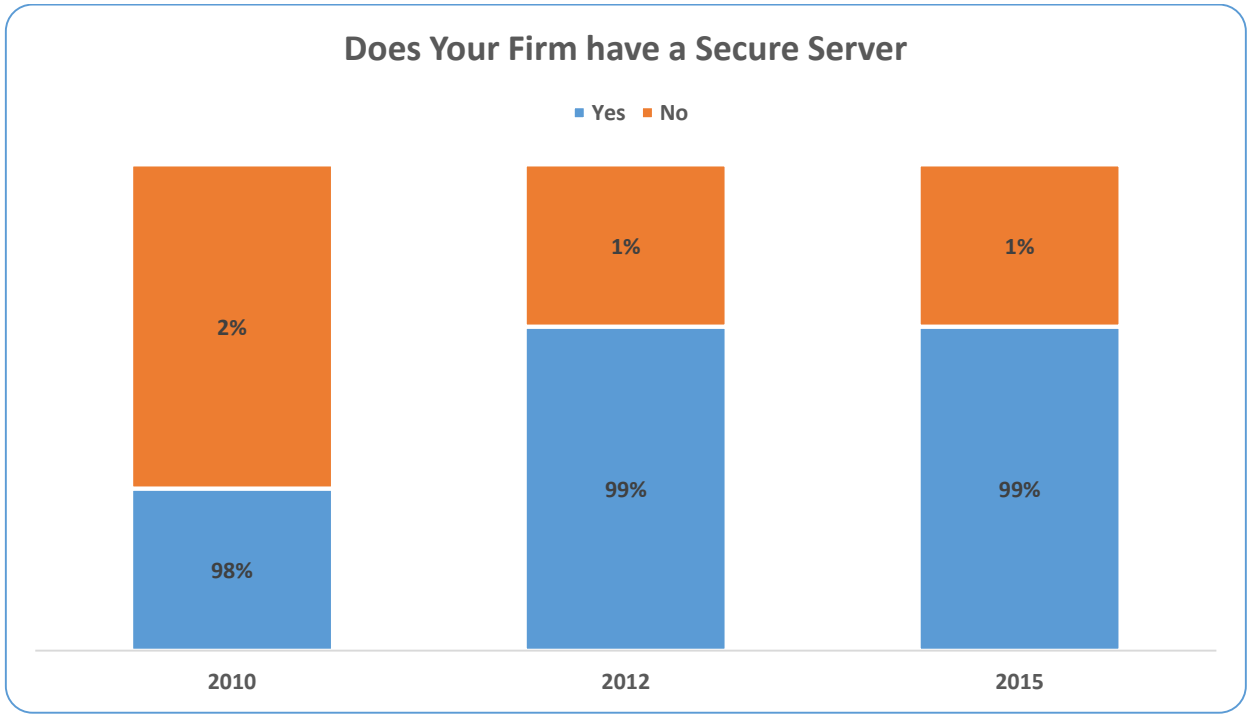
Whether firms have a corporate social networking presence						
	TOTAL (2010)	TOTAL (2012)	TOTAL (2015)	Small (1-9)	Medium (10-30)	Large (31+)
Yes	13%	44%	60%	42%	74%	71%
No	87%	57%	40%	58%	26%	29%

Most firms reported using social networking for the benefit of advertising and marketing, as a general communication tool, and specifically to reach their target audience.

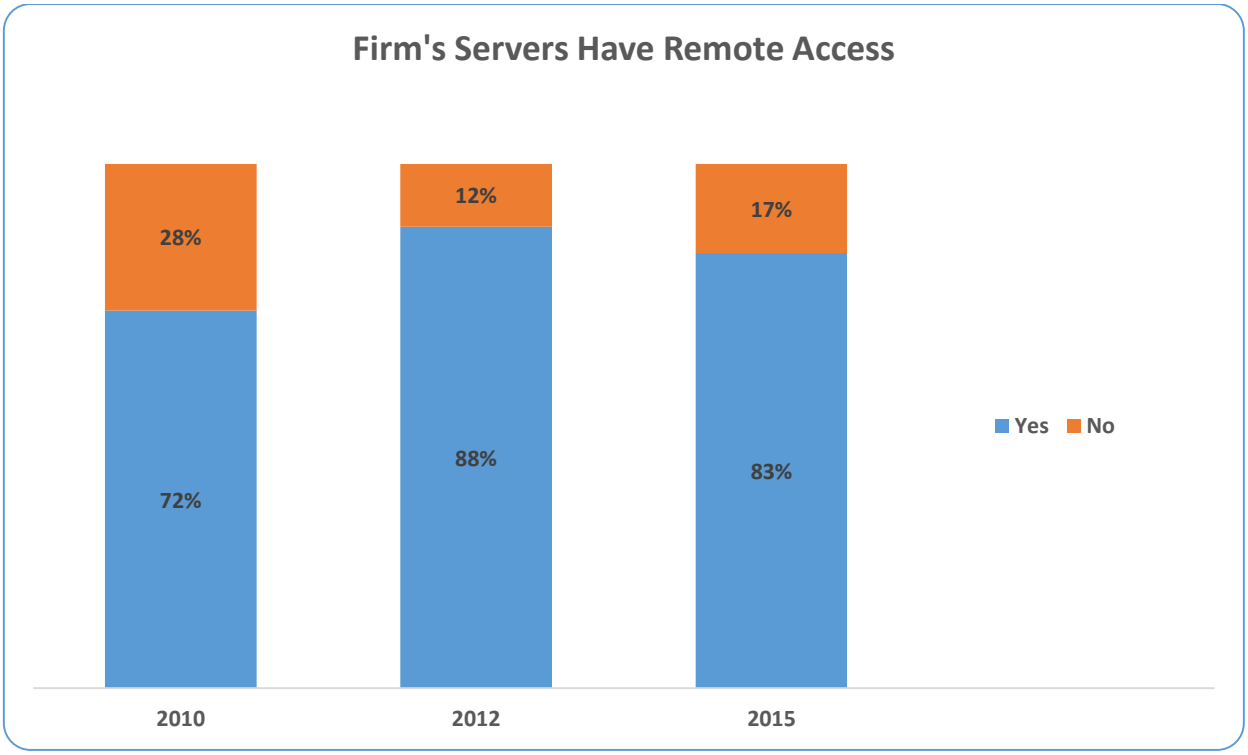
Hardware

Eighty-six percent of companies declared having a common server where their employees could access/share company documents (86% vs. 84% in 2012 and 86% in 2010).

Similarly to previous years, the vast majority confirmed that their servers were secure.



Eighty-three percent of respondents reported that their employees could access the firm's server remotely (83% vs. 88% in 2012 and 72% in 2010).



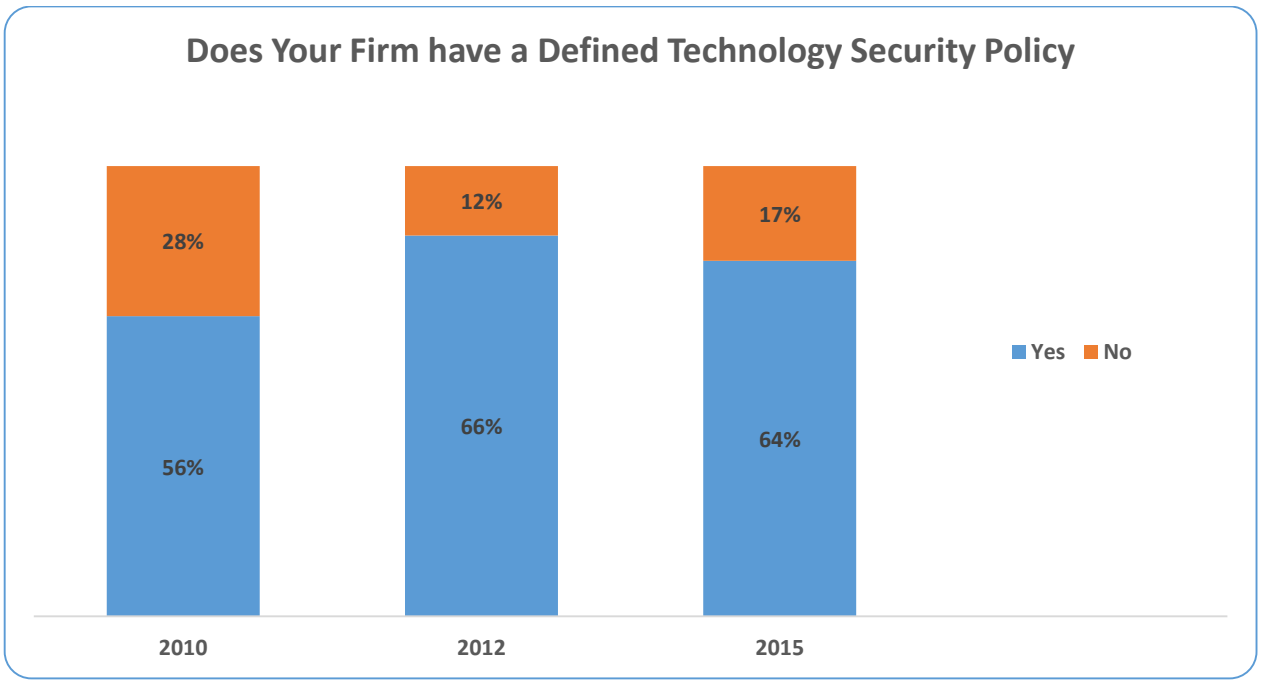
When asked about how access was gained, fifty-one percent of the companies answered "secure access over the Internet" whereas the most common answer in 2012 and 2010 was "through a virtual private network (VPN)" (44% of responses in 2012 and 52% in 2010). The majority of businesses had a secure server (99% vs. 99% in 2012 and 98% in 2010).

Whether firms have a remote server			
	2010	2012	2015
Through a Virtual Private Network (VPN)	52%	44%	32%
Secure access over the Internet	27%	40%	51%
Secure access via the Cloud	0%	9%	7%
Don't Know	11%	2%	3%
Other (See below)	11%	5%	7%
Other responses include: Secure access over the Internet and VPN; all of the above (x4), depending on connection method and product; Digital certificates; Go to my PC; Remote desktop and remote desktop apps; VPN and Citrix secure access			

Data protection

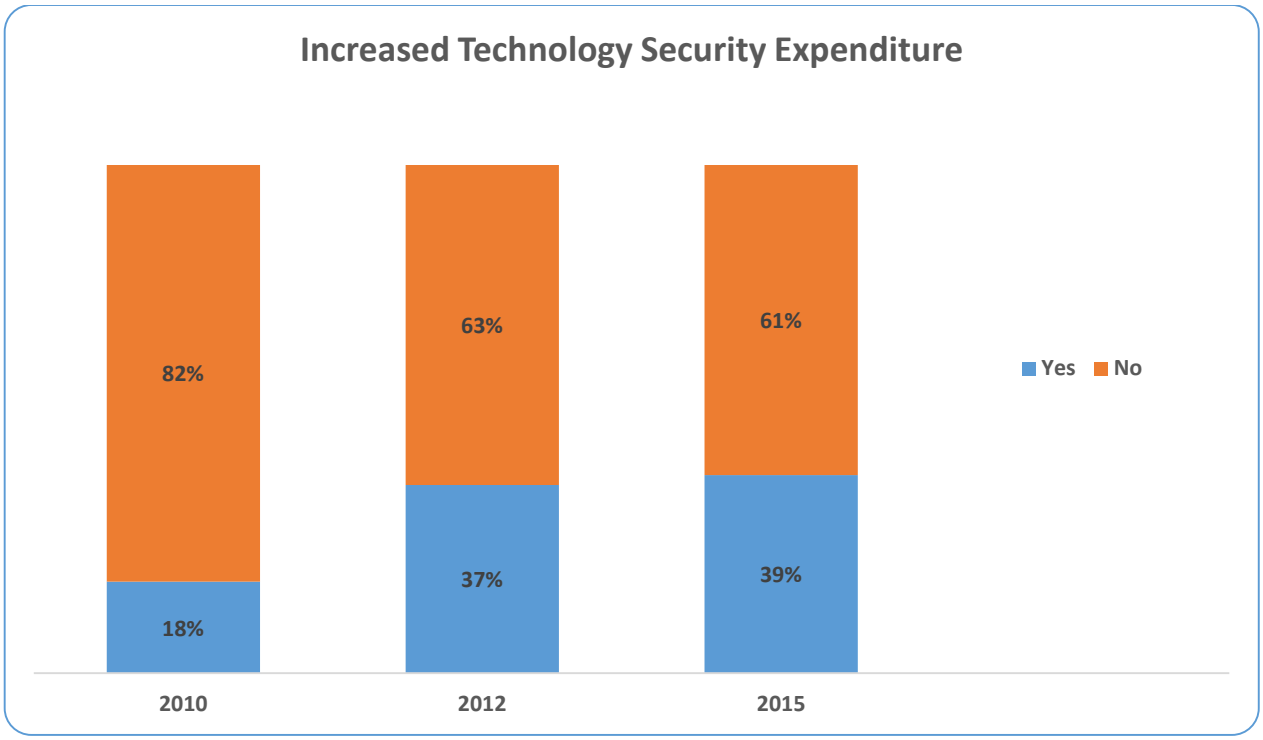
Security

Sixty-four percent of responding companies had a defined technology security policy (64% vs. 66% in 2012 and 56% in 2010). These were composed of forty-two percent of small business (42%), sixty-six percent of medium-sized businesses (66%), and eighty-seven percent of large businesses (87%).



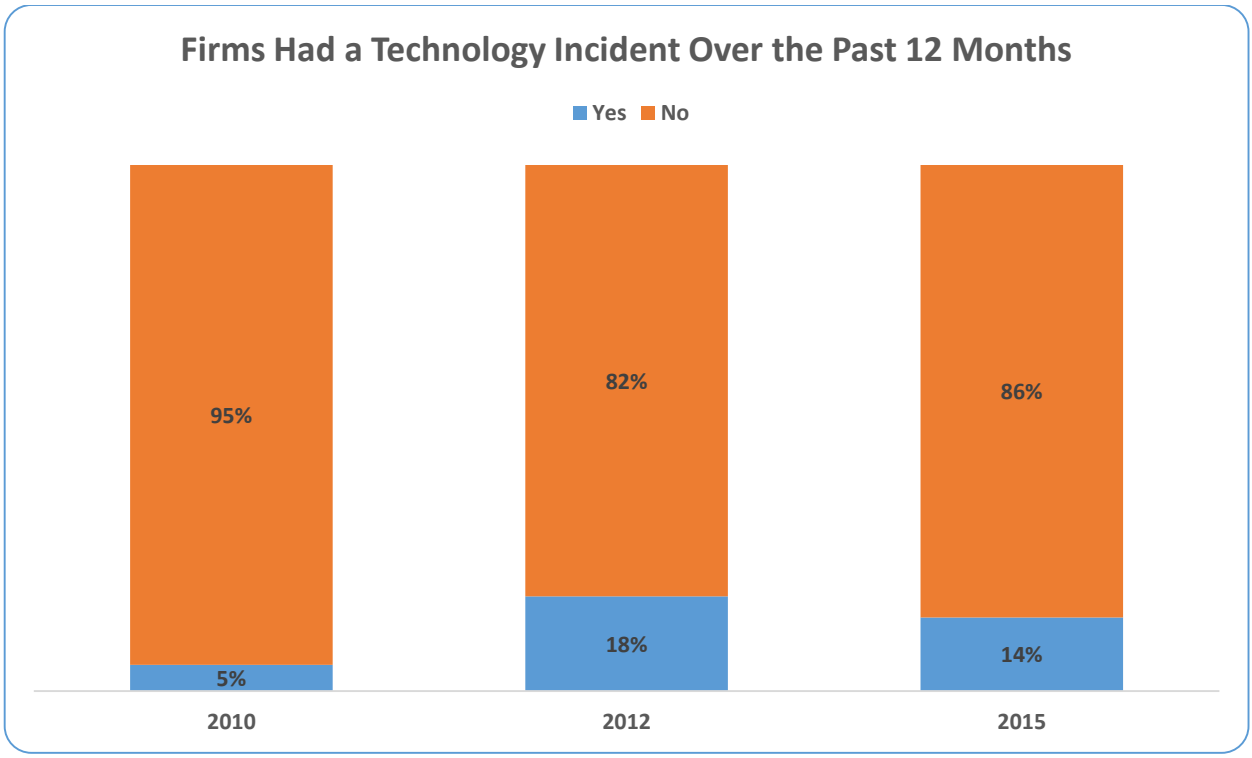
Speaking about the country overall, thirty-nine percent of businesses (39%) did not feel that the Internet in Bermuda was secure. Large firms were more likely to feel that way (43%), followed by medium-sized companies (36%) and small companies (36%). The most common reasons given for that were that "systems can be hacked" and the recent the incidents reported in the news as well as personal experiences.

Thirty-nine percent (39%) of respondents confirmed that their technology security expenditure had increased in the last twelve (12) months, which was a step up compared to 2012 (37%) and 2010 (18%).



When asked what information would be useful for them to have regarding Internet matters in Bermuda, most of the companies surveyed mentioned security alerts.

Fourteen percent of companies said that they had a technology security incident in the past 12 months. That was a drop from 2012 (14% vs. 18% in 2012), which itself, most notably, had shown a significant increase since 2010 (5%).



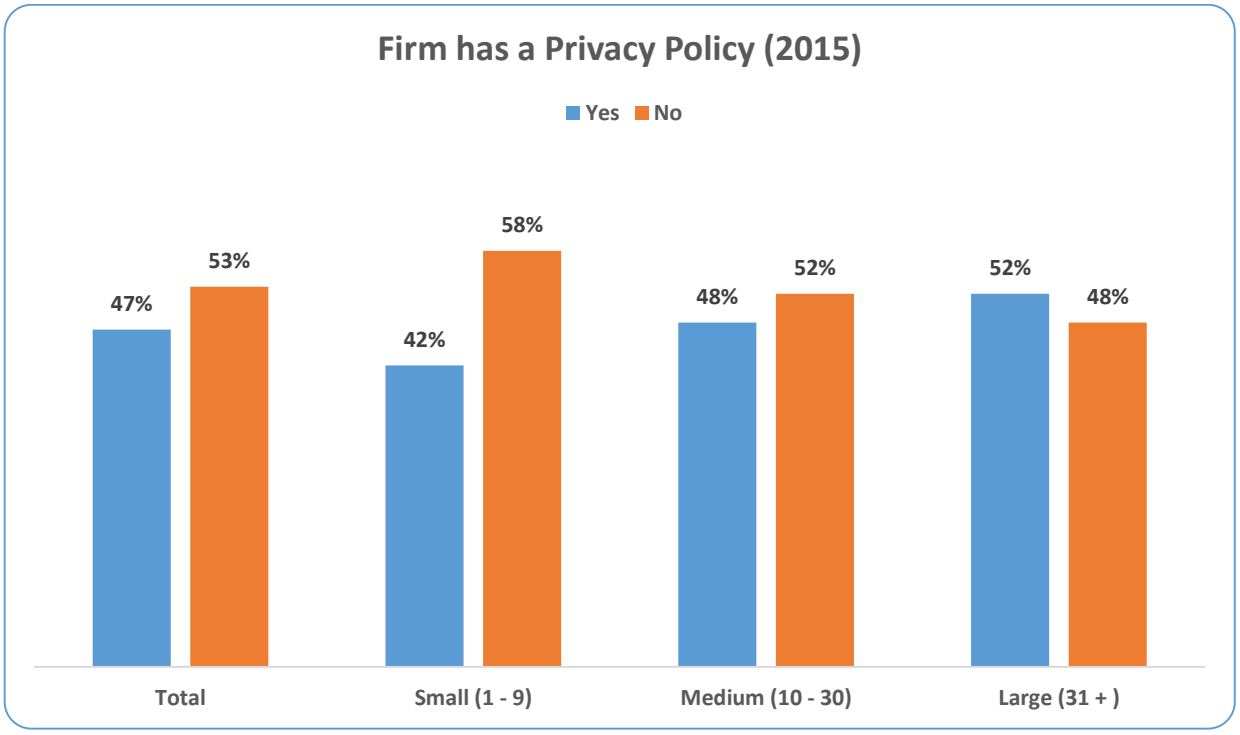
The most common types of security breach experienced by businesses were infections by virus or other malicious software (45% vs. 67% in 2012), attacks by unauthorized outsiders (30% vs. 33% in 2012), and systems failure/ data corruption (20% vs. 25% in 2012). It is worthy to note that all of the above saw a reduction since the previous survey.

Types of technology security breaches firms have experienced in the past 12 months		
	2012	2015
Infection by virus or other malicious software	67%	45%
Attacks by an unauthorised outsider (including hacking attempts)	33%	30%
Systems failure or data corruption	25%	20%
Staff misuse of information systems	12%	10%
Theft or fraud involving computers	8%	10%
Don't know	n/a	5%
Other (See below)	n/a	25%
Other responses included: Drained money from their business account; security of premises; swipe card machine; credit card was compromised; website was hacked – on a server somewhere else.		

Privacy

Forty-seven (47%) percent of responding companies had a privacy policy: fifty-two percent of large firms (52%), forty-eight percent of medium-sized firms (48%), and forty-two percent (42%) of small firms. Most

common privacy policies included those regarding client confidentiality, employee confidentiality, data security, credit card security, and email security.

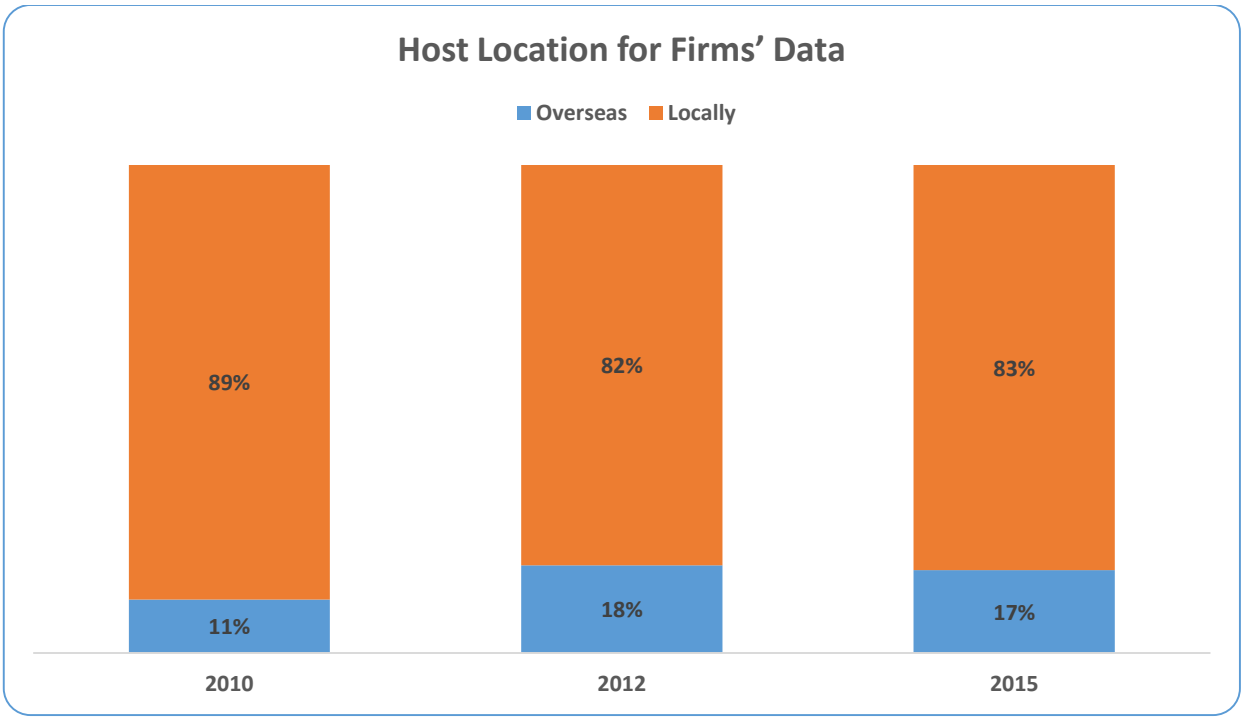


Twenty-six percent of companies were subject to data privacy regulations or laws regarding personal information (26% vs. 27% in 2012 and 14% in 2010). That comprises thirty-three percent of large firms (33%), twenty-four percent of medium-sized firms (24%), and twenty-one percent (21%) of small companies.

Most common descriptions of such regulations were client confidentiality, credit card security, data security, BMA regulations, and Bermuda Bar Council.

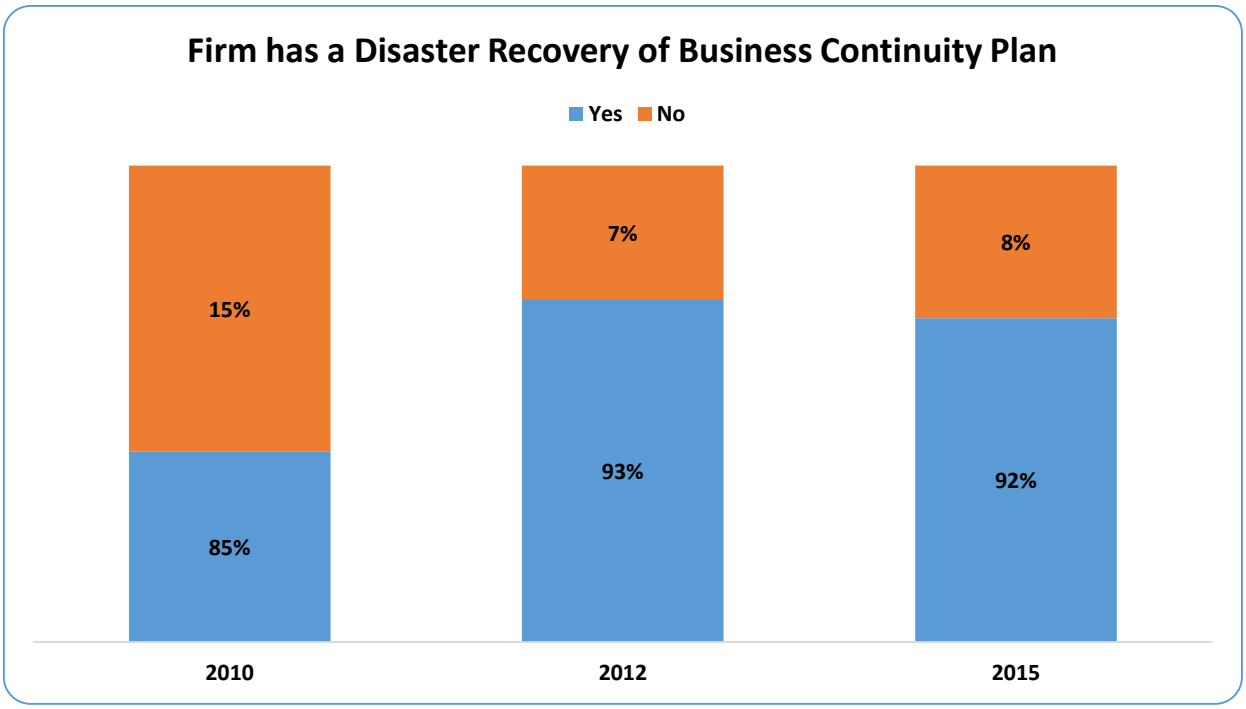
Data Hosting

Similar to last survey, eighty-three (83%) of companies hosted their data locally. For those whose data hosting was provided overseas, the jurisdictions most used were the USA and Canada.



Back-Ups and Disaster recovery

Ninety-two percent of companies had a disaster recovery and business continuity plan (92% vs. 93% in 2012 and 85% in 2010): one hundred percent (100%) of large firms, eighty-eight (88%) percent of medium-sized firms, and eighty-six percent (86%) of small firms.



The most popular methods for data back-ups was backing up data to tapes and storing them off- or on-site, using network attached storage/storage area networks in house, and using a managed service provider on-Island or overseas.

It is important to note the movement between the two methods between 2012 and the current survey. Network attached storage/storage area networks in house was most common in 2012, at fourty-three percent (43%). Since then, it has lost twenty points, down to twenty-three percent (23%). Offsite storage of back-up tapes, on the other hand, gained four points, jumping to fourty-one percent (41%) from thirty-six percent (36%) in 2012.

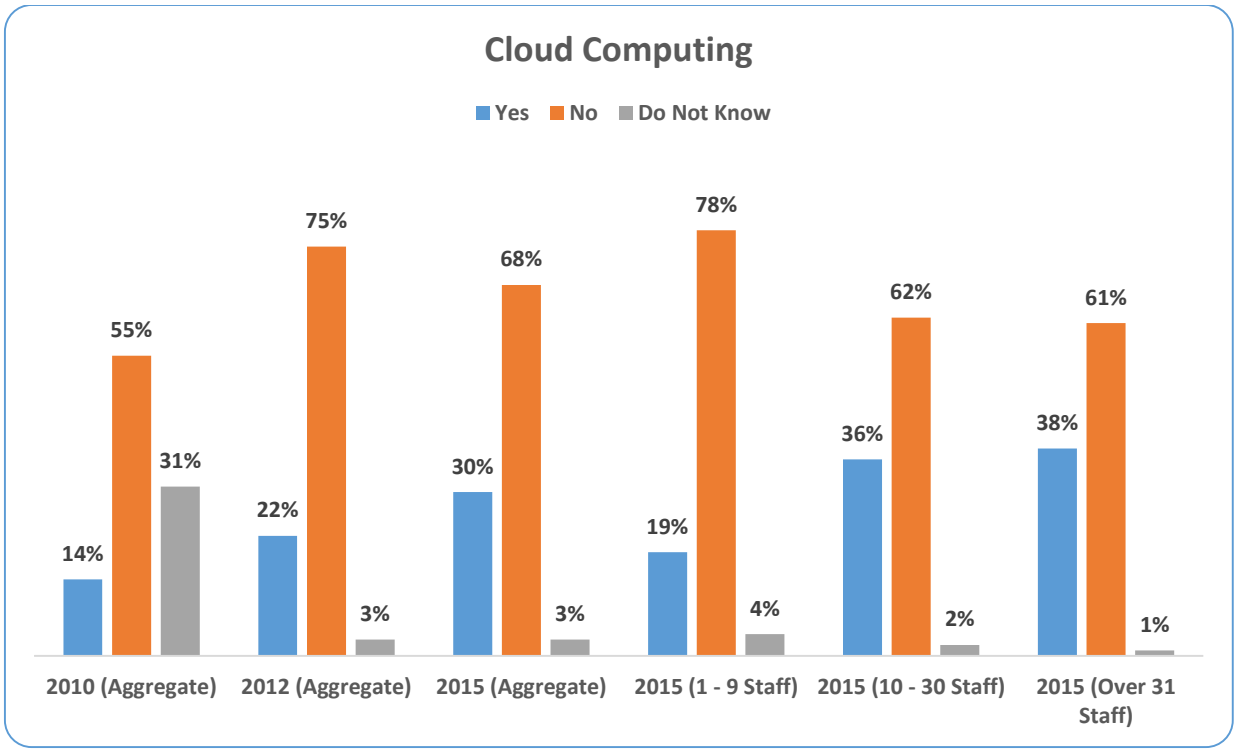
Methods firms use to back-up data		
	2012	2015
Tapes and store Tapes outside of our corporate offices	36%	41%
Tapes and store Tapes in-house	25%	29%
Network Attached Storage / Storage Area Network in-house	43%	23%
Managed Service Provider in Bermuda	20%	22%
Cloud Computing	11%	20%
Managed Service provider off-island (outside Bermuda)	18%	14%
Don't Know	2%	4%

The use of managed service providers on-Island increased to twenty-two percent (22% vs. 20% in 2012) while using an overseas service dropped to fourteen percent (14% vs. 18% in 2012). The most commonly-used overseas jurisdictions for back-ups were the USA and Canada.

Cloud Computing

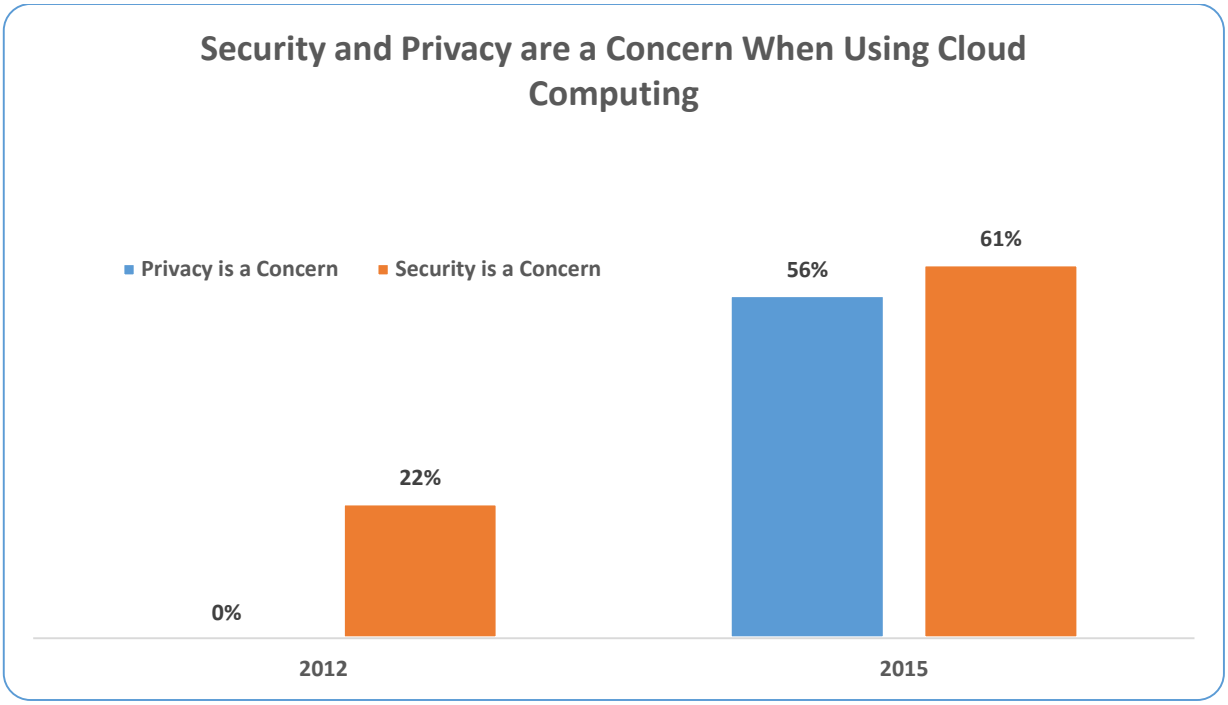
Thirty percent of companies used cloud computing (30% vs. 22% in 2012 and 14% in 2010). That consisted of thirty-eight percent of large companies (38%), thirty-six percent of medium-sized companies (36%) and nineteen percent of small firms (19%).

Such services were most often used for accounting purposes, MS Office, data storage, and educational programmes.



Firms using cloud computing expressed concerns regarding privacy and security. Specifically, security was mentioned as a concern in sixty-one percent of the responses (61%), a notable increase from 2012's twenty-two percent (22%).

Privacy, which was not the subject of a question in previous years, was mentioned in more than half of the responses (56%).

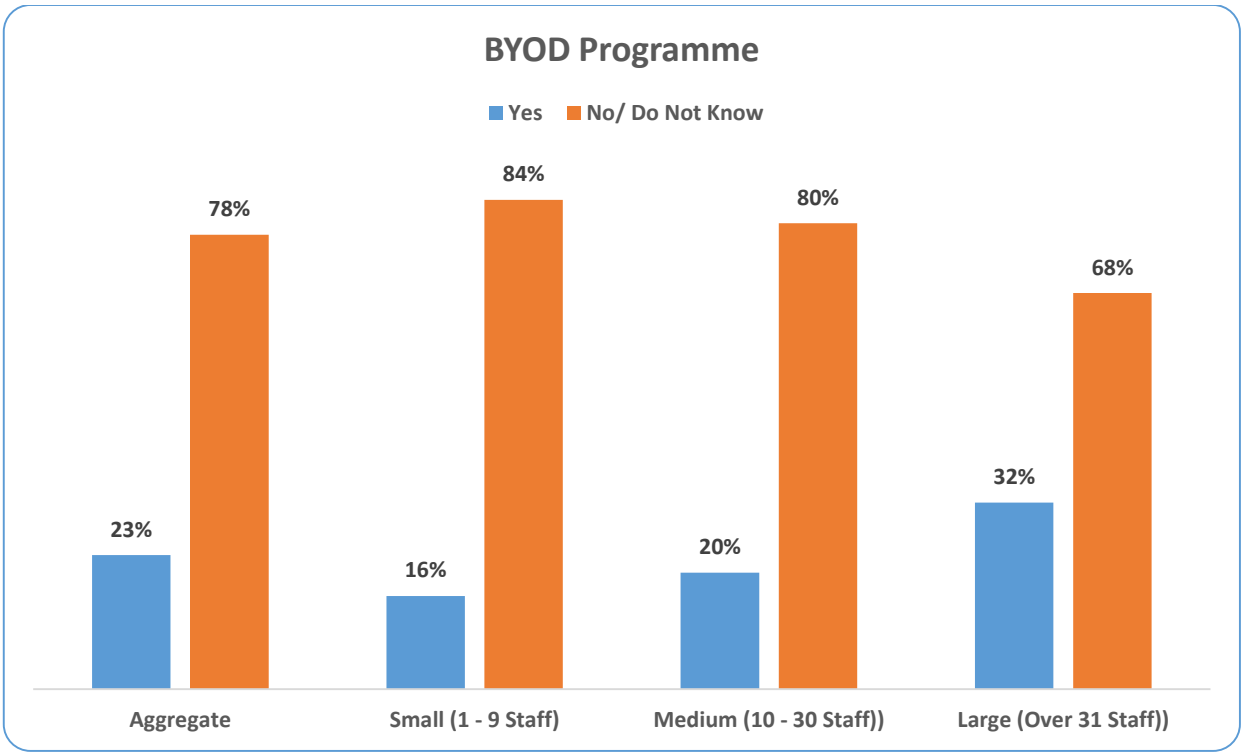


Back-up via cloud computing showed an increase as now twenty percent of companies reported using it (20% vs. 11% in 2012 and 14% in 2010). The jurisdictions most used were the USA and Bermuda.

Bring Your Own Device (BYOD)

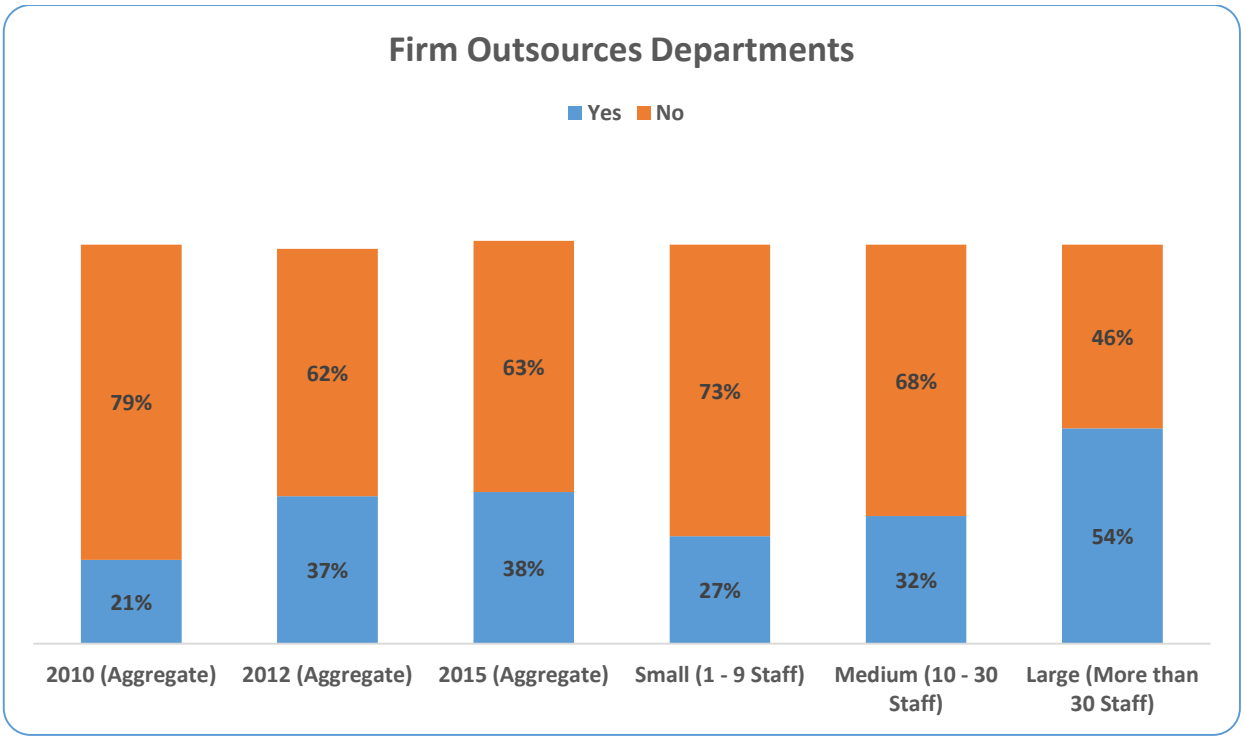
Overall, more than three quarters of businesses surveyed (78%) did not have a BYOD programme. That consisted of sixty-eight percent of large companies (68%), eighty percent of medium-sized companies (80%) and eighty-four percent of small firms (84%).

When asked why not, most answered that there was no need for such a programme and that the business provided everything that was needed. Some cited security reasons and others declared never having heard of such a programme before.

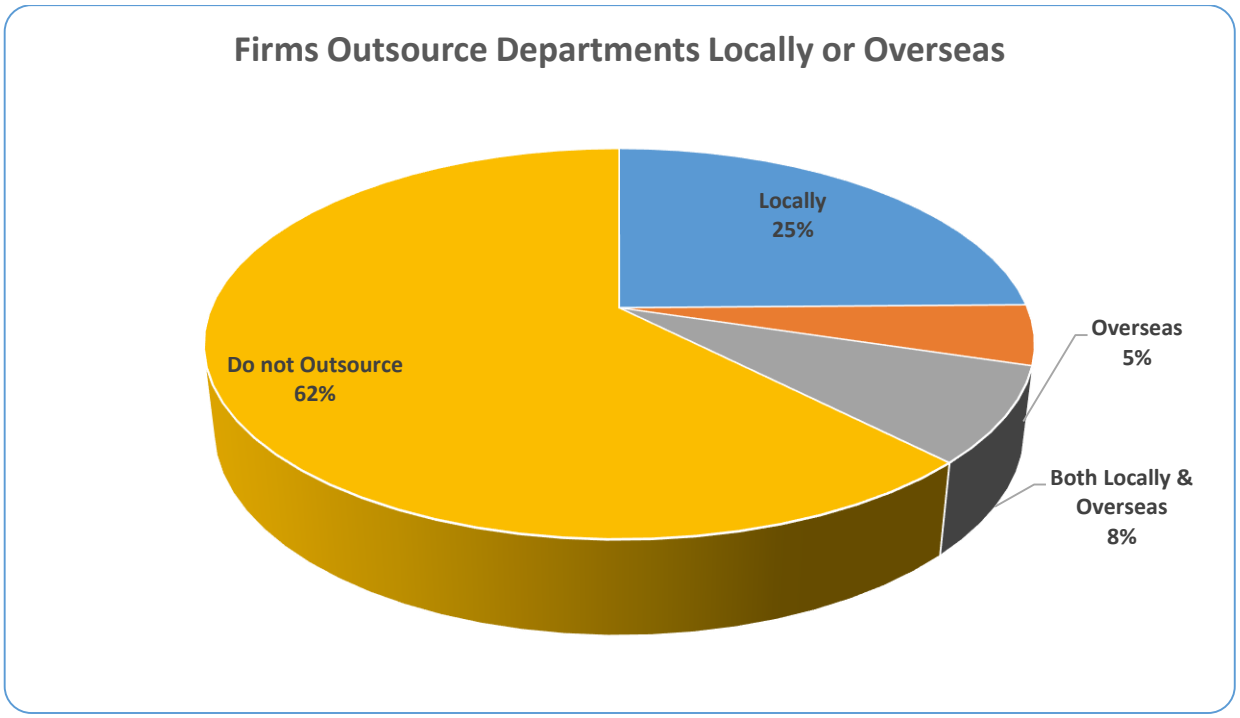


Outsourcing IT Services

Thirty-eight percent (38%) of companies reported outsourcing departmental functions, which continued the upward trend of prior years (38% vs. 37% in 2012 and 21% in 2010). The likelihood of outsourcing increased with the size of the companies: twenty-seven percent (27%) of small companies, thirty-two percent (32%) % of medium-sized companies, and fifty-four percent (54%) of large companies outsourced.



To varying degrees, outsourcing was done locally and overseas. Twenty-five percent of companies outsourced locally (25%), five percent (5%) outsourced overseas, and eight percent (8%) used a combination.



Services outsourced were helpdesk or customer support (53% locally, 47% overseas), IT department functions (82% locally, 18% overseas), finance and accounting functions (71% locally, 29% overseas), and HR functions (86% locally, 14% overseas).

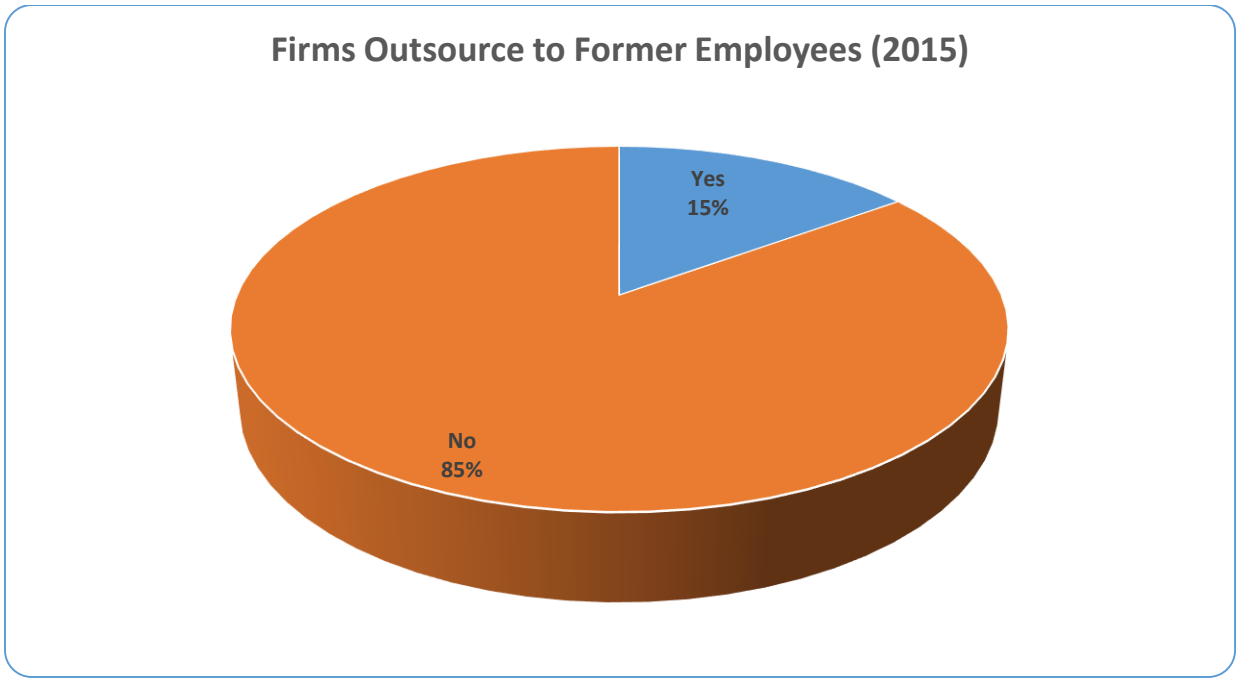
Different departments outsourced by firms						
	2010		2012		2015	
	Locally	Overseas	Locally	Overseas	Locally	Overseas
Help Desk or Customer Support	60%	40%	65%	35%	53%	47%
IT department	64%	36%	72%	28%	82%	18%
Finance and Accounting	68%	32%	65%	35%	71%	29%
Human Resources (HR) department	87%	13%	94%	6%	86%	14%

Overseas jurisdictions most often used were the USA for helpdesk or customer support, as well as for IT department functions, Canada and India for finance and accounting functions, and Cayman, the USA, and the BVI for HR functions.

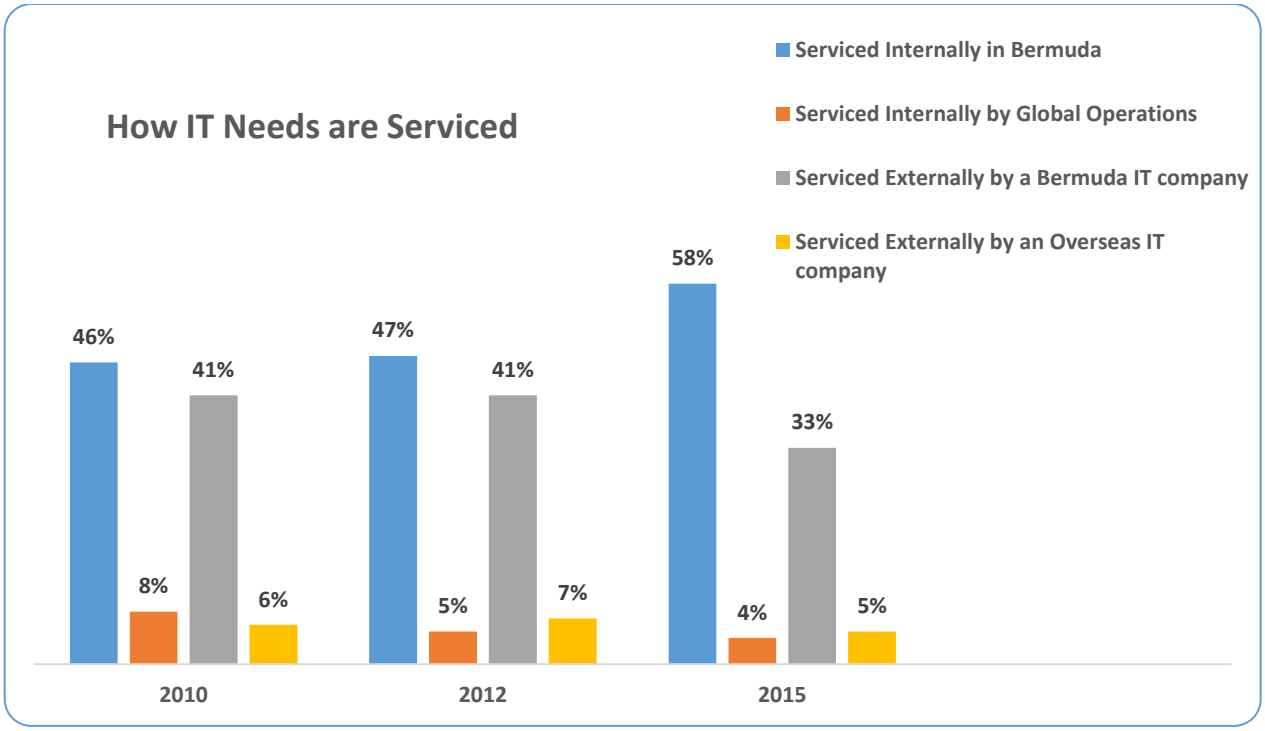
The top three reasons for outsourcing were the size of the respondent's organisations (55% vs. 30% in 2012 and 38% in 2010), pursuing a low-cost strategy (40% vs. 43% in 2012 and 49% in 2010) and the lack of qualified Bermudians, which increased from nine percent in 2010 (9%) to eleven percent in 2012 (11%), to a significant twenty-six percent this year (26%).

Reasons firms outsource			
	2010	2012	2015
Size of organisation	38%	30%	55%
To keep costs low	49%	43%	40%
Unqualified Bermudians	9%	11%	26%
Immigration issues	19%	13%	3%
Work Permit rule	6%	8%	2%
Payroll Tax	2%	4%	2%

Fifteen percent of companies (15%) outsourced services to someone who had once been an employee. That was the case in twenty-seven percent of small firms (27%), thirteen percent of medium-sized firms (13%), and eight percent of large companies (8%).

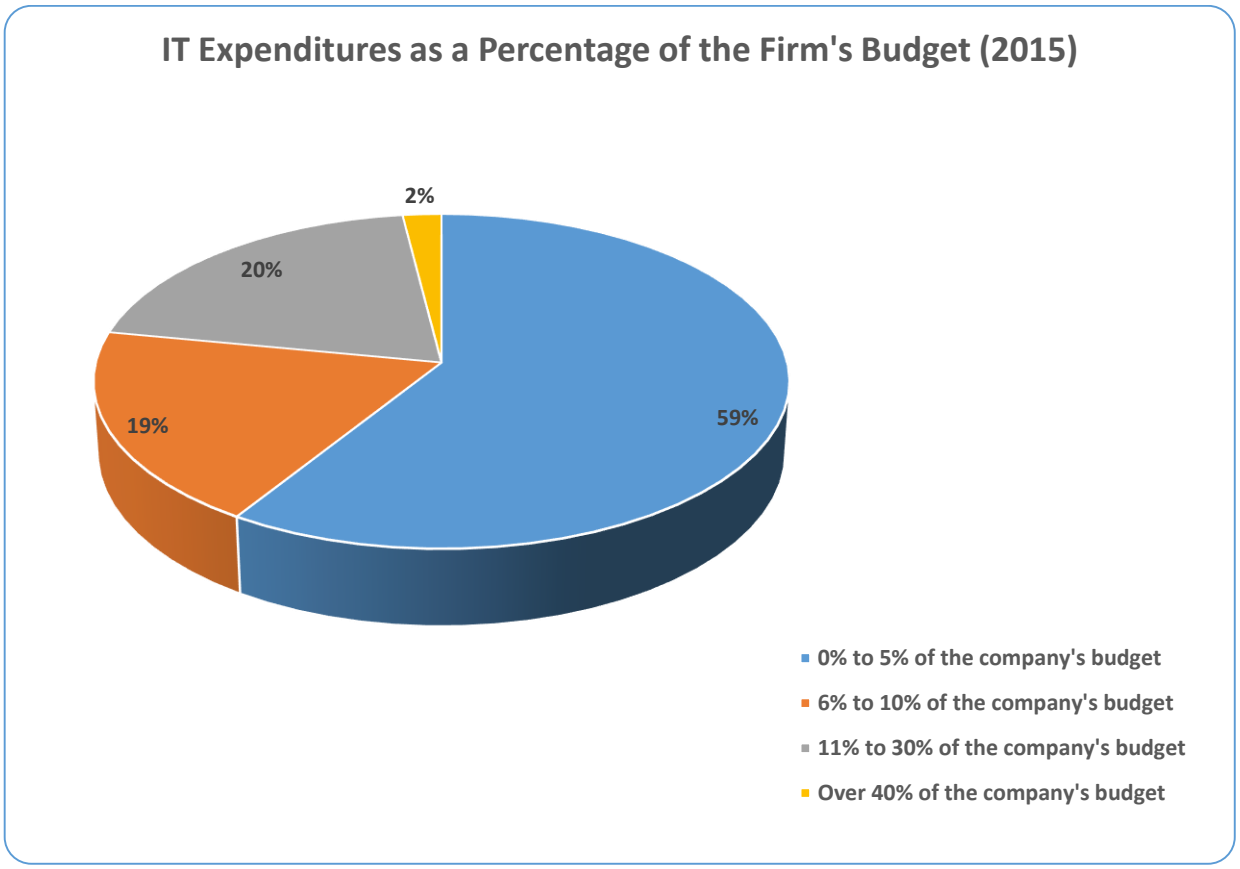


While fifty-eight percent (58%) of companies' IT needs were services internally, thirty-three percent (33%) were contracted out to a local IT business, and five percent (5%) were contracted out to an IT company overseas.



Eight percent of respondents intend to outsource departments in the next six months, an increase from last year's number (8% vs. 3% in 2012).

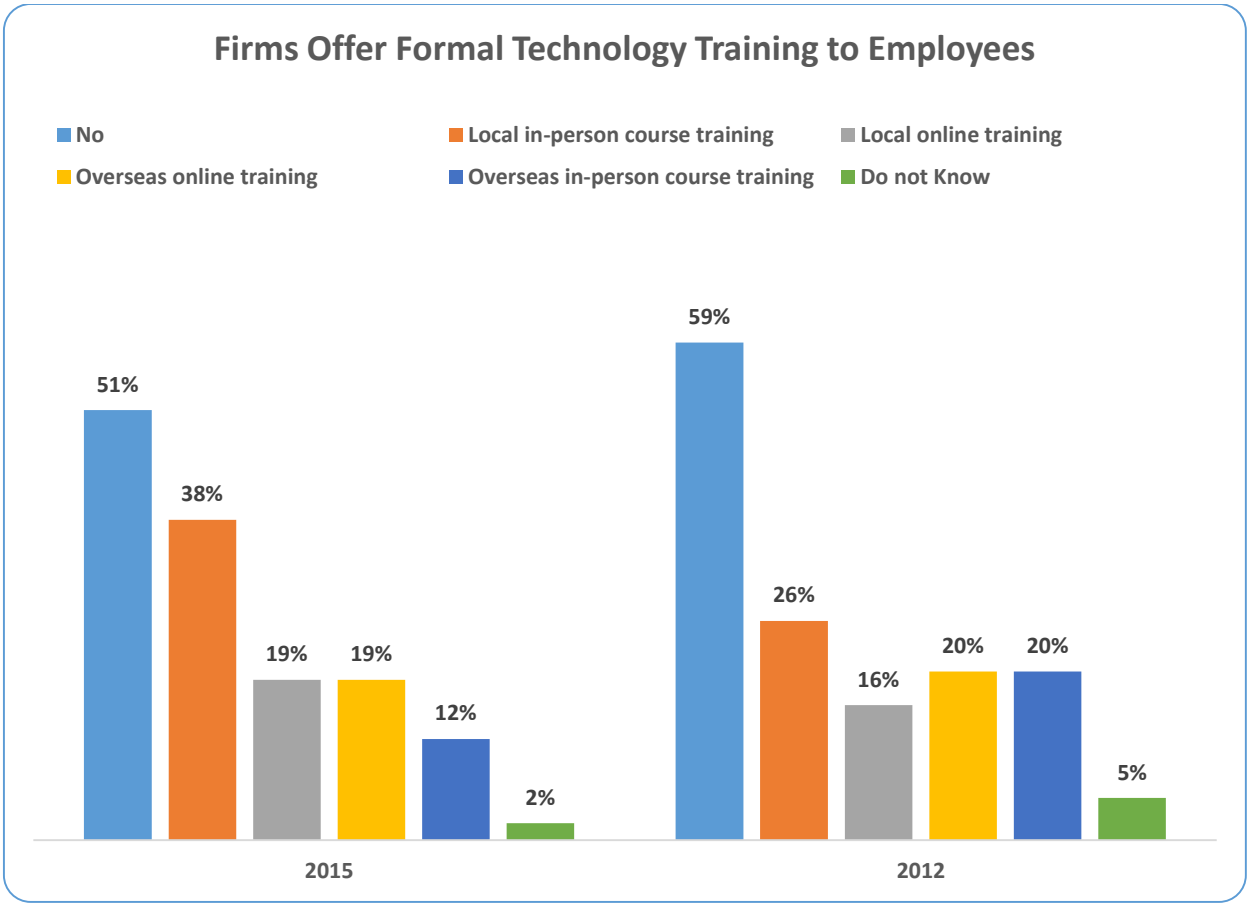
In terms of budgets, more than half the businesses (59%) reported that their companies spent five percent or less of their budget on IT.



Human Capital

Training Programmes

The large majority of companies offered more local in-person course training (38% vs. 26% in 2012). Online training was offered through both local providers (19% vs. 16% in 2012) and overseas providers (19% vs. 20% in 2012). Overseas training that was in person was reduced (12% vs. 20% in 2012).

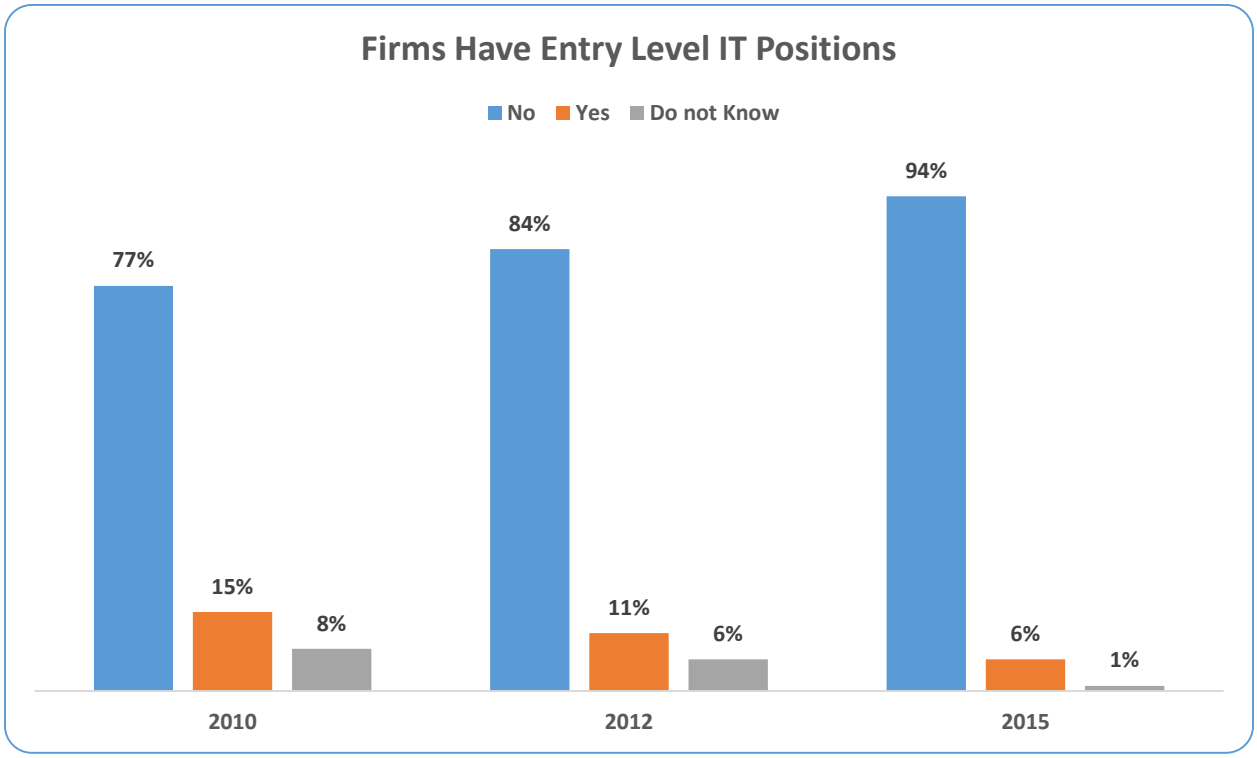


The most commonly offered basic technology training was in the use of corporate applications specific to the company's industry (63% vs. 67% in 2012 and 42% in 2010). Similarly to previous years, although the percentages switched up slightly, this was followed by spreadsheet, word processing, email and presentation applications. Other technology training targeted using the Internet for business information gathering, and using cellular and smartphone devices for calls and Internet access.

Formal technology training offered by employees			
	2010	2012	2015
Other corporate applications specific to your industry	42%	67%	63%
Using Word Processing Software like Microsoft Word	69%	52%	54%
Using Spreadsheet Software like Microsoft Excel	72%	55%	54%
Using Emailing Software like Outlook or Lotus	62%	46%	46%
Using Presentation Software like Microsoft PowerPoint	65%	47%	43%
Using the Internet for Business Information Gathering	35%	41%	31%
Making and Receiving Cell Phone Calls	27%	13%	11%
Using a mobile cellular device to access the Internet	33%	20%	9%

ICT- Related Positions and Skills

Six (6%) percent of respondents had entry-level IT positions in their companies (6% vs. 11% in 2012 and 15% in 2010); a significant downward trend over time.



When asked which IT skills they either seek or foresee a need for in the future, most common answers were computer networking and support, IT support staff, basic computer literacy, and web development. The most common certifications mentioned were MS Office, a degree/diploma, CCNA, and MCSE/MCSA.

To the question "What type of IT training would be useful for your staff to receive if cost was not an issue?" companies responded MS Office far ahead of Cisco, which was followed by basic computer skills and security training.

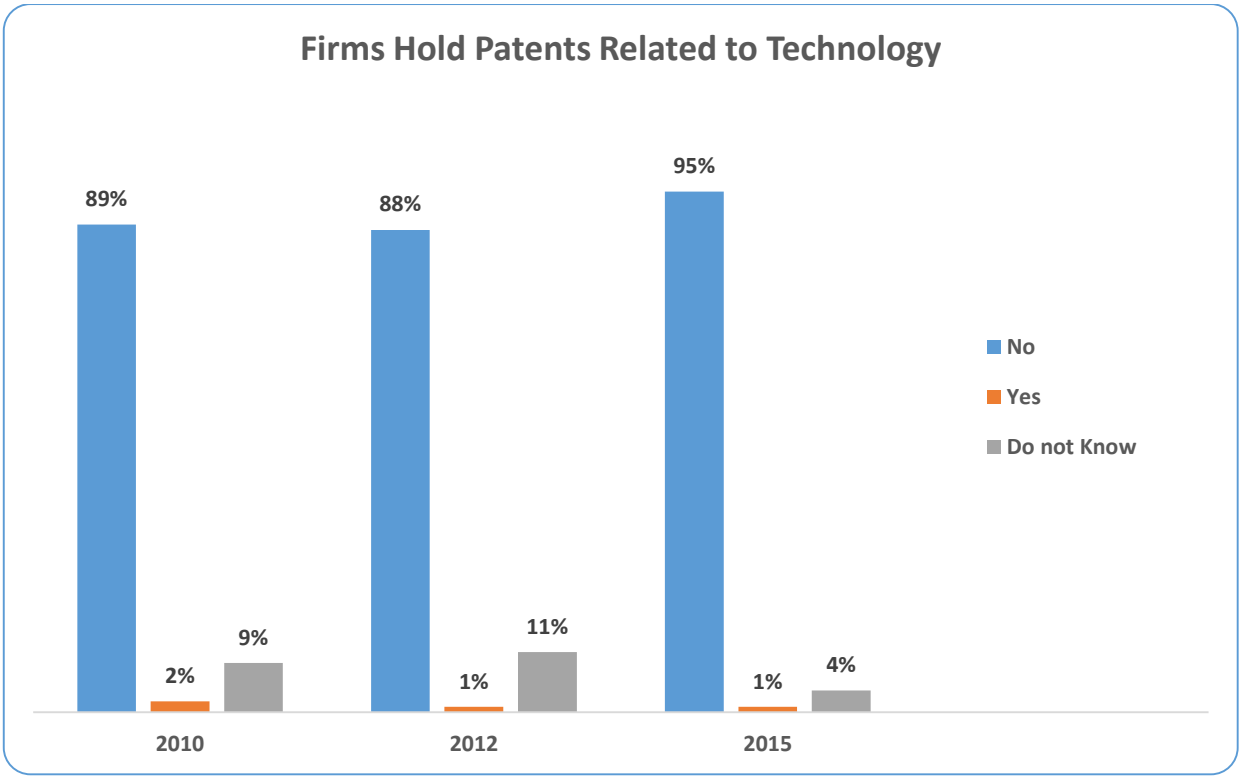
Corporate Technology Development and Innovation

Seventy-seven percent (77% vs. 75% in 2012 and 73% in 2010) of companies used off-the-shelf products purchased in the mass market, continuing on an upward trend. The use of customized products continued

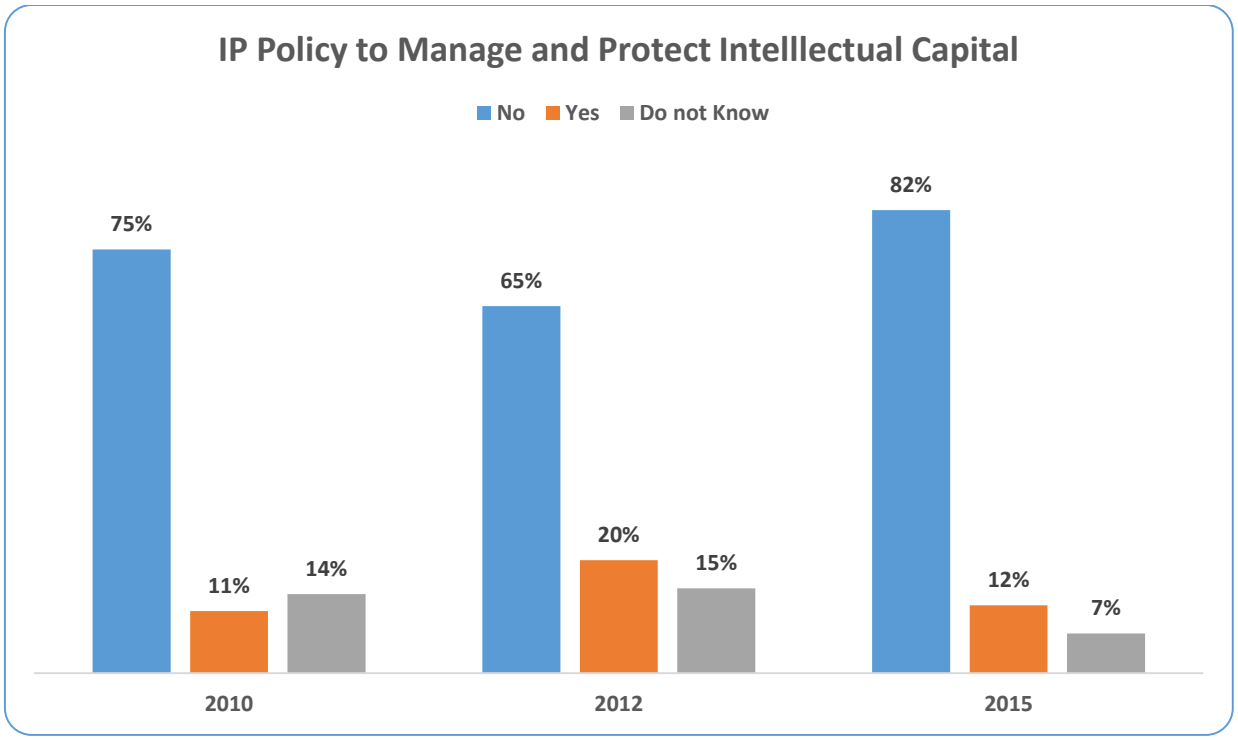
its drop for those which were locally-developed (23% vs. 37% in 2012 and 40% in 2010) and dropped for those developed overseas (34% vs. 50% in 2012 and 44% in 2010).

Ten percent (10% vs. 8% in 2012 and 15% in 2010) had developed proprietary or adapted software or hardware relating to ICT.

One percent of the companies surveyed held patents related to technology they developed (1% vs. 1% in 2012 and 2% in 2010).



Twelve percent of firms (12% vs. 20% in 2012 and 11% in 2010) had an intellectual property (IP) policy in place for the management and protection of their intellectual property.



Respondents were asked to identify measures that might encourage more investment in technology by Bermuda-based companies. Naturally, a growing economy was the most-often mentioned requisite. Many respondents also believed that better pricing would play a role, while others mentioned an increased return on investment for organizations and increased business.

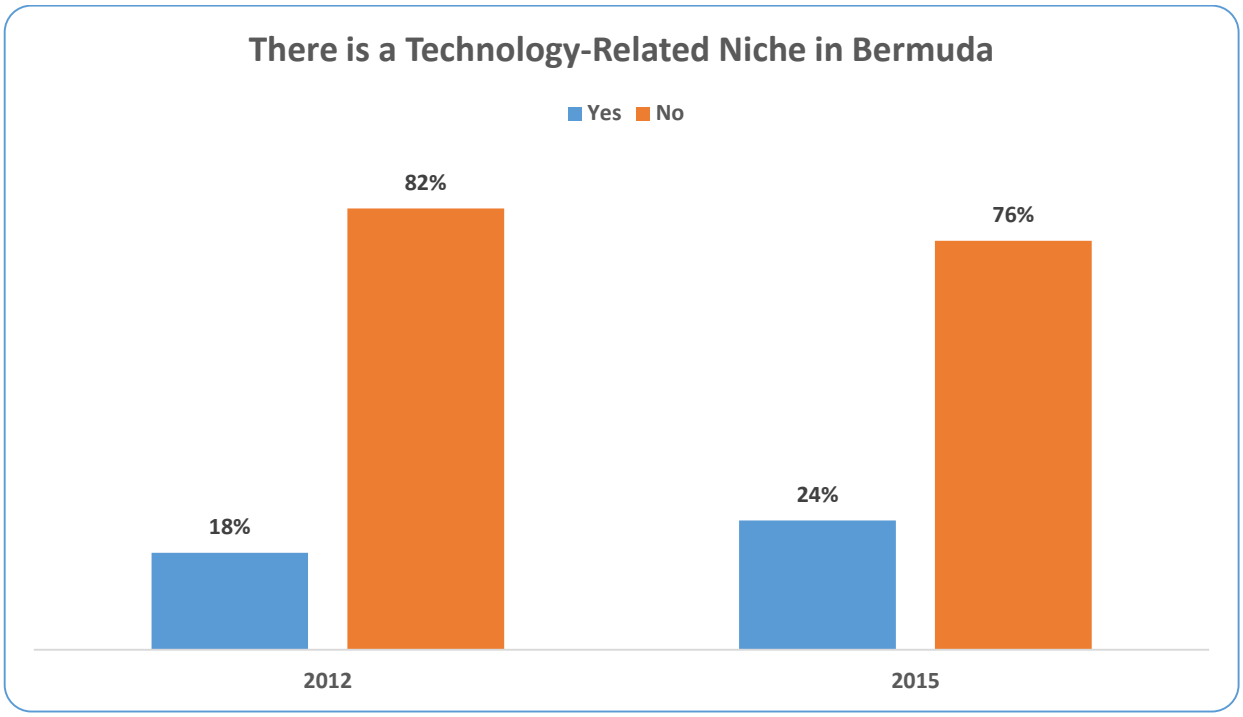
When asked to name technology products or applications that, while unavailable in Bermuda right now, would be instrumental in the future. Many respondents mentioned better cellular service, billing and customer care systems, and development products.

Bermuda – Leader in ICT?

A quarter of the respondents declared that there was a technology-related niche that Bermuda could develop further (24% vs. 18% in 2012.) Examples included fostering a "Silicon Valley" type of environment, better speeds and pricing, a private cloud in Bermuda, coding, and communications. Other niches were mentioned related to:

- opportunities provided by America's Cup,
- getting students involved in programming and web development,
- cyber security,
- remote hosting or data storage,
- electric transport,
- water and solar power, and
- online gambling.

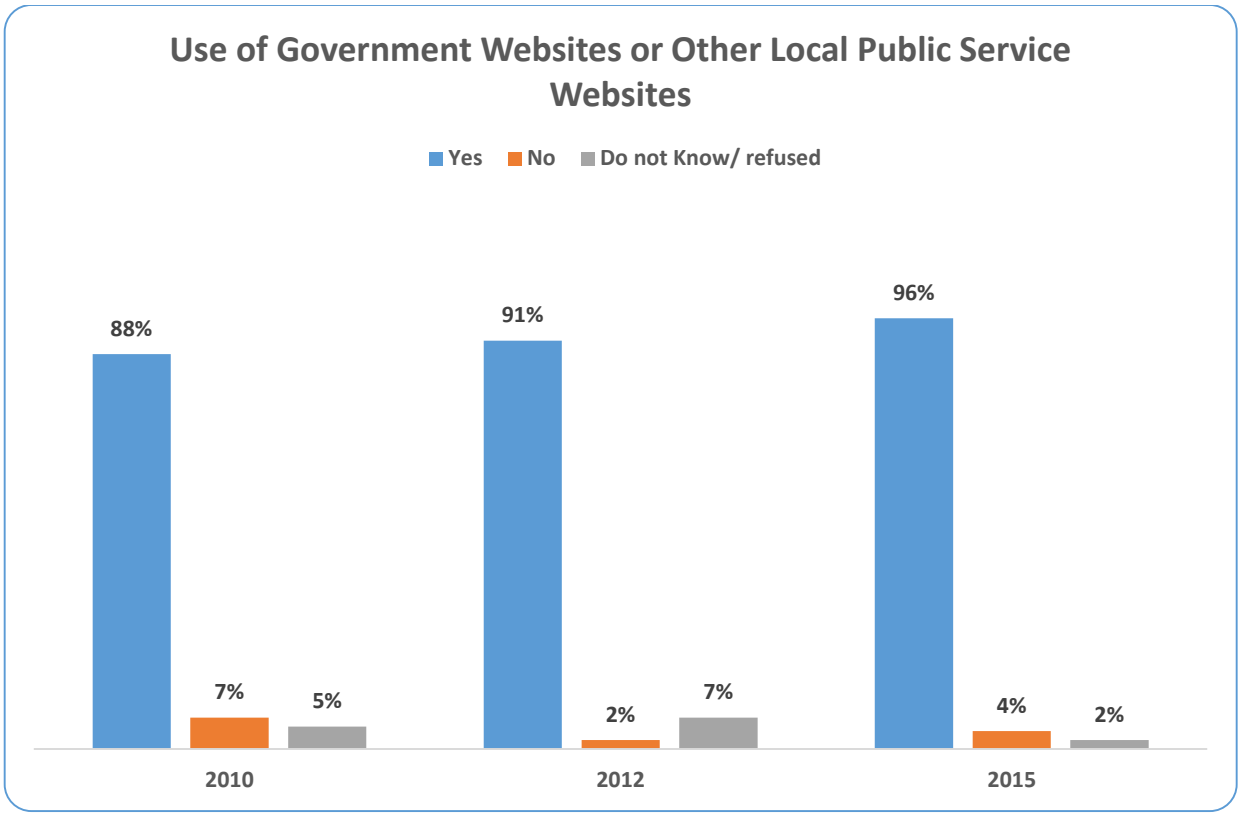
Seventy-six percent of businesses did not think that there was a technology-related niche that Bermuda could develop further (76% vs. 82% in 2012). The most-commonly mentioned reasons why not included the economies of scale and the high cost of living on the island. While they saw the Island as adequately supplied, they also saw its size as a constraint.



When asked to what extent ICT created new organisational models, most respondents stated that it allowed for a more flexible work environment, virtual meetings and collaborations, overseas reliance, and working remotely.

Business Use of Government Services

Ninety-five percent of respondents used Government websites or local public service websites, which showed an increase over time (95% vs. 91% in 2012 and 88% in 2010.) Of those, thirty-eight percent used them daily (38% vs. 29% in 2012 and 8% in 2010) and twenty-four percent used them weekly (24% vs. 24% in 2012 and 17% in 2010).



More specifically, regarding online Government services, fifteen percent used them daily (15% vs. 11% in 2012 and 4% in 2010) and twenty-three percent used them weekly (23% vs. 15% in 2012 and 7% in 2010). Those services included Payroll Tax, Social Insurance, and TCD and were generally used by eighty-four percent of companies (84% vs. 81% in 2012 and 77% in 2010).

Frequency firms use any Government online services			
	2010	2012	2015
Daily	4%	11%	15%
Weekly	7%	15%	23%
A few times per month	22%	15%	13%
Monthly	19%	21%	17%
Quarterly	16%	11%	10%
Less frequently than quarterly	9%	8%	6%
Never	11%	6%	10%
Don't Know / Refused	11%	13%	6%
TOTAL USAGE	77%	81%	84%

The most popular government online service was Payroll Tax, followed by Social Insurance, Immigration, and TCD.

For the four percent who did not use government services online (4% vs. 2% in 2012 and 7% in 2010), the barriers to such use included the opinion that the websites were not user-friendly, in addition to issues of functionality and speed, and lack of regular updates.

When asked what other Government services companies would like to see offered online, most respondents declared that all Government services should be available online. Many companies also wished to see the Government portal updated regularly.

Takeaways

Higher Speeds

Individual and organisational consumers are demanding both higher and more affordable broadband speeds. However, factors that are outside of the control of their service providers impact Internet speed including using Wi-Fi (which may reduce speeds by as much as 50%), the age and condition of the equipment used in the homes and offices (including the router), and the construction materials used in the buildings themselves (under floor heating, thicker walls, etc.). Organizations were well-informed about their needs and options.

Many companies are interested in upgrading to a fiber solution. Fibre To The Cabinet (FTTC) is the most oft-used upgrade from ADSL. Yet, significant investment is also required in order to make Fibre To The Building (FTTB) a reality in Bermuda. Notable, however, is the fact that as the demand for broadband speeds continues to increase, there is little indication that prices will decrease to make it affordable for small and medium sized businesses.

The Internet of Things

Looking ahead, global patterns continue to impact Bermuda and how it perceives, acquires, adapts to, and uses technology both at the individual and organisational level. The obvious truth is that everything is getting connected at exponential speeds, from individual objects such as smartphones, Bluetooth-activated vehicle features, and wearables, to organisational assets including internet-ready devices and smart buildings. These connections, which continue to increase in number and complexity, are generating data that aims to inform and improve decision-making at the individual, institutional, and government-wide level.

The resulting Internet of Things (IoT) makes connections increasingly valuable and relevant[1]. At this stage in the IoT's development, it is becoming clear that enterprises are poised to benefit more from machine-

[1] The World Economic Forum's Global Information Technology report 2015

to-machine connections (M2M) than consumers are. Savings by consumers are only minimal and the additional costs that would allow them to benefit from a highly smart and connected IoT so far are prohibitive[2]. For Bermuda, adoption will likely be seen through applications centered on transportation, smart homes, and consumer applications.[3] Apps and wearables, which create and leverage rich data and metadata, are slowly penetrating the Bermuda market.

While IoT allows more personal and predictive interactions, and merges the physical world and the virtual world to create highly customized, connected experiences, the IoT still has to resolve three major issues, unified standards for devices, privacy and security[4]. Privacy appears to be the greatest concern regarding the use of such devices. The IoT will increasingly compel global companies to be more transparent about their use of personal data. Companies would also have to become more accepting of consumers' reluctance to share information.

Big Data to Smart Data

Organizations continue to investigate ways that machine-generated data can add value to their business. This movement is in addition to data collected from customers, employees, and citizens who are interacting with organisations in more digital methods. Organisations are collecting large amounts of data and need to work with the data in a way that gets predictive results and that allows smarter decision making. The evolution of big data into smart data is more about process than technology. While tools are getting better at aggregating and parsing data, organizations must then connect past behavior to future wants, preferences, and needs of their clients and customers. Organisations will be adding context, standards, and agility in their data processing to ensure that they make the most out of what they collect.

UAVs

Bermuda is currently seeing a surge in the commercial use of drones (Unmanned Aerial Vehicles – UAVs)[5] which have multiple commercial applications. UAVs are still unlikely to be a mass-market item by virtue of their propensity to crash and emerging regulation; however, they have many potential uses. We currently see UAVs in Bermuda used for wedding and event photography and videography as well as for art and film. UAVs are also beneficial in agriculture, tourism, archeology (e.g. shipwreck sites), research, and policing.

Security

Businesses and institutions recognize that it is not possible to provide a 100 percent secured environment. Secure perimeters and firewalls are no longer enough, particularly in the growth of the IoT and its most pressing challenges: privacy and security. Smart home devices and wearables are able to register, process, and communicate significant amounts of information about a user or group of users.

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[2] Deloitte's Technology, Media, & Telecommunications Predictions

[3] https://www.bbvaopenmind.com/en/internet-of-things-opportunities-and-challenges/?utm_source=facebook&utm_medium=techreview&utm_campaign=MITcompany&utm_content=IoT

[4] https://www.bbvaopenmind.com/en/internet-of-things-opportunities-and-challenges/?utm_source=facebook&utm_medium=techreview&utm_campaign=MITcompany&utm_content=IoT

[5] Deloitte's Technology, Media, & Telecommunications Predictions

Such information includes personal schedules, shopping and entertainment habits, banking details, medicine intake schedules and even, more widely used, the location of the user at any given time. The challenge will be to ensure that any damage that can be inflicted on said users is mitigated.[6]

Cloud Computing

The convergence of cloud and mobile computing, which are used by an increasing number of residents and organisations island-wide, will continue to push the development of applications that can be delivered to any device[7]. On the other hand, cloud computing also raises privacy and security concerns. At an organizational level, the jurisdictional location of the cloud, contract terms and conditions and intrusion concerns are a few for discussion.

Click and Collect[8]

"Click and Collect" defines the convenience of collecting a product that one ordered online at a physical location, instead of the product being delivered to the purchaser. In a country where most consumer goods and organisational assets and supplies are imported, this added convenience is likely to amplify the appeal of local e-commerce. The exploration of this model by businesses may create a positive impact on internet marketing, usage, and penetration on the Island.

[6] https://www.bbvaopenmind.com/en/internet-of-things-iot-the-third-wave/
[7] https://www.bbvaopenmind.com/en/cloud-computing-big-data-and-mobility-2015-tech-trends/
[8] Deloitte's Technology, Media, & Telecommunications Predictions

CONCLUSION

Despite the economic downturn in Bermuda, technology continues to be seen as an important tool for individuals and organisations alike. Looking at the most common uses of technology, whether for work or recreation, one can quickly note that it is as omnipresent as ever, acting as a means of simplifying life, work, and providing increasing efficiencies.

Companies find technology to be essential for competitiveness as it facilitates communication, allows for greater efficiency, and provides tools for specific organizational needs. Technology permeates training, education and research, as well as customer service, communication, and marketing/advertising. The Bermuda market and business environments require that most industry sectors embrace technology to remain competitive.

Fiscal responsibility and strategic planning have industry leaders carefully considering technology options. While prices have dropped in recent years for equipment and connectivity as market forces act upon the Bermuda landscape, respondents are still clamoring for lower rates, better broadband speeds, and better cellular and data service overall. Technology adoption remains brisk; however, a shrinking workforce, companies engaging in cost-saving activities and other factors do have a tangible impact on technology spending.

Cybersecurity is often at the forefront of organizational conversations. Respondents expressed the need for more information regarding security alerts and privacy. At the same time, most believe that their servers are secure and they have a disaster recovery or business continuity plan in place. Security and privacy considerations may be an area for future focus, particularly given the increasing use of cloud solutions.

Looking into the future, employers see an increased need for IT specialists with specific skills in Bermuda. Certifications in Microsoft Office, CCNA, and MCSE/MCSA are currently considered beneficial, and students should keep an eye on such feedback. We do note that companies may turn to outsourcing, as they may feel that the size of their organization, cost-effectiveness, and the shortage of qualified Bermudians may push them in such a direction. While outsourcing to local service providers is indeed beneficial, encouraging high-skilled work to remain on the Island is critical.