

The Report on
Wi-Fi Adoption and Security Survey 2017
Hong Kong

Prepared by
Dr. Stanley Kam Sing Wong

Under the Advisory of
Dr. Ken Fong
Honorary Chairman (Life), Hong Kong Wireless Technology Industry Association (WTIA)

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1. Introduction

Despite the growing availability of low cost mobile data plans and the extensive coverage of 4G mobile data connectivity, Wi-Fi connection remains an important alternative carrier for mobile data offloading, especially when the users are using their mobile devices for watching videos in busy business centers such as Causeway Bay or Mongkok. Wi-Fi connection has an edge over mobile data connection because of the former's higher bandwidth and its absence of limits on the upload and download speeds imposed by service providers.

Mobile data and Wi-Fi connection are by no means competing technologies. Some devices, such as smart meter and handheld ticketing machine, work better with mobile data connection. Other devices, such as smart light bulb and printer, work better with Wi-Fi connection.

With regard to Internet connection, both mobile and Wi-Fi networks can serve well as a conduit for gaining access to the Internet but the difference is, if the mobile network is used, an active SIM card is needed for the device to gain access to 4G connection, which could be expensive especially when there are 10 or more devices at home that need Internet access.

Wi-Fi connection does not need a SIM card and the majority of smart home gadgets are Wi-Fi-enabled. They come with a Wi-Fi module, hence saving the user from paying extra for the optional accessories if the mobile connection is used instead.

In many parts of the world, including Hong Kong, Wi-Fi is a necessity not a luxury. The majority of the portable electronic gadgets are Wi-Fi-enabled. Most users expected to be provided with stable and high-speed Internet anytime, anywhere. It is common to see pedestrians with their eyes glued to their mobile phones or tablets while walking even when crossing a busy street. Sometime, even cyclists and drivers have their heads down and checking their mobile phone when it rings or buzzes. In view of the high demand of Wi-Fi connectivity, some airlines, such as American, Delta, and the United, have started to provide Wi-Fi Internet access service on their planes for a reasonable fee.

Free Wi-Fi is also important to travelers, whether businessmen or holiday makers. To many, Wi-Fi availability is the determining factor in choosing a hotel.

However, for this accessibility and convenience to become a way of life a sound Wi-Fi infrastructure augmented by instant connectivity, a high awareness of information security and an enhanced ability and interest in learning via this new medium among the users is a must. This report, which is the 6th

in a series of research compiled by WTIA, investigates Wi-Fi usage, Wi-Fi accessibility, Wi-Fi security and the knowledge of it in Hong Kong. Starting from last year, the respondent perceptions on e-Learning and how Wi-Fi connection facilitates e-Learning for both adults and school children are also examined to find out to what extent one the users are ready to embrace this new way of life.

In view of the skepticism that surrounds the safety of free Wi-Fi provided by hotels and websites of adult contents and the risks of being attacked by spyware, ransomware and malwares and viruses of various kinds as a result, in this year's report, some additional questions are asked to better understanding users' attitude towards the use of hotel free Wi-Fi and visits to adult content websites.

Data collected from the study will help stakeholders to understand more about the user experience, their awareness and perceptions of Wi-Fi service and security in Hong Kong. Through critical data analysis, it is hoped that the findings of the report will assist both the Government and commercial Wi-Fi network providers to identify gaps in the current service and help shed light on areas of improvement and future directions.

Similar to previous reports, copies of conventional paper-and-pen self-administered questionnaire were used to collect data from a total of 209 respondents. The report is divided into 7 parts: Part 1 is this introduction which sets the scene for and outlines the aims of the study. Part 2 is a descriptive summary of the demographic profiles of the respondents. Part 3 is about Wi-Fi usage in Hong Kong, covering essential details such as the types of Wi-Fi network for Internet access, user profiles of the seven main types of Wi-Fi Internet access, how Wi-Fi network is used by the respondents, and the devices used and Wi-Fi tethering. Part 4 details the use of Wi-Fi network for mobile messaging and social networking in Hong Kong, investigates the types of mobile messaging Apps and social networking Apps the respondents are using and the amounts of time they spent on them. Part 5 explores the potentials of free Wi-Fi access on e-Learning and investigates the respective influence of e-Learning on learning interests on adults, secondary school and primary school children, as well as the practical issue of the potential contribution of free Wi-Fi access to this new mode of learning. Part 6 looks into the details of Wi-Fi access, both at home and outside home. It examines the types of Wi-Fi standard used by the respondents at home, the Wi-Fi security settings adopted, and the respondent assessment of public Wi-Fi Internet access provided by both private and Government service providers and respondents' comments on improving public Wi-Fi services in Hong Kong. Part 7 concludes the report with a discussion of the study results and the insights gained.

2. Profiles of Respondents

Among the 209 respondents who took the time to fill out the copies of the questionnaire, 2 of them did not provide their gender information. Of the remaining 207 respondents who answered the question, 138 (66.67%) of them are male and 69 (33.33%) are female (Table 1).

Table 1. Gender of Respondents

	Sample		Valid Response	
	No.	%	No.	%
Male	138	66.03	138	66.67
Female	69	33.01	69	33.33
No response	2	0.86		
Base	209	100.0	207	100.0

Among the 209 respondents who filled out the copies of the questionnaire, 3 of them did not provide any information about their age. Table 2 below illustrates the frequency distribution and percentage composition of the age of the respondents. Last year, those aged between 26 and 35 took up 40.0% of the respondents. This year, those who are within the same age bracket stand at 23.3% of the 206 respondents (100%) who responded to this question. Those aged between 46 and 55 take up 22.33%, while those between 36 and 45 and 56 and 65 account for 16.99% and 16.5% of the total respectively.

Table 2. Age of Respondents

	Sample		Valid Response	
	No.	%	No.	%
15-18 years old	2	0.96	2	0.97
19-25 years old	26	12.44	26	12.62
26-35 years old	48	22.97	48	23.30
36-45 years old	35	16.75	35	16.99
46-55 years old	46	22.01	46	22.33
56-65 years old	34	16.27	34	16.50
65 years old and above	15	7.18	15	7.28
No response	3	1.44		
Base	209	100.0	206	100.0

As regards their marital status, 4 of the respondents did not provide any information. Among the 205 valid responses, the majority of them are single (59.02% or 121 out of 205) and 84 (40.98%) are married (Table 3).

Table 3. Marital Status of Respondents

	Sample		Valid Response	
	No.	%	No.	%
Single	121	57.89	121	59.02
Married	84	40.19	84	40.98
No response	4	1.91		
Base	209	100.0	205	100.0

Two of the respondents did not provide information about to which industry sector they belong. Of the 207 respondents, only 32.85% (68 out of 207) of them said they engaged in the IT-related sectors, 67.15% (139 out of 207) said they worked in sectors which are not IT-related (Table 4).

Table 4. Are you working in the IT-related field?

	Sample		Valid Response	
	No.	%	No.	%
Yes	68	32.54	68	32.85
No	139	66.51	139	67.15
No response	2	0.96		
Base	209	100.0	207	100.0

As regards the question about the respondents' education level, 4 of them did not give any answer. Table 5 below illustrates the frequency distribution and percentage composition of the education profile of the respondents who responded to the question. The frequency distribution shows that the majority of the respondents (38.54% or 79 out of 205) have a bachelor degree. They are followed by those are senior secondary graduates (20.98% or 43 out of 205) and those with a postgraduate degree (20.98% or 43 out of 205).

Table 5. Education Profile of Respondents

	Sample		Valid Response	
	No.	%	No.	%
Junior Secondary	6	2.87	6	2.93
Senior Secondary	43	20.57	43	20.98
Associate Degree	34	16.27	34	16.57
Bachelor Degree	79	37.80	79	38.54
Postgraduate	43	20.57	43	20.98
No response	4	1.91		
Base	209	100.0	205	100.0

A total of 207 respondents answered the question about their place of residence. Table 6 below illustrates the frequency distribution and percentage composition of the place of residence profile of the respondents. The frequency distribution shows that the majority of the respondents live in Kowloon (34.78% or 72 out of 207). This is closely followed by those who live in the New Territories (33.33% or 69 out of 207). Those who live on Hong Kong Island (30.43% or 63 out of 207) come third. The share of those who live on outlying islands is less than 1% (3 out of 207).

Table 6. Place of Residence Profile of Respondents

	Sample		Valid Response	
	No.	%	No.	%
Hong Kong Island	63	30.14	63	30.43
Kowloon	69	33.01	69	33.33
New Territories	72	34.45	72	34.78
Outlying Islands	3	1.44	3	1.45
No response	2	0.96		
Base	200	100.0	200	100.0

3. Use of Wi-Fi Network in Hong Kong

Table 7 and Figure 1 below illustrate the frequency distribution and percentage composition of the Wi-Fi experience profile of the respondents. The frequency distribution shows that the majority of the respondents (90.5% or 181 out of 200) have more than 2 years' of experience using Wi-Fi. The percentage share of this group of increases 9.5 percentage points over that recorded last year (81.1%), indicating the growing popularity of Wi-Fi usage in Hong Kong.

Those with 1-2 years' of Wi-Fi usage experience (4.0% or 8 out of 200) rank second, while those with six to 12 months' experience using Wi-Fi account for 3.0% (6 out of 200), 1.5% (3 out of 200) of them have an experience of less than six months. Those who have never used

Wi-Fi before accounted for a small percentage (1.0% or 2 out of 200) only.

Table 7. Experience Profile of Respondents

	This Year (2017)		%		Differences (17 vs. 16)
	No.	%	2016	2015	
Never used it	1	0.49	1.0	1.5	-0.51%
Less than six months	8	3.88	1.5	4.0	+2.38%
Six months to one year	9	4.37	3.0	4.5	+1.37%
One year to two years	8	3.88	4.0	9.0	-0.12%
Longer than two years	180	87.38	90.5	81.1	-3.12%
Base	206	100.0	100.0	100.0	

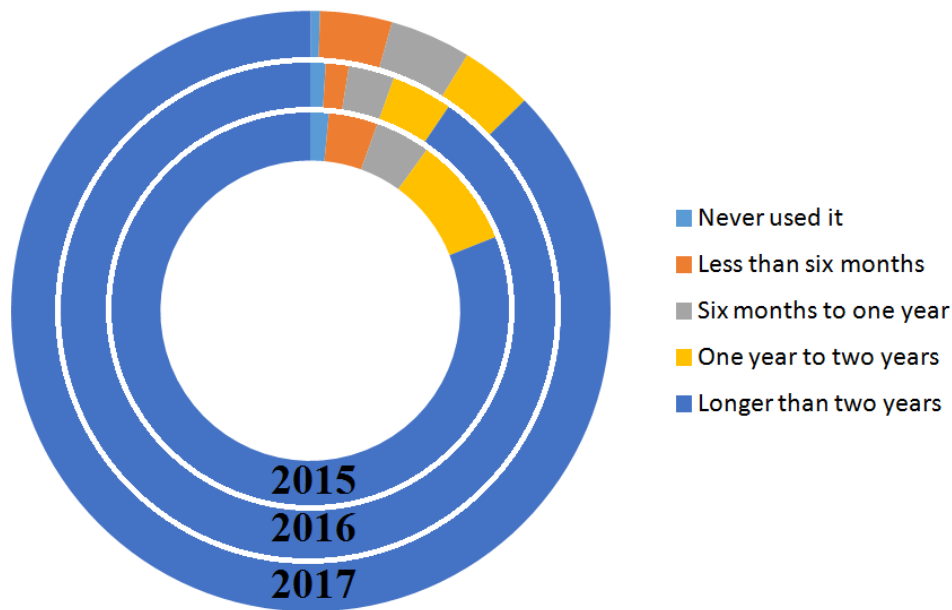


Figure 1: Experience Profile of Respondents

3.1 Time Spent on Wi-Fi Internet Access

Table 8 and Figure 2 illustrate the frequency distribution and percentage composition of the amounts of time the respondents had spent on accessing the Internet using Wi-Fi. Of the 205 respondents, all of them indicated that they had experienced accessing the Internet via Wi-Fi.

Compared to the figures last year, the share of respondents who described themselves as frequent Wi-Fi users increased 0.8 percentage points (72.2% in 2017 vs. 71.4% in 2016). Those who described themselves as occasional user drop from 24.6% in 2016 to 19.5% in 2017, and those who described themselves as only using Wi-Fi network unless necessary increase from 4.0% in 2016 to 8.3% in 2017. The increase in the percentage share of light Wi-Fi access users could be attributed to the availability of cheaper unlimited mobile data plan in Hong Kong, while the increase in heavy Wi-Fi access users might indicate that Wi-Fi has become a necessity to more and more people.

Table 8. Time Spent on Wi-Fi Connection

	This Year (2017)		Comparison	
	No.	%	2016 (%)	% change
Frequently (e.g. 4 hrs/day)	148	72.2%	71.4%	+0.8%
Occasionally (e.g. < 10 hrs/wk)	40	19.5%	24.6%	-5.1%
Unless necessary	17	8.3%	4.0%	+4.3%
Base	205	100.0	100	

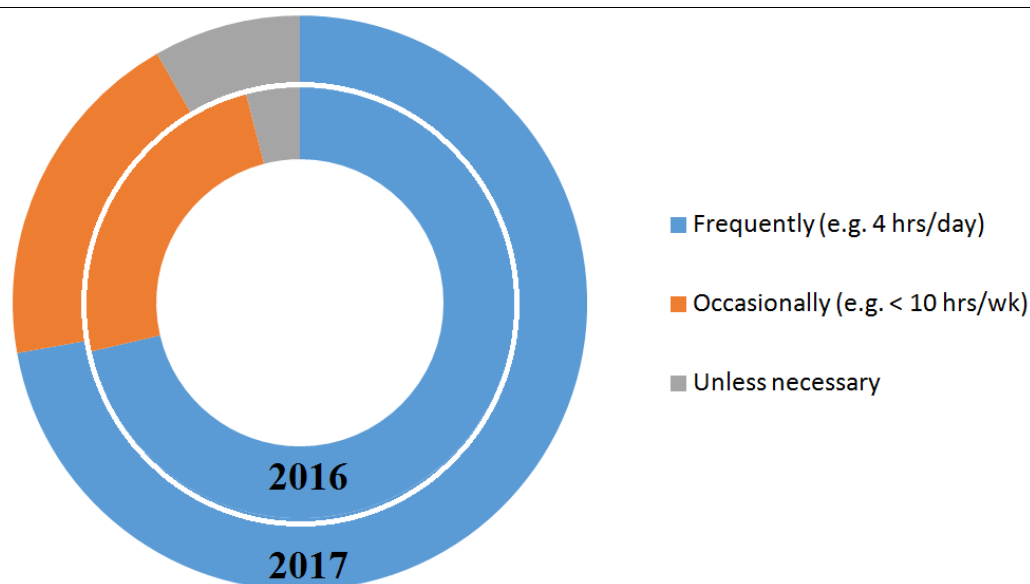


Figure 2: Time Spent on Wi-Fi Connection

3.2 Types of Wi-Fi Network for Internet Access

The types of Wi-Fi network for Internet access are shown in Table 9 and Figure 3 below. The

majority of the respondents (89.5%) said they used Wi-Fi at home, similar to the percentage reported last year and is in keeping with the 88.4% reported in 2015. Those who use Wi-Fi in office account for 61.2%, which is slightly lower than the 67.8% reported last year.

It was reported that 49.3% of those responded last year use government free Wi-Fi. This year, 54.6% used it, representing an increase of 5.3 percentage points, while the increase in share of respondents who use commercial Wi-Fi hotspots increased only 1.5 percentage points (from 39.2% in 2016 to 40.7% in 2017). The percentage share of those using free government Wi-Fi this year is the highest over the period of three consecutive years, indicating the growing popularity of government free Wi-Fi in Hong Kong.

Table 9 Types of Wi-Fi Network Used for Internet Access

	This Year (2017)		2016	2015
	No.	%	%	%
Wi-Fi at Home	187	89.5	89.5	88.4
Wi-Fi on Campus	43	20.6	31.7	19.7
Wi-Fi in Office	128	61.2	67.8	53.0
Wi-Fi in business districts	93	44.5	45.2	45.5
Wi-Fi hotspots provided by commercial service providers	85	40.7	39.2	44.4
GovWiFi public hotspots	114	54.6	49.3	54.2
Free Wi-Fi hotspots under the Wi-Fi.HK brand	46	22.0	22.1	23.2

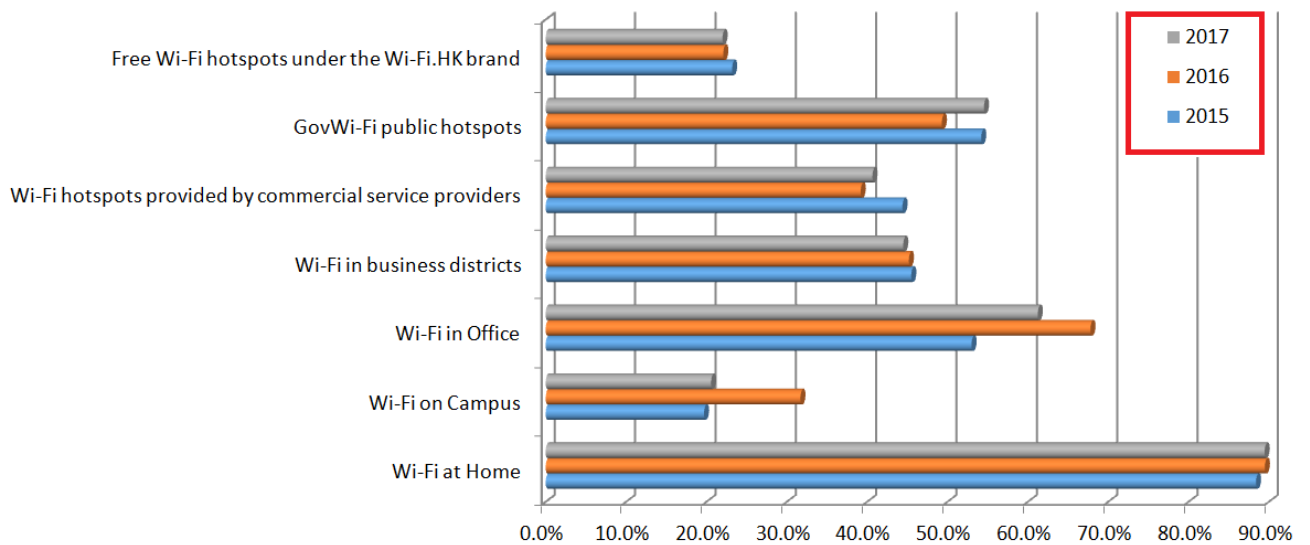


Figure 3: Types of Wi-Fi Network Used for Internet Access

3.3 User Profile of the Seven Main Types of Wi-Fi Internet Access

3.3.1 Wi-Fi Using Experience Profile

Table 10 below shows the Wi-Fi using experience profile of the respondents in terms of the seven main types of Wi-Fi network. It is clear from the Table that the more experienced users (those with more than two years' of experience of using Wi-Fi) accessed the Internet using Wi-Fi at home (96.11%), Wi-Fi in office (69.44%), GovWiFi (56.11%), and Wi-Fi in business districts (48.33%), while the less experienced users (those with less than six months of experience) accessed the Internet via Free government Wi-Fi hotspots (62.5%).

Table 10. Wi-Fi Using Experience in Terms of Wi-Fi Internet Network

	< 6 months	1/2 to 1 yr	1-2 yrs	> 2 yrs
Wi-Fi at Home	25.00%	55.56%	62.50%	96.11%
Wi-Fi on Campus	0.00%	22.22%	0.00%	22.78%
Wi-Fi in Office	0.00%	22.22%	12.50%	69.44%
Wi-Fi in business districts	12.50%	22.22%	37.50%	48.33%
Wi-Fi hotspots provided by commercial service providers	12.50%	11.11%	37.50%	44.44%
GovWiFi public hotspots	62.50%	33.33%	50.00%	56.11%

Free Wi-Fi hotspots under the Wi-Fi.HK brand	0.00%	0.00%	12.50%	25.00%
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3.3.2 Gender Profile

Table 11. Use of Wi-Fi Network for Internet Access by Gender

	Male	Female
Wi-Fi at Home	89.86%	89.86%
Wi-Fi on Campus	22.46%	17.39%
Wi-Fi in Office	63.04%	57.97%
Wi-Fi in business districts	50.72%	31.88%
Wi-Fi hotspots provided by commercial service providers	42.75%	34.78%
GovWiFi public hotspots	55.07%	52.17%
Free Wi-Fi hotspots under the Wi-Fi.HK brand	25.36%	14.49%

Table 11 above shows the gender profile of the respondents in terms of the seven main types of Wi-Fi network. Both genders display a similar pattern in terms of the types of Wi-Fi network used. The majority of them (89.86% of the males and the females) used Wi-Fi at home. Those who used Wi-Fi in office rank second (63.04% of the males and 57.97% of the females). They are followed by those who used GovWiFi public hotspots (55.07% of the males and 52.17% of the females).

3.3.3 Marital Status Profile

Figure 12 below shows a breakdown of the use of the seven main types of Wi-Fi Internet network by marital status. The majority of the respondents, both single and married, used Wi-Fi at home (88.43% of the single and 91.67% of the married). This is followed by those who used Wi-Fi in office (63.64% of the single and 59.52% of the married) and those who used GovWiFi public hotspots (51.24% of the single and 57.14% of the married). Almost half of the respondents used Wi-Fi in business districts (44.63% of the single and 44.05% of the married) and more than one-third of respondents used Wi-Fi hotspots provided by commercial service providers (44.63% of the single and 34.52% of the married). About one-fifth of the

respondents used Free Wi-Fi hotspots under the Wi-Fi.HK brand (19.01% of the single and 25.00% of the married). As regards the respondents using Wi-Fi on campus, there is a considerable difference between the single (26.45%) and married (12.10%) respondents.

Table 12. Use of Wi-Fi Network for Internet Access by Marital Status

	Single	Married
Wi-Fi at Home	88.43%	91.67%
Wi-Fi on Campus	26.45%	13.10%
Wi-Fi in Office	63.64%	59.52%
Wi-Fi in business districts	44.63%	44.05%
Wi-Fi hotspots provided by commercial service providers	44.63%	34.52%
GovWiFi public hotspots	51.24%	57.14%
Free Wi-Fi hotspots under the Wi-Fi.HK brand	19.01%	25.00%

3.3.4 Age Profile

As there are only 2 respondents in the “15-18 years old” age group, the number is too small for yielding any useful insight and hence the group is excluded from analysis.

Table 13 below shows a breakdown of the use of the seven main types of Wi-Fi Internet network by the 4 remaining age groups. Using Wi-Fi at home (with a share ranging from 88.46% to 95.83%), using Wi-Fi in office (with a share ranging from 53.85% to 75.00%) and GovWiFi public hotspots (with a share ranging from 46.15% to 57.14%) are the three most common Internet access conduits across the age groups.

Table 13. Use of Wi-Fi Network for Internet Access by Age

	26-35	36-45	46-55	56-65
Wi-Fi at Home	88.46%	95.83%	88.57%	91.30%
Wi-Fi on Campus	46.15%	33.33%	17.14%	6.52%
Wi-Fi in Office	53.85%	75.00%	77.14%	63.04%
Wi-Fi in business districts	38.46%	54.17%	48.57%	45.65%
Wi-Fi hotspots provided by commercial service providers	53.85%	43.75%	25.71%	41.30%
GovWiFi public hotspots	46.15%	50.00%	57.14%	56.52%
Free Wi-Fi hotspots under the Wi-Fi.HK brand	23.08%	14.58%	28.57%	21.74%

3.3.5 Education Profile

As there are only 6 respondents in the “Junior Secondary” educational level group, the number is too small for yielding any useful insight and hence the group is excluded from analysis. Table 14 below is a breakdown of the use of the seven main types of Wi-Fi Internet network by respondents of the 4 remaining educational level groups. Using Wi-Fi at home (with a share ranging from 79.07% to 94.12%), using Wi-Fi in office (with a share ranging from 41.85% to 74.42%) and GovWiFi public hotspots (with a share ranging from 53.16.0% to 58.14%) are the three most common Internet access conduits across the age groups.

Table 14. Use of Wi-Fi Network for Internet Access by Educational Level

	Senior Sec.	Asso. Deg.	Bachelor Degree	Postgrad.
Wi-Fi at Home	79.07%	94.12%	93.67%	90.70%
Wi-Fi on Campus	11.63%	20.59%	26.58%	20.93%
Wi-Fi in Office	41.86%	58.82%	69.62%	74.42%
Wi-Fi in business districts	37.21%	38.24%	46.84%	55.81%
Wi-Fi hotspots provided by commercial service providers	41.86%	41.18%	35.44%	48.84%
GovWiFi public hotspots	53.49%	55.88%	53.16%	58.14%
Free Wi-Fi hotspots under the Wi-Fi.HK brand	23.26%	32.35%	18.99%	18.60%

3.3.6 Place of Residence Profile

As only 3 respondents are living on outlying islands, the number is too small for yielding any useful insight and hence the group is excluded from analysis. Table 15 below shows a breakdown of the use of the seven main types of Wi-Fi Internet network by the 4 places of residence groups. Using Wi-Fi at home (with a share ranging from 82.54% to 95.83%), using Wi-Fi in office (with a share ranging from 57.97% to 65.28%) are the most common Internet access conduits across the place of residence groups.

Table 15. Use of Wi-Fi Network for Internet Access by Place of Residence

	HK Island	Kowloon	New Territories
Wi-Fi at Home	82.54%	89.86%	95.83%
Wi-Fi on Campus	20.63%	18.84%	23.61%
Wi-Fi in Office	60.32%	57.97%	65.28%
Wi-Fi in business districts	57.14%	36.23%	41.67%
Wi-Fi hotspots provided by commercial service providers	46.03%	39.13%	34.72%
GovWiFi public hotspots	58.73%	44.93%	58.33%
Free Wi-Fi hotspots under the Wi-Fi.HK brand	26.98%	15.94%	23.61%

3.4 Use of Wi-Fi Network

Table 16 shows the kinds of device used by the respondents to access the Wi-Fi network. Amongst the 209 respondents who used Wi-Fi network, the majority of them used smartphones (90.43%) and personal computers (59.33%) to access Wi-Fi. Slightly less than half of them (47.85%) used tablets, such as iPads, to access Wi-Fi. Only very few respondents (3.83%) used PDAs.

Table 16. How do you access Wi-Fi?

	Sample	
	No.	%
Use PC to access Wi-Fi	124	59.33%
Use tablet to access Wi-Fi	100	47.85%
Use smartphone to access Wi-Fi	189	90.43%
Use PDA to access Wi-Fi	8	3.83%

Base	209
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As shown in Table 17, amongst the 209 respondents who used Wi-Fi to access the Internet, only 0.96% of them are not users of smartphones (1.5% for both 2015 and 2016). For those who used smartphones, the majority of them used Android smartphones (65.55%). However, it is noteworthy that the percentage share of this group of users in this year has increased by 6.75 percentage points over the 58.8% recorded in 2016. Those who used Apple iPhones account for 36.84%, which shows a decrease of 6.36 percentage points over the figure (43.2%) in 2015.

Table 17. Are you a Smartphone user?

	This Year (2017)		Comparison	
	No.	%	2016 (%)	Change
iOS smartphone user	77	36.84	43.2	-6.36
Android phone user	137	65.55	58.8	+6.75
Other smartphone user	13	6.22	2.5	+3.72
Not use smartphone	2	0.96	1.5	-0.54

As shown in Table 18 and Figure 4, amongst the 209 respondents who used Wi-Fi to access the Internet, their Wi-Fi usage pattern is similar to that of the year before. This year (2017), the majority of the 209 respondents used Wi-Fi to obtain information from the Internet (79.43% for 2017 and 78.4% for 2016). They are followed by those who used Wi-Fi to contact friends (69.86% for 2017 and 70.4% for 2016).

Meanwhile, the percentage share of respondents who need to use Wi-Fi to complete their work (56.46%) is on the rise when compared with the figures reported in 2016 (55.3%) and 2015 (48.3%).

Table 18. Why do you use Wi-Fi to access the Internet?

	This Year (2017)		Comparison	
	No.	%	2016 (%)	2015 (%)
Must use Wi-Fi to complete my work	118	56.46%	55.3%	48.3%
Must use Wi-Fi to support my learning	97	46.41%	31.7%	36.3%
Use Wi-Fi to contact friends	146	69.86%	70.4%	76.6%

Use Wi-Fi to obtain information from the Internet	166	79.43%	78.4%	75.1%
Use Wi-Fi to conduct activities online	125	59.81%	63.3%	53.2%

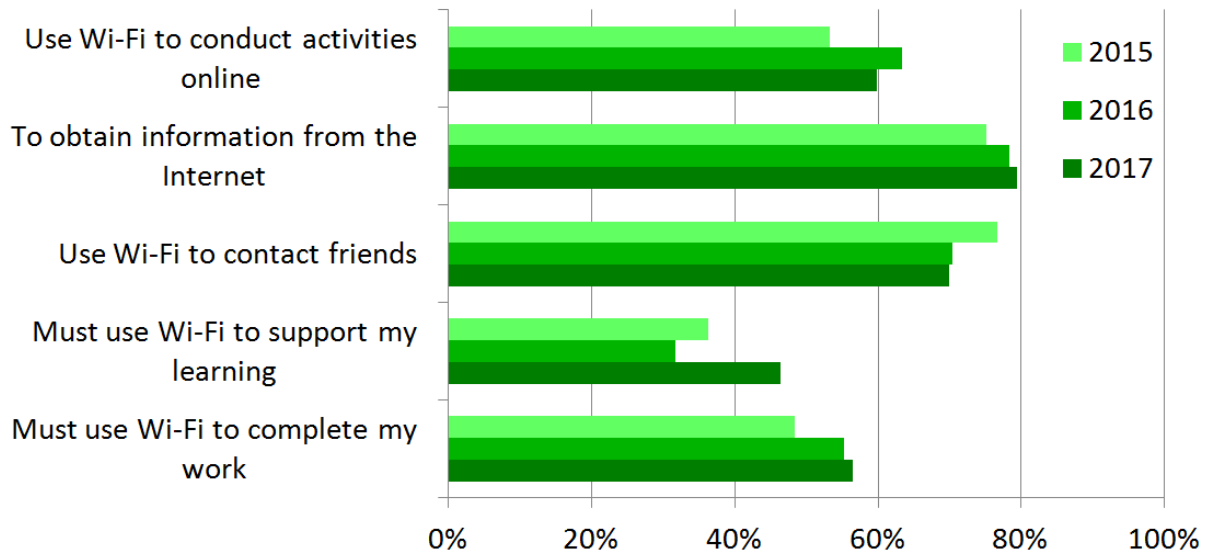


Figure 4: Why do you use Wi-Fi to access the Internet?

Figure 19 below shows a breakdown of the reasons of using Wi-Fi network by gender. Two of the respondents did not give information on gender. Among the 207 valid responses, it is revealed that there is a higher percentage of male respondents used Wi-Fi across all types of usage. Also, there are some differences in Wi-Fi usage patterns between male and female respondents. Using Wi-Fi to obtain information from the Internet and to contact friends are the two most cited uses of Wi-Fi network in both genders. But the difference between the two genders with respect to other types of Wi-Fi usage is quite considerable. For instance, 64.04% of the males used Wi-Fi to complete work, but only 44.93% of the females did so. Comparatively, the female respondents group are keener to use the Wi-Fi network to conduct activities online (52.17%).

Table 19. Reason of Using of Wi-Fi Network by Gender

	Male		Female	
	No.	%	No.	%
Must use Wi-Fi to complete my work	87	64.04	31	44.93
Must use Wi-Fi to support my learning	73	52.90	23	33.33
Use Wi-Fi to contact friends	101	73.19	45	65.22

Use Wi-Fi to obtain information from the Internet	113	81.88	51	73.91
Use Wi-Fi to conduct activities online	88	63.77	36	52.17
Base	138		69	

Table 20 shows the activities conducted by the respondents while using the Wi-Fi network. The three most common activities conducted by using the Wi-Fi network switch places this year. Social networking, the most common activity conducted using Wi-Fi (79.4%) last year, ranks third this year (73.21%). Checking and answering emails, the second place winner last year (77.4%) comes first this year (81.82%), while searching for and downloading information, which ranked third last year (75.9%) comes second this year (73.68).

The percentage share of respondents using Wi-Fi network to play on-line games decreases considerably by 12.52 percentage points over last year's 50.8% to 38.28%. There is also a significant drop by 5.35 percentage points (from last year's 50.8% to this year's 45.45%) and 6.19 percentage point (from last year's 79.4% to this year's 73.21%) in connection to the percentage shares of respondents using Wi-Fi network for on-line purchasing and social networking respectively.

Table 20. Activities conducted using the Wi-Fi network

	2017		2016
	No.	%	%
Financial transactions, like transfer payment or credit card payment	99	47.37	45.7
Investment, like on-line brokerage	56	26.79	25.6
On-line purchasing, e.g. shopping, auction, etc...	95	45.45	50.8
Check and answer e-mails	171	81.82	77.4
Search and download information	154	73.68	75.9
Play on-line games	80	38.28	50.8
Download or buying Mobile Apps	104	49.76	48.7
Download or buying Ringtones, Images, Music	63	30.14	30.2
Social Networking e.g. facebook, WhatApps, WeChat	153	73.21	79.4
Base	209	209	

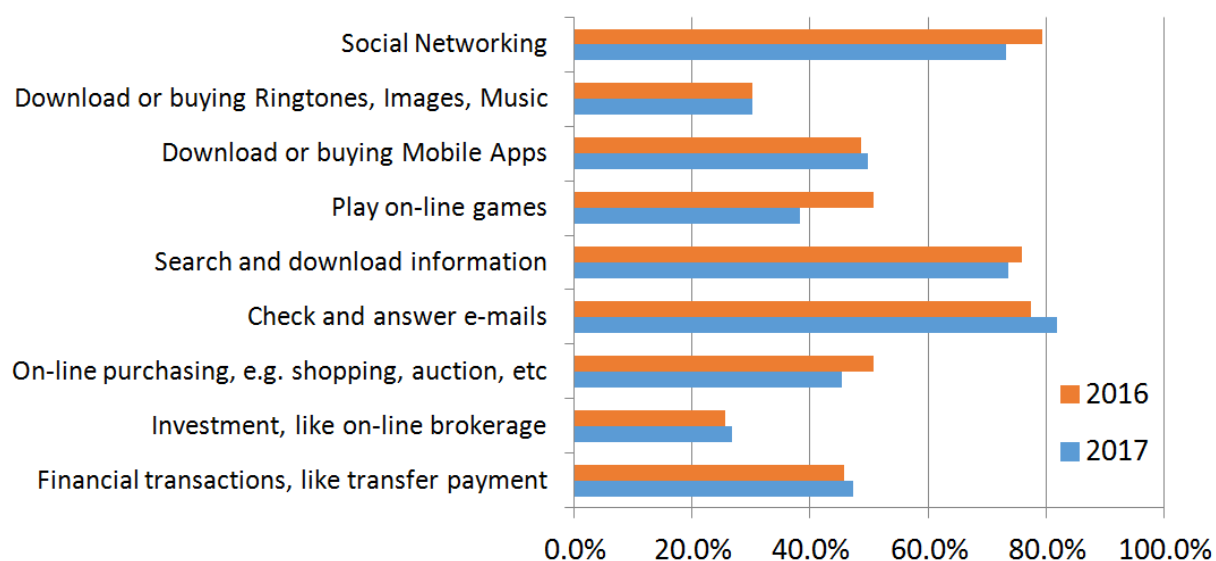


Figure 5: Activities conducted using the Wi-Fi network

4. Using Wi-Fi for Mobile Messaging and Social Networking

4.1 Mobile Messaging

Table 21 below shows the types of mobile messaging Apps used by the respondents. The resulting figures are benchmarked with the percentage shares reported last year.

Table 21. Types of Wi-Fi Mobile Messaging Apps

	This Year (2017)		Comparison	
	No.	%	2016 (%)	Changes
Whatsapp	190	94.53	95.0	-0.47
LINE	54	26.87	35.7	-8.83
WeChat	99	49.25	40.7	+8.55
Use other mobile messaging Apps	44	21.89	25.1	-3.21
Not using any mobile message Apps	8	3.98	1.5	+2.48
Base	209			

Only 3.83% of respondents did not use any mobile messaging apps. For the remaining 201 Wi-Fi users who used mobile messaging, WhatsApp is the most common mobile messaging apps (94.53% this year vs. 95.0% last year), meaning for two consecutive years, WhatsApp continues to dominate the mobile messaging App market in Hong Kong. The second most popular Apps is WeChat. The percentage of respondents using WeChat increase considerably by 8.55 percentage points to 49.25% from the 40.7% reported last year. Close to half of the respondents are using the Mainland of China based mobile messaging apps, indicating strengthened Mainland-Hong Kong connectivity. Meanwhile the percentage of LINE users reduces considerably by 8.83 percentage points to 26.87% from 35.7 % reported last year.

Table 22 and Figure 6 below show how mobile messaging Apps are used among the 209 Wi-Fi users. Except for voice communication, the shares of all types of mobile messaging report a decrease comparing to those of last year's. However, it is noted that the use of mobile message apps for voice communication increases to 45.45% over the 43.2% reported last year. This may due to the growing popularity of using mobile messaging apps to make long distance calls instead of IDD.

Table 22. Use of Mobile Messaging Apps Used

	This Year (2017)		Comparison	
	No.	%	2016 (%)	Changes
Textual Communication	167	79.90	84.9	-5.00
Textual plus Emoticon	155	74.16	78.4	-4.24
Voice Messaging	111	53.11	57.3	-4.19
Voice Communication	95	45.45	43.2	2.25
Group Chats	123	58.85	70.9	-12.05
Base	207			

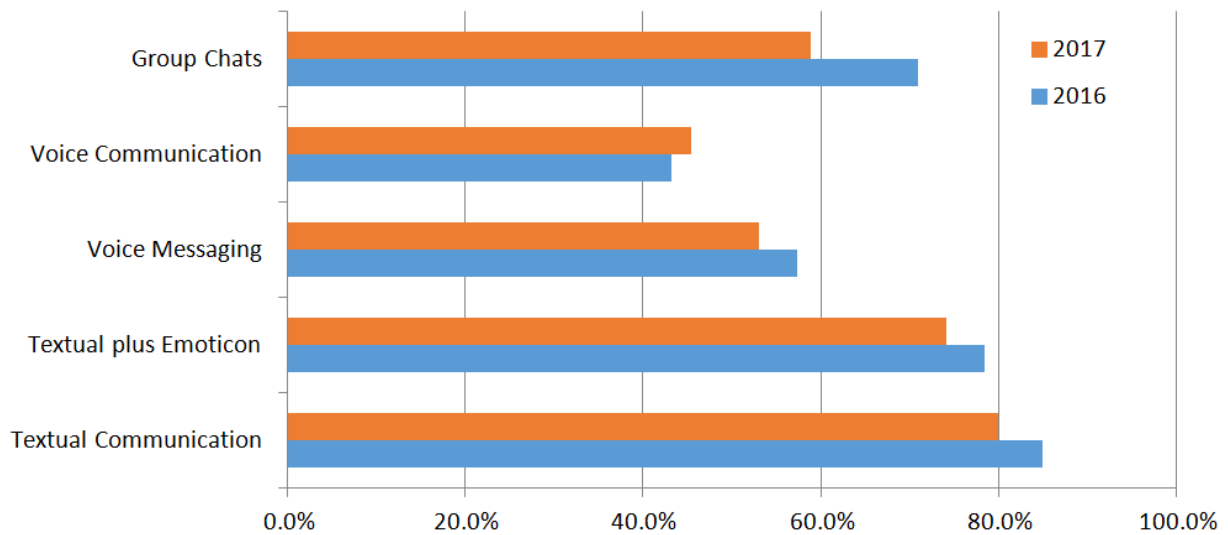


Figure 6: Use of Mobile Messaging Apps Used

Table 23 and Figure 7 below illustrate the percentage shares of online time that the respondents spent on using mobile messaging Apps. It is found that the respondents this year spent less percentage of their online time on mobile messaging in general. Those who spent less than 10% and between 10-25% of their online time on mobile messaging account for 17.48% and 26.21% respectively (a 7.38 percentage point 0.11 percentage point increases compare to the corresponding figures reported last year respectively). Meanwhile those who spent more than 90% and between 76- 90% of their online time on mobile messaging account for only 4.85% and 6.8% respectively (a 0.65 percentage point and 0.70 percentage point increase compare to the corresponding figures reported last year respectively).

Table 23. Percentage of Online Time for Mobile Messaging

	This Year (2017)		Comparison	
	No.	%	2016 (%)	% change
<10%	36	17.48	10.1	7.38
10-25%	54	26.21	26.1	0.11
26-50%	51	24.76	34.7	-9.94
51-75%	41	19.90	16.1	3.80

76-90%	14	6.80	7.5	-0.70
>90%	10	4.85	5.5	-0.65
Base	206			

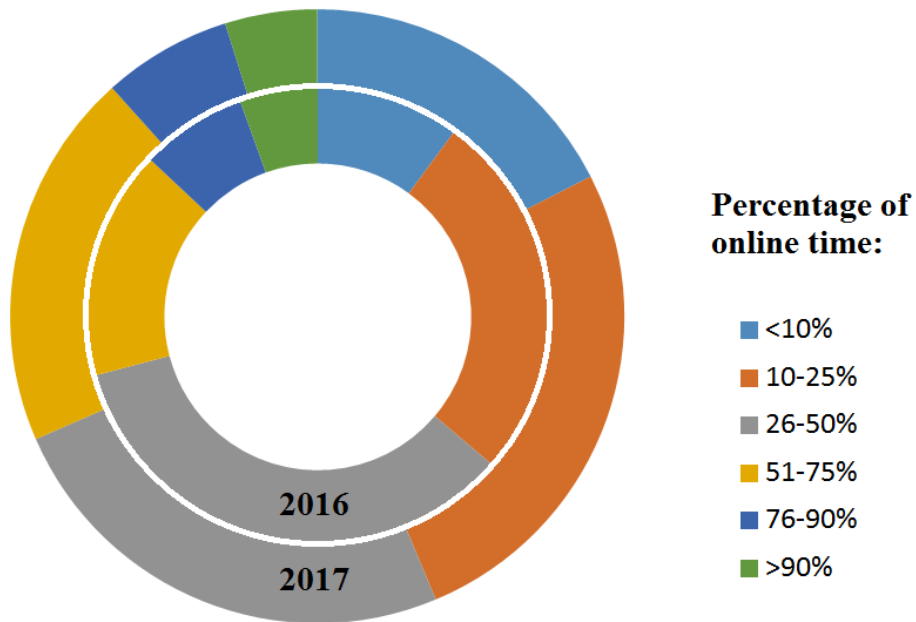


Figure 7: Percentage of Online Time for Mobile Messaging

4.2 Social Networking

Table 24 shows the types of social networking Apps used by the respondents. The findings are benchmarked with those reported last year. The findings reveal that only a small percentage of respondents did not use any social networking apps. Similar to the findings in the last two years, the majority of the respondents used Facebook (81.34%), followed by Instagram (37.32) and LinkedIn (29.19%).

Table 24. Types of Social Networking Apps Used

	This Year (2017)		Comparison	
	No.	%	2016 (%)	% change

Twitter user	45	21.5	12.6	8.9
Facebook user	170	81.34	89.9	-8.56
LinkedIn user	61	29.19	28.6	0.59
Instagram user	78	37.32	46.7	-9.38
Using other social networking Apps	37	17.70	13.6	4.1
Not using any	18	8.61	7.5	1.11
Base	209			

Table 25 below shows a breakdown of the use of various types of social networking apps by the five major age groups. It is found that all of the respondents in the 18- to 25-year-old age group are using social network.

Facebook dominates all five age groups with respect to social networking Apps, with a share ranging from 77.14% (for the 36-to 45-year-old age group) to 92.31% (for the 18- to 25-year- old age group). Instagram is the second most popular social networking app for the 18- to 25-year-old age group (69.23%), 26- to 35-year-old age group (54.17%) and 36- to 45-year-old age group (34.29%); LinkedIn also ranks second amongst the 46- to 55-year-old age group (30.43%) and 56- to 65- year-old age group (20.59%).

Table 25. Social Network Used by Age Group

	18-25	26-35	36-45	46-55	56-65
Twitter user	19.23%	29.17%	28.57%	13.04%	20.59%
Facebook user	92.31%	85.42%	77.14%	80.43%	79.41%
LinkedIn user	30.77%	39.58%	31.43%	30.43%	20.59%
Instagram user	69.23%	54.17%	34.29%	23.91%	17.65%
Using other social networking Apps	19.23%	20.83%	11.43%	15.22%	17.65%
Not using any	0.00%	10.42%	5.71%	10.87%	8.82%

Table 26 below illustrates the percentage of online time the respondents spent on using social networking Apps and the figures are benchmarked with those of the year before. As 4 respondents did not answer this question, there are only 205 valid responses. It is found that the respondents this year spent less percentage of their online time on social networking in general as compared with those reported last year.

Table 26. Percentage of Online Time for Social Networking

	This Year (2017)		Comparison	
	No.	%	2016 (%)	% change
<10%	55	26.83	18.9	7.93
10-25%	67	32.68	30.8	1.88
26-50%	41	20.00	30.8	-10.8
51-75%	28	13.66	13.5	0.16
75-90%	9	4.39	3.3	1.09
>90%	5	2.44	2.7	-0.26
Base	205	100.0		

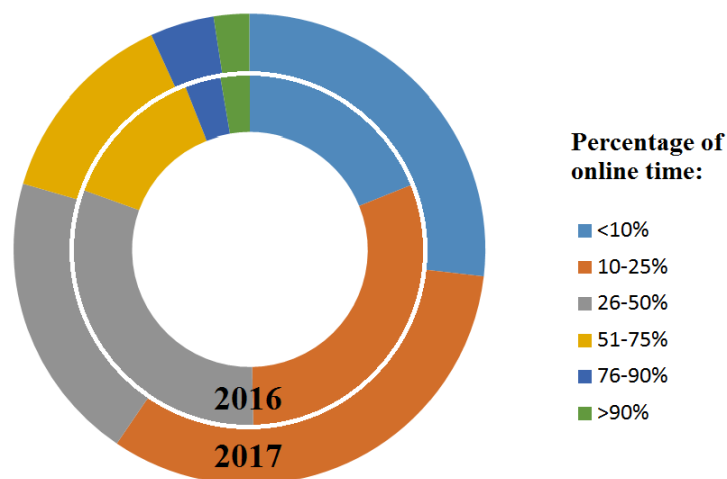


Figure 8: Percentage of Online Time for Social Networking

This year's survey finds that those who spent less than 10% of their online time on social networking account for 26.83% of the total (a 7.93 percentage point increase against the 18.9% reported last year). While those who spent more than 90% of their online time on social networking account for only 2.44% (a 0.26 percentage point decrease against the 2.7% reported last year). Those who spent 26-50% of their online time on social networking from drop from 30.8% last year to 20.00% this year, representing a decrease of 10.8 percentage points.

5. Internet, Free Wi-Fi and e-Learning

Table 27 shows the respondents' attitude toward e-Learning and the findings are benchmarked with those found in the same study conducted last year (2016). It is found that the majority of respondents (81.95% or 168 out of 205) use e-Learning and the percentage is considerably higher than the 76.9% reported last year. When being asked whether the respondents will encourage people to use e-learning, the majority of them say that they will (94.15% or 193 out of 205), which is also considerably higher than the figure reported last year (86.9%).

Table 27. Respondents' Attitude toward e-Learning

	2017		2016	
	No.	%	No.	%
Have you ever used e-learning	168	81.95	153	76.9
Will you encourage people to use e-learning	193	94.15	173	86.9
Based	205		199	

Table 28 and Figure 9 below show the respondents' perceptions on whether e-Learning can increase learning interest or not. The majority (79.2%) of the respondents believe that e-Learning can increase his/her learning interest, 13.1% of the respondents remain neutral, and only a small percentage (3.0%) of the respondents thinks otherwise.

When being asked whether they agree that e-Learning can increase an adult's learning interest in general, close to fourth-fifths (79.9%) of the respondents agree, 18.5% of the respondents remain neutral, and only a small percentage of 4.4% of them do not think so. When being asked whether they agree that e-Learning can increase the learning interest of primary and secondary school students in general, the majority (83.4% for primary school students and 83.9% for secondary school students) of the respondents agree and only a small percentage (4.5% for both primary and secondary school students) of the respondents think otherwise.

Table 28. e-Learning and Learning Interest

	Strongly Agree	Agr ee	Slightly Agree	Neu tral	Slightly Disagree	Disag ree	Strongly Disagree
e-Learning can increase my learning interest	20.9%	45.2%	13.1%	18.0%	1.0%	1.5%	0.5%
e-Learning can increase adults' learning	19.0%	42.	18.5%	15.6	2.4%	2.0%	0.0%

interest		4%		%			
e-Learning can increase secondary school students' learning interest	26.8%	41.5%	15.6%	11.7%	3.0%	1.0%	0.5%
e-Learning can increase primary school students' learning interest	28.8%	40.0%	14.6%	12.2%	1.5%	1.5%	1.5%

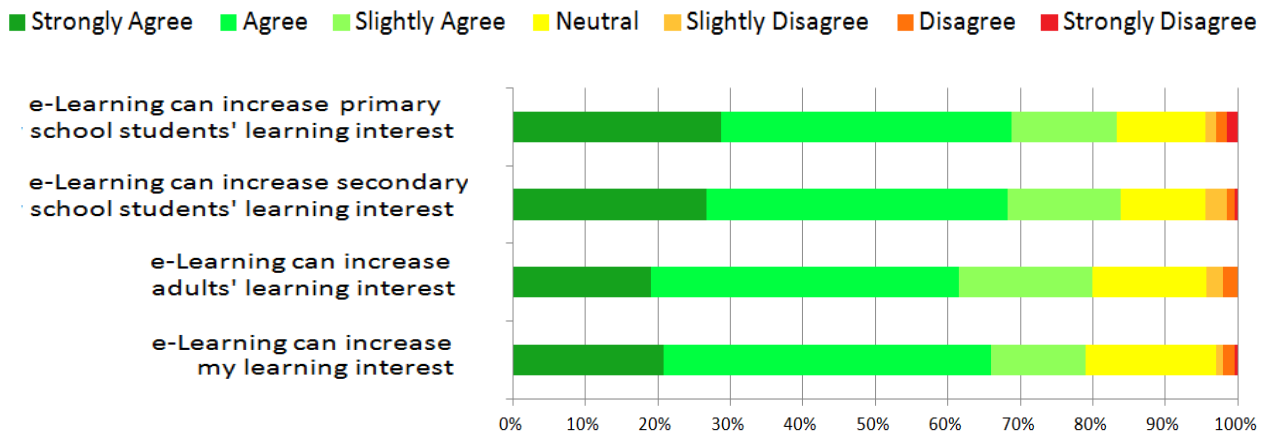


Figure 9: e-Learning and Learning Interest

5.1 e-Learning for Adults

This year's study finds that respondents, in general, agree that e-Learning can help adults learn better. Table 29 below shows the respondents' perceptions on whether e-Learning can increase the learning interest of an adult or not.

Table 29. e-Learning for Adults

	Strongly Agree	Agree	Slightly Agree	Neutral	Slightly Disagree	Disagree	Strongly Disagree
Enhance interest in learning	19.1%	40.7%	17.2%	17.7%	3.4%	1.5%	0.5%
Make information collection easier	40.8%	45.6%	11.2%	1.9%	0.5%	0.0%	0.0%
Broadened horizons	30.9%	45.4%	16.4%	6.3%	0.5%	0.5%	0.0%
Facilitate communication with fellow students	20.6%	35.8%	19.1%	16.7%	5.9%	1.5%	0.5%
Facilitate communication with tutors	21.5%	33.7%	22.4%	14.6%	5.9%	1.5%	0.5%
Enhance self-learning ability	29.1%	36.9%	19.9%	9.7%	3.4%	0.5%	0.5%

The majority (77.0% this year vs. 69.0% last year) of the respondents believe that e-Learning enhances interest in learning and only a small percentage (5.4%) of them think otherwise. A large majority (97.6.0% this year vs. 92.0% last year) of the respondents agree that e-Learning makes their information collection easier and, among them, 40.8% strongly agree. Only a small percentage (0.5%) of the respondents disagree. A large majority (92.7% this year vs. 87.5% last year) of the respondents

believe that e-Learning broaden their horizons and, among them, 30.9% strongly agree. Only a small percentage (1.0%) of the respondents disagree. 75.5% of the respondents agree that e-Learning facilitates communication with their fellow students, 77.6% of the respondents agree that e-Learning facilitates communication with their tutors and 85.9% of the respondents agree that e-Learning enhances an adult’s self-learning ability.

5.2 e-Learning for Secondary School Students

This year’s study finds that respondents, in general, agree that e-Learning can help secondary school students learn better. Table 30 below shows the respondents’ perceptions on whether e-Learning can increase the learning interest of secondary school students.

Table 30. e-Learning for Secondary School Students

	Strongly Agree	Agree	Slightly Agree	Neutral	Slightly Disagree	Disagree	Strongly Disagree
Enhance interest in learning	26.7%	40.1%	16.3%	12.9%	1.5%	2.0%	0.5%
Make information collection easier	37.1%	45.5%	11.9%	5.0%	0.5%	0.0%	0.0%
Broadened horizons	30.2%	47.0%	13.9%	8.4%	0.5%	0.0%	0.0%
Facilitate communication with fellow students	28.2%	37.6%	18.8%	9.4%	4.5%	1.0%	0.5%
Facilitate communication with tutors	23.3%	40.1%	18.8%	11.4%	5.5%	0.5%	0.5%
Enhance self-learning ability	25.3%	38.8%	21.9%	9.5%	3.0%	1.0%	0.5%

The majority (83.1% this year vs. 81.8% last year) of the respondents agree that e-Learning enhances interest in learning among secondary school students. A large majority (94.5% this year vs. 90.9% last year) of the respondents agree that e-Learning makes information collection easier for secondary school students and, among them, 37.1% of them strongly agree. The majority (91.1% this year vs. 77.7% last year) of the respondents agree that e-Learning broaden horizons of secondary school student and, among them, 30.2% strongly agree. The majority (84.6% this year vs. 81.3% last year) of the respondents agree that e-Learning facilitates secondary school students’ communication with their fellow students. The majority (82.2% this year vs. 77.7% last year) of the respondents agree that e-Learning facilitates secondary school students’ communication with their tutors. The majority

(86.0% this year vs. 80.2% last year) of the respondents agree that e-Learning enhances self-learning ability of secondary school students.

5.3 e-Learning for Primary School Students

Table 31 below shows the respondents' perceptions on whether e-Learning can increase the learning interest of primary school students. The majority (82.1% this year vs. 81.8% last year) of the respondents agree that e-Learning enhances learning interest of primary school students. The majority (83.6% this year vs. 81.2% last year) of the respondents agree that e-Learning makes information collection easier for primary school students. The majority (85.1% this year vs. 83.7% last year) of the respondents agree that e-Learning broaden the horizons of primary school students. The majority (75.6% this year vs. 73.1% last year) of the respondents agree that e-Learning facilitates primary school students' communication with their fellow students. The majority (72.3% this year vs. 70.4% last year) of the respondents agree that e-Learning facilitates primary school students' communication with their tutors. The majority (74.1% this year vs. 75.7% last year) of the respondents agree that e-Learning enhances self-learning ability of primary school students.

Table 31. e-Learning for Primary School Students

	Strongly Agree	Agree	Slightly Agree	Neutral	Slightly Disagree	Disagree	Strongly Disagree
Enhance interest in learning	29.4%	37.3%	15.4%	11.0%	4.5%	2.0%	0.5%
Make information collection easier	26.9%	39.8%	16.9%	12.4%	2.5%	1.5%	0.0%
Broadened horizons	29.9%	40.3%	14.9%	9.5%	4.0%	1.5%	0.0%
Facilitate communication with fellow students	22.9%	37.3%	15.4%	11.9%	9.0%	3.0%	0.5%
Facilitate communication with tutors	20.3%	34.7%	17.3%	14.9%	8.4%	3.5%	1.0%
Enhance self-learning ability	22.4%	35.8%	15.9%	17.4%	5.5%	2.5%	0.5%

5.4 Free Wi-Fi and e-Learning

Table 32 and Figure 10 below summarize the respondents' perceptions on the extend of how helpful is Free Wi-Fi in facilitating people learn online. Same as last year, respondents in general are very positive on the role of Free Wi-Fi in helping people to learn. The majority (81.8% this year vs. 82.0% last year) of the respondents agree that Free Wi-Fi helps them learn online. The majority (83.4% this year vs. 82.9% last year) of the respondents believe that Free Wi-Fi helps students learn online. The majority (85.0% this year vs. 81.5% last year) of the respondents believe that Free Wi-Fi helps their fellow citizens learn online.

Table 32. Free Wi-Fi and e-Learning

	Strongly Agree	Agree	Slightly Agree	Neutral	Slightly Disagree	Disagree	Strongly Disagree
Free Wi-Fi help me to learn online	38.1 %	31.7%	12.0%	10.7%	4.4%	2.44%	0.5%
Free Wi-Fi can help student to learn online	37.1%	35.1%	11.2%	11.2%	2.9%	2.0%	0.5%
Free Wi-Fi can help our fellow citizen to learn online	36.7%	33.8%	14.5%	9.2%	3.4%	1.9%	0.5%

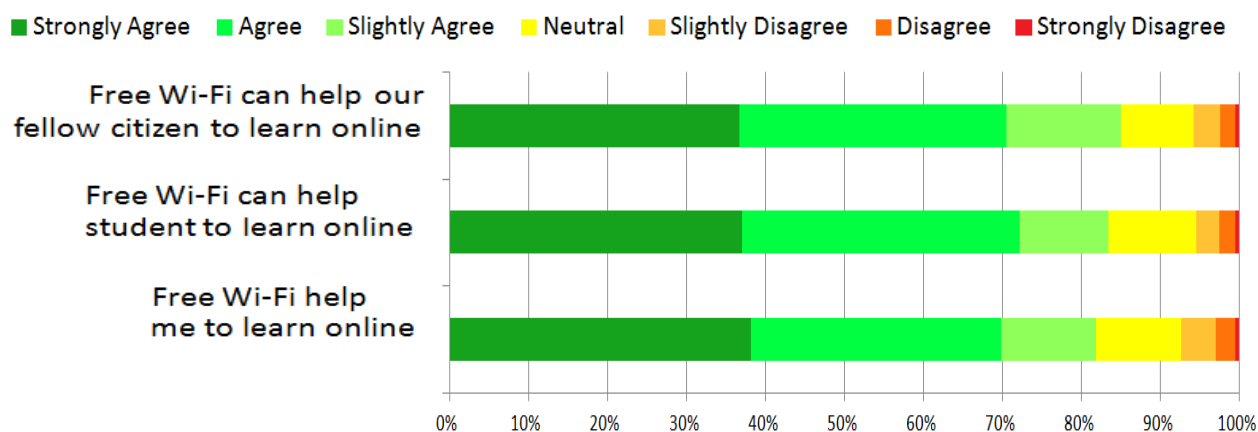


Figure 10: Free Wi-Fi and e-Learning

195 respondents answer the question of whether they are worried that their personal information could be leaked while using e-Learning platforms. 150 of them (76.9%) express worries over the

possible leakage of their personal information while using e-Learning platforms. The percentage is more or less that same as that of last year (77.1%).

6. Wi-Fi Access

6.1 Wi-Fi at Home

Table 33 below shows the types of Wi-Fi standard the respondents use at home and the data are benchmarked with the findings reported in 2016. Last year, it is found that 51.0% of the home Wi-Fi users do not know what kinds of Wi-Fi standard they are using. This year, all respondents indicate they know the kind of Wi-Fi standard they are using at home (Don't know = 0%). One of the possible cause may due to the enhanced efforts made by various sectors in promoting the safe use of Wi-Fi during the past years.

Table 33. Wi-Fi Standards Used by Home Wi-Fi Users

	This Year (2017)		Comparison	
	No.	%	2016 (%)	% change
802.11b	87	41.6	8.2	33.4
802.11a	73	34.9	6.1	28.8
802.11g	101	48.3	14.3	34
802.11n	113	54.1	20.9	33.2
802.11ac	88	42.1	15.3	26.8
Other	1	0.5	1.0	-0.5
Don't know	0	0	51.0	-51
Base	209			

Table 34 below shows the types of Wi-Fi encryptions use by the respondents at home and the data are benchmarked with the findings of 2015 and 2016.

Table 34. Wi-Fi Encryptions Used by Home Wi-Fi Users

	This Year (2017)			Comparison	
	No.	%	% / 209	2016 (%)	2015 (%)

No Encryption	10	7.7	4.8	4.8	5.9
WEP	15	11.5	7.2	7.4	7.4
WPA/WPA2 using TKIP	22	16.9	10.5	15.4	18.8
WPA/WPA2 using AES	48	36.9	23.0	33.5	38.6
Don't know	43	33.1	20.6	42.0	33.2
No reply	79		37.8		
Base	209				

A total of 79 respondents did not answer the questions. Amongst the 130 respondents who answered the question, 33.1% of them do not know what kinds of Wi-Fi security they are using. The number is lower than 42.0% reported last year. For those who know, 7.7% (10 out of 130) of them do not use any Wi-Fi encryptions at home. For those home Wi-Fi users who use Wi-Fi security, the majority of them (36.9%) use “WPA/WPA2 using AES”. They are followed by those who use “WPA/WPA2 using TKIP” (16.9%). Only 11.5% of the home Wi-Fi users use WEP (Wired Equivalent Privacy).

Table 35. Wi-Fi Authentication Protocols Used by Home Wi-Fi Users

	This Year (2017)			Comparison	
	No.	%	% / 209	2016 (%)	2015 (%)
Open	2	1.5	1.0	5.1	4.5
Shared	6	4.6	2.9	1.5	3.0
WPA-Personal	41	31.5	19.6	20.9	22.3
WPA-Enterprise	6	4.6	2.9	2.0	6.4
WPA2-Personal	85	65.4	40.7	34.7	42.1
WPA2-Enterprise	13	10.0	6.2	3.1	5.0
Don't know	62	47.7	29.7	39.3	22.8
No reply	79		39.3		
Base	209				

Table 35 shows that the types of Wi-Fi authentication protocol respondents use at home and the data are benchmarked with the 2015 and 2016 findings. 79 respondents did not answer the question.

Amongst the 130 respondents who did, 47.7% of them have no idea of the kinds of authentication protocols they are using at home. The percentage is higher than the respective figures of 2015 (22.8%) and 2016 (39.3%).

For those who know the kinds of Wi-Fi authentication protocol they are using, the majority (65.4%) of them use WPA2-Personal (aka WPA-PSK or Pre-Shared Key mode). They are followed by those who are using WPA-Personal (31.5%). Only a small percentage of the respondents use WPA-Enterprise (4.6%) or WPA2-Enterprise (10.0%) at home.

Table 36 below shows the reasons why people do not use WiFi security setting. The majority of the respondents to this question indicate that they do not know how to setup the security setting on the WiFi network (54.79% or 40 out of 73). It was followed by those who said they do not know how to setup the security setting on the device (32.88% or 24 out of 73). Surprisingly, 31.51% (23 out of 73) of the respondents do not know the importance of setting up WiFi security.

Table 36. Reason of not enable the WiFi Security Setting

	No.	%
Do not know the importance of setting up WiFi Security	23	31.51
Do not know how to setup the security setting on the WiFi network	40	54.79
Do not know how to setup the security setting on the Device	24	32.88
I don't have the right to change the security setting of the WiFi network	13	17.81
I don't think it is necessary to turn on the WiFi security setting	2	2.74
Base	73	100

6.2 Public Wi-Fi Access

Amongst the 209 respondents, 134 of them comment on the commercial Wi-Fi services. Table 37 below summarizes the respondents' comments and the data are benchmarked with those reported in 2015 and 2016. Same as the findings from the past two years, inadequate Wi-Fi access points (64.18% in 2017, 61.7% in 2016 and 60.9% in 2015), unstable service quality (54.48% in 2017, 67.3% in 2016 and 62.9% in 2015), and inadequate bandwidth (43.28% in 2017, 43.9% in 2016 and 46.5% in 2015) are the top 3 comments given by the respondents. They are followed by service charge too high (21.64%) and inadequate transparency in service pricing (20.90%).

Table 37. Respondent Comments/Suggestions on Commercial Wi-Fi Services

	This Year (2017)		Comparison	
	No.	%	2016 (%)	2015 (%)
Cost or service charge too high	29	21.64	25.0	27.7
Inadequate transparency in service pricing and service charge	28	20.90	32.7	29.7
Unstable service quality	73	54.48	67.3	62.9
Inadequate bandwidth	58	43.28	43.9	46.5
Inadequate Wi-Fi access points	86	64.18	61.7	60.9
Other reason	5	3.73	5.1	8.9
Base	134			

Amongst the 209 respondents, 133 of them comment on the free public Wi-Fi services provided by HKSAR Government. Table 38 below summarizes the respondents' comments and the data are benchmarked with those reported in 2015 and 2016. Same as the findings from the past two years, inadequate Wi-Fi access points (75.19% in 2017, 72.4% in 2016 and 75.7% in 2015), unstable service quality (54.14% in 2017, 61.2% in 2016 and 58.4% in 2015) and inadequate bandwidth (51.13% in 2017, 45.9% in 2016 and 52.5% in 2015) are the top three comments given by the respondents. They are followed by inadequate contents or services (23.31%).

Table 38. Respondent Comments/Suggestions on GovWiFi

	This Year (2017)		Comparison	
	No.	%	2016 (%)	2015 (%)
Inadequate Wi-Fi access points	100	75.19	72.4	75.7
Inadequate bandwidth	68	51.13	45.9	52.5

Unstable service quality	72	54.14	61.2	58.4
Inadequate contents or services	31	23.31	25.0	23.3
Other reason	5	3.76	6.1	5.4
Base	133			

A total of 136 respondents give suggestions on where to install more Wi-Fi hotspots and their suggestions are shown in Table 39 below. Most of the respondents suggest installing more Wi-Fi hotspots on public transport (79.41% in 2017 and 45.6% in 2016). This is followed by on MTR (68.38% in 2017 and 66.2% in 2016), in parks (64.71% in 2017 and 45.1% in 2016), public transport interchanges (63.24% in 2017 and 51.8% in 2016), bus station (61.76% in 2017 and 47.2% in 2016).

Table 39. Suggestions on places to install more Wi-Fi hotspots

	2017		2016	
	No.	%.	No.	%
Public housing estates	78	57.35	73	37.5
MTR	93	68.38	129	66.2
Wet market	40	29.41	46	23.6
Bus stations	84	61.76	92	47.2
Public transport	108	79.41	89	45.6
Coffee shop	41	30.15	58	29.7
Hotel	42	30.88	58	29.7
Park	88	64.71	88	45.1
Promenade	76	55.88	103	52.8
Shopping malls	76	55.88	100	51.3
Restaurants	57	41.91	79	40.5
Public Transport Interchange	86	63.24	101	51.8

Other	5	3.68	5	2.6
Base	136		195	

6.3 More on Wi-Fi Security

In previous sections, we attempt to discover the Wi-Fi security aspects in Hong Kong, from the last two years' data, it seems that a considerable percentage of respondents do not know the technical aspects of Wi-Fi security. In order to have a better understanding on Wi-Fi security in Hong Kong, a number of additional questions are asked this year.

As shown in Table 40, the majority (85.02% or 176 out of 207) of the respondents take availability of free Wi-Fi as an important factor when choosing a hotel to lodge and the majority (66.02% or 136 out of 206) of them have the experience of using their smartphones as Wi-Fi hotspots (Wi-Fi tethering) to share Internet connection.

It is found that 20.69% (42 out of 203) of the respondents have the experience of using their neighbor's Wi-Fi which imposes no password requirements. If the Wi-Fi router at home does not work properly, 24.02% (49 out of 204) of the respondents will try to use their neighbors' Wi-Fi connection and 17.16% (35 out of 204) will even guess their neighbor's Wi-Fi password.

Websites of adult contents are normally unsafe, people visit those websites may risk the safety of their computer by exposing to attacks from spyware, ransomware and all kind of malwares and viruses. In the worst scenario, all the personal files will be encrypted (e.g. WannaCry or other ransomwares). Cyber hackers might also take control of the computer (e.g. Gameover Zeus virus), or even attempt to steal the personal information stored in the computer. Spyware infections might make browser pop-up ads of gambling, obscene and pornographic contents websites.

It is found that 39.13% (81 out of 207) of the respondents indicated that they have viewed adult contents using their home Wi-Fi and 14.98% (31 out of 207) of them say that they have viewed adult contents on the Internet using public Wi-Fi.

Table 40. More on Wi-Fi Security

	No. of Response	No. of "Yes"	%
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Have you ever shared your smartphone as a WiFi Hotspot (WiFi tethering)?	206	136	66.0 2
Availability of free Wi-Fi is an important factor when I choose a hotel.	207	176	85.0 2
I used my neighbor's Wi-Fi which didn't require a password.	203	42	20.6 9
If my WiFi at home does not work, I will try to use my neighbors'	204	49	24.0 2
If my WiFi at home does not work, I will try to guess the neighbor's Wi-Fi password.	204	35	17.1 6
Have you ever viewed adult contents on the Internet via your home Wi-Fi?	207	81	39.1 3
Have you ever viewed adult contents on the Internet via public Wi-Fi?	207	31	14.9 8

7. Discussion

Nowadays, Wi-Fi is a necessity more than a luxury. To many people Wi-Fi is more than just an easy and convenient way to connect their mobile devices to the Internet, but also an essential conduit for learning, gathering information, entertaining themselves with variety of on-line resources, communicating with others, conducting business or personal affairs and facilitating their work and making their lives fun, easier, more productive and efficient.

Setting out to examine the use of Wi-Fi in Hong Kong, the knowledge and knowledge gap in Wi-Fi security, the status of Wi-Fi connectivity Hong Kong and the possibility of Wi-Fi as a facilitator of e-Learning, this report seeks to empirically assessment the user perceptions on Wi-Fi usage with a view of providing evidence-based suggestions to both commercial and government stakeholders in Hong Kong.

7.1 Wi-Fi Usage

It is revealed that the majority of the respondents use Wi-Fi network (99.51%). Same as the findings from last year, the majority of them use Wi-Fi at home (89.5% for both 2016 and 2017) and in office (61.2% for 2017 and 67.8% in 2016). It is found that gender, marital status, age, education level and place of residence do not pose any substantial effect on the types of Wi-Fi connection via which the Internet is accessed.

It is also found that, apart from Wi-Fi at home and in office, GovWiFi public hotspots (54.6% in 2017 vs. 49.3% in 2016) is also a very popular conduit of access among the respondents. It is also found that GovWiFi public hotspots is the most used type of Wi-Fi network for respondents with less Wi-Fi experiences, especially those who have used Wi-Fi for less than 6 months (62.5%). Therefore, it is very important for service providers, both government and private, to enhance the free public Wi-Fi infrastructure to improve the user experience of Wi-Fi users, in particular the fresh users.

Similar to the findings from last year, the majority of the respondents use smartphones (90.43% in 2017 and 88.5% in 2016) and PC (59.33% in 2017 and 61.5% in 2016) for Wi-Fi connection. It is also revealed that more and more Android phone users use Wi-Fi network to access the Internet (from 58.8% in 2016 to 65.55% in 2017, an increase of 6.75 percentage points). Same as the findings from the last two years, the most mentioned reason of using Wi-Fi network to access the Internet is to obtain information from the Internet (79.43% in 2017, 78.4% in 2016 and 75.1% in 2015). The percentage is increasing. Other obvious trends are more and more people use their Wi-Fi enabled devices to complete their work (56.46% in 2017, 55.3% in 2016 and 48.3% in 2015) and to support their learning (46.41% in 2017 and 31.7% in 2016).

Owing to the growing importance of using Wi-Fi network to support (an increase of 14.7 percentage points on people using Wi-Fi to support their learning this year), to meet and enhance services in this regard to further the culture of continuous learning, it is essential for government and commercial Wi-Fi access service providers to upgrade and improve the quality of their networks.

7.2 Mobile Messaging and Social Networking

Our results reveal that mobile messaging and social networking still forms an indispensable part of the lives of the people in Hong Kong. However, people are spending less time in both mobile messaging and social networking. The share of respondents who spend less than 10% of their online time on mobile messaging has increased from 10.1% in 2016 to 17.48% in 2017; while those who spend less than 10% of their online time on social networking increase from 18.9% in 2016 to 26.83% in 2017.

WhatsApp remains the most used mobile messaging Apps reported by our respondents (94.53% in 2017 and 95.0% in 2016). However, it is obvious that a competing App, WeChat is catching up (49.25% in 2017 and 40.7% in 2016), probably an indication of the increasing economic integration, business connectivity and people-to-people bonding between Hong Kong and the Mainland of China.

Same as last year, amongst our respondents, the two most used social networking Apps are Facebook (81.34% in 2017 and 89.9% in 2016) and Instagram (37.32% in 2017 and 46.7% in 2016). Both show

notable percentage points reduction (8.56 percentage point reduction for Facebook and 9.38 percentage point reduction for Instagram).

7.3 Wi-Fi Accessibility

Similar to findings from all previous reports, inadequate Wi-Fi access points, inadequate bandwidth and unstable service quality continue to top the list of problems that frustrate Wi-Fi users in Hong Kong. These problems are found in both public Wi-Fi access services run by commercial service providers and those provided by the HKSAR Government. However, unlike the previous reports, the study this year finds that complaints against unstable service quality have considerably reduced (7.06 percentage points for GovWiFi and 12.82 percentage points for commercial Wi-Fi service).

However, complaints against inadequate access points and bandwidth of GovWiFi have increased by 2.79 and 5.23 percentage points respectively. It is noticed that the HKSAR Government has been making continuous and substantial investment on Wi-Fi access points in recent years. This finding indicates that although public Wi-Fi services in Hong Kong are improving, but the pace may still not quick enough to catch up with growing appetite the Wi-Fi-hungry mobile gadgets.

When being asked the possible places to install more Wi-Fi hotspots, respondents point to public transport (79.41%), MTR (68.38%), park (64.71%), public transport interchange (63.24%) and bus station (61.76%) as the most preferred locations. This finding is particularly meaningful to the service providers when looking for places to expand their present Wi-Fi coverage.

The importance of Wi-Fi accessibility to Hong Kong people can also be reflected from their demand for free Wi-Fi when choosing a hotel, and from whether they will attempt to use their neighbors' Wi-Fi when their own is down. This study also finds that 85.02% of the respondents agree that availability of free Wi-Fi is an important factor when choosing a hotel. It is also found that 24.02% of the respondents will attempt to use their neighbors' Wi-Fi when their own is not working, 20.69% of them will use their neighbors' Wi-Fi if it is not password-protected, and 17.16% of them will even try to guess the neighbors' Wi-Fi passwords in order to gain access to it.

7.4 Home Wi-Fi Security

More and more mobile devices are equipped with Wi-Fi connection capability. Home cloud storage and smart home is getting increasingly common in Hong Kong. As the trend grows, home Wi-Fi will become a necessity to most homes in Hong Kong. However, as home Wi-Fi routers are always on, a

high security risk may arise if not controls and processes are put in place to management them in general.

When setting up a Wi-Fi router at home, it is very important to have proper Wi-Fi encryption and Wi-Fi authentication to make the network safe and to bar any possible unauthorized connection to the network.

When being asked what kind of Wi-Fi encryptions they are using at home, 130 respondents reply to the question. It is found that a rather large portion of respondents (33.1% in 2017 vs. 42.0% in 2016) don't know what kind of Wi-Fi encryptions they are using at home. Although there is an improvement of 8.9 percentage points, but the increase is meager and there is a big room for improvement with respect to cyber security education and promoting the importance of Wi-Fi security to the general public. Of the 130 respondents who answer the questions, the majority of them are using WPA/WPA2 based encryption protocols (16.9% of them using WPA/WPA2 using TKIP and 36.9% of them using WPA/WPA2 using AES).

When being asked what kinds of Wi-Fi authentication they are using at home, 130 respondents answer the question. It is found that a rather large portion of respondents (47.7% in 2017 vs. 39.3% in 2016) don't know the kind of Wi-Fi authentication they are using at home. The finding confirmed again the importance of cyber security education and promotion. Both Government and Non-government agencies need to step up their efforts to publicize the message of better and safer use of home Wi-Fi in Hong Kong. Of the 130 respondents who answer the question, the majority of them are using WPA/WPA2 based authentication protocols (65.4% of them are using WPA2-Personal and 31.5% of them are using WPA-Personal).

7.5 Wi-Fi Tethering

Pocket Wi-Fi router is gaining popularity especially among the heavy Internet users or people travel oversea in group with their family or friends that requires the sharing of the same mobile data connection by a large number of devices simultaneously. However, for lone travelers who have only one Wi-Fi-enabled device such as a notebook or tablet to connect to the Internet via mobile data network, Wi-Fi tethering is a better solution.

The advantages of Wi-Fi tethering include no additional connection fee, no pocket Wi-Fi router rental fee and giving of support to Wi-Fi only devices which does not have mobile network connectivity, such as notebook computer.

This study finds that Wi-Fi tethering has become increasingly popular in Hong Kong. When being asked whether they have ever shared their smartphones as a Wi-Fi hotspot (Wi-Fi tethering), 206 respondents answer the question. Among these respondents, 136 of them (66.02%) say they have used Wi-Fi tethering. The percentage is similar to the 66.8% reported last year (2016) and is considerably higher than the 53.0% to 50.0% reported in 2015 and 2014 respectively. It indicates that Hong Kong people are embracing Wi-Fi tethering, a technology which enables them to use low cost Wi-Fi-only tablets to connect to the Internet while on the go.

There is no doubt that Wi-Fi tethering is convenient. However, the convenience comes with a security risk to the people who share and use their Wi-Fi connection. Therefore, when using Wi-Fi tethering for sharing, the users have to set up Wi-Fi security, e.g., by using either WPA or WPA2 protocols. If the gadgets connected to the mobile phone support WPA2 and AES, then WPA2 using AES encryption is also an option.

Wi-Fi users also have to be reminded not to connect their Wi-Fi enabled gadgets to unknown Wi-Fi connections as there is a potential danger of giving access to hackers to obtain important personal information. It is suggested that the Government and Non-government agencies to put more efforts on educating Wi-Fi users about the potential risks involved and the ways to reduce risks when using the Wi-Fi tethering functionality.

7.6 Wi-Fi Security and Adult Contents

Adult content websites are generally risky. Some viruses and spyware maybe hidden in or malicious websites may pretend themselves as adult content websites to attract visits. While the users are watching video from these websites, it might pop-up a window, soliciting the users to click it or click I by accident and hence install viruses, spyware or malicious codes in their devices. If the device is not set up properly, viruses, spyware and malicious codes may find their way into the device automatically.

If it is a spyware, it might just be a pop-up advertisement of t adult contents or an online gambling website which appears while the browser is used to search for other information. It might attempt to infect other devices connected to the same network, send out vast quantities of spam using the device or launch denial of service (DoS) attacks from your device to other servers. In the worst case scenario, it might get control of the device and steal the user's identity data.

This study finds that 39.13% of the respondents have viewed adult contents on the Internet via their home Wi-Fi while 14.98% of the respondents have viewed adult contents on the Internet via public Wi-Fi. It is suggested that Government and Non-government agencies to step up their efforts on user

education with respect to the potential risks related to accessing high-risk websites. They should be reminded that as a rule of thumb, great precautions must be taken before responding to any pop-up windows or messages from adult content websites.

7.7 Free Wi-Fi and e-Learning

E-learning is cost effective and can produce great results if done right. By using interactive technologies and simulations, it enriches learning experience, engages the learner and reduce material costs. E-learning can be applied to facilitate learning at all levels of education, from nursery and pre-education to post-graduate and beyond. It can be used for all subjects, from history to science and from skill-based like cooking and locksmith to quantum physics.

The study proves the growing importance and popularity of e-learning in Hong Kong. Compared with last year's findings, a 5.05 percentage point increase of people (81.95% in 2017 and 76.9% in 2016) indicate that they use e-Learning and a 7.25 percentage point increase of people (94.15% in 2017 and 86.9% in 2016) say they will encourage others to use e-Learning.

The study also finds that, comparing with the findings from last year, our respondents this year are having a more positive attitude towards making available e-Learning to primary school students, secondary students and adults in general.

To maintain our competitiveness, Hong Kong as one of the most modern and most knowledge-intensive cities in China, needs to have a comprehensive e-Learning strategy. As e-Learning is a global trend and people in Hong Kong are increasingly ready to embrace to this way of learning, it is suggested that the Government, Non-government agencies and the private sector should make available more e-Learning platforms, invest in the production of more online learning materials, and more importantly, to provide a stable and free, or low-cost Wi-Fi connection for people to access the learning materials.

In conclusion, access to the Internet is vital for people in this digital age. Most of the Internet connected electronic devices of today are equipped with Wi-Fi. Hence, it is the most convenient and most cost-effective conduit of Internet access, especially for devices which require high bandwidth, such as video streaming, which is crucial to e-Learning. Given the importance of Wi-Fi connectivity, it is essential for the HKSAR Government and the commercial Wi-Fi access service providers to put in place a Wi-Fi infrastructure which is more stable and with higher bandwidth in order to make our city a truly digitally world city.