Project No.: NCCL110027

Telecommunications Market Survey

Commissioned by the National Communications Commission

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A. Purpose

Technological advancements in information and communications, such as 5G mobile communications, Internet of Things (IoT), and artificial intelligence (AI), have not only led to a thriving digital economy, but have also become critical to the national economy. Subsequently, an increasing range of audio-visual applications, such as augmented reality (AR), visual reality (VR), over-the-top (OTT) streaming services, as well as a growing number of applications in different sectors have all enhanced their respective industries. Such developments are bringing new lifestyles to people by means of smart retail, smart wearables, smart homes, and smart healthcare among others. In view of significant shifts in the telecommunications and broadcasting ecologies and business models in Taiwan, it has become vital to compile and analyze data on consumer behaviors in the communications market.

Likewise, in order to gain deeper understanding of changes in the market and ascertain consumer trends, regulators in various advanced countries, such as Ofcom in the UK, Ministry of Internal Affairs and Communications in Japan, OFCA in Hong Kong, KCC in Korea, and IMDA in Singapore, have long compiled data on consumer behaviors on a regular basis. These surveys provide key indicators of the overall national development and offer valuable insights to consumer behaviors and the market status.

Similarly, the National Communications Commission (NCC) has conducted a market survey encompassing telecommunications, broadcasting, broadband usage, and digital convergence each year since 2017, with the exception of the canceled survey in 2021 due to the COVID-19 pandemic. For the 2022 survey, the four categories have been merged into two and interviews have been conducted over the telephone rather than face-to-face. The aim of the survey was to acquire an overview of consumer preferences and the latest advancements in innovative applications by means of a thorough and in-depth investigation on consumer demand. Furthermore, the obtained data on consumer behaviors can function as a basis for the development of digital economy and future policies in Taiwan.

B. Methodology

I. Questionnaire Design

The questionnaires used for this survey were adapted from research undertaken by Ofcom, which has gained extensive experience of surveying consumer behavior and trends in the communications industry, with the original four categories — telecommunications, broadcasting, broadband usage, and digital convergence — merged into two: Telecommunications & Internet and Broadcasting & Convergence.

II. Survey Population and Methodology

i. Survey Population

The survey was conducted in Taiwan, Penghu, Kinmen, and Matsu with people aged 16 and over (those who were born on and before December 31, 2006).

ii. Sampling Method

1. Sampling Design

（1） Landline survey

The survey was conducted over the telephone with stratified random sampling and Chunghwa Telecom (CHT) white pages used as the frame. With the nation divided into 22 city / counties or sub-populations, the number of samples in a sub-population had to be proportional to the ratio of the sub-population aged 16 and over in the nation to make its sample representative of the sub-population.

The stratified random sampling was performed in two stages with CHT white pages as the sampling frame. In Phase 1, the probabilities proportional to size (PPS) sampling was employed with the population stratified by city / county. Then, an area code or telephone prefix was selected from the white pages of a city / county through systematic sampling. In Phase 2, random digit dialing (RDD) was employed since the white pages list only telephone numbers that opted to be listed. Thus, the last two digits of the area code determined in Phase 1 were replaced with two other randomly selected digits so that unlisted phone numbers could be selected and interviews could be conducted.

The stratified PPS sampling was used in this survey with the nation stratified into 22 strata by city / county and the planned sample size proportional to the ratio of its population aged 16 and over in the nation. The number of samples was calculated as follows:

$$n_i = \frac{N_i}{N} \times n$$

N is the population aged 16 and over in Taiwan,

N_i is the population aged 16 and over in a city / county

n_i is the number of samples in a city / county, n is the total number of samples, and

i could be any city / county

The samples were allocated based on the population statistics provided by the Ministry of the Interior in November 2021 with 550 successful samples completed through landline and another 550 through mobile phone in each category. Since the mobile phone numbers contain no area code, it was impossible to link the numbers to areas, 550 interviews were carried out first with those on mobile phones followed by interviews with those on landlines to make up for the shortage in any city or county. A minimum of 30 samples was required in any city / county to allow the sample to be representative of the stratum.

Finally, 1,282 valid samples (including 550 samples conducted through mobile phone) were completed in each category with a sampling error of within ± 3% at a 95% confidence level. The sampling error is calculated as follows:

$$\mathrm{D} = \pm \mathrm{z} \times \sqrt{\frac{\mathrm{p} \times \mathrm{q}}{\mathrm{n}} \times \frac{\mathrm{N} - \mathrm{n}}{\mathrm{N} - 1}}$$

$$\mathrm{D} = \pm 1.96 \times \sqrt{\frac{0.5 \times 0.5}{1{,}282} \times \frac{20{,}295{,}053 - 1{,}282}{20{,}295{,}053 - 1}}$$

$$\mathrm{D} \fallingdotseq \pm 2.74\%$$

wherein, D means the error, $p \times q$ is the maximum standard error,

Z is the confidence level,

N is the number of the population, and n is the number of samples.

（2） Mobile phone survey

The current status of assigned subscriber's number for mobile telecommunications service provided by NCC every quarter was used as a sampling frame for the mobile phone survey. The currently available 650 mobile phone prefixes[1] (the first five digits) and 100,000 automatically generated mobile phone numbers after each prefix was entered into the mobile phone sampling application meant a total of 65 million mobile phone numbers were available.

When the desired number of mobile phone numbers was entered into the sampling application, mobile phone numbers were selected based on the market shares of the five major telecom operators in Taiwan with the last five digits selected randomly. Then, those phone numbers were screened through a mobile phone number pre-dial validation application to cross out dead phone numbers to make sure selected numbers were active and the mobile phone survey could be conducted accordingly.

2. Pilot Test

Prior to the formal survey, pilot tests were conducted to obtain feedback regarding the questionnaire and design. Fifteen successful samples were completed in each category.

3. Formal Survey

The formal survey was conducted with people aged 16 and over in 22 cities and counties in Taiwan and Fujian (including outlying islands, Kinmen and Matsu).

4. Allocation of Samples

A total of 1,100 samples (including 550 samples conducted via landline and 550 samples conducted via mobile phone) were expected to be completed with a sampling error within ± 3% at a 95% confidence level. In addition, if a city / county had less than 30 samples completed, a minimum of 30 successful samples was required.

Prior to conducting the formal survey, samples were allocated based on the demographic data provided by the Ministry of the Interior at the end of November 2021.

[1]National Communications Commission has released more than 900 mobile phone prefixes with the last 350 not in use; thus, samples were selected from the first 650 prefixes.

Table 1　Allocation of Samples

Geographic Stratum	City / County	No. of People Ages 16 and above	Population Percentage	Planned Allocation of Samples	Reallocation of Samples
Taipei City, New Taipei City, and Keelung	New Taipei City	3,487,310	17.27%	190	190
	Taipei City	2,148,919	10.64%	117	118
	Keelung City	323,041	1.60%	18	30
	Subtotal	5,959,270	29.50%	325	338
Taoyuan, Hsinchu, and Miaoli	Taoyuan County	1,921,519	9.51%	105	104
	Hsinchu City	371,877	1.84%	20	30
	Hsinchu County	478,149	2.37%	26	30
	Miaoli County	468,227	2.32%	25	30
	Subtotal	3,239,772	16.04%	176	194
Taichung, Changhua, and Nantou	Taichung City	2,394,992	11.86%	130	130
	Changhua County	1,084,989	5.37%	59	59
	Nantou County	428,226	2.12%	23	30
	Subtotal	3,908,207	19.35%	213	219
Yunlin, Chiayi, and Tainan	Yunlin County	590,050	2.92%	32	32
	Chiayi City	227,128	1.12%	12	30
	Chiayi County	444,909	2.20%	24	30
	Tainan City	1,623,118	8.04%	88	88
	Subtotal	2,885,205	14.28%	157	180
Kaohsiung, Pingtung, and Penghu	Kaohsiung City	2,394,954	11.86%	130	130
	Pingtung County	713,825	3.53%	39	39
	Penghu County	94,823	0.47%	5	30
	Subtotal	3,203,602	15.86%	174	199
Yilan, Hualien, and Taitung	Yilan County	393,916	1.96%	22	30
	Hualien County	280,798	1.39%	15	30
	Taitung County	187,256	0.93%	10	30
	Subtotal	861,970	4.27%	47	90
Kinmen, Matsu	Kinmen County	127,880	0.63%	7	30

	Lianjiang County	12,168	0.06%	1	30
	Subtotal	140,048	0.69%	8	60
Grand total		**20,198,074**	**100%**	**1,100**	**1,280**

During the implementation of the survey, the gender and age segments in all cities and counties were controlled to ensure that the structure of the survey results could be similar to that of the population. In case of any inconsistency between obtained samples and the population, the results were weighted by variables like gender, age, and community. The weighted sample number in each age group could not exceed the original number of samples by ±60%. The samples were reallocated as shown in Table 2 below.

Table 2 Reallocation of Samples by Area, Sex, Age

Population Variant	Base		Initial No. of Samples		Final No. of Samples	
	No. of Population	Percentage	No. of Population	Percentage	No. of Population	Percentage
Grand total	**20,198,074**	**100%**	**1,100**	**100%**	**1,280**	**100%**
Sex						
Male	9,928,443	49.2%	541	49.2%	600	49.2%
Female	10,269,631	50.8%	559	50.8%	620	50.8%
Age						
16-25	2,603,004	12.9%	142	12.9%	165	12.9%
26-35	3,141,336	15.6%	171	15.5%	199	15.6%
36-45	3,847,055	19.0%	210	19.1%	244	19.0%
46-55	3,514,740	17.4%	191	17.4%	223	17.4%
56-65	3,442,104	17.0%	187	17.0%	218	17.0%
66 and over	3,649,835	18.1%	199	18.1%	231	18.1%
City / County						
New Taipei City	3,487,310	17.3%	190	17.3%	190	14.8%
Taipei City	2,148,919	10.6%	117	10.6%	118	9.2%
Taoyuan County	1,921,519	9.5%	105	9.5%	104	8.1%
Taichung City	2,394,992	11.9%	130	11.9%	130	10.2%
Tainan City	1,623,118	8.0%	88	8.0%	88	6.9%
Kaohsiung City	2,394,954	11.9%	130	11.9%	130	10.2%

Yilan County	393,916	2.0%	21	2.0%	30	2.3%
Hsinchu County	478,149	2.4%	26	2.4%	30	2.3%
Miaoli County	468,227	2.3%	25	2.3%	30	2.3%
Changhua County	1,084,989	5.4%	59	5.4%	59	4.6%
Nantou County	428,226	2.1%	23	2.1%	30	2.3%
Yunlin County	590,050	2.9%	32	2.9%	32	2.5%
Chiayi County	444,909	2.2%	24	2.2%	30	2.3%
Pingtung County	713,825	3.5%	39	3.5%	39	3.0%
Taitung County	187,256	0.9%	10	0.9%	30	2.3%
Hualien County	280,798	1.4%	15	1.4%	30	2.3%
Penghu County	94,823	0.50%	5	0.50%	30	2.30%
Keelung City	323,041	1.60%	18	1.60%	30	2.30%
Hsinchu City	371,877	1.80%	20	1.80%	30	2.30%
Chiayi City	227,128	1.10%	12	1.10%	30	2.30%
Kinmen County	127,880	0.60%	7	0.60%	30	2.30%
Lianjiang County	12,168	0.10%	1	0.10%	30	2.30%

iii. Survey Period

The telephone interviews took place from 14:00 to 17:30 in the afternoon and from 18:00 to 21:30 at night between March 14 and April 24, 2022. The evening interviews in remote areas ended at 21:00 when necessary so as to not interrupt the routine of those surveyed. Interviews were also conducted in the afternoon and night on weekends to ensure that people of different properties (e.g. people working at different times or with different lifestyles) could be reached.

Table 3　Implementation of Survey

Geographic Stratum	City / County	No. of Population ages 16 and Above	Percentage	Communications & Internet Markets	Broadcasting and Convergence Markets
Taipei City, New Taipei City, and Keelung	New Taipei City	3,487,310	17.27%	190	196
	Taipei City	2,148,919	10.64%	118	127
	Keelung City	323,041	1.60%	30	40
	Subtotal	5,959,270	29.50%	338	363
Taoyuan, Hsinchu, and Miaoli	Taoyuan County	1,921,519	9.51%	104	107
	Hsinchu City	371,877	1.84%	30	31
	Hsinchu County	478,149	2.37%	30	34
	Miaoli County	468,227	2.32%	30	32
	Subtotal	3,239,772	16.04%	194	204
Taichung, Changhua, and Nantou	Taichung City	2,394,992	11.86%	130	138
	Changhua County	1,084,989	5.37%	59	65
	Nantou County	428,226	2.12%	30	36
	Subtotal	3,908,207	19.35%	219	239
Yunlin, Chiayi, and Tainan	Yunlin County	590,050	2.92%	32	33
	Chiayi City	227,128	1.12%	30	30
	Chiayi County	444,909	2.20%	30	37
	Tainan City	1,623,118	8.04%	88	97
	Subtotal	2,885,205	14.28%	180	197
Kaohsiung, Pingtung, and Penghu	Kaohsiung City	2,394,954	11.86%	130	139
	Pingtung County	713,825	3.53%	39	42
	Penghu County	94,823	0.47%	30	31
	Subtotal	3,203,602	15.86%	199	212
Yilan, Hualien, and Taitung	Yilan County	393,916	1.96%	30	32
	Hualien County	280,798	1.39%	30	30
	Taitung County	187,256	0.93%	30	32
	Subtotal	861,970	4.27%	90	94
Kinmen, Matsu	Kinmen County	127,880	0.63%	30	30
	Lianjiang County	12,168	0.06%	30	30

	Subtotal	140,048	0.69%	60	60
Grand total		**20,198,074**	**100%**	**1,280**	**1,369**

Table 4 Contingency Table for Telecommunications and Internet Survey before Weighting

Allocation of Samples	**Allocated Number of Samples**		**Number of Samples before Weighting**		**Chi-Square Test before Weighting**
	No. of People	**Percentage**	**No. of People**	**Percentage**	
Grand total	**1,220**	**100%**	**1,309**	**100%**	
Location					
Taipei City, New Taipei City, and Keelung	338	27.7%	363	27.7%	The Chi-square test value being 6.823 and p-value=0.276 indicated no significant difference between the sample and distribution of the population at a 5% confidence level.
Taoyuan, Hsinchu, and Miaoli	194	15.9%	204	15.6%	
Taichung, Changhua, and Nantou	219	18.0%	238	18.3%	
Yunlin, Chiayi, and Tainan	180	14.8%	197	15.0%	
Kaohsiung, Pingtung, and Penghu	199	16.3%	212	16.2%	
Yilan, Hualien, and Taitung	90	7.4%	94	7.2%	

Note: Table 4 shows the consistency test in allocation of samples and the numbers of samples before weighting.

III. Implementation of Survey

i. Survey description

Prior to the survey being formally launched, preparations for questionnaires and related affairs were undertaken in February 2022 with a pilot test performed between March 14 and March 30, 2022. After the questionnaires were modified based on the conclusions from the meeting with the agency that commissioned this research, the survey formally began on March 31, 2022. The timeline is outlined as follows.

1. Preparation period: February 14 to March 13, 2022
2. Survey period: Phase 1: March 14 to March 30, 2022
   Phase 2: March 31 to April 24, 2022
3. Review period: April 25 to May 13, 2022

ii. Survey assistance tools

The survey was conducted via telephone with stratified random sampling.

iii. Statistical analysis method

1. Data consolidation

In this research, the survey was conducted via landline and mobile phone with reference to the dual-frame approach adopted by the NCC with weighting.

First, P1 denotes the proportion of landline phone only users in the population, P2 denotes the proportion of dual users, while P3 denotes the proportion of the mobile phone only users, and P4 the proportion of non-users. Without loss of generality, if P4=0, then P1+P2+P3=100%. Theoretically, a landline survey covers P1+P2 only and a mobile phone survey covers P2+P3 only. The proportions of landline and mobile phone users are calculated as follow:

P1+P2+P3=1

(P1+P2):P2=1: the proportion of mobile phone users in a landline phone survey

(P2+P3):P2=1: the proportion of landline users in a mobile phone survey

The landline and mobile phone survey data sets were combined according to the ratios of P1, P2, and P3 (landline only users, dual users, mobile phone only users) and checked for sample representativeness by basic variables such as city / county, sex, and age. If the samples did not match the composition of the population, they were weighted by sex, age, and city / county to make sure no significant difference existed between the sample and the population.

2. Sample representativeness and weighting

A sample telephone survey was conducted in order to compile data. Since non-sampling errors during the surveys led to deviation from the population, the sample had to be weighted to make reasonable inferences about the population.

The NPAR Chi-square test was used to check the sample by variables of the telephone survey—city / county, sex, and age. If the sample was determined to significantly differ from the population, it was ranked by city, sex and age with the

latest population data published by Ministry of the Interior as the population until no significant difference existed between the sample and the population.

$$w_{i..}^{(1)} = \frac{N_{i..}}{N} \times \frac{n}{n_{i..}}$$

$$w_{.j.}^{(2)} = \frac{N_{.j.}}{N} \times \frac{n}{n_{.j.}^{(1)}}, \text{ wherein } n_{.j.}^{(1)} = \sum_i \sum_k w_{i..}^{(1)} n_{ijk}$$

$$w_{..k}^{(3)} = \frac{N_{..k}}{N} \times \frac{n}{n_{..k}^{(2)}}, \text{ wherein } n_{..k}^{(2)} = \sum_i \sum_j w_{.j.}^{(2)} n_{ijk} \cdots$$

The adjustment weights can be obtained from the iterative calculations above:

$$W_{raking} = \sum_{i=1}^{k} \frac{N_i}{N} \sum_{j=1}^{n_i} \frac{w_{ij} y_{ij}}{n_i}$$

$$\text{wherein } y_{ij} = \begin{cases} 1, \text{Sample } j \text{ in Stratum } i \text{ has property} \\ 0, \text{Sample } j \text{ in Stratum } i \text{ does not have property} \end{cases}$$

$$w_{ij} = \text{Adjustment weight of Sample } j \text{ in Stratum } i, \; n_{ij} =$$

$$\text{No. of successful Samples in Stratum } i,$$

k = stratum, i=sex, i=1,2、j=age, j=1,2,3,…, k=city / county, k=1,2,3,..,22

All the data in the results were multiplied by the adjustment weight. N, $N_i$and n_i represent the number of the population and the number of weighted sample population in cross group i, and N and n represent the number of the total population and the number of the total weighted sample population. By doing so, the sampling distribution was completely the same as the population distribution after weighting. The last weight was gained by multiplying all the adjustment weights.

3. Frequency

How people understand and rate each of the aspects was realized through the frequencies and data presented in percentage in all of the items.

4. Cross analysis and Chi-square test

A cross analysis table was established with the basic data in “all issues” to realize whether a difference existed between the respondents with different backgrounds in all issues. Pearson’s Chi-square test was used in the cross table. The Chi-square test value (W) is defined as below:

$$W=\sum_{i=1}^{r}\sum_{j=1}^{c}\frac{(O_{ij}-E_{ij})^2}{E_{ij}}\sim\chi^2((r-1)(c-1))$$, wherein

O_{ij} is the observed frequency from Row j, Column i, and

E_{ij} is the expected frequency from Row j, Column i.

A less than 5% p-value in the Chi-square test indicates a significant statistic difference between the two variables at a 5% confidence level.

5. Analysis of variance (ANOVA)

The total variation can be broken down into the variation between groups and the variation within groups. Analysis of variance is used to calculate the ratio of variation between groups to variation within groups. If the variation between groups is significantly greater than the variation within groups, significant differences among group means exist between two or more groups. If the variation between groups does not differ highly from the variation within groups, no significant differences exist among groups. The ANOVA F-test calculations are as below.

$$F=\frac{MS_b}{MS_w}=\frac{SS_b/k-1}{SS_w/n-k}$$

, where n represents the number of samples and k represents the number of groups,

$SS_b=n\sum_{i=1}^{k}(\overline{X}_i-\overline{X})^2$ is the total sum of squared deviations of group means from grand mean, and

$SS_w=\sum_{i=1}^{k}\sum_{j=1}^{n_i}(X_{ij}-\overline{X}_i)^2$ is the total sum of the squared deviations within groups.

iv. Sample structure

This survey was conducted in Taiwan, Penghu, Kinmen and Matsu. Due to the small adult (aged 16 and over) population of 140,048 in Kinmen and Matsu compared to other areas, the samples of Kinmen and Matsu were separated from those of Taiwan proper (including Penghu) so that the number of samples of Kinmen and Matsu would not be too few to be representative when weighted and analyzed with samples of other

20 cities and counties.

As of May 13, 2022, the communications and internet survey for this research had been completed and reviewed by the research team, with 1,369[2] valid questionnaires completed as valid samples. The sample structure is shown in Table 5.

Table 5 Contingency Table for Telecommunications and Internet Survey Samples

Population Variants	Population		No. of Samples before Weighting		No. of Samples after Weighting		Chi-Square Test before Weighting	Chi-Square Test after Weighting
	No. of Population	Percentage	No. of Population	Percentage	No. of Population	Percentage		
Grand total	**20,058,026**	**100%**	**1,309**	**100%**	**1,280**	**100%**		
Sex							The Chi-square test value being 3.671 and p-value=0.055 indicated no significant difference existed between the sample and the population at a 5% confidence level.	The Chi-square test value being 0.000 and p-value=0.999 indicated no significant difference between the sample and the population at a 5% confidence level.
Male	9,858,028	49.1%	678	51.8%	643	49.1%		
Female	10,199,998	50.9%	631	48.2%	666	50.9%		
Age							The Chi-square test value being 13.398 and p-value=0.012 indicated no significant difference between the sample and the population at a 5% confidence level.	The Chi-square test value being 0.000 and p-value=1.000 indicated no significant difference between the sample and the population at a 5% confidence level.
16 -25	2,583,629	12.9%	135	10.3%	169	12.9%		
26 -35	3,116,634	15.5%	189	14.4%	203	15.5%		
36 -45	3,824,727	19.1%	254	19.4%	250	19.1%		
46 -55	3,490,240	17.4%	255	19.5%	228	17.4%		
56 -65	3,414,362	17.0%	245	18.7%	223	17.0%		
66 and over	3,628,434	18.1%	231	17.6%	237	18.1%		
By City / County							The Chi-square test value being 196.978 and p-value=0.000 indicated no significant difference between the sample and the population at a 5% confidence level.	The Chi-square test value being 0.000 and p-value=1.000 indicated no significant difference between the sample and the population at a 5% confidence level.
New Taipei City	3,487,310	17.3%	196	15.0%	228	17.4%		
Taipei City	2,148,919	10.6%	127	9.7%	140	10.7%		
Taoyuan County	1,921,519	9.5%	107	8.2%	125	9.5%		
Taichung City	2,394,992	11.9%	138	10.5%	157	12.0%		
Tainan City	1,623,118	8.0%	97	7.4%	106	8.1%		
Kaohsiung City	2,394,954	11.9%	139	10.6%	156	11.9%		
Yilan County	393,916	2.0%	32	2.4%	25	1.9%		
Hsinchu County	478,149	2.4%	34	2.6%	32	2.4%		
Miaoli County	468,227	2.3%	32	2.4%	30	2.3%		

[2]This survey was conducted in Taiwan, Penghu, Kinmen and Matsu. Since the population in Kinmen and Matsu was too small for analysis, their samples were separated from those of Taiwan proper (including Penghu) before weighting by city / county. Also, samples were regrouped according to where interviewees registered their domicile. (Namely, an interviewee who was interviewed in Taiwan with his domicile registered in Kinmen or Matsu would be classified as a valid sample of Kinmen and Matsu; while an interviewee who was interviewed in Kinmen or Matsu with his domicile registered in Taiwan proper was processed as a valid sample of Taiwan proper.)

Changhua County	1,084,989	5.4%	65	5.0%	71	5.4%		
Nantou County	428,226	2.1%	36	2.8%	28	2.1%		
Yunlin County	590,050	2.9%	33	2.5%	39	3.0%		
Chiayi County	444,909	2.2%	37	2.8%	29	2.2%		
Pingtung County	713,825	3.5%	42	3.2%	46	3.5%		
Taitung County	187,256	0.9%	32	2.4%	13	1.0%		
Hualien County	280,798	1.4%	30	2.3%	18	1.4%		
Penghu County	94,823	0.5%	31	2.4%	6	0.5%		
Keelung City	323,041	1.6%	40	3.1%	21	1.6%		
Hsinchu City	371,877	1.8%	31	2.4%	24	1.8%		
Chiayi City	227,128	1.1%	30	2.3%	15	1.1%		

Note: The data shown in Table 5 are the March 2022 data on population structure by village (neighborhood) provided by the Ministry of the Interior at its open data website.
The number of samples of a city / county was weighted based on the household registration, with the consistency between numbers of samples before and after weighting tested.

The changes in sample size of each age group after weighting are all in accordance with the requirement that "the rate of change in sample size of any age group must not exceed ±60% or more after weighting," as shown in Table 6.

Table 6 Expansion Ratios of the Number of Samples by Age Group after Weighting

No. of Population	Before Weighting		After Weighting		Expansion Ratios by Age Group (Compared with the Initial Number of Samples)
	No. of Population	Percentage	No. of Population	Percentage	
Grand total	**1,309**	**100%**	**1,309**	**100%**	
Age					
16-25	135	10.30%	169	12.90%	1.25
26-35	189	14.40%	203	15.50%	1.07
36-45	254	19.40%	250	19.10%	0.98
46-55	255	19.50%	228	17.40%	0.89
56-65	245	18.70%	223	17.00%	0.91
66 and over	231	17.60%	237	18.10%	1.03

IV. Research Limitations

In order to truly ascertain how Taiwanese people use communications, a survey on the development and trends in the communications industry was conducted through telephone interviews with people aged 16 and above (those born on and before

December 31, 2006) in Taiwan, Penghu, Kinmen, and Matsu, at the request of NCC. However, the following study limitations were encountered when actually performing the survey:

i. Sample Frame Limitations

According to NCC standard requirements, at least 1,100 successful samples in Taiwan, Penghu, Kinmen, and Matsu were required with the sample proportional to the population of each city / county.

The dual frame (landline and cell phone) survey was adopted for this research, with the CHT White pages and the current status of assigned subscriber's number for mobile telecommunications service published by NCC as the frames. However, due to the fact that the sample structure might be affected by user habits, such as most landline only users being ages 66 and over and most mobile phone only users being young people, the sample sizes were merged by sex, age, and education level and then weighted by the ratios of landline only users, mobile phone only users and dual users with a view to matching the ratios in the population while expanding the sample coverage, according to the way proposed by Hung Yong-tai et al. (2017) [3] on how to merge landline and mobile phone samples.

ii. Sample Recovery Restrictions

The questionnaire consisted of fifty-nine questions; 81,879 calls were made with 80.1% of them unanswered and 19.9% answered. Among the answered calls, 7.6% were rejected, 9.9% were interrupted for some reasons, with 2.2%, an extremely low rate, successfully completed.

Even so, the interviewers in this survey were urged earlier in the year to achieve the required number of samples by area, sex and age; hence, none of the weighted numbers across all age groups exceeded the original numbers of samples by±60%.

iii. Sample Inference Restrictions

After weighing, the sample size of young people, such as ages 16-25, was 1.25 times greater; the sample size of ages 26-35 1.07 times greater; the sample size of ages

[3]Hung Yong-tai, Yu Cheng-hua, Kao Shi-yuan, 2017. *Challenges and Responses in Local Public Opinion Exploration in the Digital Age* (P. 18). http://www.tcef.org.tw/layout/exfile/file/researchcenter/methodology/report/106report.pdf#page=31&zoom=100,92,508

36-45 0.98 times greater; the sample size of middle-aged people (46-55), was 0.89 times greater; the sample size of ages 56-65 0.91 times greater; and the sample size of ages 66 and over 1.03 times greater. Non-probability sampling was employed in this research; therefore, care should be taken when using the resulting statistical inferences.

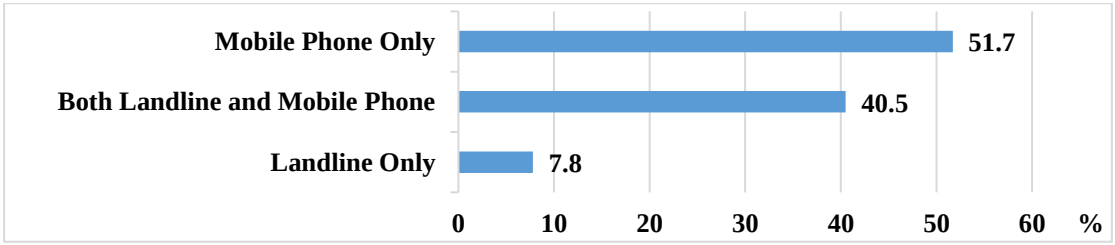
C. Telecommunications and Internet Market Survey Results

I. Landline Phones

i. Landline Phone Usage Q3

1. Overall analysis

When asked about the type of telephone used at home, 51.7% of the surveyed said they only use a mobile phone, 40.5% said they use both landline and mobile phone, with 7.8% saying they use the landline only (Figure 1).



Base: N=1,309, single-choice

Figure 1 Home Telephone Usage

2. Comparative analysis

(1) Analysis on regional differences

The Chi-square test[4] suggests that telephone use at home varied greatly with area.

The cross analysis suggests that when asked about the type of telephone used at home, the majority of respondents in all areas said they use the mobile phone only, with the highest ratio seen in Taoyuan, Hsinchu, and Miaoli (56.4%) and the lowest in Taichung, Changhua, and Nantou (47.3%), except in Yilan, Hualien, and Taitung, where dual users constituted the largest share (48.5%).

(2) Analysis on basic differences

The Chi-square test suggests that telephone use at home varied greatly with age.

When broken down by sex, the majority of both male (51.3%) and female (52.1%) respondents said they use the mobile phone only at home.

When broken down by age, most respondents aged 45 and below answered that they only use a mobile phone at home, with the highest ratio seen in ages 16-25 (73.9%)

[4]The Chi-square tests used in the survey analysis in Chapter 3 were tests for independence of variables.

and the lowest in ages 36-45 (60.5%); while most respondents aged 46 and over said they use both landline and mobile phone, with the highest ratio seen in ages 56-65 (53.2%) and the lowest in ages 66 and over (43%). Furthermore, landline only users accounted for a significantly larger share in ages 66 and over range than in the others, with the ratio of mobile phone only users decreasing with age.

When broken down by marital status, most respondents across all marital statuses are mobile phone only users, with the highest ratio seen in the divorced / separated (66.6%) and the lowest in the widowed (44.5%), except in the married, where mobile phone only users were the most common (46.9%).

(3) Analysis on differences in social and economic status

The Chi-square test suggests that telephone use at home varied greatly with education level and monthly income.

When broken down by education level, the ratio of landline only users decreased with education, with the highest ratio seen in those with elementary education and below (34.5%) and the lowest in master's and post-graduate degree holders (0%); the ratio of mobile only users increased with education, with the highest ratio seen in bachelor's degree holders (61.6%) and the lowest in those with elementary education and below (32.9%).

When broken down by monthly income, mobile only users accounted for the majority of respondents in all income levels, with the highest ratio seen those earning NT$30,000-NT39,999 (61.7%) and the lowest in those earning less than NT$10,000 (37.7%), except in those with no income, where dual users were the most common (44.9%). Furthermore, the ratio of landline only users decreased with income, with landline only users accounting for a significantly higher ratio in those earning less than NT$20,000 than in those earning more than NT$20,000.

ii. Satisfaction with Landline Call Quality Q6

1. Overall analysis

The respondents rated the landline phone call quality on average 8.04 out of 10 (1 being the lowest and 10 being the highest) (N=632, the landline phone users).

2. Comparative analysis

(1) Analysis on regional differences

When broken down by area, the surveyed across all areas rated the landline phone

call quality somewhere between seven and nine, with the highest seen in Taoyuan, Hsinchu and Miaoli (8.5) and the lowest (7.84) in Taichung, Changhua and Nantou (7.84) (Table 7).

Table 7 Satisfaction with Landline Call Quality (by Area)

Area	Average Score
Taipei City, New Taipei City, and Keelung	8.02
Taoyuan, Hsinchu, and Miaoli	8.50
Taichung, Changhua, and Nantou	7.84
Yunlin, Chiayi, and Tainan	7.94
Kaohsiung, Pingtung, and Penghu	7.87
Yilan, Hualien, and Taitung	8.18
Total Average	**8.04**

Source: Results from this research

(2) Analysis on basic differences

When broken down by sex, male respondents rated the landline call quality on average 8.05, slightly higher than their female counterparts (8.03).

When broken down by age, respondents in all ages rated the landline call quality on average somewhere between eight and nine, with ages 36-45 giving the highest score (8.24) and ages 56-65 the lowest (8), except ages 16-25 (7.5) and ages 26-35 (7.6).

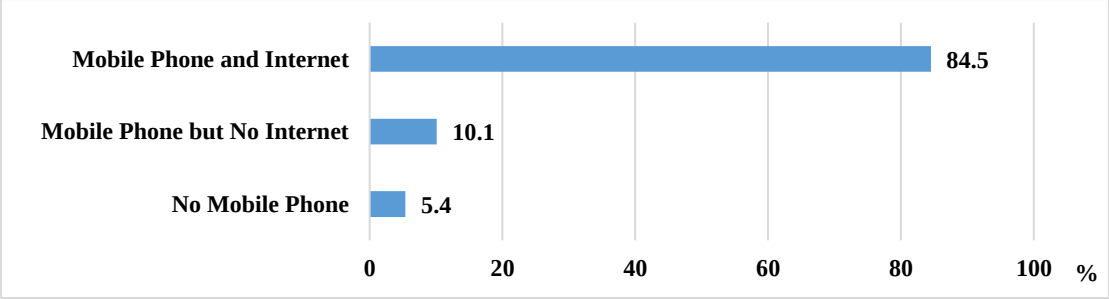
When broken down by marital status, the divorced / separated rated the landline call quality the highest (8.16), and the widowed the lowest (7.48).

II. Mobile Phone Services

i. Mobile Phone and Internet Use Q9

1. Overall analysis

When it comes to mobile phone and internet use, those who use both the mobile phone (including smart phones and non-smart phones) and the internet (including social media) accounted for the majority (84.5%) of respondents, followed by those who use mobile phones but not the internet (10.1%), and those with no mobile phones (5.4%) (Figure 2).



Base: N=1,309, single-choice.

Figure 2 Mobile Phone and Internet Use

2. Comparative analysis

(1) Analysis on regional differences

The Chi-square test suggests that mobile phone and internet use varied greatly with area.

According to the cross analysis, it was found that most of the surveyed access the internet with their mobile phones, with the highest ratio seen in Taoyuan, Hsinchu, and Miaoli (88.1%) and the lowest in Yilan, Hualien, and Taitung (79.1%).

(2) Analysis on basic differences

The Chi-square test suggests that mobile phone and internet use varied greatly with age.

When broken down by sex, over 80% of males (85.6%) and females (83.5%) use the mobile phone and the internet.

When broken down by age, over 80% of the interviewees across all ages use the mobile phone and the internet, with the highest proportion (98.5%) found in ages 26-35 and ages 36-45 and the lowest in ages 56-65 (82.8%), except in ages 66 and over, where 44.3% use the mobile phone and the internet.

When broken down by marital status, 80% of the respondents in all marital status use the mobiles phone and the internet, with the highest ratio shown in the unmarried (95.3%) and the lowest in the married (80.4%), except in the widowed, where most use mobile phones but not the internet (47.6%).

(3) Analysis on differences in social and economic status

The Chi-square test suggests that mobile phone and internet use varied greatly with education level and monthly income.

When broken down by education level, most of the respondents across all education levels said they use the mobile phone and the internet and the ratio increased

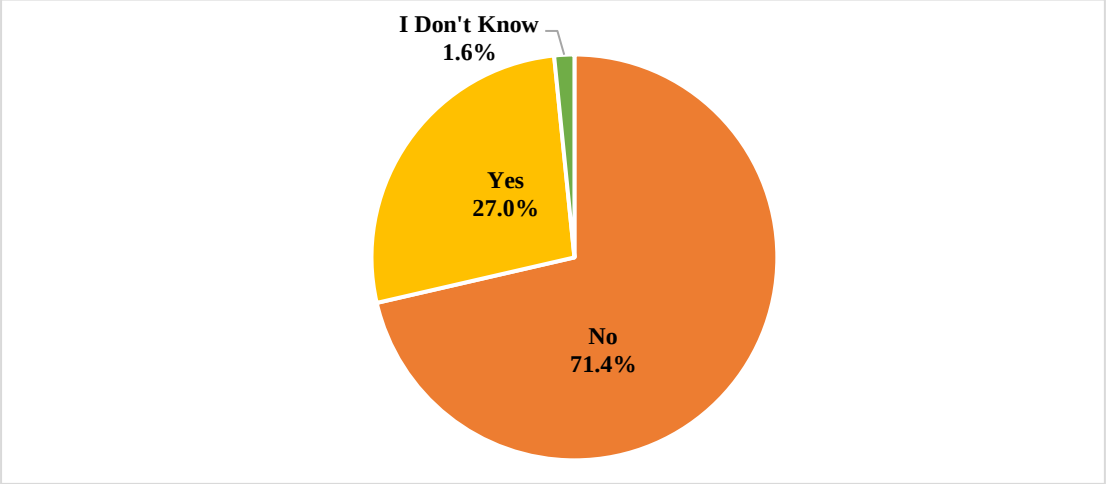
with education level, with the largest percentage found in master's and post-graduate degree holders (98.2%) and the lowest in those with junior high education (70.5%), except in those with elementary education and below, where 75.3% use the mobile phone but not the internet.

When broken down by income, the majority (over 60%) of interviewees of all income levels use the mobile phone and the internet, with the highest proportion found in those who earned NT30,000-NT39,999 (96.7%) and the lowest in those who earned less than NT10,000 (50.2%). In addition, those who use the mobile phone but not the internet and those with no mobile phones represented significantly larger shares in those with no income and those earning less than NT$20,000 than in those earning more than NT$20,000.

ii. Transfer from 4G to 5G Q11Q12Q13

1. Overall analysis

Those who had not transferred from 4G to 5G network constituted 71.4%; while those who had represented 27% (Figure 3).

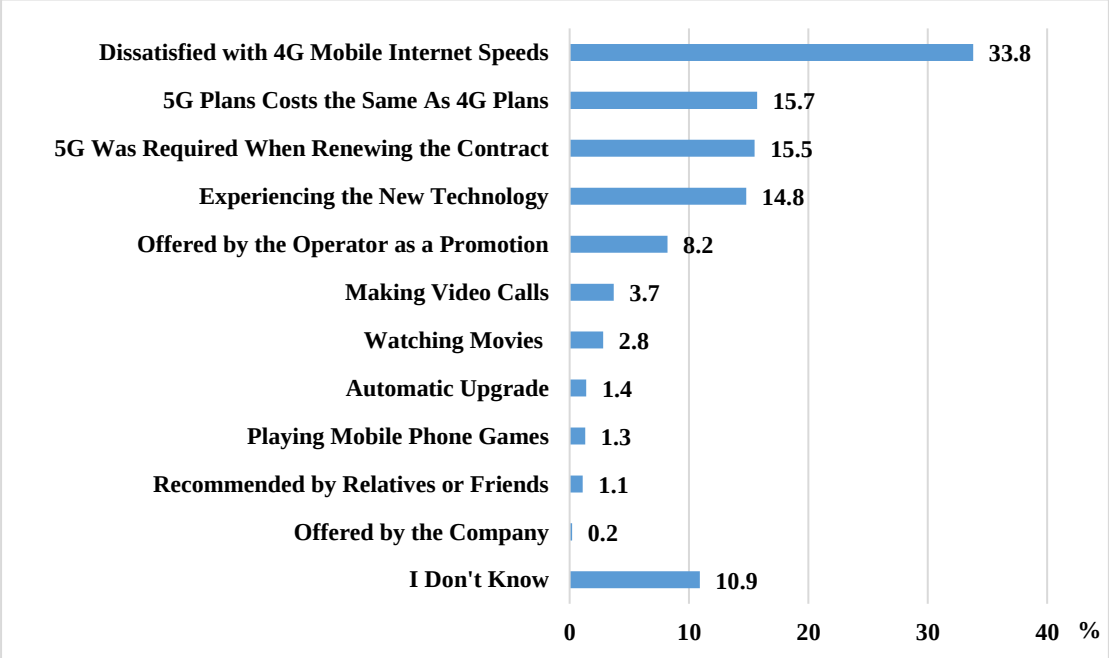


Base: N=1,106, single-choice (Those who use the mobile phone and the internet)

Figure 3 Transfer from 4G to 5G

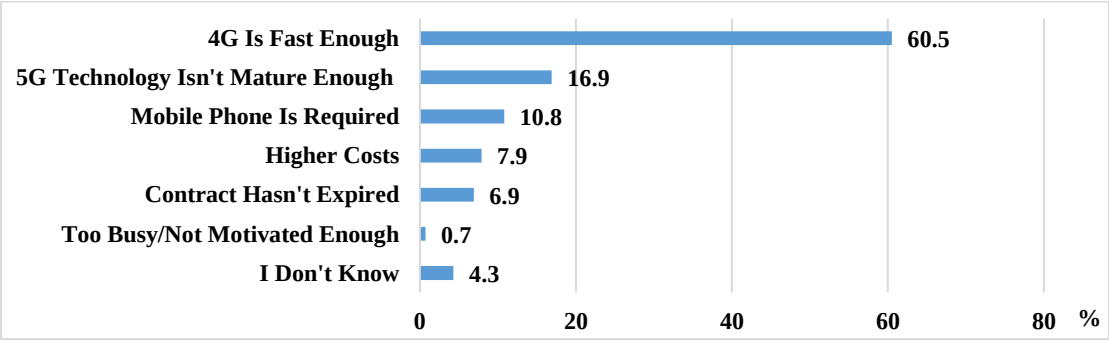
When it comes to the reasons for transferring to 5G, the predominant reasons were "Dissatisfied with 4G Mobile Internet Speeds" (33.8%), followed by "5G Plans Costs the Same As 4G Plans" (15.7%), and "5G Was Required When Renewing the Contract" (15.5%) (Figure 4). When it comes to the reasons to remaining with 4G, the predominant reasons were "4G Is Fast Enough" (60.5%), followed by "5G Technology

isn't Mature Enough" (16.9%), and "New Mobile Phone is Required (The current mobile phone does not support 5G network)" (10.8%) (Figure 5).



Base: N = 299, multiple answers allowed (Mobile phone owners who access the internet and has transferred to 5G)

Figure 4 Reasons for Transferring to 5G



Base: N = 790, multiple answers allowed (Mobile phone owners who access the internet but has not transferred from 4G to 5G)

Figure 5 Reasons for not Transferring to 5G

2. Comparative analysis

(1) Analysis on regional differences

The cross analysis suggests that 4G users made up the largest percentage of interviewees in all areas, with the highest ratio in Taichung, Changhua, and Nantou (74.1%) and the lowest in Yunlin, Chiayi, and Tainan (66.8%). The 5G users represented the highest ratio in Yunlin, Chiayi, and Tainan (33%) and the lowest in

Yilan, Hualien, and Taitung (20.7%).

The most common reason for transferring to 5G across all areas was dissatisfaction with the 4G internet speed, with the largest percentage seen in Taipei City, New Taipei City, and Keelung (41.3%) and the lowest in Kaohsiung, Pingtung, and Penghu (26.2%). When it comes to the reasons for not transferring to 5G, over half of respondents across all areas said 4G is fast enough, with the highest ratio seen in Taichung, Changhua, and Nantou (63.4%) and the lowest in Taoyuan, Hsinchu, and Miaoli (53.2%).

(2) Analysis on basic differences

The Chi-square test suggests that whether one had transferred to 5G varied greatly with sex.

When broken down by sex, 4G users accounted for the majority of both male (68.6%) and female (74.2%) interviewees. When it comes to the reasons for the transfer, most male (32%) and female (36.2%) interviewees said they were dissatisfied with 4G mobile internet speeds." When it comes to the reasons for remaining with 4G, most male (57.4%) and female (63.3%) respondents said 4G is fast enough.

When broken down by age, most of the interviewees in all age groups said they had not transferred to 5G, with the highest percentage (77.4%) in ages 46-55 and the lowest in ages 36-45 (64.8%). When it comes to the reasons for the transfer, most of the interviewees across all ages replied that they were dissatisfied with 4G mobile internet speeds, with the highest ratio seen in ages 16-25 (53.4%) and the lowest in ages 36-45 (34.4%), except in ages 46-55 and ages 66 and over, where most respondents answered "5G Was Required When Renewing the Contract" (20.3%) and "5G Plans Costs the Same as 4G Plans" respectively. As for the reasons for still using 4G, respondents in all ages said 4G is fast enough, with the highest ratio in ages 56-65 (70.9%) and the lowest in ages 36-45 (53.1%).

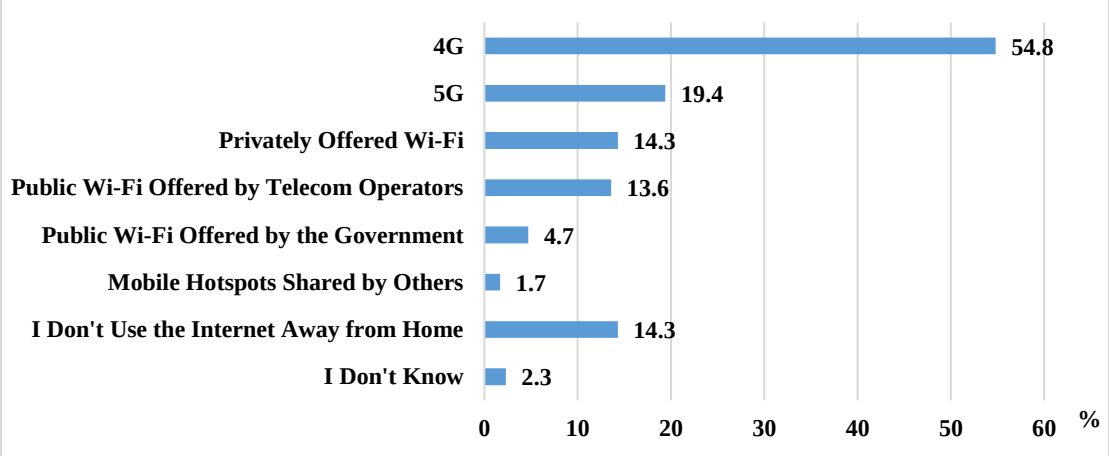
When broken down by marital status, non-4G users constituted the majority of interviewees in all marital statuses, with the highest percentage in the unmarried (72.8%) and the lowest in the divorced / separated (50.6%); while 5G users accounted for the largest share of the divorced / separated (49.4%) and the smallest share in the married (25.9%). The widowed were excluded from the analysis due to the small sample size. When it comes to the reasons for the transfer, respondents across all marital statuses answered that they were dissatisfied with 4G mobile internet speeds, with the highest ratio found in the unmarried (42.5%) and the lowest in the married (31.1%), except in the divorced / separated, where most respondents said "5G Plans Costs the Same As 4G

Plans" (35.1%). The widowed were excluded from the analysis due to the small sample size. When it comes to the reasons for still using 4G, most of the divorced / separated (80.6%), the married (62.2%) and the unmarried (56.5%) said 4G is fast enough. The widowed were not included in the analysis due to the small sample size.

iii. Most Common Mobile Network Services Away from Home Q14

1. Overall analysis

When asked about the mobile internet used away from home, most (54.8%) answered 4G, followed by 5G (19.4%), privately offered Wi-Fi (such as shops, offices) (14.3%), and public Wi-Fi offered by telecom operators (such as CHT Wi-Fi, TWM Wi-Fi, FET Wi-Fi) (13.6%) (Figure 6).



Base: N=1,106, Multiple-choice (Those who used a mobile phone and the internet)

Figure 6 Most Common Mobile Network Services away from Home

2. Comparative analysis

(1) Analysis on regional differences

The cross analysis suggests that those who use 4G mobile internet when away from home represented over half of respondents in all areas, with the highest proportion found in Yilan, Hualien, and Taitung (62.8%) and the lowest in Yunlin, Chiayi, and Tainan (51.7%). In addition, those who use the public Wi-Fi offered by telecom operators accounted for a significantly lower percentage in Yilan, Hualien, and Taitung (5.5%) than in other areas.

(2) Analysis on basic differences

When broken down by sex, the majority of both male (51.6%) and female (58.1%) respondents use 4G mobile network when not home.

When broken down by age, over half of respondents across all ages said they use 4G mobile internet when not home, with the highest proportion found in ages 46-55 (59.8%) and the lowest in ages 66 and over (50.5%). In addition, the ratio of 5G mobile internet users decreased with age, with the highest proportion found in ages 26 -35 (23%) and the lowest in ages 56-65 (14.9%).

When broken down by marital status, 4G mobile internet users accounted for the majority of respondents in all marital statuses, with the highest ratio in the unmarried (55.9%) and the lowest in the divorced / separated (49.1%). In addition, the widowed were not included in the analysis due to the small sample size.

III. Mobile Phones and Data Plans

i. Mobile Phone Bill per Month Q20

1. Overall analysis

On average, the mobile phone bill of the surveyed is NT$728 per month (N=1,174, those who have a mobile phone and subscribe to a monthly plan).

2. Comparative analysis

(1) Analysis on regional differences

When broken down by area, the average mobile phone bill of the surveyed ranges between NT$700-800, except in Taoyuan, Hsinchu, and Miaoli, where the average cost is below NT$700, with the highest in Kaohsiung, Pingtung, and Penghu (NT$792) and the lowest in Taoyuan, Hsinchu, and Miaoli (NT$677) (Table 8).

Table 8 Mobile Phone Bill per Month (by Area)

Unit: NT Dollar

Area	Average Cost
Taipei City, New Taipei City, and Keelung	727
Taoyuan, Hsinchu, and Miaoli	677
Taichung, Changhua, and Nantou	725
Yunlin, Chiayi, and Tainan	742
Kaohsiung, Pingtung, and Penghu	792
Yilan, Hualien, and Taitung	720
Total Average	**728**

Source: Results from this research

(2) Analysis on basic differences

The Chi-square test suggests that the mobile phone bill per month varied greatly with sex and age.

When broken down by sex, males respondents' average mobile phone bill is NT$785, higher than their female counterparts (NT$670).

When broken down by age, the average mobile phone bill of the surveyed in all ages are over NT$700, with the highest in ages 36-45 (NT$829), except in ages 56-65 (NT625) and ages 66 and over (NT$621).

When broken down by marital status, the unmarried showed the highest average cost (NT$813), and the divorced / separated the lowest (NT$709).

(3) Analysis on differences in social and economic status

The Chi-square test suggests that the mobile phone bill varied greatly with the education level, profession, and income.

When broken down by education level, the average mobile phone bills of the surveyed in all education levels ranges between NT$700-800, with the highest in those with junior high education (NT$784), except in those with elementary education and below (NT$429), where the average bill is significantly lower.

When broken down by profession, the highest average mobile phone bill (NT$999) was found in the real estate industry, followed by NT$949 in the art / entertainment and recreation industries, NT$911 in the construction engineering industry, NT$893 in the wholesale and retail industries; and the lowest seen in the retirees (NT$506), followed by NT$571 in the agricultural / forestry / fishery / husbandry industries, NT$603 in students, and NT$618 in housekeepers.

When broken down by income, the average mobile phone bill increased with income, with the highest average seen in those earning NT60,000 and more (NT$831) and the lowest in those earning NT10,000-NT19,999 (NT$519).

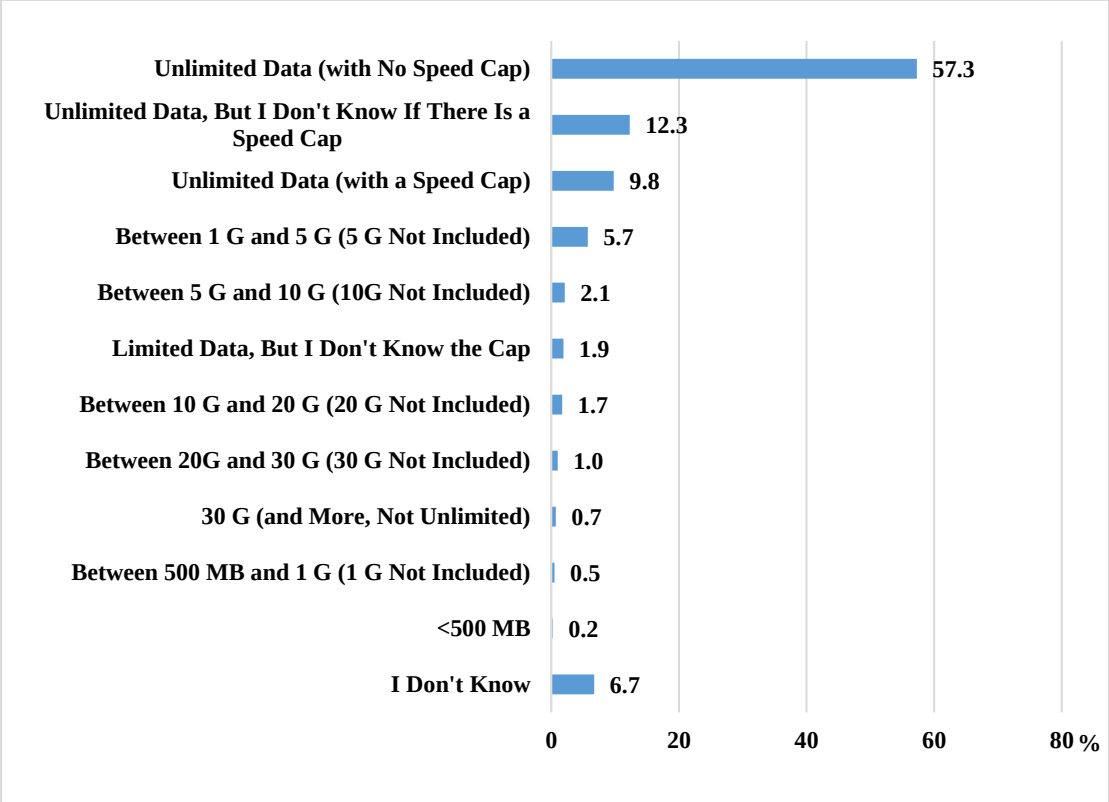
IV. Mobile Phone Usage

ii. Mobile data plans Q21

1. Overall analysis

When it comes to mobile data plans, most (79.4%) of those surveyed subscribe to an unlimited data plan (including those with and without a speed cap, and those who did not know if there is a speed cap). Among them, those on an unlimited data plan with

no speed cap accounted for the largest percentage (57.3%), followed by those who do not know the answer (12.3%) and those on an unlimited data plan with a speed cap (9.8%). Among those subscribing to a limited data plan, 1-5GB (exclusive of 5G) data plans were the most popular (5.7%) (Figure 7).



Base: N=1,106, single-choice (Those who used a mobile phone and the internet)

Figure 7 Mobile Data Plans

2. Comparative analysis

(1) Analysis on regional differences

The cross analysis suggests that over seventy percent of the surveyed in all areas were on an unlimited mobile data plan, mostly without a speed cap, with the highest ratio found in Kaohsiung, Pingtung, and Penghu (59.5%) and the lowest in Yilan, Hualien, and Taitung (55.5%). Among those on a limited data plan, 1-5GB data plans accounted for the majority, with the highest in Yunlin, Chiayi, and Tainan (7.3%) and the lowest in Taipei City, New Taipei City, and Keelung (3.3%).

(2) Analysis on basic differences

The Chi-square test suggests that the data plans varied greatly with sex.

When broken down by sex, 83.8% of male respondents and 74.9% of female respondents are on an unlimited data plan, mostly without a speed cap, at ratios of

61.8% and 52.9% respectively. Among those on a limited data plan, 1-5GB data plans accounted for the majority, at 4.4% and 7.1% respectively.

When broken down by age, over 80% of the surveyed across all ages are on an unlimited data plan, except in ages 56-65 (64.6%) and ages 66 and over (62.8%). These data plans are mostly without a speed cap, with the highest percentage seen in ages 26-35 (72.1%) and the lowest in ages 66 and over (32%). Among those on a limited data plan, 1-5GB data plans were the most popular among all ages, with a significantly higher ratio seen in ages 56-65 (10.7%) and ages 66 and over (8.7%) than in the rest.

When broken down by marital status, over 70% of the surveyed in all marital statuses subscribe to an unlimited data plan, mostly without a speed cap, with the highest ratio in the unmarried (66.2%) and the lowest in the divorced / separated (48.1%). Among those on a limited data plan, 1-5GB data plans were the most popular across all ages, with a significantly higher ratio seen in the divorced / separated (11.2%) than in the unmarried (5.4%) and the married (5.7%). The widowed were not included in the analysis due to the small sample size.

iii. Satisfaction with mobile phone voice quality Q22

1. Overall analysis

On average, the respondents rated the mobile phone call quality 7.79 out of 10 (1 being the lowest and 10 being the highest) (N=1,238, the mobile phone users).

2. Comparative analysis

(1) Analysis on regional differences

When broken down by area, the surveyed in all areas rated the mobile phone call quality on average between seven and eight, with the highest score shown in Taoyuan, Hsinchu and Miaoli (7.97) and the lowest in Yilan, Hualien, and Taitung (7.49) (Table 9).

Table 9 Satisfaction with Mobile Phone Voice Quality (by Area)

Area	Average Score
Taipei City, New Taipei City, and Keelung	7.92
Taoyuan, Hsinchu, and Miaoli	7.97
Taichung, Changhua, and Nantou	7.56
Yunlin, Chiayi, and Tainan	7.71
Kaohsiung, Pingtung, and Penghu	7.69
Yilan, Hualien, and Taitung	7.49
Total Average	**7.79**

Source: Results from this research

(2) Analysis on basic differences

The one-way ANOVA suggests that satisfaction with mobile phone voice quality varied greatly with marital status.

When broken down by sex, male respondents rated the mobile phone call quality on average 7.74 and their female counterparts rated 7.83.

When broken down by age, the surveyed across all ages rated the mobile phone call quality higher than seven, with the highest seen in ages 16-25 (8.04) and the lowest in ages 46-55 (7.53).

When broken down by marital status, the unmarried rated the mobile phone call quality on average the highest (8.17), with the divorced / separated the lowest (6.61).

(3) Analysis on differences in social and economic status

The Chi-square test suggests that satisfaction with mobile phone voice quality varied greatly with education level, profession, and monthly income.

When broken down by education level, the surveyed of all educational levels rated the mobile phone call quality on average higher than seven, with the master's and post-graduate degree holders showing the highest (8.05) and those with elementary education and below the lowest (7.07).

When broken down by profession, those in the real estate industry rated the mobile phone call quality on average the highest (8.73), followed by those in the art / entertainment and recreation industries (8.54), those in the support service industry (8.38), students (8.2); while job seekers and those waiting to return to work gave the lowest (6.77), followed by those in other service industries (7.55), those in the public administration and national defense/mandatory social security sectors (7.56), and the retirees (7.61).

When broken down by income, those who earned NT30,000-NT39,999 rated the mobile phone call quality on average the highest (8.08); while those who earned NT40,000-NT49,999 gave the lowest (7.31).

iv. Satisfaction with 4G mobile internet speed Q23

1. Overall analysis

On average, the respondents rated the 4G mobile phone internet speeds 7.09 out of 10 (1 being the lowest and 10 being the highest) (N=790, those who use the internet with a mobile phone and hadn't switched to 5G).

2. Comparative analysis

(1) Analysis on regional differences

When broken down by area, the respondents in all areas rated the 4G mobile phone internet speeds on average higher than seven, with the highest score seen in Yilan, Hualien, and Taitung (7.28), except in Taichung, Changhua, and Nantou (6,86) and Kaohsiung, Pingtung, and Penghu (6.94) (Table 10).

Table 10 Satisfaction with 4G Mobile Internet Speeds (by Area)

Area	Average Score
Taipei City, New Taipei City, and Keelung	7.23
Taoyuan, Hsinchu, and Miaoli	7.09
Taichung, Changhua, and Nantou	6.86
Yunlin, Chiayi, and Tainan	7.12
Kaohsiung, Pingtung, and Penghu	6.94
Yilan, Hualien, and Taitung	7.28
Total Average	**7.09**

Source: Results from this research

(2) Analysis on basic differences

The one-way ANOVA suggests that satisfaction with 4G mobile internet speeds varied greatly with sex and marital status.

When broken down by sex, male respondents rated the 4G mobile phone internet speeds on average 6.91, lower than their female counterparts (7.24).

When broken down by age, all ages rated the 4G mobile phone internet speeds on average higher than seven, with ages 46-55 giving the highest (7.28), except ages 56-65 (6.86) and ages 66 and over (6.61).

When broken down by marital status, respondents in the unmarried (7.28) rated the 4G mobile phone internet speeds on average the highest and the married (6.96) the lowest. The widowed were not included in the analysis due to the small sample size.

(3) Analysis on differences in social and economic status

The one-way ANOVA suggests that satisfaction with 4G mobile internet speeds varied greatly with education level.

When broken down by education level, the surveyed across all education levels rated the 4G mobile phone internet speeds on average between seven and eight, with the highest in those with junior college education (7.26), except in those with elementary education and below (6.07) and those with senior high and higher vocational education (6.85).

v. Satisfaction with 4G Mobile Internet Coverage Q24

1. Overall analysis

On average, the respondents rated the 4G mobile internet coverage 7.13 out of 10 (1 being the lowest and 10 being the highest) (N=790, those use the internet with a mobile phone and hadn't switched to 5G).

2. Comparative analysis

(1) Analysis on regional differences

When broken down by area, the respondents in all areas rated the 4G mobile internet coverage higher than seven, with the highest score seen in Taipei City, New Taipei City, and Keelung (7.29), except in Taichung, Changhua, and Nantou (6,83) and Yilan, Hualien, and Taitung (6.59) (Table 11).

Table 11 Satisfaction with 4G Mobile Phone Internet Coverage (by Area)

Area	Average Score
Taipei City, New Taipei City, and Keelung	7.29
Taoyuan, Hsinchu, and Miaoli	7.27
Taichung, Changhua, and Nantou	6.83
Yunlin, Chiayi, and Tainan	7.23
Kaohsiung, Pingtung, and Penghu	7.03
Yilan, Hualien, and Taitung	6.59
Total Average	**7.13**

Source: Results from this research

(2) Analysis on basic differences

The one-way ANOVA suggests that satisfaction with 4G mobile phone internet coverage varied greatly with age.

When broken down by sex, male respondents rated the 4G mobile internet coverage on average 7.16, higher than their female counterparts (7.1).

When broken down by age, respondents in all ages rated the 4G mobile internet coverage higher than seven, with ages 16-25 giving the highest (7.43), except in ages 26-35 (6.97) and ages 66 and over (6.61).

When broken down by marital status, the unmarried rated the 4G mobile internet coverage the highest (7.28), with the married rating the lowest (7.04). The widowed were not included in the analysis due to the small sample size.

(3) Analysis on differences in social and economic status

The one-way ANOVA suggests that satisfaction with 4G mobile phone internet coverage varied greatly with education level and profession.

When broken down by education level, the surveyed across all education levels rated the 4G mobile internet coverage on average between six and eight, with the highest in those with junior high education (7.34), except those with elementary education and below, who on average rated 5.74, significantly lower than other age groups.

When broken down by profession, those in the healthcare and social work services rated the 4G mobile internet coverage the highest (7.55), followed by students (7.53), those in the manufacturing industry (7.5) and those in the transportation and warehousing industries (7.49); while those in the wholesale and retail industries gave the lowest (6.27), followed by those in the public administration and national defense / mandatory social security sectors (6.69), those in the construction engineering industry (6.7) and the retirees (6.78).

vi. Satisfaction with 5G mobile internet speed Q25

1. Overall analysis

On average, the respondents rated the 5G mobile phone internet speeds 7.13 out of 10 (1 being the lowest and 10 being the highest) (N=299, those use the internet with a mobile phone and had switched to 5G).

2. Comparative analysis

(1) Analysis on regional differences

When broken down by area, the respondents in all areas rated the 5G mobile phone internet speeds on average higher than seven, with the highest score seen in Taipei City, New Taipei City, and Keelung (7.32), except in Kaohsiung, Pingtung, and Penghu (6.64) (Table 12).

Table 12 Satisfaction with 5G mobile internet speed (by Area)

Area	Average Score
Taipei City, New Taipei City, and Keelung	7.32
Taoyuan, Hsinchu, and Miaoli	7.17
Taichung, Changhua, and Nantou	7.31
Yunlin, Chiayi, and Tainan	7.04
Kaohsiung, Pingtung, and Penghu	6.64
Yilan, Hualien, and Taitung	7.06
Total Average	**7.13**

Source: Results from this research

(2) Analysis on basic differences

The one-way ANOVA suggests that satisfaction with 5G mobile internet speeds varied greatly with age.

When broken down by sex, male respondents rated the 5G mobile phone internet speeds 6.98, lower than their female counterparts (7.31).

When broken down by age, respondents across all ages rated the 5G mobile phone internet speeds higher than seven, with ages 26-35 giving the highest (7.52), except in ages 16-25 (6.69) and ages 46-55 (6.44).

When broken down by marital status, the unmarried rated the 5G mobile phone internet speeds the highest (7.2), with the divorced / separated the lowest (6.94). The widowed were not included in the analysis due to the small sample size.

(3) Analysis on differences in social and economic status

The one-way ANOVA suggests that satisfaction with 5G mobile internet speeds varied greatly with residential status.

When broken down by residential status, house renters rated the 5G mobile phone internet speeds (7.32) higher than house owners (7.1).

vii. Satisfaction with 5G Mobile Phone Internet Coverage Q26

1. Overall analysis

On average, the respondents rated the 5G mobile internet coverage 6.74 out of 10 (1 being the lowest and 10 being the highest) (N=299, those use the internet with a mobile phone and had switched to 5G).

2. Comparative analysis

(1) Analysis on regional differences

When asked to rate the 5G mobile internet coverage, the interviewees in Taipei City, New Taipei City, and Keelung and Taoyuan, Hsinchu, and Miaoli gave on average the highest score (6.8), with those in Yilan, Hualien, and Taitung the lowest (6.28) (Table 13).

Table 13 Satisfaction with 5G Mobile Phone Internet Coverage (by Area)

Area	Average Score
Taipei City, New Taipei City, and Keelung	6.80
Taoyuan, Hsinchu, and Miaoli	6.80
Taichung, Changhua, and Nantou	6.76
Yunlin, Chiayi, and Tainan	6.77
Kaohsiung, Pingtung, and Penghu	6.57
Yilan, Hualien, and Taitung	6.28
Total Average	**6.74**

Source: Results from this research

(2) Analysis on basic differences

The one-way ANOVA suggests that satisfaction with 5G mobile phone internet coverage varied greatly with gender.

When broken down by sex, male respondents rated 5G mobile phone internet coverage on average 6.35, significantly lower than their female counterparts (7.23).

When broken down by age, ages 66 and over rated 5G mobile phone internet coverage on average the highest (7.32), with ages 46-55 the lowest (6.02).

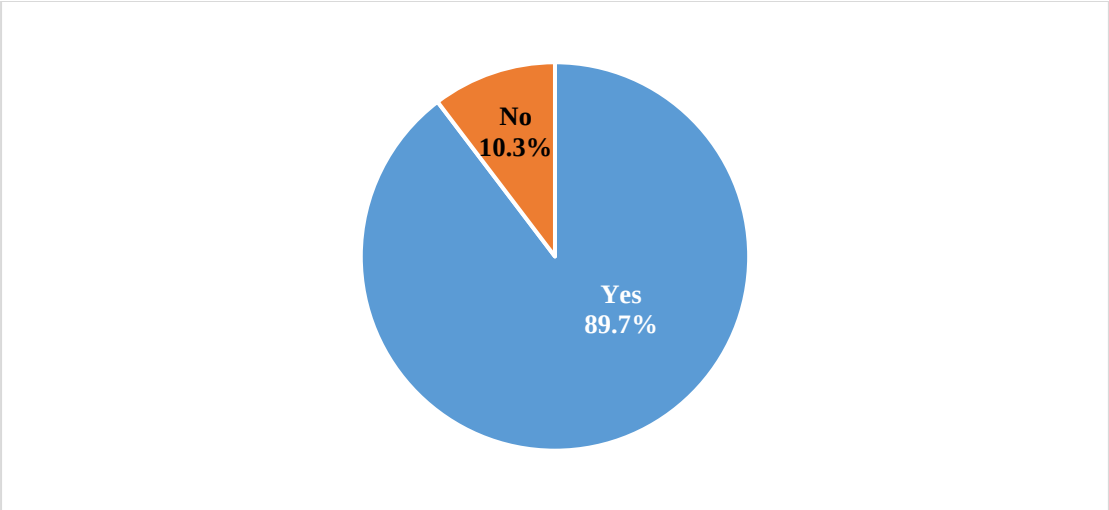
When broken down by marital status, the unmarried rated 5G mobile phone internet coverage the highest, 6.87, with the divorced / separated the lowest, 6.19. The widowed were not included in the analysis due to the small sample size.

V. Fixed Broadband Internet Usage

i. Internet Access at Home Q27

1. Overall analysis

Those who can access the internet (including fixed and mobile internet) at home accounted for 89.7% of the surveyed, significantly outnumbering those who cannot (10.3%).



Base: N=1,309, single-choice.

Figure 8 Internet Access at Home

2. Comparative analysis

(1) Analysis on regional differences

The Chi-square test suggests that the internet access at home varied greatly by area.

According to the cross analysis, it was found that the vast majority (over 90%) of the surveyed in all areas can access the internet at home, with the highest ratio seen in Taoyuan, Hsinchu, and Miaoli (93.5%), followed by Taipei City, New Taipei City, and Keelung (92.1%), and the lowest in Kaohsiung, Pingtung, and Penghu (85.1%).

(2) Analysis on basic differences

The Chi-square test suggests that the internet access at home varied greatly with age.

When broken down by sex, most male (90.6%) and female (88.7%) respondents can access the internet at home.

When broken down by age, most respondents in all ages can access the internet at home, with the highest ratio seen in ages 36-45 (99.3%). The ratios in ages 56-65

(88.9%) and ages 66 and over (61.8%) were significantly lower ratios than in ages 55 and below (over 90%).

When broken down by marital status, most of the respondents in all marital statuses can access the internet at home, with the highest ratio shown in the unmarried (96.1) and the lowest (87.3%) in the married, except in the widowed, where most respondents cannot access the internet at home (50.7%).

(3) Analysis on differences in social and economic status

The Chi-square test suggests that the internet access at home varied greatly with education level and monthly income.

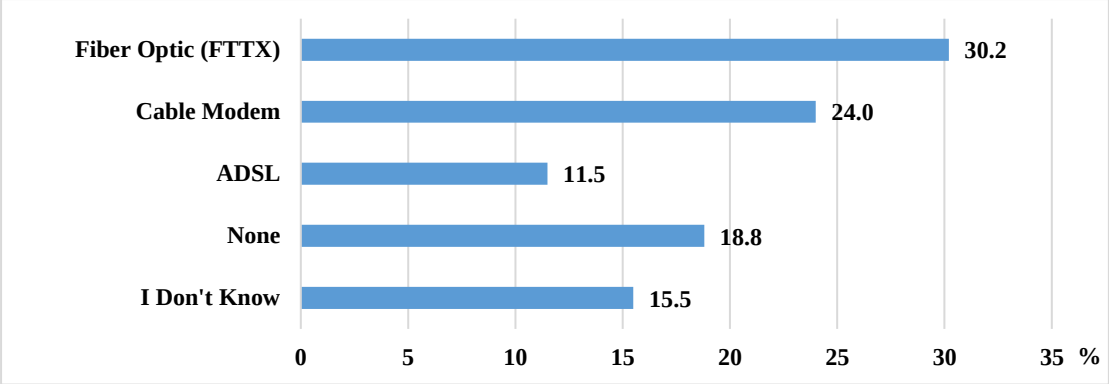
When broken down by education level, the ratio of those who could access the internet at home increased with education. Most respondents in all education levels can access the internet at home, with the highest ratio seen in master's and post-graduate degree holders (99.3%), except those with elementary education and below (59.5%), most of whom cannot access the internet at home. In addition, the ratios all exceeded 90% in all education levels, except those with junior high education (84.8%).

When broken down by monthly income, those who can access the internet at home accounted for the majority of the surveyed in all income levels and the ratio increased with income, with the ratio in those earning less than NT20,000 significantly lower than in the rest (over 90%). The highest ratio was seen in those earning NT$60,000 and more (98.4%) and the lowest in those earning less than NT$10,000 (59.7%).

ii. Fixed Internet Connection at Home Q28

1. Overall analysis

When asked if they subscribe to the fixed internet at home, 65.8% of the respondents replied affirmatively, with FTTX (30.2%) as the predominant connection, followed by cable modem (24%), with ADSL (11.5%) as the least common; while those who do not subscribe to fixed internet at home accounted for 18.8% (Figure 9).



Base: N=1,174, single-choice (Those who can access the internet at home)

Figure 9 Fixed Internet Connection at Home

2. Comparative analysis

(1) Analysis on regional differences

The Chi-square test suggests that the use of fixed internet at home varied greatly by area.

The cross analysis suggests that over 60% of respondents across all areas subscribe to fixed internet at home and FTTX (30.2%) was the most common connection in most areas, with the highest ratio seen in Yilan, Hualien, and Taitung (34.2%) and the lowest in Taipei City, New Taipei City, and Keelung (30%), except in Taoyuan, Hsinchu, and Miaoli, where cable modem (30.2%) accounted for the largest share.

(2) Analysis on basic differences

The Chi-square test suggests that the use of fixed internet at home varied greatly with gender and age.

When broken down by sex, fixed home internet subscribers accounted for the majority of both male (70.4%) and female (61.1%) respondents, with FTTX as the most common connection among male (35%) and female (25.5%) respondents.

When broken down by age, fixed home internet subscribers accounted for approximately 70% of respondents in all ages, except in ages 16-25 (55.6%) and ages 66 and over (47.6%), with the answer “I Don’t Know” representing significantly lower percentages. When asked about the type of internet connection used, most respondents across all ages answered FTTX, with the highest ratio seen in ages 36-45 (35.7%) and the lowest in ages 66 and over (20.5%), except in ages 56-65, where most respondents in all ages answered cable modem.

When broken down by marital status, fixed home internet subscribers accounted for over 60% of respondents across all marital statuses, except in the widowed, where "I Don't Know" answers (59.9%) represented a significantly higher ratio than in the rest. When asked about the type of internet connection used at home, most respondents in the unmarried (31.4%) and the married (30.7%) answered FTTX; while most respondents in the divorced / separated (49.9%) and the widowed (23.7%) said cable modem.

(3) Analysis on differences in social and economic status

The Chi-square test suggests that the use of fixed internet at home varied greatly with education level and income.

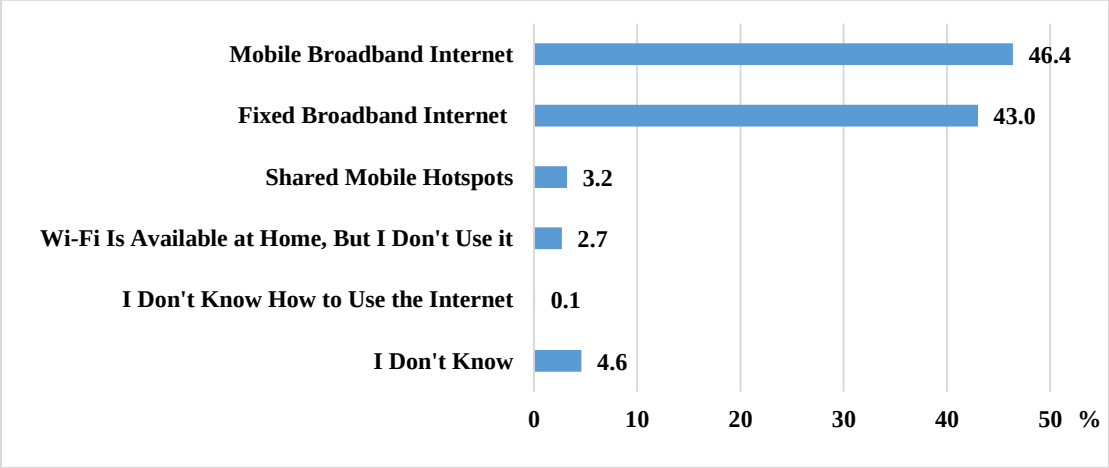
When broken down by education level, fixed home internet subscribers accounted for over 60% of the surveyed in all education levels, except in those with elementary education and below (39.4%) and those with senior high and higher educational education (59.4%). In addition, those who were unsure of the answer (59.9%) represented a significantly higher ratio in those with elementary education and below than in the rest. When asked about the type of internet connection used at home, most respondents in all education levels answered FTTX, with the highest proportion in those with junior college education (37.1%) and the lowest in those with senior high and higher vocational education (27.7%), except in those with elementary education and below (14.7%) and those with junior high education (36.1%), where cable modem users accounted for the largest share.

When broken down by monthly income, fixed internet subscribers accounted for the majority across all income levels with the ratio generally increasing with income. A significantly higher ratio was found in those earning more than NT$20,000 (higher than 60%) and "I Don't Know" answers represented a significantly higher ratio in those earning less than NT$20,000. When asked about the type of internet connection used at home, respondents of all incomes levels answered FTTX, with the highest ratio seen in those earning more than NT60,000 (37.5%) and the lowest in those with no income (24.7%), except in those earning less than NT10,000 (23.9%), where cable modem was the most common.

iii. Most Common Form of Internet Access at Home Q29

1. Overall analysis

Ubiquitous mobile broadband services in Taiwan allow people to access the internet via mobile broadband internet and shared mobile hotspots in addition to fixed broadband. According to the survey results, the most used form of internet (4G, 5G) connection was mobile broadband internet (46.4%), followed by fixed broadband internet (43%), and shared mobile hotspots (3.2%) (Figure 10).



Base: N=1,174, single-choice (Those who can access the internet at home)

Figure 10 Most Common Form of Internet Access at Home

2. Comparative analysis

(1) Analysis on regional differences

The cross analysis suggests that mobile broadband internet was the most common among respondents in all areas with the highest ratio found in Kaohsiung, Pingtung, and Penghu (53.2%) and the lowest in Yunlin, Chiayi, and Tainan (46%), except in Taipei City, New Taipei City, and Keelung (45.1%) and Taoyuan, Hsinchu, and Miaoli (47.9%), where fixed broadband was the most popular.

(2) Analysis on basic differences

The Chi-square test suggests that the use of fixed broadband at home varied greatly with gender and age.

When broken down by sex, most male respondents (46.4%) access the internet via fixed broadband internet; while most female respondents (49.4%) access the internet via mobile broadband internet.

When asked about the internet connection, respondents across all ages access the internet via mobile broadband, with the highest ratio seen in ages 36-45 (50%) and the

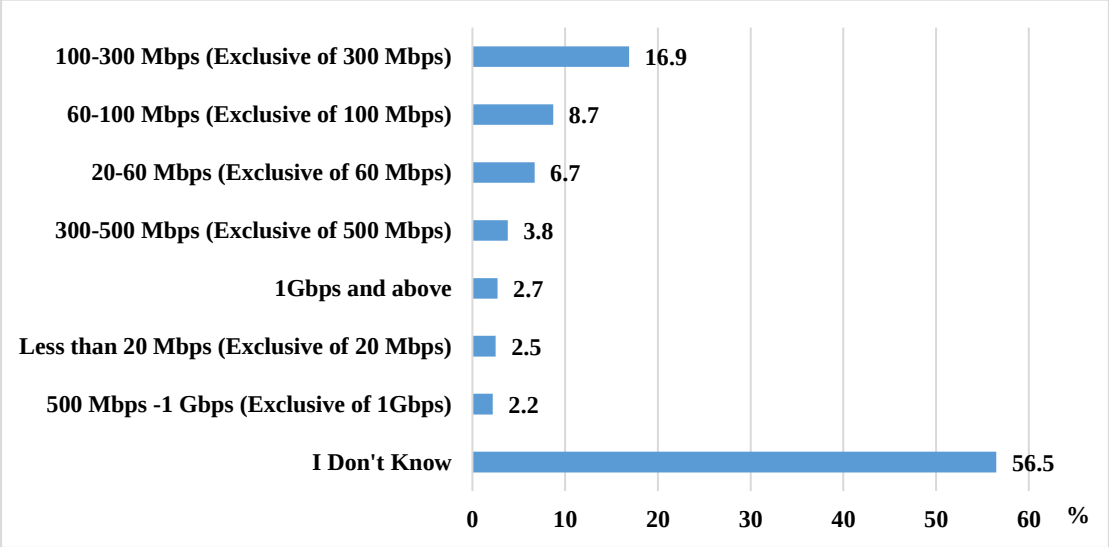
lowest in ages 66 and over (42.9%), except in ages 26-35 (47.6%) and ages 56-65 (47.2%), where most respondents access the internet via fixed broadband.

When broken down by marital status, most of the unmarried (47.3%) and the divorced / separated (50.9%) access the internet via fixed broadband, most of the married (48.7%) via mobile broadband, and most of the widowed (43.2%) answered "Wi-Fi Is Available at Home, But I Don't Use it."

iv. Fixed Home Broadband Speeds Q33

1. Overall analysis

When asked about the fixed home broadband speed, up to 56.5% of respondents were unsure of the speed, 16.9% replied 100-300 Mbps (exclusive of 300 Mbps) and 8.7% said 60-100 Mbps (exclusive of 100 Mbps) (Figure 11).



Base: N=953, single-choice (Those who subscribe to fixed broadband at home)

Figure 11 (Download) Speed of Fixed Broadband at Home

2. Comparative analysis

(1) Analysis on regional differences

According to the cross analysis, it was found that most respondents in all areas were unsure of the speed of the fixed home broadband, with the highest proportion seen in Kaohsiung, Pingtung, Penghu (65.2%) and the lowest in Taoyuan, Hsinchu, and Miaoli (47.9%). Among those who were aware of the speed, most respondents across all areas answered 100-300 Mbps (exclusive of 300 Mbps), with the highest ratio seen in Taoyuan, Hsinchu, and Miaoli (20.9%) and the lowest in Kaohsiung, Pingtung, and Penghu (9.8%), except in Yilan, Hualien, and Taitung, where most people claimed they

had 1 Gbps and above (8.7%).

(2) Analysis on basic differences

The Chi-square test suggests that the speed of fixed home broadband varied greatly with gender.

When broken down by sex, most males (47.6%) and females (65.4%) were unsure of the speed of the fixed home broadband. Among those who knew their fixed broadband speed, males (18.2%) and females (15.5%) answered 100-300 Mbps (exclusive of 300 Mbps).

When broken down by age, most respondents in all ages were unsure of the speed of the fixed home broadband, with the highest ratio found in ages 66 and over (84.8%) and the lowest in ages 36-45 (46.1%). Among those who know their fixed broadband speed, most respondents in all ages answered 100-300 Mbps (exclusive of 300 Mbps), with the highest ratio found in ages 36-45 (24%) and the lowest in ages 56-65 (12.2%), except in ages 66 and over.

When asked about the speed of the fixed broadband at home, most respondents in all marital statuses were unsure of the speed of the fixed home broadband, with the highest ratio found in the widowed (90.1%) and the lowest in the unmarried (50.5%). Among those who know their fixed broadband speed, most of the unmarried (18.9%) and the married (16.5%) answered 100-300 Mbps (exclusive of 300 Mbps), most of the divorced / separated (12.8%) replied 20-60 Mbps (exclusive of 60 Mbps), and the majority of the widowed (6.2%) replied 60-100 Mbps (exclusive of 100 Mbps).

v. Satisfaction with Fixed Broadband Speeds at Home Q34

1. Overall analysis

On average, the respondents rated the fixed broadband speed 7.12 out of 10 (1 being the lowest and 10 being the highest) (N=953, those who subscribe to fixed home broadband).

2. Comparative analysis

(1) Analysis on regional differences

When broken down by area, Taipei City, New Taipei City, and Keelung rated the fixed broadband speed the highest (7.4), with Taoyuan, Hsinchu, and Miaoli the lowest (6.76) (Table 14).

Table 14 Satisfaction with Fixed Home Broadband Speeds (Area)

Area	Average Score
Taipei City, New Taipei City, and Keelung	7.40
Taoyuan, Hsinchu, and Miaoli	6.76
Taichung, Changhua, and Nantou	6.93
Yunlin, Chiayi, and Tainan	7.02
Kaohsiung, Pingtung, and Penghu	7.33
Yilan, Hualien, and Taitung	7.02
Total Average	**7.12**

Source: Results from this research

(2) Analysis on basic differences

When broken down by sex, male respondents rated the fixed broadband speed on average 7.15, slightly higher than their female counterparts (7.09).

When broken down by age, respondents across all ages rated the fixed broadband speed on average greater than seven, with the highest (7.28) shown in ages 16-25, except ages 56-65 (6.99) and ages 66 and over (6.92).

When broken down by marital status, the widowed rated the fixed broadband speed the highest (7.56), with the divorced / separated the lowest (6.3).

vi. Fixed Home Broadband Bill per Month Q35

1. Overall analysis

The respondents pay, on average, NT853 for the fixed home broadband bill per month (N=953, those who subscribe to fixed home broadband).

2. Comparative analysis

(1) Analysis on regional differences

When broken down by area, the surveyed in Taoyuan, Hsinchu, and Miaoli pay on average the most (NT$990) for the fixed broadband bill per month, with those in Taipei City, New Taipei City, and Keelung paying the least (NT$787) (Table 15).

Table 15 Fixed Home Broadband Bill per Month (by area)

Unit: NT Dollar

Area	Average Amount
Taipei City, New Taipei City, and Keelung	787
Taoyuan, Hsinchu, and Miaoli	858
Taichung, Changhua, and Nantou	871
Yunlin, Chiayi, and Tainan	909
Kaohsiung, Pingtung, and Penghu	880
Yilan, Hualien, and Taitung	990
Total Average	**853**

Source: Results from this research

(2) Analysis on basic differences

The one-way ANOVA suggests that the monthly fixed broadband internet bill varied greatly with gender.

When broken down by sex, male respondents pay on average NT$887 for fixed home broadband bill, higher than their female counterparts at NT$814.

When broken down by age, ages 36-45 pay on average the most (NT$932) for fixed home broadband bill among all age groups, with ages 56-65 paying the least (NT$784).

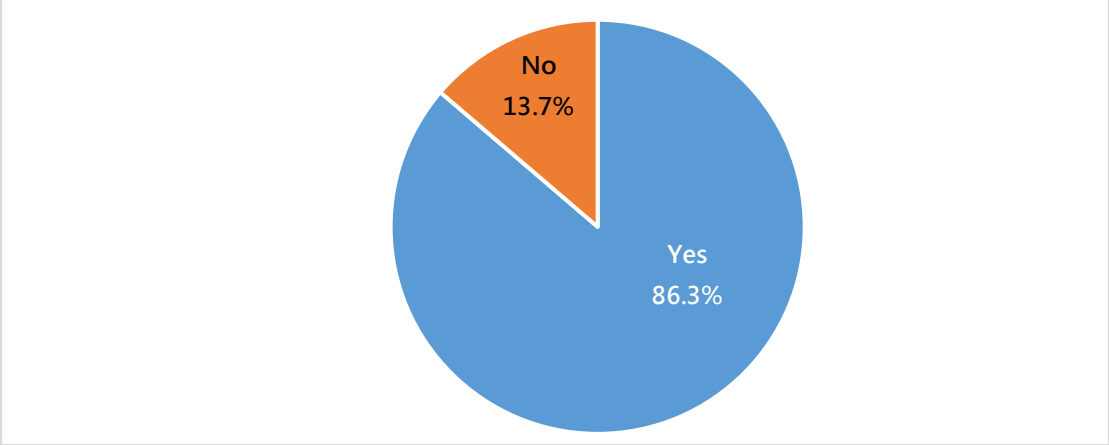
When broken down by marital status, the unmarried pay on average the most (NT$905) for fixed home broadband bill, and the widowed the least (NT$814).

VI. Internet Usage

i. Internet Usage Q36

1. Overall analysis

When asked about the internet use (including social media and instant messengers), 86.3% of those surveyed replied affirmatively; while 13.7% replied negatively (Figure 12).



Base: N=1,309, single-choice.

Figure 12 Internet Usage

2. Comparative analysis

(1) Analysis on regional differences

The cross analysis suggests that most of the interviewees across all areas use the internet, with the highest rate found in Taoyuan, Hsinchu, and Miaoli (89.1%) and the lowest in Kaohsiung, Pingtung, and Penghu (82.4%).

(2) Analysis on basic differences

The Chi-square test suggests that internet use varied greatly with age.

When broken down by sex, male respondents showed a higher rate (88%) to use the internet than their female counterparts (84.6%).

When broken down by age, the internet use decreased with age. Internet users represented the largest shares in all ages, except in ages 66 and over, where non-internet users accounted for the majority (53.1%), and represented over 90% in ages under 55, with the highest percentage shown in ages 26-35 (99.2%), and represented 86% in ages 56-65.

When broken down by marital status, most of the respondents in all marital statuses use the internet, with the highest ratio seen in the unmarried (97.1) and the lowest in the married (82%), except in the widowed, where most respondents do not use the internet (82.7%).

(3) Analysis on differences in social and economic status

The Chi-square test suggests that internet use varied greatly with one's education level, and monthly income.

When broken down by education level, most of the respondents across all education levels use the internet and the ratio increased with education level, with the

highest percentage seen in master's and post-graduate degree holders (99.3%) and the lowest in those with junior high education (74%), except in those with elementary education and below, where non-internet users (75.4%) accounted for the majority.

When broken down by monthly income, internet users accounted for the majority across all income levels, with a significantly smaller ratio seen in those earning less than NT$20,000. The highest ratio was seen in those earning NT$40,000-49,999 (98%) and the lowest in those earning less than NT$10,000 (55.8%).

ii. Time spent on the internet Q37

1. Overall analysis

Those surveyed spend on average a total of 36.53 hours on the internet every week (N=1,129, those who use the internet).

2. Comparative analysis

(1) Analysis on regional differences

The one-way ANOVA suggests that the average time spent online every week varied greatly with area.

The cross analysis suggests that the surveyed in all areas spend on average more than 30 hours on the internet, with the most time seen in Taipei City, New Taipei City, and Keelung (40.73 hours), except in Yilan, Hualien, and Taitung (28.47 hours) (Table 16).

Table 16 Time Spent Online per Week (by Area)

Unit: Hour

Area	Average Hours
Taipei City, New Taipei City, and Keelung	40.73
Taoyuan, Hsinchu, and Miaoli	36.08
Taichung, Changhua, and Nantou	32.86
Yunlin, Chiayi, and Tainan	32.90
Kaohsiung, Pingtung, and Penghu	38.53
Yilan, Hualien, and Taitung	28.47
Total Average	**36.53**

Source: Results from this research

(2) Analysis on basic differences

The one-way ANOVA suggests that the average time spent online every week varied greatly with age and marital status.

When broken down by sex, female respondents spend on average 36.71 hours on the internet per week, slightly more than their male counterparts (36.36 hours).

When broken down by age, the time spent online decreased with age. Respondents in all ages spend on average more than 30 hours online per week, with the ages 16-25 showing the most time (47.45 hours), except the ages 56-65 (19.41 hours) and the ages 66 and over (25.01 hours).

When broken down by marital status, the unmarried spend on average the most time (44.42 hours) on the internet and the married counterparts spend the least (30.66 hours). The widowed were not included in the analysis due to the small sample size.

(3) Analysis on differences in social and economic status

The one-way ANOVA suggests that the average time spent online every week varied greatly with residential status, education level, and profession.

When broken down by residential status, house renters (41.98 hours) spend more time on the internet than house owners (34.83 hours).

When broken down by education level, the time spent online each week by the surveyed increased with education level, with master's and post-graduate degree holders spending the most time (42.74 hours) and those with elementary education and below the least (14.76 hours).

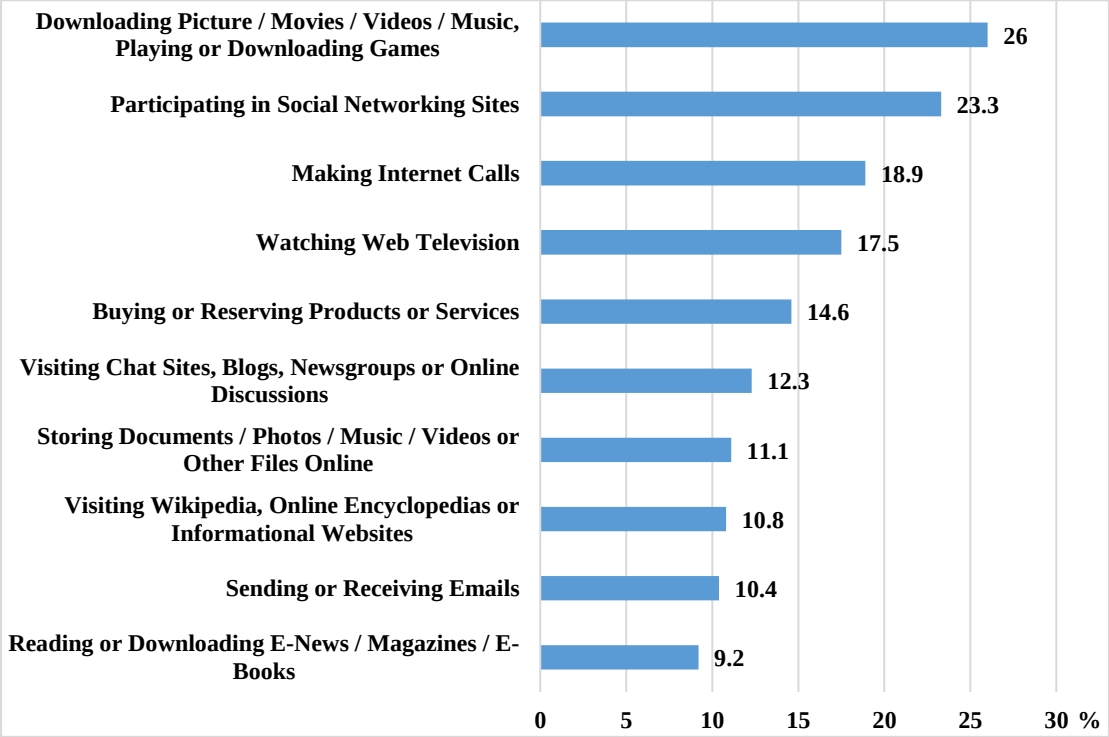
When broken down by profession, those in the art / entertainment and recreation industries (66.14 hours) spend the most time on the internet, followed by those in the real estate industry (62.35 hours), the education industry (48.31 hours), students (47.79 hours); while those in the agricultural / forestry / fishery / husbandry industries (13.43 hours) spend the least time, followed by the retirees (18.43 hours), housekeepers (31.13 hours), and those in the manufacturing industry (32.95 hours).

iii. Online Activities over the Last Three Months Q39

1. Overall analysis

When asked about the online activities over the last three months, most respondents answered "Downloading Pictures / Movies / Videos / Music, Playing or Downloading Games" (26%), followed by "Participating in Social Networking Sites" (23.3%), "Making Internet Calls" (18.9%), "Buying or Reserving Products or Services" (14.6%), "Visiting Chat Sites, Blogs, Newsgroups or Online Discussions" (12.3%), "Storing Documents / Photos / Music / Videos or Other Files Online" (11.1%), "Visiting Wikipedia, Online Encyclopedias or Informational Websites" (10.8%), "Sending or Receiving Emails" (10.4%), with the rest accounting for less than 10% each (Figure

13).



Base: Base: N=1,129, multiple answers allowed (Those who use the internet)

Figure 13 Online Activities over the past Three Months (Top 10)

2. Comparative analysis

(1) Analysis on regional differences

When broken down by area, most respondents in across areas said they had downloaded picture / movies / videos / music, playing or downloaded games in the past three months, except in Kaohsiung, Pingtung, and Penghu, where most respondents had participated in social networking sites (25.1%). The answer "Participating in Social Networking Sites" ranked the second in all areas except in Kaohsiung, Pingtung, and Penghu, where "Downloading Pictures / Movies / Videos / Music, Playing or Downloading Games" (20.7%) ranked the second largest share. The answer "Making Internet Calls" ranked third in all areas except in Taichung, Changhua, and Nantou, where the answer "Buying or Reserving Products or Services" (18.4%) ranked third, and Yilan, Hualien, and Taitung, where the answers "Making Internet Calls" (16.2%) and "Buying or Reserving Products or Services" (16.2%) tied for third.

(2) Analysis on basic differences

When broken down by sex, the top two answers by both male and female respondents were "Downloading Pictures / Movies / Videos / Music, Playing or

Downloading Games" (27.1% by males; 24.9% by females) and "Participating in Social Networking Sites" (22.7% by males; 24% by females) respectively, followed by "Making Internet Calls" (19.3%) among males and "Buying or Reserving Products or Services" (18.5%) among females.

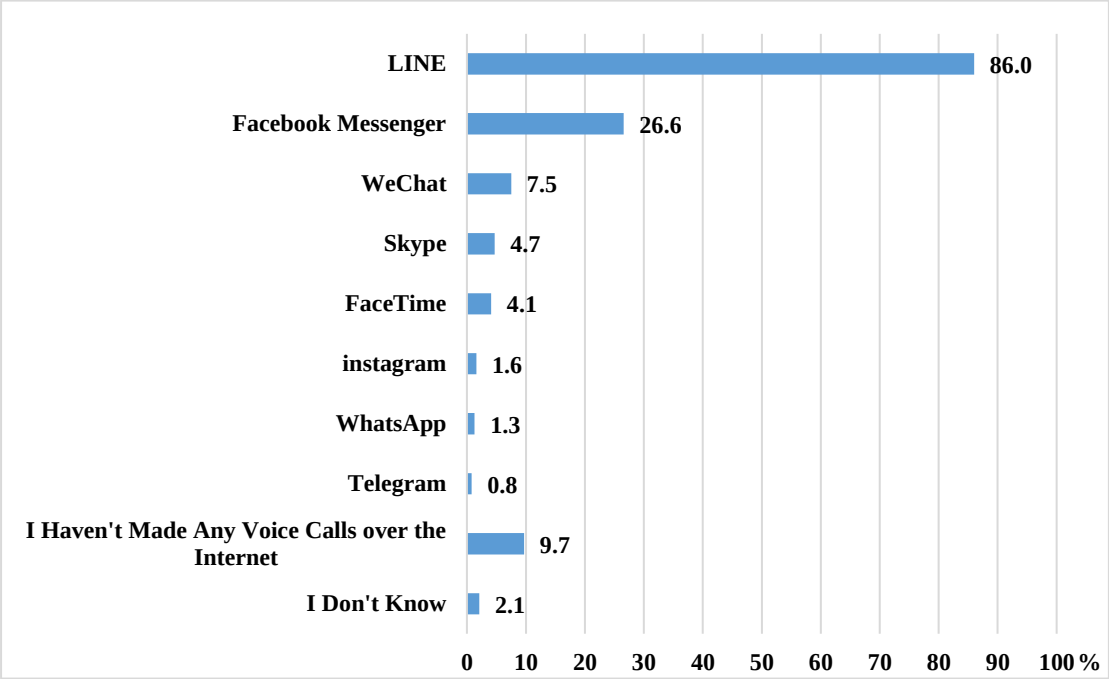
When broken down by age, the ratio of "Downloading Pictures / Movies / Videos / Music, Playing or Downloading Games" answers decreased with age; while the ratio of "Making Internet Calls" answers increased with age. The answer "Downloading Pictures / Movies / Videos / Music, Playing or Downloading Games" topped the list in ages 16-25 (38.4%), ages 26-35 (33.1%), and ages 36-45 (27.7%), the answer "Participating in Social Networking Sites" topped the list in ages 56-55 (26.7%) and "Making Internet Calls" topped the list in ages 56-65 (24.4%) and ages 66 and over (21.6%). The second most common answers were "Participating in Social Networking Sites" in ages 16-25 (23.8%), ages 26-35 (24.9%), ages 36-45 (23%), and ages 56-65 (23.9%), "Downloading Pictures / Movies / Videos / Music, Playing or Downloading Games" in ages 46-55 (21.4%), and "Storing Documents / Photos / Music / Videos or Other Files Online" in ages 66 and over (13.9%) respectively. And the third most common answers were "Making Internet Calls" in ages 26-35 (18.6%), ages 36-45 (18.6%), and ages 46-55 (15%), and "Storing Documents / Photos / Music / Videos or Other Files Online" in ages 16-25, "Downloading Pictures / Movies / Videos / Music, Playing or Downloading Games" in ages 56-65 (20%), and "Participating in Social Networking Sites" in ages 66 and over (13%) respectively.

When broken down by marital status, the top three answers in the unmarried and the married were "Downloading Pictures / Movies / Videos / Music, Playing or Downloading Games" (the unmarried: 34.3%; the married: 21.7%), "Participating in Social Networking Sites" (the unmarried: 26.5%; the married: 21%), and "Making Internet Calls" (the unmarried: 18.6%; the married: 18%) respectively. The top three answers in the divorced / separated were "Making Internet Calls" (32.7%), "Participating in Social Networking Sites" (26.9%), and "Visiting Chat Sites, Blogs, Newsgroups or Online Discussions" (23.5%). The widowed were not included in the analysis due to the small sample size.

iv. Internet Call Apps Q40

1. Overall analysis

When asked about the internet call applications they had used, most respondents said they had used LINE (86%), followed by Facebook Messenger (26.6%), with the remaining internet call applications accounting for less than 10% each, and those who had not used any internet calls application representing 9.7% (Figure 14).



Base: N=1,129, multiple answers allowed (Those who use the internet)

Figure 14 Internet Call Applications (Top 10)

2. Comparative analysis

(1) Analysis on regional differences

The cross analysis suggests that when asked about the internet call application they had used, over 80% of respondents across all areas said they had used LINE, with the highest ratio found in Taichung, Changhua, and Nantou (91.4%) and the lowest in Yunlin, Chiayi, and Tainan (81%), followed by Facebook Messenger at around twenty to thirty percent.

(2) Analysis on basic differences

When broken down by sex, most male (84.3%) and female (87.6%) respondents said they had used LINE, followed by Facebook Messenger at 26.2% and 27% respectively.

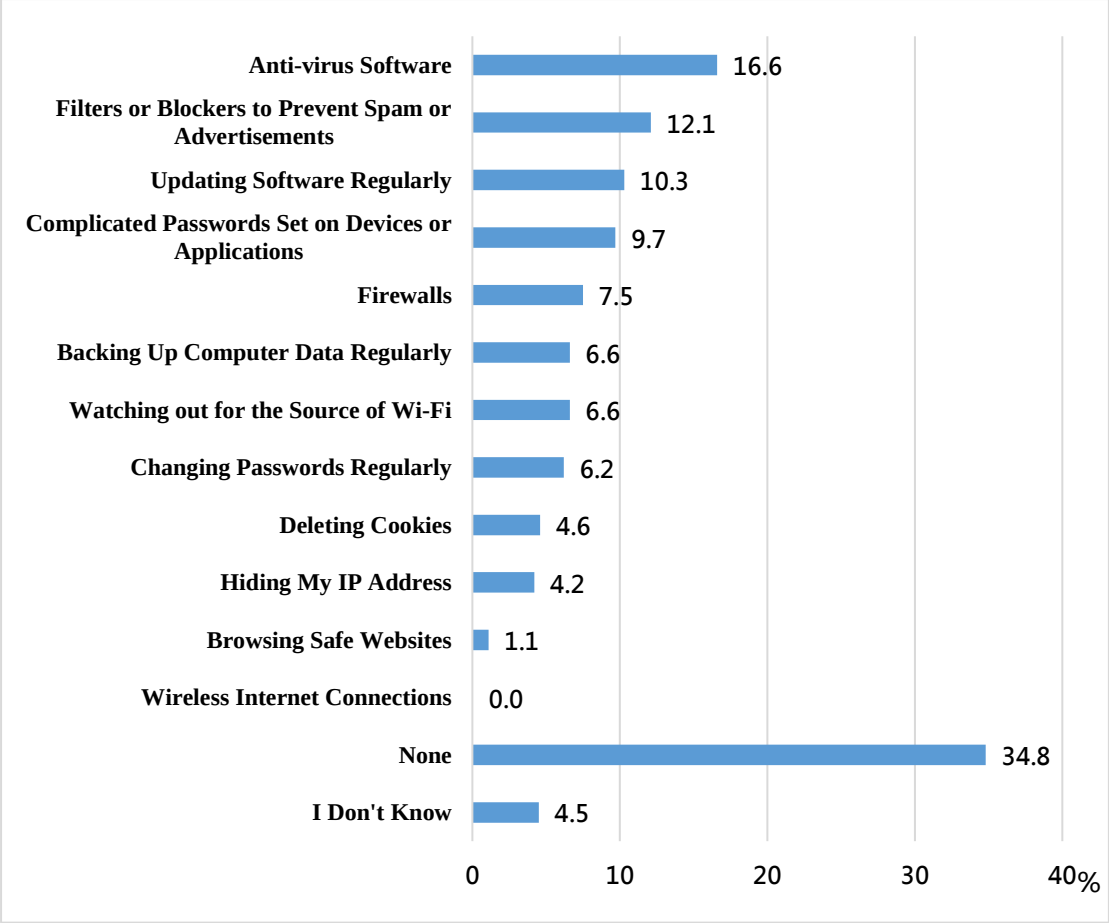
When broken down by age, most respondents across all ages said they had used LINE, followed by Facebook Messenger, with the ratio generally decreasing with age. “LINE” answers accounted for the largest share in ages 26-35 (93.5%) and the smallest in ages 56-65 (76%); “Facebook Messenger” answers constituted the largest share in ages 16-25 (45.7%) and the smallest in ages 66 and over (11.4%). In addition, the ratio of those who had not used any internet calls services over the internet increased with age.

When broken down by marital status, most respondents in all marital statuses said they had used LINE, followed by “Facebook Messenger” answers, with the highest ratios shown in the unmarried (LINE: 90.4%; Facebook Messenger: 34.2%) and the lowest in the divorced / separated (LINE: 71%; Facebook Messenger: 11.3%). And, those who had not used any internet calls services represented a significantly higher ratio in the divorced / separated (29%) than in the rest. The widowed were not included in the analysis due to the small sample size.

v. Measures Taken for Internet Security Q42

1. Overall analysis

When asked about the measures taken to protect internet security, most of the surveyed said anti-virus software (16.6%), followed by filters or blockers to prevent spam or advertisements (12.1%), updating software regularly (10.3%), and complicated passwords set on devices or applications (including emails, social media, third-party payment software) (9.7%); while 34.8% said they did not take any actions (Figure 15).



Base: N=1,129, multiple answers allowed (Those who use the internet)

Figure 15 Internet Security Measures

2. Comparative analysis

(1) Analysis on regional differences

The cross analysis suggests that when it comes to the internet security measures, those adopting anti-virus software accounted for the majority in all areas, with the highest ratio seen in Taoyuan, Hsinchu, and Miaoli (22.3%) and the lowest in Taipei City, New Taipei City, and Keelung (14.5%), except in Taichung, Changhua, and Nantou, where those who adopt filters or blockers to prevent spam or advertisements (17.6%) accounted for the largest share, and Yilan, Hualien, and Taitung, where those who update software regularly (17.9%) accounted for the largest share.

(2) Analysis on basic differences

When broken down by sex, most male (18%) and female (15.2%) respondents protect online security with anti-virus software followed by filters or blockers (male: 10.9%; female: 13.3%), and updating software regularly (male: 9.9%; female: 10.6%), while 37.6% and 32% of men and women take no action.

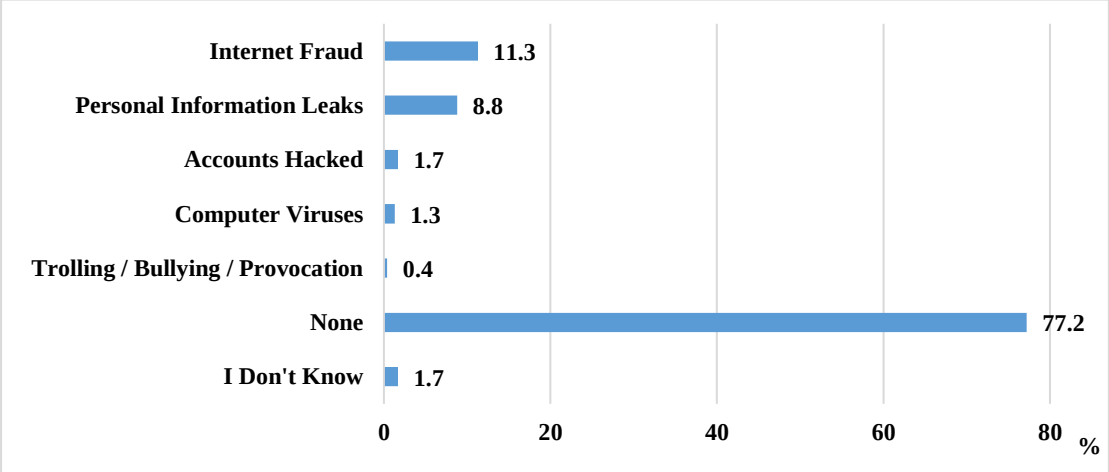
When broken down by age, most respondents in all ages said they protect online security with anti-virus software, with the highest ratio seen in ages 46-55 (18.4%) and the lowest in ages 56-65 (11.3%), followed by filters or blockers, with the ratios ranging between 12% and 16% among respondents across all ages, except in ages 56-65 (7.7%) and ages 66 and over (7.1%), where the answer updating software regularly ranked the second. In addition, the ratios of those who take no action increased with age, with the highest ratio seen in ages 56-65 (46.2%) and the lowest in ages 16-25 (28.6%).

When broken down by marital status, most respondents in the unmarried (19.9%) and the married (14.9%) replied that they use anti-virus software, most respondents in the divorced / separated (12.9%) answered updating software regularly. The second most common answers were filters or blockers in the unmarried (14.6%) and the married (11.1%), and anti-virus software (8.7%) in the divorced / separated; while those taking no action accounted for a significantly higher ratio in the divorced / separated (49.9%). The widowed were not included in the analysis due to the small sample size.

vi. Issues Encountered Online over the past Twelve Months Q43

1. Overall analysis

When asked about the issues encountered online during the past twelve months, most respondents said they had encountered no issue (77.2%). Among the issues encountered, most respondents (11.3%) answered “Internet Fraud”, followed by “Personal Information Leaks” (8.8%) (Figure 16).



Base: N=1,129, multiple answers allowed (Those who use the internet)

Figure 16 Issues Encountered Online over the past Twelve Months

2. Comparative analysis

(1) Analysis on regional differences

The cross analysis suggests that when asked about the issues encountered online during the past twelve months, most respondents across all areas said they had not encountered any, with the highest ratio seen in Yunlin, Chiayi, and Tainan (83.3%) and the lowest in Yilan, Hualien, and Taitung (68.9%). Among the issues encountered, most of the surveyed in all areas said "Internet Fraud," with the highest ratio seen in Yilan, Hualien, and Taitung (16.5%) and the lowest in Taoyuan, Hsinchu, and Miaoli (10%), except in Yunlin, Chiayi, and Tainan, where "Personal Information Leaks" answers represented the largest share (8.5%).

(2) Analysis on basic differences

When it comes to the issue encountered online in the past 12 months, most male (78.5%) and female (75.8%) respondents said they had not encountered any issue during the past 12 months. Among the issues encountered, most male respondents said they had encountered "Internet Fraud" (12.7%), followed by "Personal Information Leaks" (7.3%); while most female respondents said they had encountered "Personal Information Leaks" (10.3%), followed by "Internet Fraud" (9.9%).

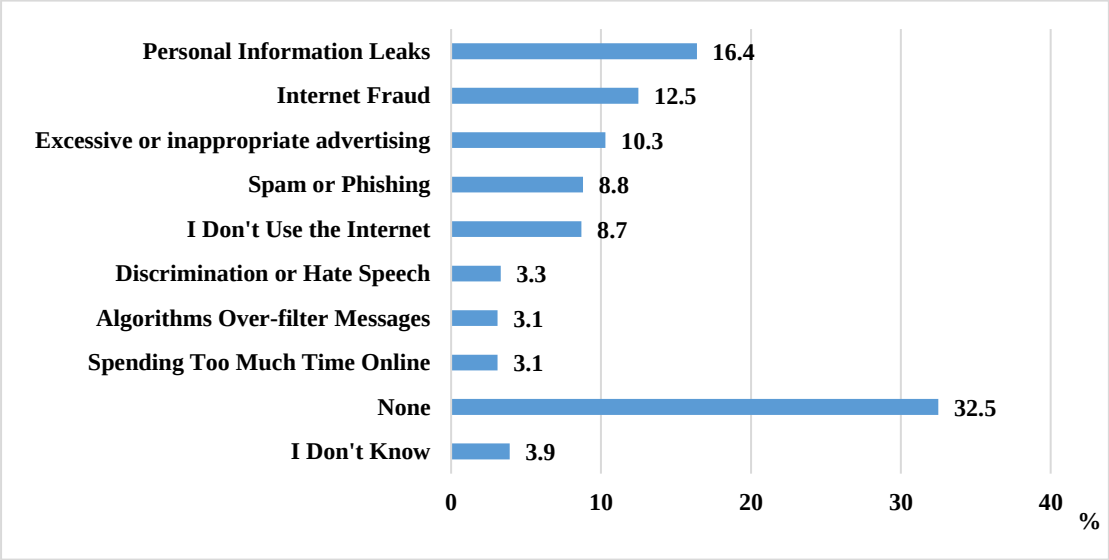
When broken down by age, over seventy percent of the respondents across all ages said they had not encountered any issues online, with the highest proportion seen in ages 66 and over (86.2%) and the lowest in ages 26-35 (71.7%). Among the issues encountered, most respondents in all ages answered "Internet Fraud," with the highest ratio seen in ages 36-45 (13.8%) and the lowest in ages 66 and over (7%), except in ages 16-25 (8.2%) and ages 26-35 (16.2%), where "Personal Information Leaks" answers represented the largest share.

When broken down by marital status, over seventy percent of the respondents in all marital statuses said they had not encountered any issues online, with the highest ratio seen in the divorced / separated (78.1%) and the lowest in the married (77%). Among the issues encountered, most respondents in the unmarried (10.7%) and the divorced / separated (17%) said they had encountered "Personal Information Leaks," and most respondents in the married (12.9%) said "Internet Fraud." The widowed were not included in the analysis due to the small sample size.

vii. Concerns about Internet use Q44

1. Overall analysis

When asked about the concerns about going online, most respondents (16.4%) said they were concerned about "Personal Information Leaks / "Identity Theft," followed by "Internet Fraud" (12.5%), and "Excessive or inappropriate advertising" (10.3%). In addition, approximately 32.5% replied "None" (Figure 17).



Base: N=1,309, Multiple-choice

Figure 17 Concerns about Internet Use (Top 10)

2. Comparative analysis

(1) Analysis on regional differences

The cross analysis suggests that when asked about the concerns about going online, most respondents across all areas answered they had no concern, with the highest ratio seen in Taipei City, New Taipei City, and Keelung (34.6%) and the lowest in Yilan, Hualien, and Taitung (27.1%). Among those with concerns, "Personal Information Leaks" answers outnumbered the rest in all areas, with the highest percentage seen in Taipei City, New Taipei City, and Keelung (19.9%) and the lowest in Yilan, Hualien, and Taitung (13.7%), except in Taoyuan, Hsinchu, and Miaoli (16.8%) and Taichung, Changhua, and Nantou (12.9%), where "Internet Fraud" answers topped the list.

(2) Analysis on basic differences

When broken down by sex, most male (35%) and female (30.2%) respondents in all areas said they had no concerns about going online. Among those with concerns, most males replied "Excessive or inappropriate advertising" (13.1%), followed by

“Internet Fraud” (12.9%) and “Personal Information Leaks / Identity Theft” (12.9%); while most females replied that they were concerned about “Personal Information Leaks / Identity Theft” (19.8%), followed by “Internet Fraud” (12.2%).

When broken down by age, most respondents across all ages said they had no concern about going online, with the highest ratio in ages 16-25 (41.7%) and the lowest in ages 56-65 (26.8%). Among those with concerns, most respondents in ages 16-25 (14.8%) are concerned about “Excessive or inappropriate advertising,” those in ages 26-35 (22.3%) ages 36-45 (18.9%), and ages 46-55 (19.3%) are concerned about “Personal Information Leaks / Identity Theft,” and those in ages 56-55 (18.9%) and ages 66 and over (9%) are concerned about “Internet Fraud.” In addition, non-internet users (30%) accounted for a significantly higher ratio in ages 66 and over than in the rest.

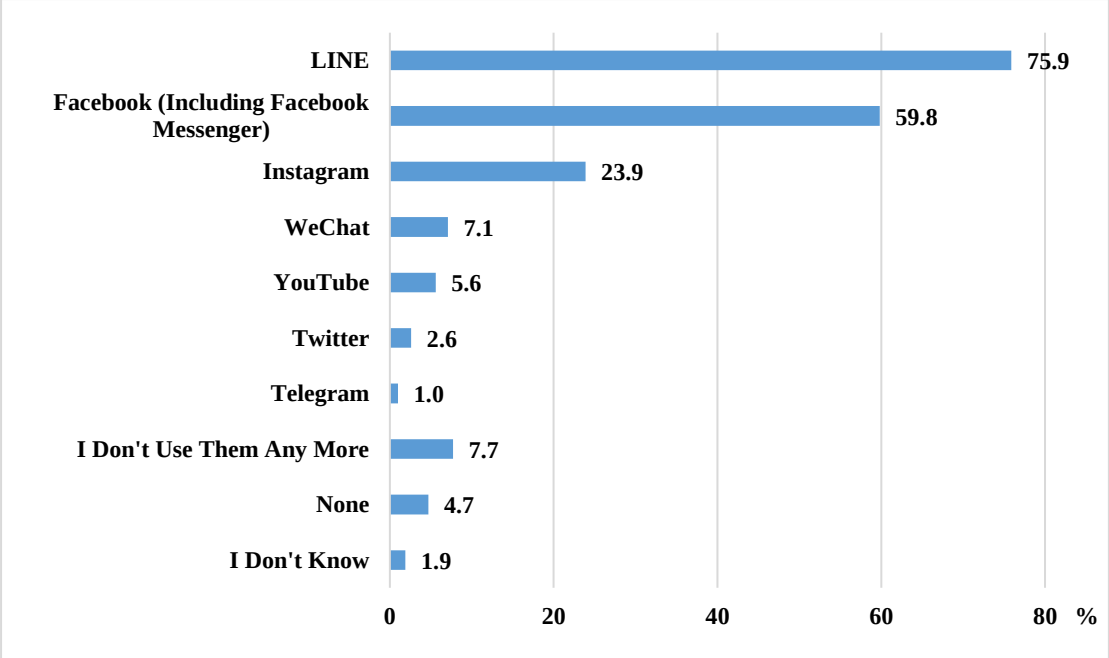
When broken down by marital status, most respondents in all marital statuses said they had no concern about going online, with the highest ratio seen in the divorced / separated (36%) and the lowest in the widowed (19.8%). Among those with concerns, “Personal Information Leaks / Identity Theft” topped the list among the unmarried (18.1%), the married (24.1%), and the divorced / separated (24.1%), with “Internet Fraud” answers accounting for the largest share in the widowed (8.1%). In addition, non-internet users (51.1%) accounted for a significantly higher ratio in the widowed than in the rest.

VII. Social Media

i. Active Social Media or App Accounts Q45

1. Overall analysis

When asked about active social media or app accounts, most respondents (75.9%) said LINE, followed by Facebook (Facebook Messenger) (59.8%) and Instagram (23.9%) (Figure 18).



Base: N=1,129, multiple answers allowed (Those who use the internet)

Figure 18 Active Social Media or App Accounts (Top 10)

2. Comparative analysis

(1) Analysis on regional differences

The cross analysis suggests that when asked about active social media or app accounts, most respondents across all areas answered LINE, with the highest ratio seen in Yunlin, Chiayi, and Tainan (80.7%) and the lowest in Yilan, Hualien, and Taitung (68.4%). In addition, “Facebook” answers ranked the second in all areas with the ratios ranging between fifty to seventy percent.

(2) Analysis on basic differences

When broken down by sex, most male (76.5%) and female (75.4%) respondents said they had a LINE account, followed by “Facebook” at 60.5% and 59.1% respectively.

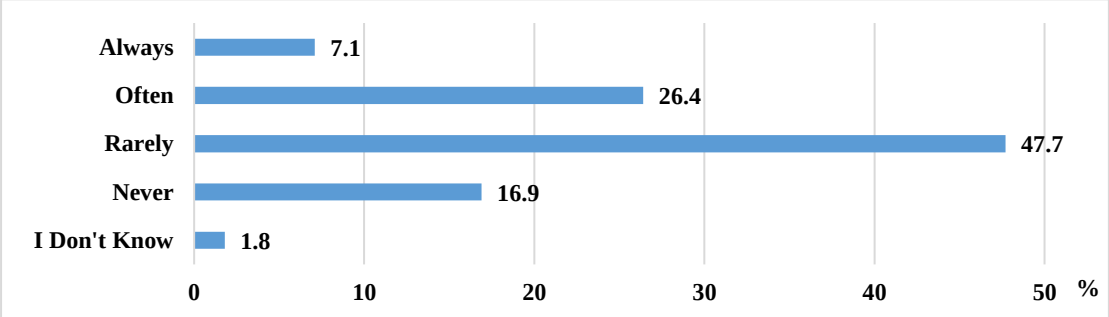
When broken down by age, most respondents across all areas said they had a LINE account, with the highest ratio seen in ages 46-55 (82.2%) and the lowest in ages 66 and over (53.7%), except in ages 16-25, where most respondents own a Facebook (76.3%) account. Also, the ratios of those who own an active Facebook, LINE, Instagram, YouTube, or Twitter account generally decreased with age, with those who do not or never have an active social media accounting significantly higher ratios in ages 56-65 and ages 66 and over than in the rest.

When broken down by marital status, over sixty percent of respondents in all marital statuses said they had a LINE account, with the highest ratio in the unmarried (77.6%) and the lowest in the divorced / separated (60.9%); while “Facebook” and “Instagram” account owners accounted for significantly higher ratios in the unmarried than in the married and the divorced / separated. The widowed were not included in the analysis due to the small sample size.

ii. Frequency of Offensive or Inappropriate Content Seen on Social Media or Instant Messaging Q46

1. Overall analysis

Over eighty percent (81.2%) of the surveyed said they had always, often or rarely seen offensive or inappropriate content on social media or instant messaging during the past twelve months, and only 16.9% said they had never (Figure 19).



Base: N=968, single-choice (Those who have any active social media or instant messenger account)

Figure 19 Frequency of Offensive or Inappropriate Content on Social Media or Instant Messaging over the past Twelve Months

2. Comparative analysis

(1) Analysis on regional differences

The cross analysis suggests that when asked about the frequency of offensive or inappropriate content seen on social media or instant messaging during the past twelve months, the majority of respondents in all areas replied “Rarely,” with the highest proportion seen in Yilan, Hualien, and Taitung (63.7%) and the lowest in Taichung, Changhua, and Nantou (43.8%).

(2) Analysis on basic differences

The Chi-square test suggests that the frequency of offensive or inappropriate content seen on social media or instant messaging during the past twelve months varied greatly with age.

When broken down by sex, most male (47.8%) and female (47.7%) respondents said they had rarely seen offensive or inappropriate content on social media or instant messaging during the past twelve months, but the answers "Always" (7.3%) and "Often" (27.6%) made up larger ratios in females than in males (7% and 25.2% respectively); while "Never" answers constituted a larger percentage among males (17.4%) than among females (16.5%).

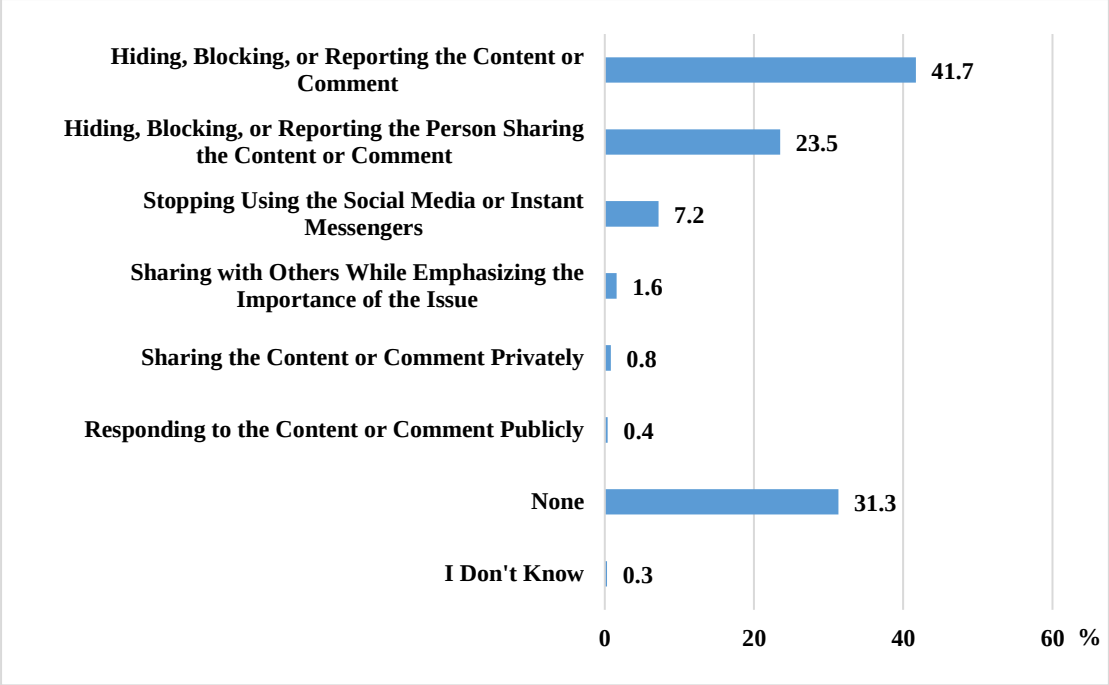
When broken down by age, most respondents across all ages said they had rarely spotted offensive or inappropriate content on social media or instant messenger during the past 12 months, with the highest proportion seen in ages 16 -25 (62.5%) and the lowest in ages 46-55 (43.4%), except in ages 66 and over, where most respondents answered "Never" (31.3%).

When broken down by marital status, the majority of those in all marital statuses said they had rarely seen offensive or inappropriate content on social media or instant messaging during the past twelve months, with the highest proportion in the unmarried (52.7%) and the lowest in the married (43.9%). The widowed were not included in the analysis due to the small sample size.

iii. Actions When Encountering Offensive or Inappropriate Content Q47

1. Overall analysis

When it comes to the action taken when spotting content they found offensive or inappropriate, most respondents said they had hidden, blocked, or reported the content or comment (41.7%), followed by those "Hiding, Blocking, or Reporting the Person Sharing the Content or Comment" (23.5%). In addition, those taking no action accounted for approximately 31.3% (Figure 20).



Base: N=787, multiple choices allowed (Those who have watched content they found offensive or inappropriate on social media or instant messengers)

Figure 20 Actions When Encountering Offensive or Inappropriate Content

2. Comparative analysis

(1) Analysis on regional differences

The cross analysis suggests that when it comes to the actions taken when encountering offensive or inappropriate content, most respondents in all areas said they had hidden, blocked, or reported the content or comment, with the highest ratio seen in Taichung, Changhua, and Nantou (50%) and the lowest in Taipei City, New Taipei City, and Keelung (41.4%), except in Yilan, Hualien, and Taitung, where most respondents (36.8%) said they had taken no action, and in Kaohsiung, Pingtung, and Penghu, where those taking no action (33.6%) and those "Hiding, Blocking, or Reporting the Person Sharing the Content or Comment" (33.5%) representing similar proportions.

(2) Analysis on basic differences

When it comes to the action taken when encountering offensive or inappropriate content, most male (41.6%) and female (41.9%) respondents said they had hidden, blocked, or reported the content or comment, followed by those "Hiding, Blocking, or Reporting the Person Sharing the Content or Comment" (23.2% and 23.9% respectively), with those taking no action accounting for a higher ratio among males (33%) than among females (29.7%).

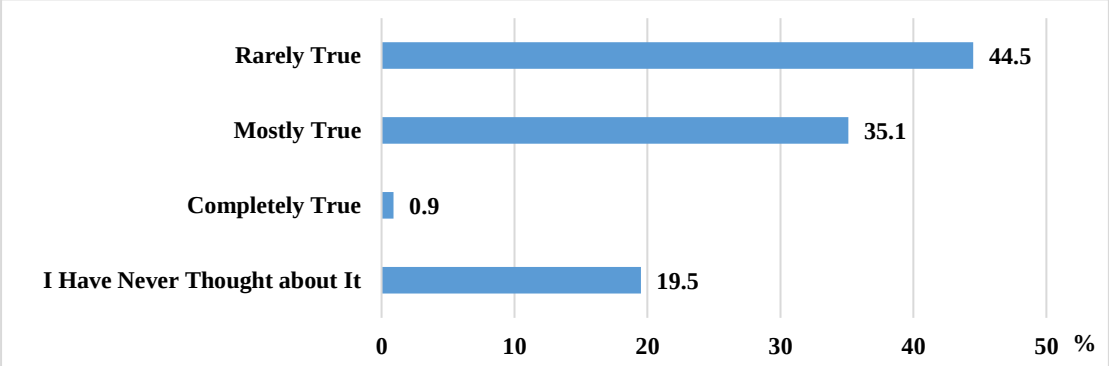
When broken down by age, most respondents in all ages said they had hidden, blocked, or reported the content or comment in all ages when spotting offensive or inappropriate content, with the highest proportion in ages 16 -25 (47.7%) and ages 46-55 (47.7%) and the lowest in ages 36-45 (40.6%), except in ages 56-65 and 66 and over, where those taking no action constituted the largest shares at 42.6% and 41.5% respectively.

When broken down by marital status, most respondents across all marital statuses said they had hidden, blocked, or reported the content or comment, with the highest ratio shown in the unmarried (44.4%) and the lowest in the divorced / separated (39.3%). The widowed were not included in the analysis due to the small sample size.

iv. Authenticity of the Content on Social Media or Instant Messaging Q48

1. Overall analysis

When it comes to the authenticity of the content seen on social media or instant messaging, most respondents said they thought it to be rarely true (44.5%), followed by those thinking it to be mostly true (35.1%), with 19.5% having never thought about it (Figure 21).



Base: N=968, single-choice (Those who have any active social media or instant messenger account)

Figure 21 Authenticity of the Content on Social Media or Instant Messaging

2. Comparative analysis

(1) Analysis on regional differences

The cross analysis suggests that when it comes to the authenticity of the content seen on social media or instant messaging, most respondents across all areas replied that they thought it to be rarely true, with the highest ratio seen in Taichung, Changhua,

and Nantou (51.3%) and the lowest in Taoyuan, Hsinchu, and Miaoli (39.6%), except in Kaohsiung, Pingtung, and Penghu, where the answers “Rarely True” (44%) and “Mostly True” (44%) were equally common.

(2) Analysis on basic differences

The Chi-square test suggests that one’s opinion on the authenticity of the content seen on social media or instant messaging varied greatly with age.

When broken down by sex, most male (42.7%) and female (46.4%) respondents think the content seen on social media or instant messaging to be rarely true, followed by those answering mostly true at 38.6% and 31.4% respectively.

When broken down by age, most respondents in all ages said they thought the content seen on social media or instant messaging to be rarely true, with the highest ratio seen in ages 36-45 (47.9%) and the lowest in ages 56-65 (40.7%), except in ages 16-25, where most (46.4%) thought it to be mostly true. The ratio of those who had never thought about it increased with age.

When broken down by marriage status, most respondents in the unmarried (44.1%) and the married (44.9%) said they thought the content seen on social media or instant messengers to be rarely true; while those who thought it to be mostly true represented the largest share among the divorced / separated (43.6%). The widowed were not included in the analysis due to the small sample size.

(3) Analysis on differences in social and economic status

The Chi-square test suggests that one’s opinion on the authenticity of the content seen on social media or instant messaging varied greatly with income.

When broken down by income, most respondents in all income levels said they thought the content seen on social media or instant messaging to be rarely true, with the highest ratio seen in those earning NT40,000-49,999 (50.7%) and the lowest in those with no income (32.6%), except in those earning NT10,000-NT19,999 and those earning NT50,000-59,999, where most thought it to be mostly true at 41.9% and 42.3% respectively, followed by those who thought it to be rarely true at 40.9% and 41.5% respectively.