Communications Market Report 2017

NATIONAL COMMUNICATIONS COMMISSION

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Foreword

The rapid development of information and communications technology is a key factor driving the digital economy. As such, the communications industry has become vital to the nation's overall economic development; consequently, how consumers use communications services is not only closely related to the business operations and technological development of the communications industry, but also has an expanding influence on many other industries. Facing developments such as diversified innovative internet applications, emerging services, and the transformation into a digital economy, relevant government authorities should be at the forefront leading with a suitably progressive approach. With view to achieving that objective, a survey of the communications industry was undertaken so as to gain understanding of national development and consumer behavior. Although previous surveys and analyses have tended to focus more on the supply side and less on the demand side, this survey report provides an in-depth analysis of both sides, based on the survey's results, have been included in this report so as to show an overall picture of the digital industry and the latest developments of the communications market in Taiwan.

Part 1: **Survey of Communications Industries towards Digital Convergence** begins with an outline of the background and research methods used in this survey. The questionnaire was designed with reference to how Ofcom, the communications regulator in the UK, conducts surveys and trends in the UK communications industry. With respect to sampling, a stratified three-stage probabilities proportional to size sampling was employed. In the first and second stages, samples were allocated based on the PPS principle; while in the third stage, samples were selected using convenience sampling and interviews to survey how Taiwanese people aged 16 and above use services in four categories: Communications, Television Broadcasting, Development of Convergence, and Broadband Usage. In addition to the methods and structure, limitations of the sampling structure, samples received and the sample reasoning of this survey are all clearly explained.

This survey research contains the results of surveys in the Teleommunications Market, Broadcasting Market, Broadband Usage and Digital Convergence. The four surveys all offer a general picture of consumer-behavior in Taiwan by presenting an overall analysis. Then, a cross analysis including region, gender, age and marriage status is shown to indicate the differences between groups in the communications market.

Telecommunications Market Survey Results highlights consumers' use of landline telephones by showing landline penetration of landline telephones and customer satisfaction with fees and quality. It also shows how subscribers to mobile communications in Taiwan use mobile phones (penetration of smart phones, the use of phone numbers, online and offline activities, satisfaction with the quality of phone service and internet connection) and mobile phone plans (phone bills, mobile phone plans selected, phone services and Internet plans). The final part of this chapter provides an outline of consumers in the communications market in Taiwan.

Broadcasting Market Survey Results focuses on consumer behavior of broadcasting media, radio and television. It begins with an introduction of the equipment people use to watch TV and listen to radio by describing the audio and visual media, and deals with whether cord-cutting occurs in Taiwan through the distribution of cable TV and MOD subscription. Then, a survey in consumer behaviors in the TV and radio sectors, including viewing times, type of programs, program quality, dependence on television broadcasting, and consumers perception of advertising on TV is presented. The chapter ends with a survey in public awareness of TV and radio program regulations, how they feel about various inappropriate contents and their attitude toward privacy so as to objectively present the preferences of viewers.

Broadband Usage Survey Results focuses on the behavior of internet users, and includes the perceived impacts, both positive and negative, the internet has on users. The report outlines habits and attitudes regarding internet use (equipment, security, self-confidence, connection, and concerns) and outline similar attitudes and concerns regarding the use of social media (accounts, sharing, privacy when posting), providing a greater understanding of online activity. Moreover, with e-commerce becoming fundamental to the digital economy, the survey shows people's interpretation of online information and online security measures conducted through information verification and security. The chapter ends with the impact of mobile phones on sleep and how people feel the internet affects their work and daily lives.

The chapter **Development of Convergence Survey Results** focuses on how people use the emerging internet media. Besides the understanding of the equipment and sources for viewing video at home, this section also highlights streaming, collaborative online platforms, as well as internet radio responding to the boom of video on demand in recent years. Since numerous new services for mobile terminals have been launched in response to the rapidly-changing mobile terminals, the government must truly understand how people use apps and mobile payments. The chapter ends with the perceived accuracy and objectivity of the news published by both traditional and new media, showing people's preferences when obtaining news.

Part 2 contains a comparison of the **Development and Trends of Convergence in the Communications Industry between Taiwan and Other Countries**. Through the comparison between Taiwan and other nations, international trends and global development in the communications industry and how Taiwan compares with these countries is shown. A comparison of policies of Taiwan and other countries is also presented so that future policies can be developed or existing policies can be amended based on the findings.

Last but not least, this report provides insight on the development and trends in Taiwan's communications industries from the perspective of both the supply and demand sides, with the results of surveys in the communications market, broadcasting market, broadband usage and the development of convergence all included.

I. Survey of Communications Industries towards Digital Convergence Development

METHODOLOGY

1. Questionnaire Design

The questionnaires used for this survey were adapted from research undertaken by the Office of Communications (Ofcom), the UK's communications regulator, which has surveyed consumer behavior and trends in the communications industry for many years. The survey, which covers the four categories of telecommunications, broadcasting, broadband usage, and digital convergence, was conducted with the objective of obtaining data on consumer behavior and preferences, as well as key developments and innovations in the digital economy so as to obtain a thorough analysis and comprehensive in-depth investigation of demand.

2. Population and Sampling Strategy

(1) Investigation Scope

The survey population consists of residents in Taiwan, excluding fugitives and those in institutions like military units, hospitals, nursing homes, schools, vocational training centers, dormitories, and prisons and was conducted on Taiwan proper (excluding Kinmen County and Lianjiang County).

The population for this survey consists of people aged 16 and above (those who were born on and before December 31, 2001).

(2) Sampling Method

Household registers from the Ministry of the Interior were unavailable due to the Personal Information Protection Act, and a limited budget meant that sampling was designed and performed in three stages according to the principle of PPS (probabilities proportional to size) sampling. In the first and second stages, samples were allocated based on the PPS principle, while in the third stage samples were selected using convenience sampling.

(3) Pilot Test

Prior to the formal survey, pilot tests were conducted. Thirty successful samples were taken in each of the four categories, a total of 120 successful samples. The original 7 levels were merged to 5 after the pretest[1].

1 *In the pilot study, the classifications established by Pei-jun Hou et al. (2008) were adopted as the basis for the stratified sampling. Villages, towns, cities and districts were grouped into seven levels based on the degree of development. The seven levels are city cores, commercial and industrial areas, emerging cities and townships, traditional industry townships, less-developed townships, aged townships and remote townships, with the last three levels– Levels 5, 6 and 7 – merged as one. The areas are defined as follows – North Area: Taipei City, New Taipei City, Keelung City, Taoyuan County, Hsinchu County and Hsinchu City, Miaoli County, Ilan County; Central*

(4) Formal Survey

Stratified three-stage PPS sampling was used in the formal survey to ensure that everyone in the population had a non-zero probability of being selected. 1,100 samples were expected to be completed in each of the four investigations. The stratified sampling was performed based on the demographic structure and economic variables of human ecology, with the 358 townships in Taiwan divided into 7 levels. For the sake of tractability in performing the survey, Levels 7 and 6, the least urbanized, were combined when implementing the sampling. The 6 levels were used as the structure of the sampling stratification in this survey[2].

The primary sample units were townships, and the second sample units were villages and village clusters. The last sample units were gathering places in the townships to set up an interview point. After the pilot tests, the demographic data in August 2017 provided by the Ministry of the Interior were used to identify the representative samples by examining the consistency in distribution of demographic characteristics between the selected individuals and the entire population. The examined items included: (1) gender, (2) age group, and (3) where the domicile is registered.

(5) Allocation of Samples

At least 1,100 valid samples were investigated in each questionnaire with a sampling error of within ± 3% at a 95% confidence level.

Table 1 Allocation of Samples

Geographic Strata	Column 1	People Aged 16 and Above	Proportion of Population (%)	Allocation of Samples
Taipei City, New Taipei City, Keelung, Ilan	Level 1	1,239,417	19.20	69
	Level 2	3,174,497	49.18	177
	Level 3	1,636,963	25.36	91
	Level 4	404,452	6.27	23
	Subtotal	6,455,329	32.71	360
Taoyuan, Hsinchu, Miaoli	Level 1	1,123,077	36.74	63
	Level 2	1,410,463	46.15	78
	Level 3	523,045	17.11	29
	Subtotal	3,056,585	15.49	170

Area: Taichung City, Changhua County, Nantou County, Yunlin County, Chiayi County, and Chiayi City; South Area: Tainan City, Kaohsiung City, Pingtung County. Interviews in Levels 1 and 2 focused on the North Area, interviews in Levels 3 and 4 focused on the South Area, while interviews in Level 5 focused on the Central Area.

2 *The classifications established by Peichun Hou et al. (2008), where villages, towns, cities and districts are grouped into seven levels based on the development, were adopted in the formal survey.*

Taichung, Changhua, Nantou	Level 1	897,458	23.18	50
	Level 2	1,260,111	32.55	70
	Level 3	1,274,413	32.92	71
	Level 4	439,835	11.36	25
	Subtotal	3,871,817	19.62	216
Yunlin, Chiayi, Tainan	Level 1	918,945	31.49	51
	Level 2	1,215,305	41.65	68
	Level 3	783,996	26.87	44
	Subtotal	2,918,246	14.79	163
Kaohsiung, Pingtung, Penghu	Level 1	858,291	29.01	48
	Level 2	983,770	33.25	55
	Level 3	1,116,511	37.74	62
	Subtotal	2,958,572	14.99	165
Hualien, Taitung	Level 1	252,539	52.97	14
	Level 2	224,240	47.03	13
	Subtotal	476,779	2.42	27
Total		19,737,328	100.00	1100

(6) Survey Period

The interviews took place in the selected areas between August 17 and October 5, 2017.

3. Implementation of Survey

(1) Timelines of Survey

Before the survey was formally launched, preparation for the questionnaires and related affairs were undertaken in July 2017. The pilot study was performed between July 27, 2017 and July 31, 2017. After the questionnaires were modified based on the conclusions from the meeting with the agency that commissioned this study, the formal survey proceeded on August 17, 2017 as shown below:

a. Preparation period: July 1 to July 31, 2017

b. Survey period: Stage 1, July 27 to July 31, 2017.
   Stage 2, August 17 to September 30, 2017.

c. Review period: October 1 to October 5, 2017

(2) Survey Method

Face-to-face interviews were employed in this research. A computer-assisted interview survey system was used during the interview, and was complemented with printed questionnaires.

4. Research Limitations

(1) Sample Structure Limitations

Due to the limitations of obtaining domicile information from the whole of Taiwan as a sample inventory, this study was unable to conduct an investigation into the mode of home visit and therefore adopted a survey on the selection of township population centers.

(2) Sample Recovery Restrictions

Since the questionnaire was quite technical, it was not easy for older respondents to understand. Even if the interviewer took more time and effort to repeat explanations, it remained challenging to increase willingness to be visited. Compared with the younger groups, there was a high probability that older respondents refused to be visited, or tended to refuse the visit halfway. Therefore, the percentage of successful respondents under the age of 55 in this survey by comparison is relatively high.

(3) Sample Inference Restrictions

As mentioned above, respondents who were willing to answer the questions make up the majority of people under age of 55, while the current population of Taiwanese people over the age of 55 accounts for about 32% of the total population. Therefore, after weighting, the weight of samples over the age of 55 has been enlarged 2.4 times. However, the opinions of elders beyond a certain age are more in line with the opinions of those who are familiar with new media. Even if the weights are increased, they can still reflect the overall opinion of the group.

The result of the power amplification is still reasonable. Although the team has endeavored to conduct the survey effectively, due to the limited time, the sample age control is still not perfect. Therefore, on the whole, the survey should be considered as an independent analysis.

RESULTS OF COMMUNICATIONS MARKET SURVEY

1. Telecommunications Market

- **Smartphone Usage Survey**

OVERALL ANALYSIS

93.5% of the respondents use smartphones, while only 5.8% use non-smartphones.

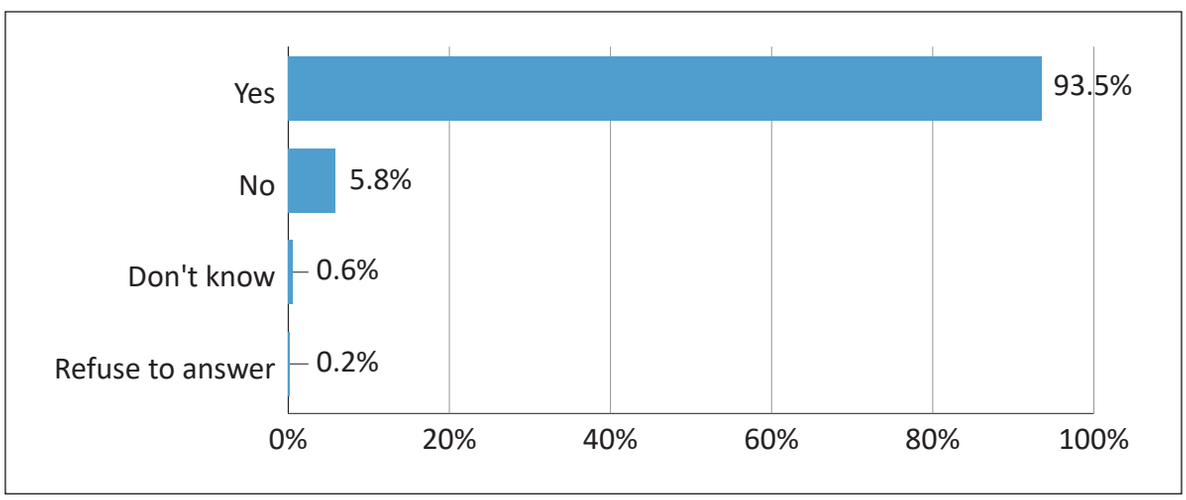

Figure 1: Smartphone Usage Survey Base: N = 1,093

COMPARATIVE ANALYSIS

(1) Analysis of Regional Differences

Cross-sectional analysis suggests that smartphone users have the highest rate in all regions, higher than 90% in all regions except the east region, where the rate is 86.9%. The highest smartphone take-up rate is 95.2% in Kaohsiung, Pingtung and Penghu.

(2) Analysis on Basic Differences

The difference test analysis shows that whether people use smartphones is significantly related to gender and age.

When analyzed by gender, 95.4% of men use smartphones and 91.5% of women.

When analyzed by age, 83.7% aged 55 and over use smartphones and the figure was over 90% for the other age groups. For the 25-34 group use is 100%, followed by those aged 35-44 (98.7%) and 16-24 (98.6%).

When analyzed by marital status, smartphone users make up 98.5% of those unmarried, followed by those married (92.3%) and those widowed or separated (77.3%).

(3) Analysis of the Socio-economic Status Differences

The difference test analysis shows that whether people use smartphones or not is significantly related to average monthly personal income, residence and education level.

When analyzed by average monthly individual income, smartphone take-up was high among all groups, over 80%. The rate was 100% for those with a monthly income higher than NT$60,000, followed by 99.3% of those earning NT$30,000-NT$40,000 and 98.7% of those earning NT$40,000-NT$50,000.

When analyzed by residence, 94.4% of home owners use smartphones and 89.7% of tenants use smartphones.

When analyzed by education level, those with primary and lower education degree have the highest rate of non-smartphone use. For those with a master degree or similar, the rate was 100 %, followed by those with a university degree (98.3%) and college degree (97.2%).

- **The Most Frequently Used Mobile Internet Services Outside Home**

OVERALL ANALYSIS

The most frequently used mobile internet service for people outside their home was broadband, after the launch of 4G services, the take-up of 4G increased rapidly to 86.5%. Second was 3G service (7%). The rates of individuals using free Wi-Fi services provided by retail stores, government, PWLAN, etc, were less than 3%.

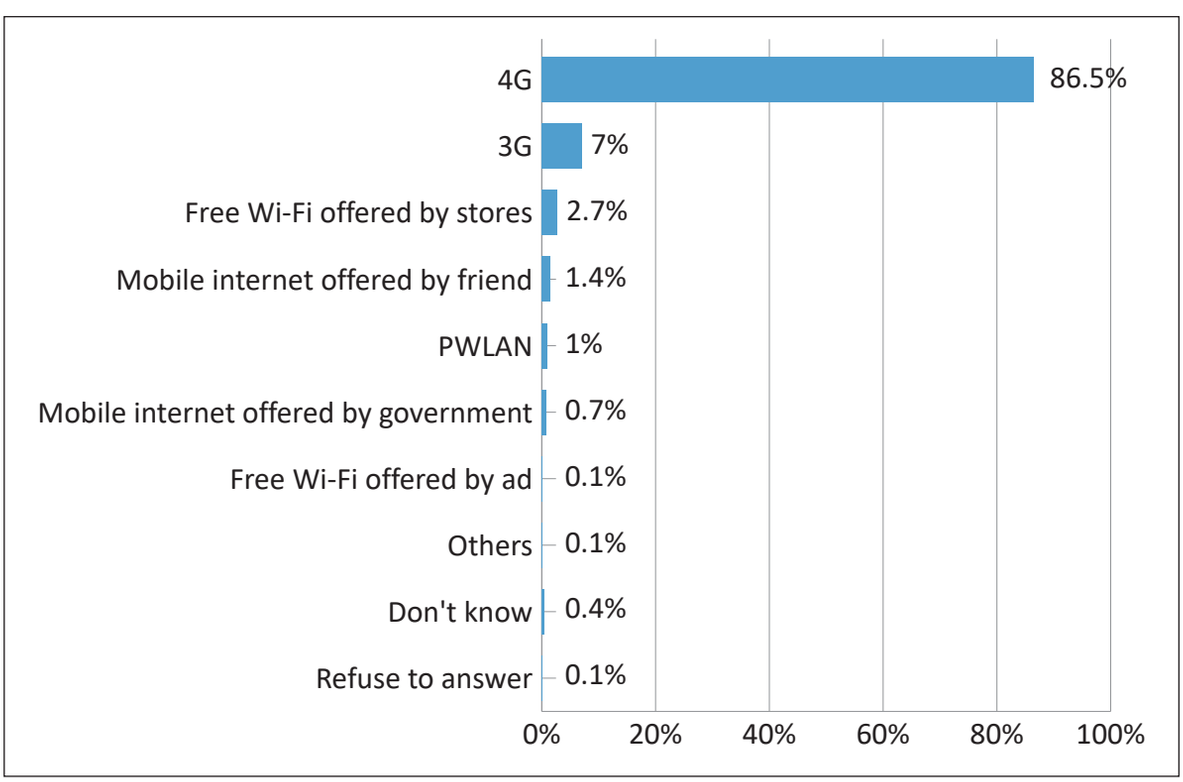

Figure 2: Most Frequently Used Mobile Internet Services Outside Home Base: N = 982

COMPARATIVE ANALYSIS

(1) Analysis of Regional Differences

Cross-sectional analysis suggests that take-up of 4G was over 80% in all regions. The highest rate was 90% in the north region (Taipei city, New Taipei City and Keelung), followed by 87.3% in the east region (Yilan, Hualien and Taitung). The highest rate of use for free Wi-Fi provided by stores was 5.3% in the central region (Taoyuan, Hsinchu and Miaoli). The highest rate of 3G service use was 12.6% in the south region (Yunlin, Chiayi and Tainan).

(2) Analysis on Basic Differences

When analyzed by gender, 86.6% of men use 4G services, higher than the percentage of women (86.4%). In contrast, more women (3.8%) than men (1.7%) use free Wi-Fi services provided by retail stores. 7.4% of men use 3G services, compared to 6.6% of women.

When analyzed by age, the take-up rate of 4G services was over 80% in all age groups. The highest take-up rate was 92% in the 25-34 age group, followed by 87.5% in 35-44 age group. 3.8% of those in the 35-44 age group use the free Wi-Fi services provided by retail stores, the highest of any age group. 10.3% of those in the 45-54 age group use 3G services, more than any other group.

Regardless of marital status, over 85% use 4G services. Widows/separated showed the highest take-up rate, 94.1%. The married group was the highest rate to use the free Wi-Fi services provided by stores (3.2%), as well as 3G services (8.6%).

- **Mobile Broadband Data Allowance Survey**

OVERALL ANALYSIS

Consumers in Taiwan have taken great advantage of unlimited data plans offered by telecom operators. Unlimited data plans (without speed limitation) have the highest take-up rate (49.5%), followed by unlimited data plans with unclear speed limitations (14.1%). Among the limited data allowance plans, the 1G-5G (5G excluded) plan was the highest with a take-up rate of 13.5%.

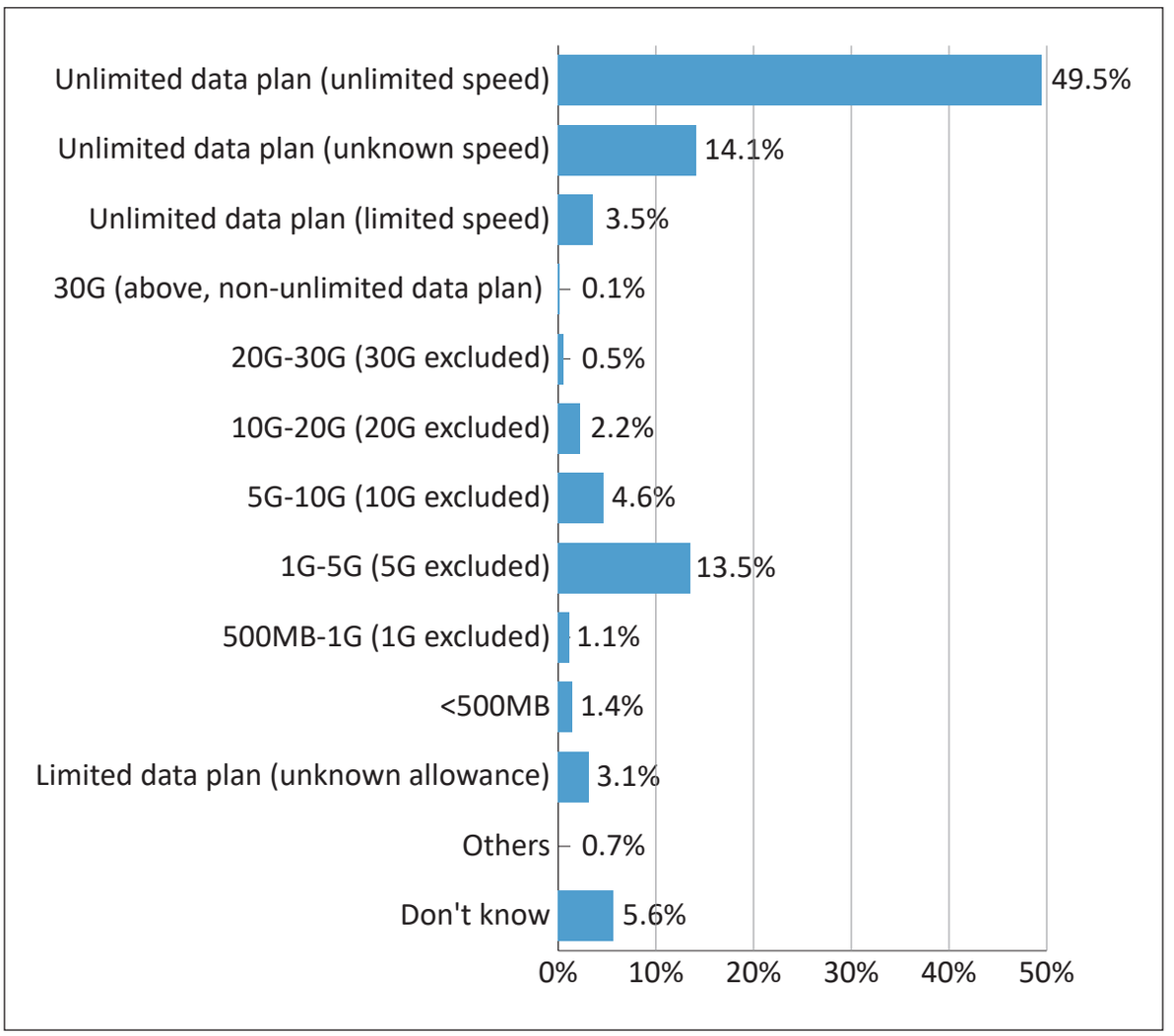

Figure 3: Plans of Mobile Broadband Data Allowance Base: N = 899

COMPARATIVE ANALYSIS

(1) Analysis of Regional Differences

Cross-sectional analysis suggests that unlimited data plans (without speed limitation) have the highest take-up rate in all regions (over 40%). Among them, the highest take-up rate (64.4%) was in the Ilan, Hualien, and Taitung region, followed by 62.5% in the Kaohsiung, Pingtung, and Penghu region. The 1G - 5G (5G excluded) plan was highest (23.8%) in the Taoyuan, Hsinchu, and Miaoli region, followed by 12.5% in the Yunlin, Chiayi, and Tainan.

(2) Analysis on Basic Differences

When analyzed by gender, the rate of unlimited data plan (without speed limitation) was 50.3% for men and 48.7% for women; the rate of 1G - 5G (5G excluded) plan was 17.1% for women and 9.9% for men.

When analyzed by age, over 40% in all age groups chose the unlimited data plan (without speed limitation), except for those 55 and over (35.3%). The highest proportion for unlimited data without speed limitation was those aged 25-34 (68.3%), followed by the 35-44 age group (57.2%). Meanwhile, 24% of those 55 and over and 11.7% of the 16-24 age group chose a 1G - 5G (5G excluded) plan.

When analyzed by marital status, 57.4% of those unmarried chose the unlimited data plan (without speed limitation), the highest proportion, compared to 47.7% of widows or separated and 44.6% of married. 17.9% of those married use a 1G - 5G (5G excluded) plan, the highest proportion, followed by 7.8% of those unmarried and 6.7% for those widowed or separated.

2. Broadcasting Market

• The Main Video Watching Platform

OVERALL ANALYSIS

The primary video watching platforms accessed by a home TV was cable TV (60.8%), followed by terrestrial TV (17.1%) and the Movie on Demand (MOD) service offered by Chunghwa Telecom (14.7%).

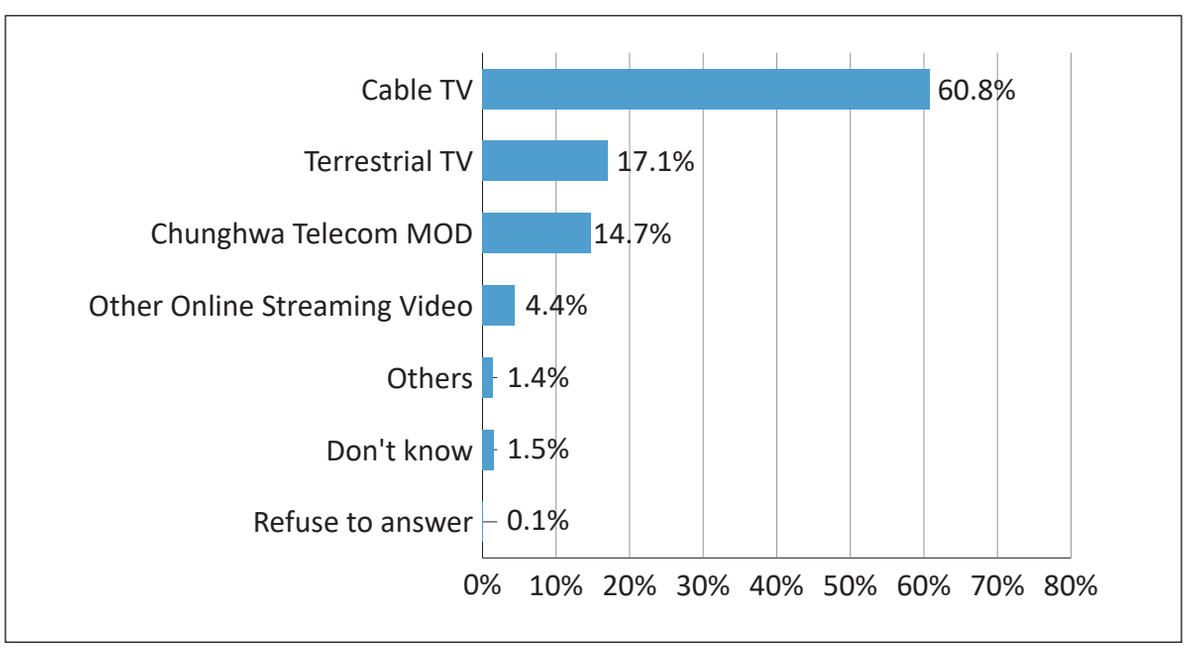

Figure 4: Primary Video Watching Platforms Base: N=1,105

COMPARATIVE ANALYSIS

(1) Analysis of Regional Difference

The results show that the choice of video platform was significant by region.

Cable television was the most important source of viewing in a number of regions, of which the highest proportion was Ilan, Hualien, and Taitung, where 75.6% use cable television.

Radio and terrestrial TV was higher in the Kaohsiung and Pingtung region than in other regions (26.5%). The highest area that uses Chunghwa Telecom's MOD was in the Taoyuan, Hsinchu, and Miaoli region, (19.2%), while other online streaming video was highest in the Taichung, Changhua, and Nantou region (7.5%).

(2) Analysis on Basic Differences

The results show a significance difference in terms of age groups as well. Overall, cable television was the main source of viewing for all ages: 69.7% of 45-54 year-olds was the highest proportion. 19.8% of those aged 25-34 watch terrestrial television, higher than other age groups. 29.0% of those aged 16-24 watch Chunghwa Telecom's MOD. 9.1% of those aged 35-44 watch other online streaming video, higher than the other groups.

In terms of gender, cable television is the main source of viewing for both men and women, with 62.7% of women watching cable television as their primary source of viewing and 58.9% of men. Men were more likely than women to listen to the radio or watch terrestrial TV, Chunghwa Telecom's MOD or online streaming video.

Regardless of marital status, cable television was the most important source of viewing, with 70.9% widowed or separated being higher than those married or unmarried. 21.8% of those widowed or separated using terrestrial TV, and 19.2% of those unmarried using Chunghwa Telecom's MOD, as their main source of viewing. The highest percentage of those watching online video streaming was the unmarried group (6.6%).

(3) Analysis of the Socio-economic Status Differences

The results vary significantly in terms of residence, indicating that the most important source of viewing varies with house ownership.

Cable television was the most important source of viewing among homeowners (61.9%). Radio was also important for those who own their own home (17.4%), higher than those who rent (12.9%). 14.5% of those who either own their own home or rent use Chunghwa Telecom's MOD as their main source of viewing. 7.7% of those who rent stream video and audio, the highest proportion by residential type.

• Types of TV Programs Often Watched

OVERALL ANALYSIS

Social news, accounting for 65.9%, was the most often watched kind of program. Variety shows rank second (46.7%) with 43.7% choosing weather reports, 43.1% drama, and 42.4% international news.

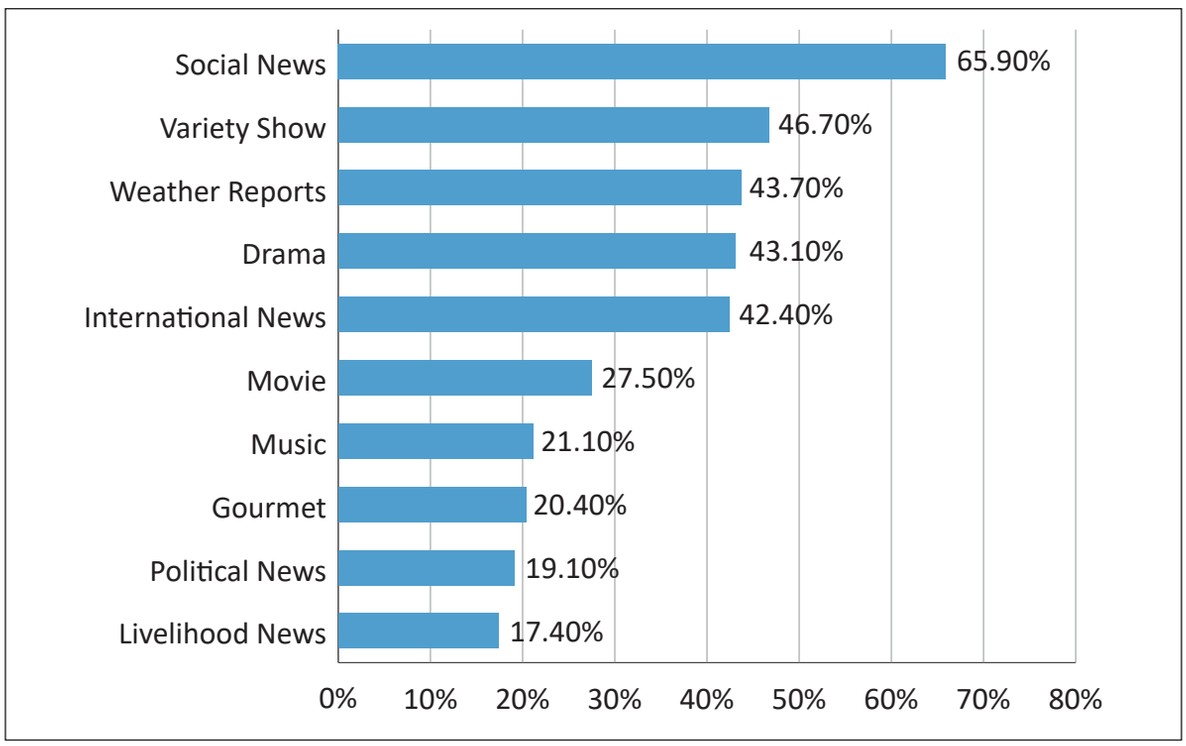

Figure 5 : Ten Most Common Types of TV Programs Often Watched Base: N=1,007 (Multiple Choice)

COMPARATIVE ANALYSIS

(1) Analysis of Regional Difference

According to the regional analysis, the most frequently watched type of TV program in all regions was social news, with which the highest percentage (80.1%) was in the Ilan, Hualien, and Taitung region. The second most watched program in the Taipei City, New Taipei City, and Keelung region was International television program news (55.4%), while the weather report was the second most watched program in the Taoyuan, Hsinchu, and Miaoli region, and Ilan, Hualien, and Taitung region (51.6% and 67.4%, respectively); variety shows rank the second in the Taichung, Changhua, and Nantou region, and Kaohsiung and Pingtung region (54% and 47.7%, respectively); and in the Yunlin, Chiayi, and Tainan area, dramas programs were the second-most watched (53.7%).

(2) Analysis on Basic Differences

Regardless of gender, social news was the most frequently watched type of program, with 68.8% of women and 62.8% of men viewing. In addition to social news, the types of television programs most watched by men were international news (47.4%) and variety shows (42.8%). Television programs most frequently watched by women were variety shows (50.4%) and dramas (50.1%).

Variety shows were the most popular for those aged 25-34 (58.4%) and 16-24 (51.5%). Social news was the most among the remaining age groups with 81.5% of the 45-54 year olds.

Regardless of marital status, social news was the most often watched type of TV program, with those married (72.2%) most likely to view.

The type of program ranked second varies, with 53.3% of those unmarried watching variety shows, 53.5% of those married watching the weather reports and 48.2% of those widowed or separated watching theatrical shows

- ## Privacy Issues on Broadcasting Market Survey

OVERALL ANALYSIS

What the public considers being the more common channels for disclosing the privacy of public figures without prior consent, are television (36.7%), magazines (23%) and newspapers (11.7%).

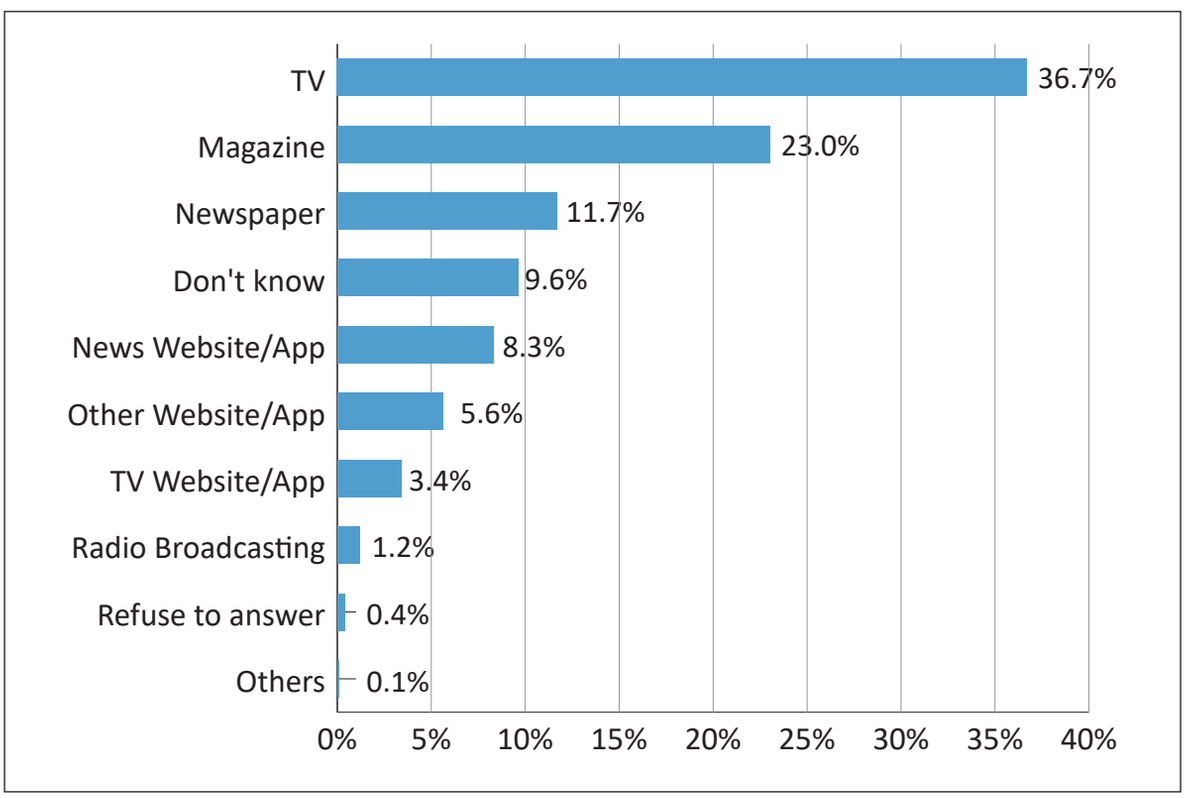

Figure 6: The Most Common Channel Disclosing the Privacy of Public Figures without Consent

Base: N=1,126

COMPARATIVE ANALYSIS

(1) Analysis of Regional Difference

40.5% of those in Ilan, Hualien, and Taitung region thought that magazines violate the privacy of public figures, while those in other regions believed it was TV, with the highest percentage in the Taoyuan, Hsinchu, and Miaoli region (45.2%).

(2) Analysis on Basic Differences

39.4% of women believed television violates the privacy of public figures, compared to 33.9% of men.

All age groups believed television most commonly violates the privacy of public figures, up to 42% of those aged 45-54.

Regardless of their marital status, television was seen as most likely to violate the privacy of public figures, up to 41%.

3. Broadband Usage

- **The Most Used Device to Access the Internet**

OVERALL ANALYSIS

According to the survey, the most commonly used device to access the Internet by Taiwanese people aged 16 and above was a smartphone (86.3%), followed by a computer (11.7%) and a tablet (1.7%).

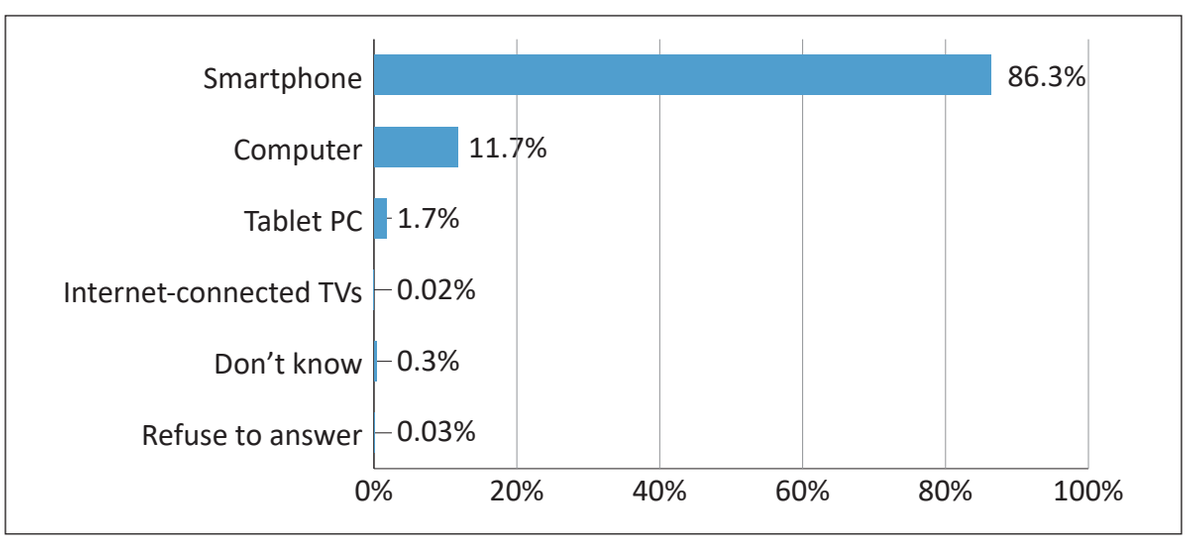

Figure 7: Most Commonly Used Devices to Access the Internet Base: N=1,079

COMPARATIVE ANALYSIS

(1) Analysis of Regional Difference

Cross-sectional analysis suggests that the most commonly used device to access the internet by people in the 6 regions is a smartphone, the highest rate being 93.5% in the Ilan, Hualien, and Taitung region.

(2) Analysis on Basic Differences

When analyzed by gender, 89.5% of women used smartphones to access the internet compared to 83.1% of men.15.7% of men used computers to access the internet compared to

only 7.6% of women.

When analyzed by age, smartphones were the most commonly used device to access the internet for people of all ages. The rate was highest among those aged 45-55, at 90.2%. Using computers to access the internet was highest among those aged 55 and over, at 15.2%.

- **Number of Average Hours Spent on the Internet per Week**

OVERALL ANALYSIS

The survey shows that the average number of hours spent online per week by Taiwanese people aged 16 and above was 22.21 hours at the workplace (Including school) per week, 19.53 hours at home, and 13.97 hours in places other than the workplace, school or home

Table 2 Average Hours Spent Online per Week by Location

Location	Average Number of Hours Spent Online per Week	Sample
At workplace (including schools)	22.21	865
Other places (non-workplace, school or home)	13.97	865
Home	19.53	1,067

COMPARATIVE ANALYSIS

(1) Analysis of Regional Difference

Cross-sectional analysis suggests that people in the Yunlin, Chiayi, and Tainan region spent the highest average number of hours on the internet, 24.36 hours per week, at their workplace, while people in the Kaohsiung, Pingtung, and Penghu region and the Ilan, Hualien, and Taitung region spent the highest average number of hours on the internet, 21.21 hours and 18.18 hours per week, at home and at other locations, respectively.

(2) Analysis on Basic Differences

When analyzed by gender, men spent an average higher number of hours (24.73 hours) on the internet at work per week compared to women (19.43 hours); men also spent on average a higher number of hours online at home (20.29 hours) and at other places (15.03 hours) than women (18.75 hours and 12.92 hours respectively).

When analyzed by age, people aged 25-34 spent the highest number of hours per week on the internet at work and other places, 27.67 hours and 19.88 hours respectively, while people aged 16-24 spent the highest number of hours online at home per week, 26.9 hours.

When analyzed by marital status, unmarried people spent the highest average number of

hours online at work, at home and at other places each week: 26.59, 25.73 and 17.77 hours respectively.

(3) Analysis of the Socio-economic Status Differences

When analyzed by average monthly individual income, those earning NT$50,000-NT$59,999 spent the highest number of hours online at work and other places 35.48 hours and 27.81 hours every week, while those earning NT$60,000 and above spent the highest number of hours, 23.71 hours on average, online at home each week.

When analyzed by education level, those with a master's degree and above spent on average every week the highest amount of time online, whether at work (28.63 hours), at other places (24.46 hours), or at home (17.43 hours).

When analyzed by occupation, people working in agriculture, forestry, fishery and husbandry; wholesale and retail trade; publishing; audio and video production; mass communications, information and communications services; finance and insurance; professional, scientific and technology services; support services; health care and social work services; and the arts, entertainment and recreation services, spent on average more than 22 hours online at work each week; meanwhile, people in agriculture, forestry, fishery and husbandry, construction; public administration and national defense; health care and social work services; the arts, entertainment and recreation services; and students and the unemployed spent more than 24 hours per week online, the highest average. People in construction, finance and insurance, public administration and national defense spent more than 24 hours per week online at places other than work or home.

- **Social Media or App Account Survey**

OVERALL ANALYSIS

The survey shows 83.6% of Taiwanese people aged 16 and above use social media.

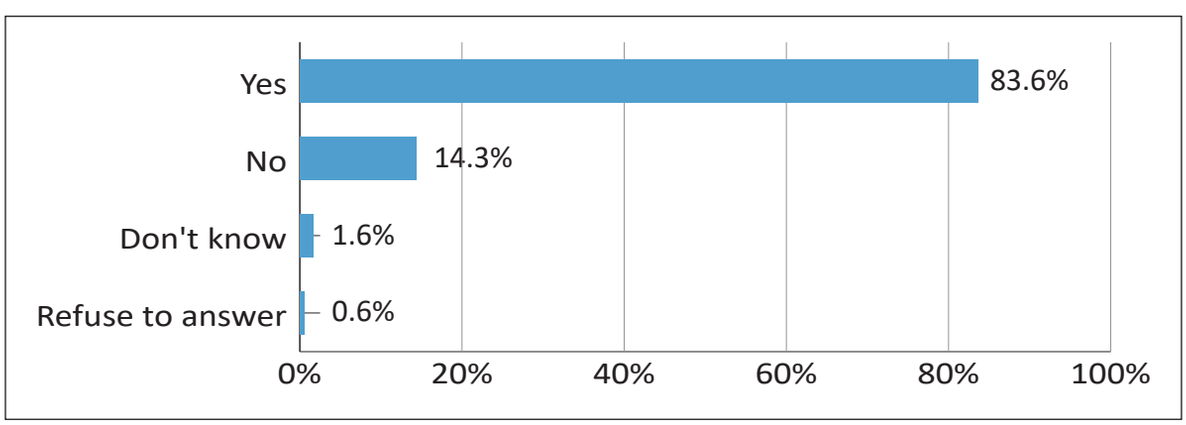

Figure 8: Do You Have A Social Media App or Account(s) Base: N=1,079

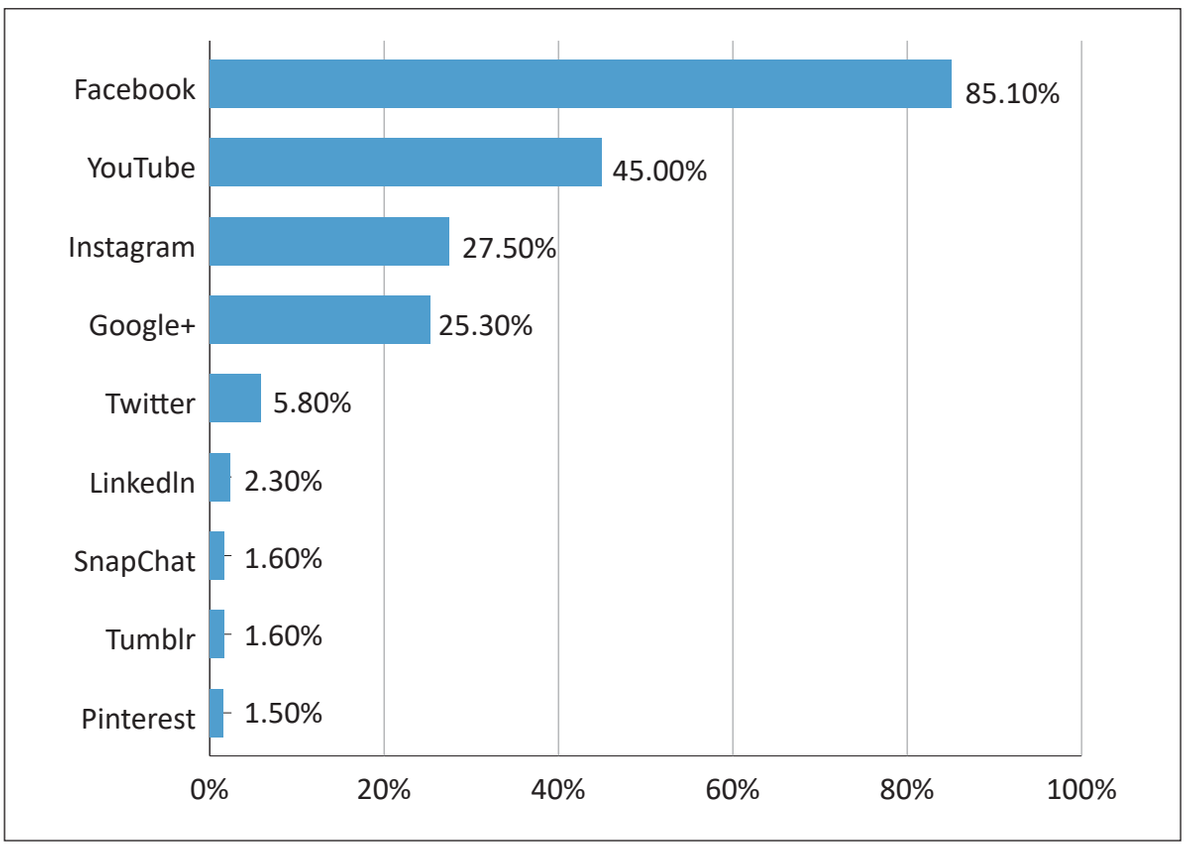

Figure 9: Most Commonly Used Social Media or App Base: N=897

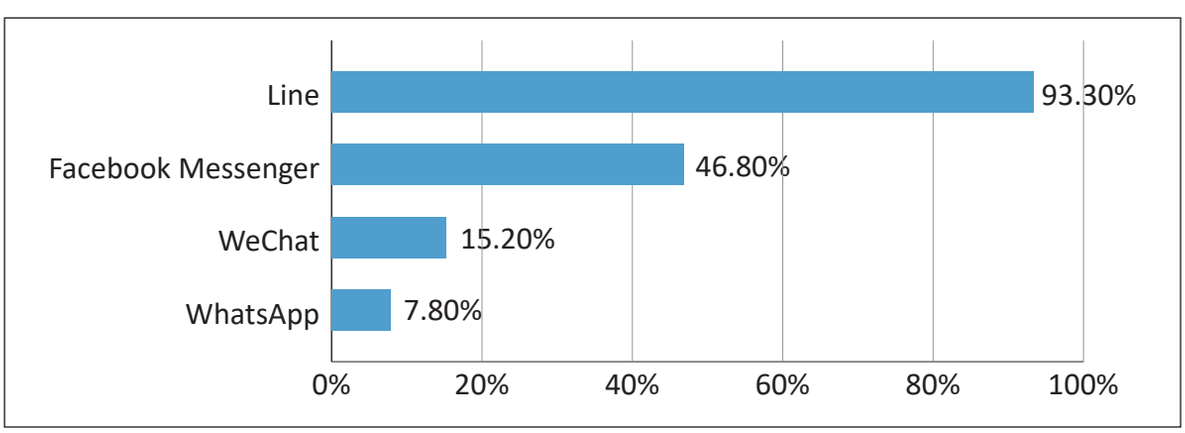

Figure 10: Most Used Messaging App Base: N=897

COMPARATIVE ANALYSIS

(1) Analysis of Regional Difference

The analysis shows that social media usage was significantly related to the region where people live.

The cross-sectional analysis suggests that people in Ilan, Hualien, and Taitung had the highest take-up rate (98.8%) of social media or app account(s). In addition, Facebook was the most commonly used social media website or app by people in all 6 regions, with the highest number of users in the Kaohsiung, Pingtung, and Penghu region, at 95%. The most commonly used messaging software or app is Line, with the highest number of users in the Kaohsiung, Pingtung and Penghu region, at 97.2%.

(2) Analysis on Basic Differences

Regardless of gender, age or marital status, Facebook was the most commonly used social media and Line was the most used messaging software among all groups. However, the analysis shows differences in social media use depending on one's gender, age and marriage status.

When analyzed by gender, 85.9% of females use social media, compared to 81.3% of males. When analyzed by age, 94.1% of people aged 25-34 use social media. When analyzed by marital status, 91.5% of unmarried people use social media.

(3) Analysis of the Socio-economic Status Differences

The analysis shows social media was also significantly related to average monthly income and education level.

When analyzed by average monthly individual income, 94.1% of those earning NT$40,000-NT$49,999 use social media while 90.1% of those with a graduate degree use social media.

When analyzed by residence, most homeowners (85.5%) and those who rent (81.7%) use social media.

- **The Impact of Internet on Daily Lives (Work)**

OVERALL ANALYSIS

The survey shows that Taiwanese people aged 16 and above thought the internet has had a positive impact on their daily working lives, including Easy Access to Data (62.5%), Opportunities to Try New Things (43.5%), and More Convenient Lives (42.4%). The most commonly considered negative effects of the internet on their daily lives were health problems (57.4%) and interruption (25.2%); though, 24.3% thought there was no negative impact.

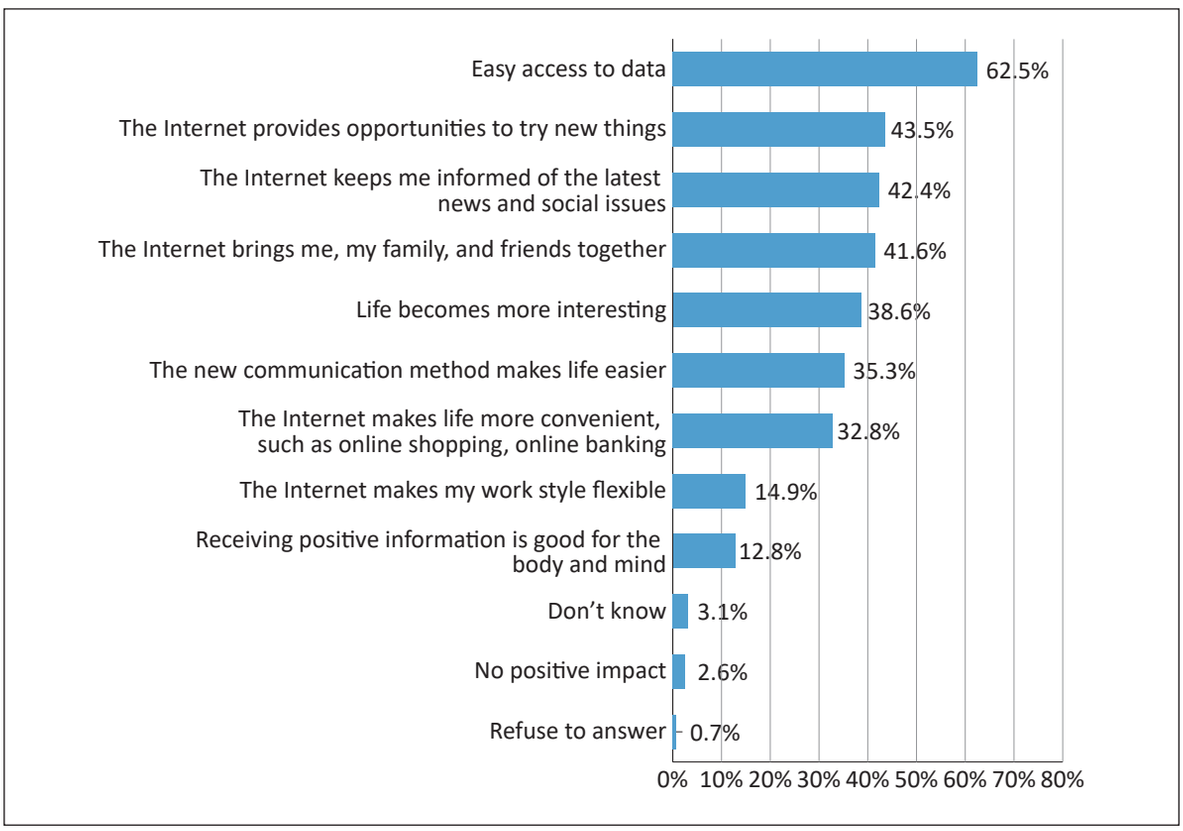

Figure 11: Positive Effects of the Internet on Work or Daily Lives

Base: N=1,079 (Multiple Choice)

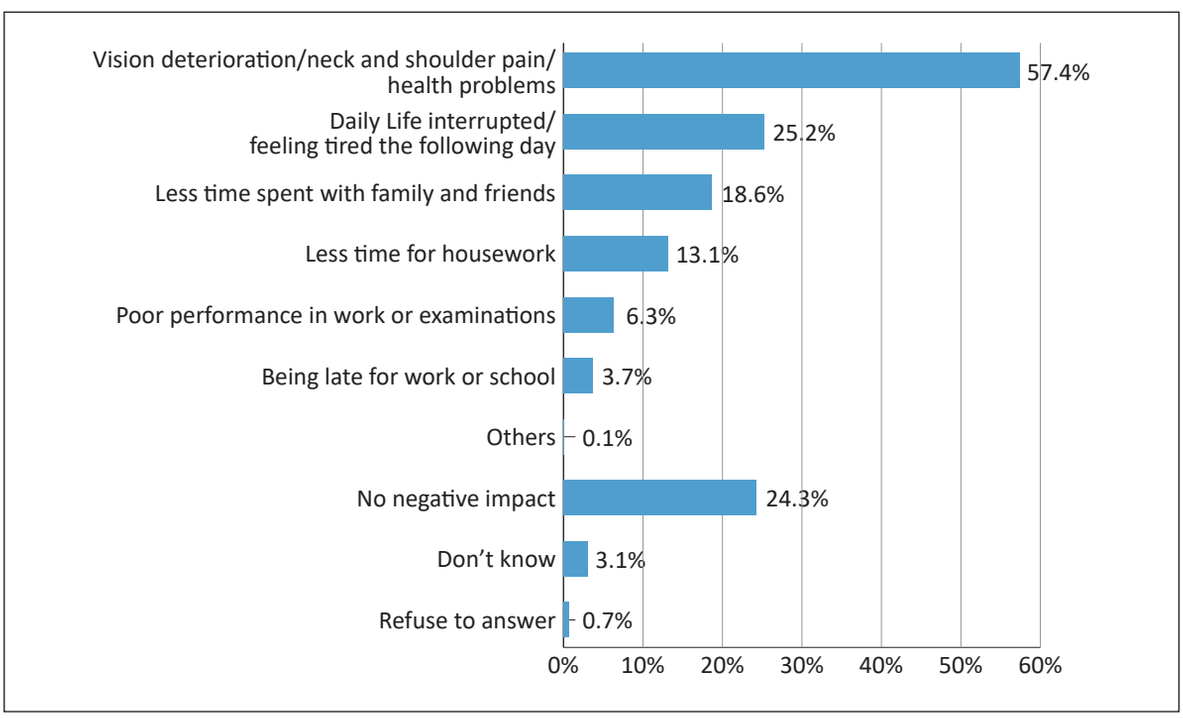

Figure 12: Negative Effects of the Internet on Work or Daily Lives

Base: N=1,079 (Multiple Choice)

COMPARATIVE ANALYSIS

(1) Analysis of Regional Difference

Cross-sectional analysis suggests that people in the six regions considered the major positive effect of the internet to be Easy Access to Data. People in the Ilan, Hualien, and Taitung region were more likely to believe this (73.4%). Those in all six regions considered the primary negative effect of the internet to be health problems, which was similar to the 64.5% of people who believe so in the Ilan, Hualien, and Taitung region.

(2) Analysis on Basic Differences

When analyzed by gender, both men and women (59.5% and 65.6%) thought that the major positive effect of the internet was Easy Access to Data, while both thought health problems was the primary negative effect (52.4% and 62.4%).

When analyzed by age, all age groups considered the main positive effect of the internet to be Easy Access to Data, with the aged 16-24 group most likely to give that answer (74.6%). All age groups also thought that health problems were the primary negative effect of the internet, with the 45-54 age group most likely to give that response (61.0%).

71.1% of those unmarried and 61.6% of those married (61.6%) considered the major positive effect of the internet to be Easy Access to Data, while 39.5% of those widowed or separated thought the major positive effect of the internet was Bringing Friends and Family Together. In addition, 58.2% of those unmarried and 59.8% of those married thought the most negative effect was health problems, while 44.3% of widowed or separated people thought the Internet did not have any negative effect (44.3%).

4. Digital Convergence

• Communications Activities

OVERALL ANALYSIS

The top three most common communications activities that people engaged in were using social media (77.6%), making or receiving calls (75.8%) and watching TV (63.5%).

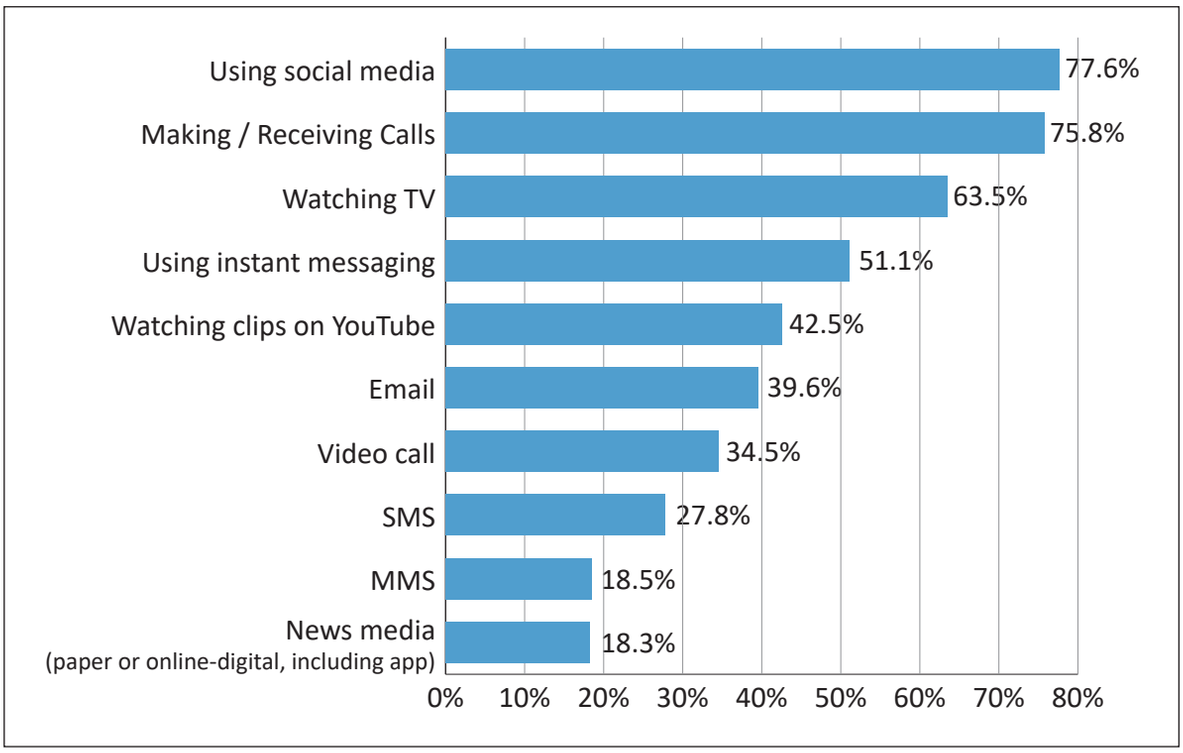

Figure 13: Engaged Communications Activities Base: N=1,140 (Multiple Choice)

COMPARATIVE ANALYSIS

(1) Analysis of Regional Difference

In terms of the communications activities, people in the regions of Kaohsiung, Pingtung and Penghu (81.5%), Taipei City, New Taipei City and Keelung (80.4%), Taoyuan, Hsinchu and Miaoli (74.4%) and Taichung Changhua and Nantou (72.5%) mainly use social media; people in the Yunlin, Chiayi and Tainan (88.6%) and Ilan, Hualien and Taitung (78.6) regions mainly use the telephone.

(2) Analysis on Basic Differences

When analyzed by gender, in terms of the communications activities engaged by people, more females (80.6%) than men (74.6%) use social media.

When analyzed by age group, with the exception of those 55 and above, which mostly engage in Making / Receiving Calls (73.5%), respondents mainly use social media, with 94% of those aged 16-24 using social media being the highest rate of social media use.

When analyzed by marital status, 87.7% of those unmarried and 70.0% of those widowed or separated mainly use social media respectively; 76.8% of those married mainly use the telephone.

- **The Use of Apps**

OVERALL ANALYSIS

The top three most commonly used apps were gaming (47.8%), gourmet (21.2%), and news (20.6%).

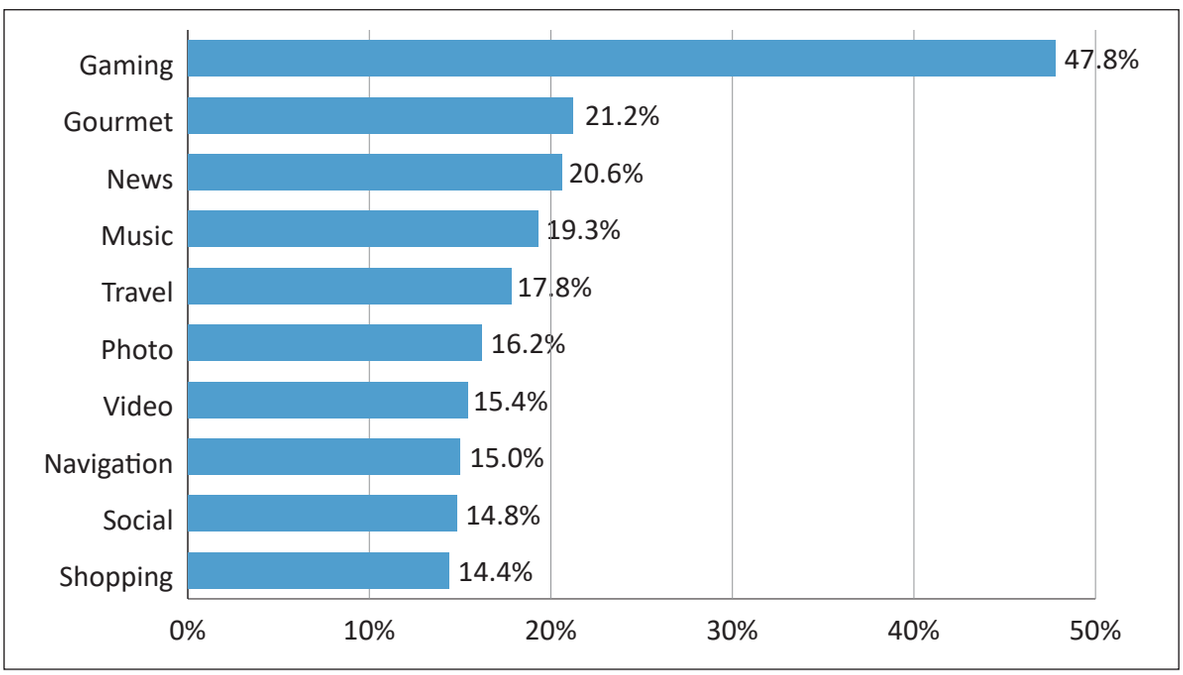

Figure 14: Most Commonly Used Apps (Top 10) Base: N=769 (Multiple Choice)

COMPARATIVE ANALYSIS

(1) Analysis of Regional Difference

Gaming apps were the most commonly used apps by people in all regions, with the highest number (57.6%) in the region of Taichung, Changhua, and Nantou (57.6%). Gourmet apps were most commonly used by those in Kaohsiung, Pingtung, and Penghu region (26.8%). News apps were most commonly used by those in the Taipei City, New Taipei City, and Keelung region (26.7%).

(2) Analysis on Basic Differences

When analyzed by gender, gaming was the most commonly used app by both men (55.9%) and women (39.5%). In addition, 27.7% of women and 14.9% of men use gourmet apps and 24.2% of men and 16.9% of females use news apps.

When analyzed by age group, gaming apps were most commonly used by people in all age groups, with the highest number (60.1%) aged 16-24. In addition, gourmet apps were most used by those in the 35-44 age group (29.7%) while news apps were most used by people in the aged 55 and over age group (27.3%).

When analyzed by marital status, news apps were most commonly used by those widowed or separated (50.8%), while gaming apps were most commonly used by those unmarried (55.9%) and married (41.9%).

- ## The Impartiality of News Source

OVERALL ANALYSIS

Regarding the impartiality of news source, 60.3% of people considered TV news to be impartial (either very impartial or fairly impartial); 29.7% of people thought that TV news is not impartial (either not impartial or extremely partial). As for radio broadcast news, 56.8% of those surveyed considered radio broadcast news to be impartial; while 27.1% of people thought that radio broadcast news was not impartial. As for newspaper media, 57.8% of people considered it to be impartial, while 29.5% of people thought that printed newspapers were not impartial.

Table3 Impartiality of Different News Sources

News source	impartiality	Percentage
TV	very impartial	11.5
	fairly impartial	48.8
	not impartial	24.8
	extremely partial	4.9
Radio Broadcasting	very impartial	8.5
	fairly impartial	48.4
	not impartial	23.7
	extremely partial	3.4
Newspaper	very impartial	11.8
	fairly impartial	46.0
	not impartial	25.4
	extremely partial	4.2

COMPARATIVE ANALYSIS

(1) Analysis of Regional Difference

When considering impartiality of TV, radio, and printed newspapers, the results vary significantly between regions.

The highest rates of viewing news sources as impartial were in the Kaohsiung, Pingtung, and Penghu region, 73.1%, 70.4% and 73.3% respectively. While those in Ilan, Hualien, and Taitung region considered the three news sources to be most partial (either not impartial or extremely partial in aggregate), 48.7%, 48.9% and 47.2% respectively.

(2) Analysis on Basic Differences

The results also show different views towards impartiality of TV news depending on marital status.

When analyzed by gender, 60.8% of women and 59.8% of men considered TV news to be impartial. 59% of men and 54.7% of women thought radio broadcasting news was impartial while 57.5% of men and 58% of women considered printed newspapers to be impartial.

When analyzed by age group, television (70.9%) and print newspapers (65.5%) are both considered to be the most impartial by those aged 45-54 while radio news was considered to be the most impartial by those aged 16-24 (63.4%).

When analyzed by marital status, 61.4% of those married believed television news to be impartial compared to 58.9% of those unmarried and 56.5% of those widowed or separated. Regards to radio and printed newspapers, a higher percentage of those unmarried considered these to be impartial (59% and 59.3% respectively) compared to those married (58.3% and 58.0%) or widowed or separated (38.2% and 48.6%).

(3) Analysis of the Socio-economic Status Differences

The results also vary according to average monthly individual income, education and profession; whereas education is statistically significant in terms of views toward the impartiality of radio broadcasting news, profession is a significant factor in terms of views toward printed newspapers.

When analyzed by average monthly income, those earning NT$40,000-49,999 consider television, radio and print newspaper news to be the most impartial, 76.1%, 65.2% and 69.2%

respectively.

43% of those earning NT$50,000-59,999 considered printed newspapers to be partial while those earning NT$60,000 and above thought that television (43.7%) and radio (41.7%) were also partial.

When analyzed by education, 67.2% people with college degrees considered television and 62.2% printed newspapers to be impartial, the highest percentage by education to do so. Those with senior high and vocational school (including the first three years of junior college) education were the most likely to consider radio broadcasting news to be impartial, reaching 61.9%. In addition, people with a master's degree or above were the most likely not to believe that television, radio and printed newspapers impartial, 48.6%, 43.7% and 41.6% respectively.

When analyzed by profession, over 65% of those who work in manufacturing, electricity and gas supply; construction and engineering; transportation and storage; finance and insurance; the real estate industry; support services; the arts; entertainment and leisure services; healthcare and social work services; and the unemployed, considered TV news to be impartial. In contrast, over 60% of those who work in publishing, audio-visual production, communications and information and communications services; professional, science and

technology services; and those engaged in other occupations, considered TV news to be partial.

Over 69% of those who work in electricity and gas supply; construction and transportation; warehousing; finance and insurance; public administration and defense industries; and the arts, entertainment and leisure services industries considered radio to be an impartial source of news. In contrast, 57.8% of those who work in publishing, audio-video production; distribution; and information and communication services; considered the news from radio broadcasting to be partial.

Those who work in manufacturing; electricity and gas supply; construction and engineering; transport and storage; finance and insurance; support services; and the arts, entertainment and leisure services sectors also considered the news to be impartial, with all of them higher than 65%. In contrast, those who work in publishing; audio-video production; distribution and information and communication services; and professional, science and technology service industries, were more likely to see the news as partial, both higher than 56%.

II. Comparison of the Digital Convergence Trend of the Domestic and International Communications Industries

A. Comparison of the Supplied Data of the Domestic and International Communications Industries

PENETRATION OF LANDLINES

According to Figure 15, the global landline penetration rate from 2011 to 2016, with the exception of increase in the United Kingdom, shows a downward trend, particularly in the United States. Landline penetration rate in Taiwan has also been decreasing, though it remained the highest among the countries surveyed.

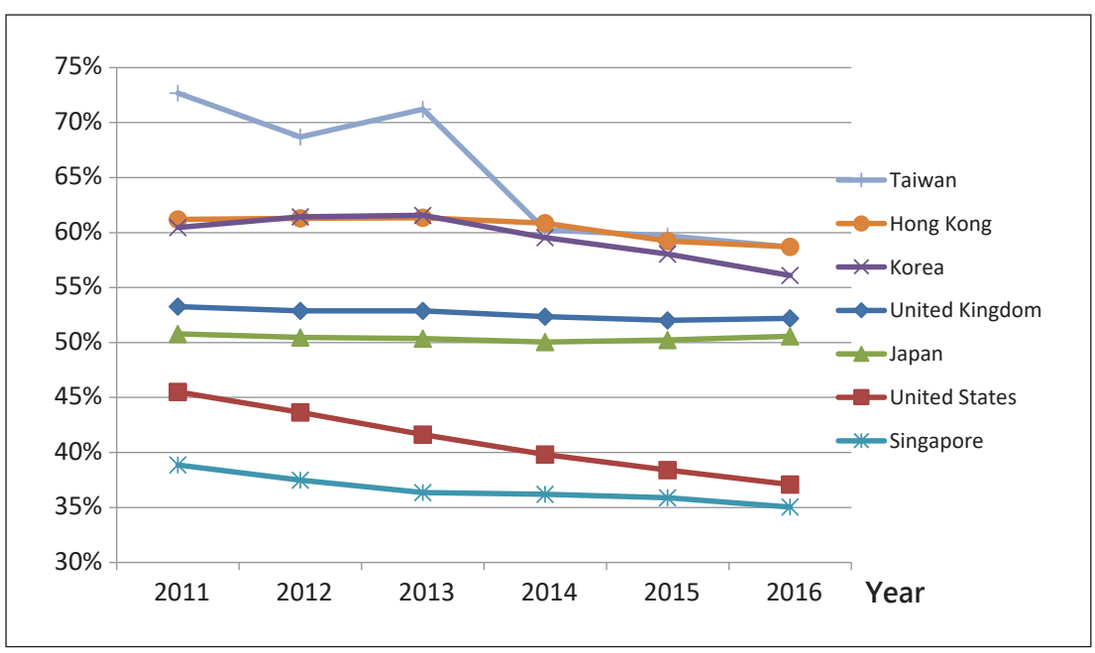

Figure 15: Landline Penetration Rate

Source: ITU and NCC

FIXED-BROADBAND PENETRATION RATE

After comparing the fixed-broadband penetration rate from 2011 to 2016, aside from the slight decrease of Singapore, the remaining countries in the survey show an increased penetration rate. Korea has the highest penetration rate over the six-year period with the United Kingdom second ranked; Taiwan on the other hand reached the highest penetration rate in 2013 and declined after that.

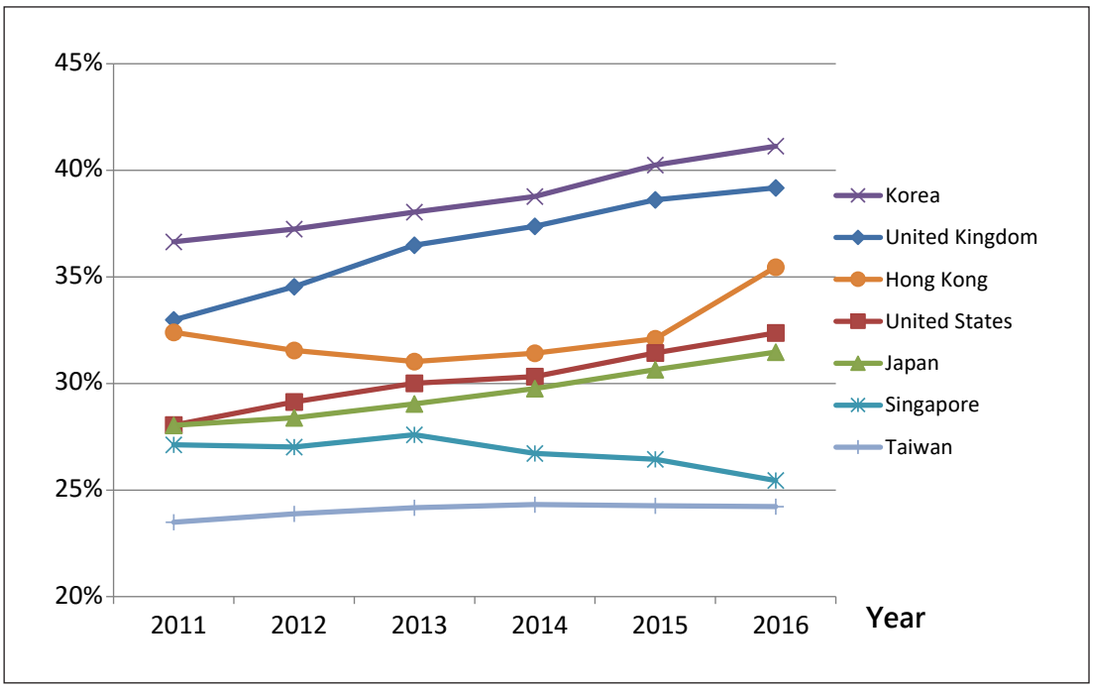

Figure 16: Fixed-broadband Penetration Rate Source: ITU and NCC

MOBILE VOICE PENETRATION RATE

By comparing the mobile voice penetration rate from 2011 to 2016, we can see that other than the United States, the other countries surveyed show a penetration rate of over 100% with Hong Kong even climbing to over 200% from 2011; the United States reached over 100% penetration rate after 2014 and has continued to grow steadily.

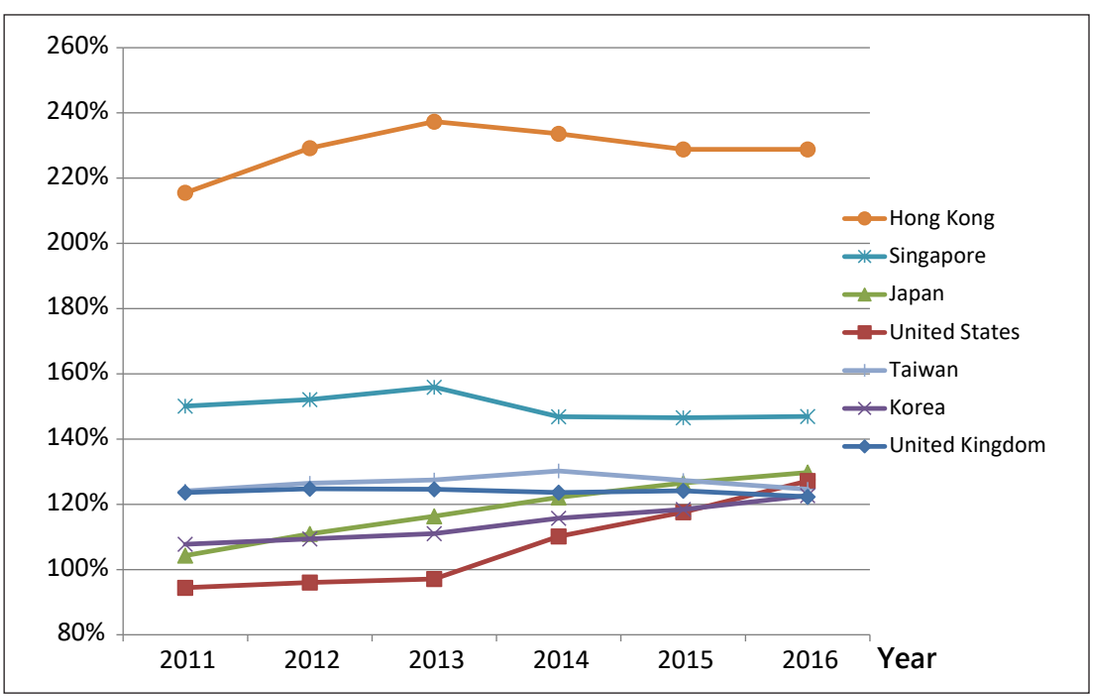

Figure 17: Mobile Voice Penetration Rate Source: ITU and NCC

MOBILE BROADBAND PENETRATION RATE

The mobile broadband penetration rate from 2011 to 2016 shows a growing trend. The penetration rate in Taiwan was below 50% in 2011, increasing tremendously to 90% in 2016. Singapore, however, ranked the highest over the past six years, reaching nearly 150% in 2016.

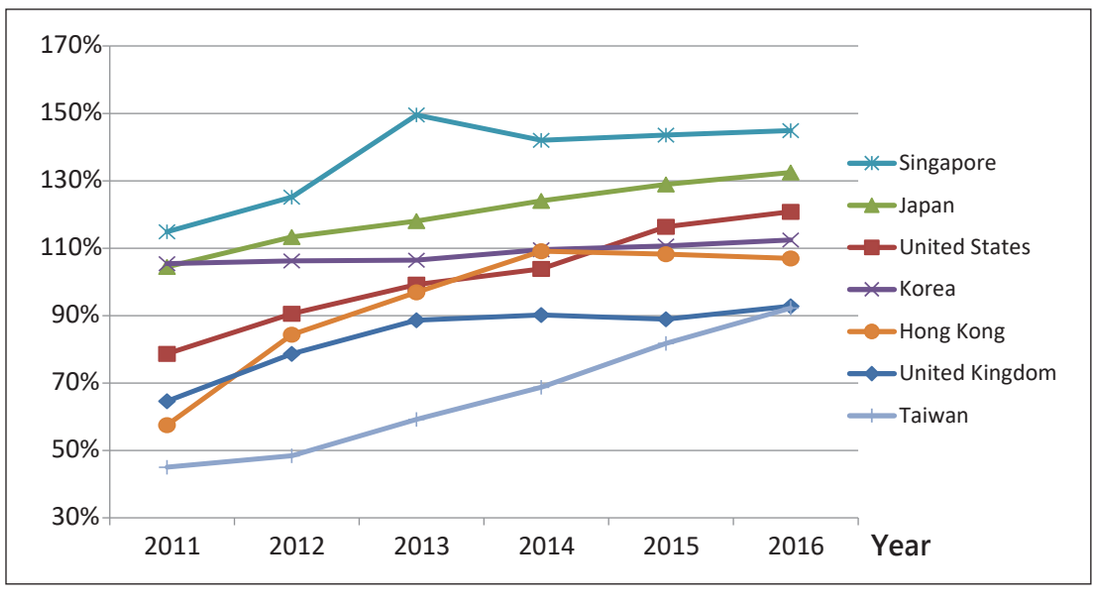

Figure 18: Mobile Broadband Penetration Rate Source: ITU and NCC

SUBSCRIBERS OF CABLE TV

Figure 19 shows the number of subscribers from 2011 to 2016. For the United States, there was an obvious decrease in 2014. Japan on the other hand, increased slightly after 2011, while the remaining countries remained relatively steady.

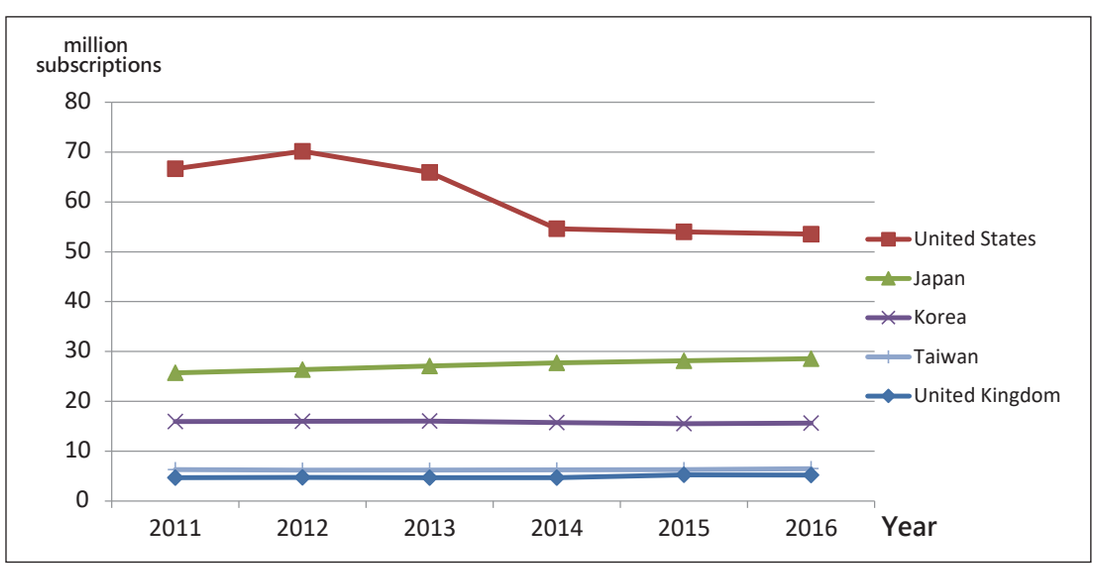

Figure 19: Subscriber of Cable TV
Note: No data for Singapore and Hong Kong

B. Comparison of the Convergence Policy of the Domestic and International Communications Industries

KEY DIGITAL CONVERGENCE POLICY

Since the launch of DIGI+ by the Executive Yuan in 2017, as expected the scale of the digital economy in Taiwan reached NT$6.5 trillion, digital lifestyle coverage spread to 80% of the public, broadband services upgraded to 2Gbps, and ensuring a minimum 25Mbps of basic broadband speed meant that our national information power ranking leapt into the top 10.

After analyzing DIGI+, we focused on the policy aspect of the strengthening of communications environment infrastructure, securing the basic broadband connection rights, and facilitating the innovation of our digital economy development. On the communications environment infrastructure aspect, according to the Networked Readiness Index released by WEF in 2016, Taiwan ranked 19th among other countries, regarding the readiness sub-index and infrastructure, Taiwan ranked 1st for two years. Concerning the protection of basic broadband connection rights, the NCC continues to concentrate on broadband infrastructure in remote areas. Since 2007, the NCC consecutively released projects such as 'Broadband for All Villages', 'Broadband for All Tribes' and 'High Speed Broadband for All Villages and Tribes' to increase 12Mbps coverage rate. By the end of 2016, speed coverage had reached 96.08%.

POLICY COMPARISON

This report analyzed the recent telecommunications policies of the United Kingdom, the United States, Japan, Korea, Singapore and Hong Kong. We categorized them into five aspects: infrastructure, application, personnel training and the participation of the public, industry, and business development.

The United Kingdom is planning to accelerate the development of infrastructure such as 4G high speed internet, which is estimated to be completed in 2020 and also the development of 5G and fiber-optical infrastructure. At the same time, it is also focusing on the rights of affordable high speed internet for the public. On the aspect of application, the United Kingdom's emphasis is on big data and the release of economic data to elevate the public's trust towards data application for a safe internet environment. Among all aspects, the United Kingdom government is also dedicated to online public services, such as the GOV.UK.Verify system.

In the United States, they are paying attention to infrastructure and applications. For instance, flexible spectrum planning, increasing the effectiveness of spectrum usage and maximizing broadband usage so that people in remote areas and the disabled can have access to internet connection.

Japan has a clear plan for infrastructure, applications and business development, especially for application aspects regarding how big data and ICT technology can solve problems, and through international events promoting the application of telecommunications.

For Korea, their emphasis is on personnel training and industry development. As well as actively recruiting telecommunications personnel from around the world, they are also targeting the nine

industries development (software development, IoT, Cloud, information security, 5G, high quality services, smart devices, digital content and big data).

Singapore mainly focuses on facilitating big data with the aspect of health care and logistics. Hong Kong lastly, is developing e-transaction platforms, expanding internet space and creating an IT technology innovative environment.

The DIGI+ project includes all aspects, but by reference to the policies of other countries, improvements can be made in the following areas.

(1) We have focused on the development of infrastructure and reducing the digital divide and have also been committed to deploying infrastructure in remote areas and building a Cell Broadcast Center. Mobile broadband has been widely used, but how the limited resources can be more effectively utilized has become a crucial issue. Therefore, we can adopt similar policies of the United States and increase flexibility of spectrum usage and provide reasonable broadband prices for business and the public.

(2) On the applications aspect, most of the countries focused on big data applications, but Taiwan has been more focused on the virtual/realistic integration and innovative applications. Regarding big data, we can refer to the policies of Japan and target a specific industry such as smart care and smart transportation while facilitating local and international events as an opportunity to promote our innovative services development.

(3) As for personnel training, emphasis has been on primary and intermediate school information literacy and the spread of digital skills whilst recruiting international personnel. Due to the fast development of ICT applications, we have recommended promoting digital skills and education regarding information literacy.

(4) Turning to public involvement, we have facilitated relevant technologies to deepen the aspect of public policies and involvement. We can adopt similar approaches as the United Kingdom by expanding government service platforms and developing online authorization for the convenience of online transaction platforms encouraging more participation.

(5) The DIGI+ project has emphasized industry/business development, especially ascertaining clear direction for industry environment, innovation and connection with the academic field. However, for the effective use of ICT technologies by local businesses, we recommend strengthening digital transformation, releasing regulation or a try-out opportunity for the benefit of promoting innovative application services with the ultimate goal of improving national competitiveness.

III. Conclusions

A. Telecommunications Market

According to the results from the telecommunications market, 17.7% of respondents only used mobile phones; 82.7% of respondents without landline phones at home decided not to get a landline phone in the future, as 63.7% of them thought mobile phones can replace landline phones (multiple choice).This shows that landline phone is no longer considered a necessary tool to connect.

After the launch of 4G services in May 2014, people have enjoyed high-speed and stable Internet access; 4G subscribers grew significantly to 11.57 million in 2015, and reached 18.07 million at the end of 2016. In this survey, 93.5% of respondents use mobile broadband outdoors. Among them, 86.5% use 4G services, 7% use 3G services, and only 2.7% use the Wi-Fi services provided by the government or stores. Unlimited data service is the most used type of service (63.6%).

When using a smartphone online at home, 54.8% of respondents use mobile broadband services at home, instead of fixed-broadband (43.8%). In terms of the behaviors of smartphone users, asides from phone calls, 68% of respondents browse or search online, followed by using social network applications (65.9%) and making VoIP calls (44.6%) (multiple choice). 97.1% of respondents make VoIP calls on Line, followed by 54.7% on Facebook Messenger, while other types of VoIP services are less than 20% (multiple choice).

In terms of choosing mobile service operators, the main factor was their relatives and friends using the current service provider (33.5%), followed by getting used to the service providers (25.7%) and the communications quality (24%). And the main reason for changing the operator of mobile service was cost (21.6%), followed by carry-mobile-number discounts (19.9%).

The development and maturity of the telecommunications market in Taiwan is also reflected by the satisfaction of telecommunications service of the subscriptions (1 point refers to very unsatisfied; 10 points refers to very satisfied). In this survey, the satisfaction of fixed-line phone service is 7.47, followed by mobile phone service (7.22), mobile internet service (6.93) and fixed-broadband internet (6.87).

B. Broadcasting Market

The survey of radio listeners and television viewers depicts media usage habit and media equipment, usage timelines, type and quality of programs, degree of reliance and privacy issues. Nearly 90% of the respondents (89.4%) watch television. Clearly, watching television remains the primary means of media consumption. More than 95% of the respondents own television sets, while among these less than 20% use smart TVs (19.3%).

Apart from viewing consumption, 36.8% of respondents listen to the radio. Car audio (47.9%), traditional radio (37.6%) and mobile phone (25.9%) were the most commonly used devices.

As for the survey of usage times, television watching times fall mainly between 6pm-9pm (53.8%) and 9pm-12 midnight (22.8%), with the highest proportion in social news (65.9%) among all TV programs, followed by variety shows (46.7%), meteorology (43.7%) and drama (43.1%).

Over 50% (57.7%) of TV viewers thought that the quality of the TV shows was the same over the past year. Almost 20% (18.6%) of respondents thought improvements have been made but 13.5% feel quality has become worse. Among those who feel improvements were made, they affirmed the diversification of TV programs (62.0%), increasing number of good quality dramas (36.7%) and more fun and entertaining programs (28.7%). Respondents who identified worse quality did not like politically biased reports (28.6%) and discrimination on sexual grounds (9.9%).

Apart from most viewers thinking that the quality of television programs has remained the same as in the past, more than 50% of the respondents (55.5%) thought that had not seen inappropriate content and over 30% of the respondents (34.5%) had never seen inappropriate content. In terms of the dislike content, 57.9% of respondents disliked violence and 51.8% answered repeated news. The program types people feel most inappropriate were political (43.0%) and news (32.3%) programs.

In terms of the radio broadcast listening session, 9am-12pm (26.7%) and 6pm-9pm (23.4%) were the peak listening times. As for the reasons, the order of importance was listening to music, gaining information on disasters, obtaining news and information, obtaining travel and weather information, obtaining other life information and recommended products. In general, the higher the age group, the more dependent they were on access to information (news, information, travel and climate information) over the radio than other age groups. This shows that radio broadcasting still plays an important role in providing information to the elderly.

In terms of the awareness of television program and radio broadcasting program norms, those who did not know were higher than those who knew. Among them, 55.4% knew about the television norms while over 60% (63.3%) did not know about the television norms.

Nearly 70% (68%) of the respondents thought that the privacy of public figures should not be disclosed without the consent of the parties. Nearly 80% of the respondents (77.7%) said that privacy of the general public should not be disclosed without the consent of the parties. It shows that the general public pays attention to the media ethics and protection of privacy. In general, television is considered as the main media channel that exposes the privacy of others without the consent of the parties. It is noteworthy that, in the convergence era, new media (such as websites and apps) was considered to be the second most common means, after television, that exposes the privacy of people without the consent of parties. As for the disclosure of privacy of public figures without consent, new media reached 17.3%, ranking behind television (36.7%) and magazines (23.0%) and higher than traditional media such as newspapers and radio. As for the disclosure of the privacy of the general public without consent, the proportion of new media reached 21.6%, surpassing magazines 18.8%, second only to television at 35.0%.

C. Broadband Usage

With the popularity of smart phones and mobile broadband, over 85% of the people in Taiwan used smartphones most often to browse the internet, most commonly for the purpose of connecting with others. In addition, people in Taiwan are accustomed to using social media, with 83.6% of the respondents having social media or app accounts. When browsing social media information, young people were more willing to browse more diversified information, while the proportion of older people not often browsing content that they do not agree with is slightly higher.

Although the popularity of social networking websites or messaging software facilitates communication between people and the circulation of information, it also highlights the issue of information security. Although nearly 50% of the people agree to providing incorrect or false information, about 40% of the public provide personal information. Among them, respondents from Taipei City, New Taipei City and Keelung region accounted for the highest proportion, reaching 48.1%. In addition, with regards to use of the internet, the survey shows that 42.3% of the people in Taiwan have worries when using the internet while 56.4% have no concerns. People who have worries when using the internet are concerned about the leakage of personal information (82.2%) and fraud (48.4%).

The search for information is also an important factor in the use of the internet. Over 60% of people thought that the most positive effect of the internet was convenience of collecting information. This shows that people are accustomed to diverse information. Prompting others to try new things (43.5%) and making life more convenient (42.4%) were also the positive impacts of the internet for the respondents, showing that mobile networks have become increasingly important to people's daily life. However, as daily life becomes interconnected with the internet, people (57.4%) also thought that the negative effect of the internet on daily life can affect health under prolonged use.

In terms of online shopping, the survey shows that more than 50% of the respondents have tried shopping online. Among them, young people have far more experience in online shopping than the elderly. In terms of the types of online shopping products, the daily necessities such as purses, apparel and communication products were most common; a further analysis shows that men mainly bought goods for mobile phones and communication products (40.6%), while women mainly bought apparel and fashion accessories (39.6%). Furthermore, the survey shows that online shopping ranks the third reason why people will continue to use the Internet over the next 12 months, highlighting the potential of e-commerce.

Regarding network usage skills, the respondents, as a whole, had an average score of 6.51 (1, completely not confident to 10, very confident) in terms of their confidence in using the internet. A further analysis showed that 25-34 year-olds had a high degree of confidence in online activities such as writing blogs, grasping the public disclosure of personal information on the internet and using the internet as a whole. In addition, in terms of the level of content of the public on the internet experience, on the average, "life is not boring because of the internet" (6.24) was the highest, and the scores of "do not know how to find information without the internet", "do not know what happened in the world without internet", "life is boring without internet", "feeling difficult being offline from the internet" are higher than 5.1.

D. Digital Convergence

In terms of convergence, smartphones have become an essential piece of equipment. 53.9% of the public used smartphones to watch video programs and nearly 30% (27.4%) of them thought that smartphones were the most commonly used video watching devices; the youngest ones being the more accustomed to using smartphones to watch video programs. In addition, video and audio viewing platforms are also becoming increasingly diversified. Although the proportion of people watching cable television still reaches 60%, MOD climbed to 20%. A further analysis shows that older groups are more accustomed to watching cable television, while the ratio of young groups using MOD service being higher than the older groups. In addition, 30% of the people watched online streaming video services, mainly in the form of free television programs or online video channels (64.6%). Young people had a higher proportion of online video streaming experience. Comparing watching TV and online video streaming services every week, they were 19.11 and 13.6 hours respectively.

Surpassing traditional telephone (75.8%) and watching TV (63.5%), the use of social media (77.6%) has become the most common practice of communications activity in the respondents' daily lives. In the case of diversified terminal equipment, whether people watch TV programmes with a television set while using other terminal devices and viewing program information, the results found that 42.8% of people have never or almost never experienced this, while almost 30% (28.9%) used other terminal devices to view program information while watching television. At least once a day, people watch TV while using other terminal devices to watch program information. However, more than 30% (34.6%) of the respondents were unaware that they could listen to real time internet broadcasting via mobile phones and other terminal equipment. Over 50% (57.6%) were unaware that they could listen to real time internet broadcasting radio stations websites or apps.

The average number of hours a person online per week was 28.77 hours. Men, people under 34, and unmarried people access the internet for longer hours. In terms of internet usage, 70% of people have watched content of a shared audio and video platform, including a high proportion of young people, especially the proportion of the population aged 16-24 being as high as 90%. While people have become accustomed to using the internet to watch all kinds of content, the amount of online advertising has surpassed TV ads. For internet advertising, "people do not like online advertising" and "I do not mind watching as long as they are interesting" were about the same ratio, with 36.4% and 36.3%, respectively; 17.8% do not mind viewing online advertising. In terms of types of apps people downloaded, the analysis found the most common types were games (47.8%), food catering (21.2%) and news (20.6%). In addition, only 17.8% of respondents have had experience in using mobile payment, among which, males in the 25-34 age group and the unmarried have a higher proportion of using mobile payment. 78.8% of those surveyed did not have experience of using mobile payment, indicating that there is still plenty of room for its promotion.

In respect to the acquisition of news, there are diversified channels of information acquisition under the development of digital convergence. Television was still the main source of news and information for respondents, accounting for 63.7% of the total. The proportion of the internet and communications software is approximately 26.5%, 5% for magazines, and only 2.3% for radio broadcasts.

Television was also considered the most accurate news channel for respondents, and respondents considered television news more impartial (60.3%) than radio broadcasting (56.8%) and printed media (57.8%). It can be seen from this that in the trend of convergence, television still plays a very important role in news dissemination.

E. The Development of the Communications Industry under the Trend of Digital Convergence in Taiwan

SUPPLY SIDE AND DEMAND SIDE ANALYSIS

Based on the data analysis of the supply side of the communications industry in Taiwan, the number of telephone subscribers has declined in recent years. The rate of mobile networks has reached 124%; the number of mobile subscribers continues to grow with the penetration rate exceeding 90%. The quantity of mobile traffic data has also risen sharply, reaching 2.37EB in 2016. The results revealed from the survey showed that nearly 20% (17.7%) of Taiwan's residents only use mobile phones. For those who have not installed landline phones, the proportion of those who will not install in the future was 82.7%; the main reason being that mobile phones can replace the role of landline phones (63.7%).

The communications statistical data indicates the high mobile phone penetration rate, high mobile broadband penetration rate and the trend of growing mobile broadband internet traffic in Taiwan. On the demand side, this survey found that people mostly subscribed to mobile broadband services with unlimited data allowance, used mobile broadband at home, and accessed fixed broadband at home. It shows that after the 4G service was launched in Taiwan in May, 2014, people in Taiwan have become increasingly reliant on mobile broadband.

The popularity of mobile networks is conducive to the development of the convergence trend. In our surveys, 53.9% of people watched video programs on their smartphones, and the youngest were more accustomed to viewing video programs on smartphones due to the development of smartphones as an important terminal. That is to say, smartphones have become an important terminal for the general public, and the potential for using innovative application services on broadband networks through smartphones indicates potential for development.

Traditional media (radio and television) still play an important role in society. From an analysis of supply side information, the numbers of cable subscribers has stabilized in recent years, reaching 5.226 million, a new high in 2016. The number of subscribers of IPTV shows a slight growth trend, reaching 1.322 million in 2016. According to the results of our surveys, nearly 90% (89.4%) watched television programs. The growth of IPTV households reflects the consumers' need, and will bring multiple channels for expanding viewers' experience.

The survey also shows nearly 30% of the public had never watched online streaming video services, mainly using free television programs or online video channels (64.6%), and young people had a higher proportion of online video streaming experience. This also reflects the trend of online

video viewing under the development of convergence. The higher the age group, the more

dependent on access to information (news, daily information, tourism and weather reports) via the radio; radio broadcasting is still essential in providing information to the elderly.

Online audio-visual content boomed in the digital convergence era; 70% of those surveyed had viewed the contents of the shared audio and video platform. The age 16-24 was the highest proportion among all the age groups. From the survey, we can see that people use the internet to watch the development trend of various contents and this echoes the growing trend of digital advertising investment in information supply. In particular, the amount of digital advertising investment in the first half of 2016 surpassed that of television media for the first time reaching NT$11.1 billion. In addition, the investment of social media advertising ranked first, compared to other types of digital advertisements, reaching 31.2%. According to our survey, more than 70% of people used social media. The investment of social digital advertisement and the higher rate of social media adoption reflect the importance of social media in Taiwan.

In respect of the acquisition of news, there are diversified channels of information acquisition under the development of digital convergence. However, Television was clearly still the main source of news (63.7% of the total). Television was also considered the most accurate news channel (60.3%) compared with radio (56.8%) and newspapers (57.8%). In a nutshell, television is the major media for disseminating news in Taiwan.

In terms of privacy disclosure, television was seen as the main media channel that exposes the privacy of others without consent of the parties; it is noteworthy that, after television, new media (such as websites and apps) was considered as the second most likely source to expose privacy without the consent of others.

INTERNATIONAL COMPARISONS

When compared by development of convergence in the communications industry with other countries[3], the 4G penetration in Taiwan has grown rapidly since the release of 4G service in 2014 and reached 76.8% by the end of 2016, higher than in some developed countries, such as the UK (69%), France (49%), and Germany (40%), but lower than in others, such as Korea (92%), Japan (86%), Australia (82%) and the US (81%). In addition, Taiwan's average monthly 4G mobile data use per person was 10.9 GB, and that of 3G was 7.8 GB in 2016, making a total of 18.7 GB, which was dramatically higher than that in other countries compared, including Sweden (5.7 GB), Korea (3.9 GB), the US (3.7 GB) and other European countries like UK (1.7 GB). According to this survey, Taiwanese people preferred the unlimited internet data plans (67.1%), which explains why Taiwan's average monthly mobile data use per person is far higher than that of other countries.

By virtue of the widespread mobile broadband and fixed line broadband in Taiwan, people can access the internet anytime, anywhere. Compared with other countries, Taiwan's most commonly used device for accessing the internet was the smartphone. 86.8% of Taiwanese people used smartphones to access the internet, higher than those in the UK (75%), France (77%), Germany (78%), Italy (85%), US (69%), Japan (58%), and Australia (77%), and as high as Spain (87%). The second most

3 Source of international comparisons: Ofcom, 2017, International Communications Market Report 2017

commonly used device for accessing the internet in most countries, like the UK, France, Germany, Spain, the US, Australia and Japan, was a notebook computer, with percentages all higher than 60%, while the second most commonly used device for accessing the internet in Taiwan was a desktop computer (34.6%). Notebooks account for only 25% in Taiwan, much lower than in major countries, showing that most Taiwanese people primarily access the internet via smartphones despite having access to various other internet devices.

When analyzed by internet-based equipment such as connected TVs, only 13.3% of Taiwanese people own smart TVs, while 39% of UK households, 46% of Spanish households and 43% of Italian and German households own smart TVs. It shows that smart TVs are not very popular in Taiwan. Also, only 2.5% of Taiwanese people have stream players (e.g. Apple TV, Chromecast, Amazon Fire TV), significantly lower than in the UK and Sweden, where the percentages are close to 30%, indicating that the development of convergence in Taiwan differs from that in European countries.

When analyzed by concerns over the internet, 82.2% of Taiwanese people who have concerns over the internet are most concerned about the leak of personal information, higher than that in Spain (79%), the US (73%), and the UK (69%).

When analyzed by the amount spent on online shopping, British people spent an average of £2,175 (equivalent to NT$87,000[4]) in 2016, more than twice the amount in other countries in comparison. According to the survey results, people in Taiwan spent an average of NT11,017 online shopping, only 13% of the amount spent in the UK, indicating that e-commerce in Taiwan still has considerable room for development. In addition, the percentage of spending on digital advertising in Taiwan was 41.4%[5] in 2016, lower than that in the UK, Sweden and China (all exceeding 50%), close to that in the US (40%), but higher than in France (35%) and Germany (31%).

When compared to the penetration of cable TV, Taiwan had a 60.8% penetration of cable TV in 2016, slightly higher than the UK (58%) and Germany (57%), but lower than most countries surveyed, such as Holland (98%), Korea (96%), Sweden (89%), US (81%), Japan (75%), China (73%), and France (69%). When analyzed by the growth of cable TV penetration, the cable TV penetration of most countries was higher in 2016 than 2011, except in the US, where the penetration decreased from 87% in 2011 to 81% in 2016. Moreover, the penetration of the US monthly SVoD was as high as 84%, higher than that of cable TV, indicating that cord cutting is occurring in the US. Back in Taiwan, the penetration of cable TV was 62.82%[6] in 2011, dropped to lower than 60% (59.67%) in 2014 and then rose gradually to 60.8%[7] in 2016. According those surveyed, slightly less than 20% (19.8%)[8] of Taiwanese people subscribe to paid over-the-top (OTT) services, means cord cutting is not as common in Taiwan as it is in the US.

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4 Calculated on the exchange rate of 1 GBP = 40 NTD

5 According to 2016 NCC Performance Report by NCC, the spending on digital advertising in 2016 was close to NT25.9 billion, while the output value of advertising in the five major traditional media was NT36.7 billion. That is, the money spent on digital advertising accounted for 41.4% of the total money spent on advertising in Taiwan.

6 NCC, 2016, NCC Performance Report 2015

7 NCC, 2017, NCC Performance Report 2016

8 Including subscription VOD (SVoD) and transactional VOD (TVoD)

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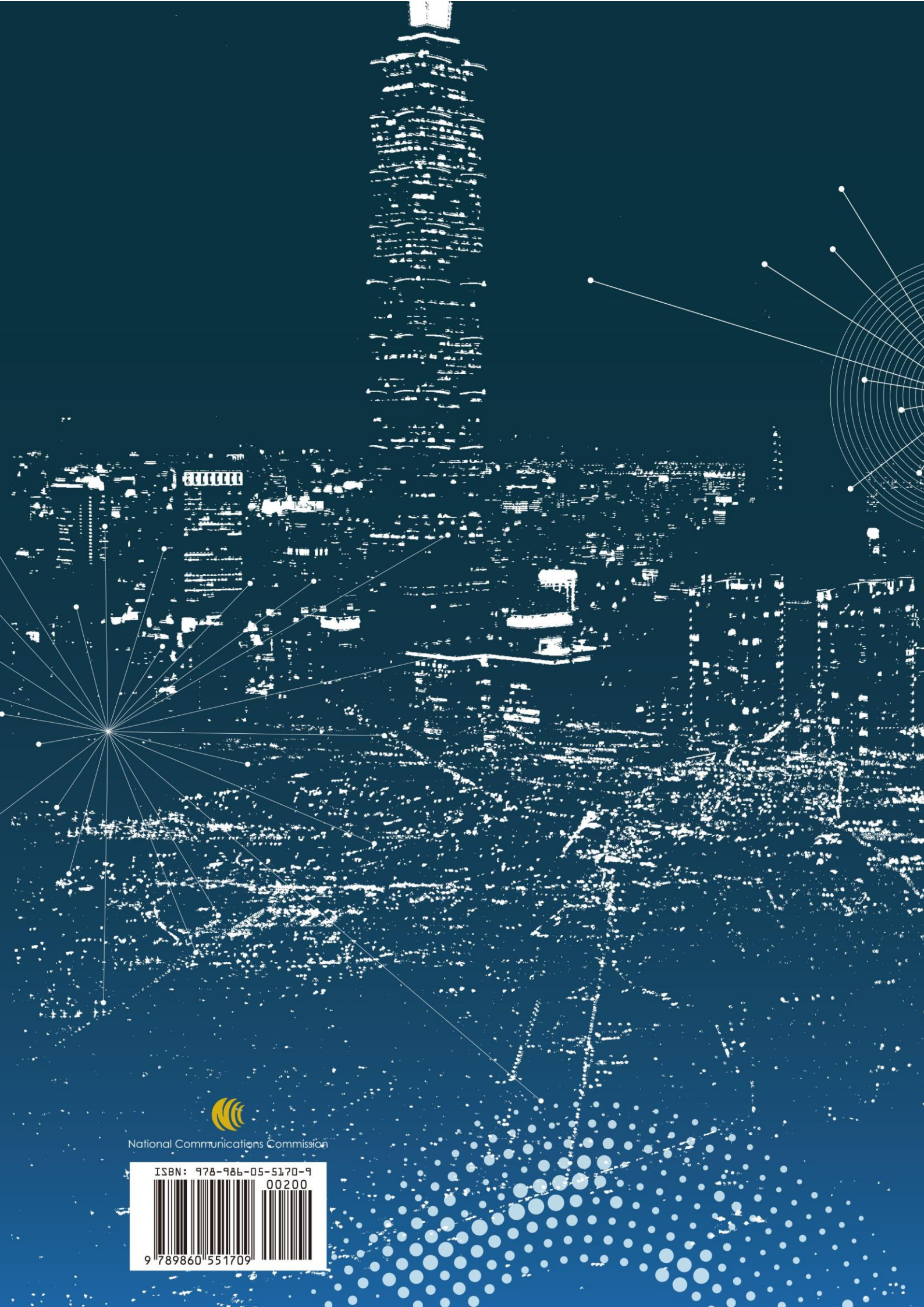

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