

Comparing Cell Phone and Internet Coverage Use in the USA and South Korea

Eun-Hee Choi
Sun-Woong Kim
Chan-Hyoung Cho
Mick Couper

Dongguk University
Korea Internet & Security Agency
University of Michigan

Outline

- Research Background
- Description of Two National Surveys
- Analysis Framework
- Results
- Conclusions

Research Background

- Many surveys have relied on data collection methods such as telephone (landline or cell) interviews and Web surveys.
- Much of the research on those modes comes from the USA or Western Europe.
- To what extent do the findings apply to other countries, especially those in Asia where both cell phone and Internet penetration is high?
- We analyze data from comparable surveys on information and communication technology (ICT) adoption and use in the USA and South Korea.

Description of Two National Surveys

Broadband Service Capability Survey (USA)

- Sponsor: Federal Communications Commission
- Collector: Princeton Survey Research Associates International
- Purpose: To understand the state of broadband adoption and use, as well as barriers facing those who do not have broadband at home
- Target Population: Adult household population
- Sample Design: Random digit dialing (RDD) landline sample and RDD cell sample
- Sample Size: 5,005 adults 18 or over
- Mode of Administration: Telephone and cell phone survey

Description of Two National Surveys (Cont.)

Survey on the Internet Usage (Korea)

- Sponsor: Korea Communications Commission
- Collector: Korea Internet & Security Agency
- Purpose: To provide reliable statistical information that can be widely used for governmental policies, business strategies, and academic research activities by systematically analyzing the rapidly changing Internet usage environment and behaviors.
- Target Population: Adult household population
- Sample Design: Multi-stage stratified sampling with clusters
- Sample Size: 29,928 adults 18 or over
- Mode of Administration: Face-to-face interviews

Description of Two National Surveys (Cont.)

- An Example of Comparable Questions: Household ownership of computer at home

Korea

Do you have ICT devices at home regardless of whether it is used? Please write down the number of devices you have?

Desktop computer _____units

Laptop computer _____units

USA

How many working computers, both desktops and laptops, are there in your household?

Description of Two National Surveys (Cont.)

- An Example of Comparable Questions: The services that use through the cell phone

Korea

Please select all the services that you use through the cell phone.

Item	Usage
(1) Sending or receiving text messages.	<input type="checkbox"/>
⋮	<input type="checkbox"/>

USA

Please tell me if you ever use your cell phone to send or receive text messages.

Yes

No

Description of Two National Surveys (Cont.)

- List of Comparable 37 Questions

Community type	Household ownership of landline
Number of household members	Internet access via computer or cell phone at home
Sex	All or almost all calls received on a cell phone
Age	Some received on a cell phone and some on a regular home phone
Education	Very few or none received on a cell phone
Employment status	Not ever used a cell phone
Household income	Sending/receiving text message using a cell phone
Marriage	Sending/receiving photo or video using a cell phone
Household ownership of computer at home	Downloading/streaming music or streaming video using a cell phone
Household ownership of cell phone	Getting information in daily life via the Internet

Description of Two National Surveys (Cont.)

- List of Comparable 37 Questions (Cont.)

Not ever used the Internet	Downloading or listening to online music via the Internet
The first use of Internet	Playing or downloading computer or video games via the Internet
Internet access at home	Downloading or streaming video films via the Internet
Internet access at other's home	Internet shopping & selling (Purchasing goods or services)
Internet access at work	Education/learning via the Internet (Formal education or training activities)
Internet access at school	Financial transaction via the Internet (Internet banking)
anywhere Internet access by cell phone wireless Internet	Online club/community
Getting information or data about job opportunities via the Internet	Managing homepage (Blog)
Getting information or data from government organizations via the Internet	

Analysis Framework

A: Comparing proportions between two surveys
(using confidence interval estimates of the true differences of proportions)



B: Comparing proportions in two-way tables between two surveys



C: Comparing logistic regression model between two surveys

A: Comparing Proportions Between Two Surveys

Summary

- Most variables are significantly different between two surveys.
- Only four variables (i.e. sex, household ownership of cell phone, household ownership of landline and managing homepage (Blog)) are not significant.
- Thus, we have confirmed distinct differences of various variables between the two countries.
- Some of them with large differences are illustrated as follows.

A: Comparing Proportions Between Two Surveys (Cont.)

- Selected variables with large differences

Household Level Variables	Categories	USA	Korea
Community type	Large cities	31.5	46.7
	Others	68.5	53.3
Number of household members	1	15.8	18.3
	2	35.1	25.8
	3	17.3	23.2
	4	17.1	26.6
	5	8.5	5.1
	6	4.0	0.8
	7 or higher	2.2	0.2
Internet access via computer or cell phone at home	Yes	74.8	95.4

A: Comparing Proportions Between Two Surveys (Cont.)

- Selected variables with large differences (Cont.)

Person Level Variables	Categories	USA	Korea
All or almost all calls received on a cell phone	Yes	31.3	23.6
Some received on a cell phone and some on a regular home phone	Yes	46.8	36.5
Very few or none received on a cell phone	Yes	21.9	39.9
Sending/receiving text message using a cell phone	Yes	66.3	99.3
Sending/receiving photo or video using a cell phone	Yes	52.2	27.7
Internet access at other's home	Yes	65.3	3.8
Downloading or streaming video files via the Internet	Yes	38.3	61.4
Internet shopping & selling (Purchasing goods or services)	Yes	78.4	60.0

B: Comparing Proportions in Two-Way Tables Between Two Surveys (Cont.)

- Example: Cell Phone Use by Education

Korea

Education	Cell Phone Use	Percent
Less than high school	Yes	17.5
High school graduate	Yes	45.4
College & Graduate	Yes	29.0
Total	Yes	91.9

* Pr>F: <0.0001

USA

Education	Cell Phone Use	Percent
Less than high school	Yes	2.3
High school graduate	Yes	33.4
College & Graduate	Yes	50.7
Total	Yes	86.4

* Pr>F: <0.0001

B: Comparing Proportions in Two-Way Tables Between Two Surveys (Cont.)

- Example: Internet Use by Education

Korea

Education	Internet Use	Percent
Less than high school	Yes	10.1
High school graduate	Yes	43.1
College & Graduate	Yes	29.1
Total	Yes	82.3

* Pr>F: <0.0001

USA

Education	Internet Use	Percent
Less than high school	Yes	0.5
High school graduate	Yes	26.4
College & Graduate	Yes	51.5
Total	Yes	78.4

* Pr>F: <0.0001

B: Comparing Proportions in Two-Way Tables Between Two Surveys (Cont.)

- Example: Internet Use by Age

Korea

Age	Internet Use	Percent
18-29	Yes	17.9
30-49	Yes	46.1
50-64	Yes	14.8
65 or higher	Yes	3.5
Total	Yes	82.3

* Pr>F: <0.0001

USA

Age	Internet Use	Percent
18-29	Yes	19.8
30-49	Yes	29.8
50-64	Yes	20.6
65 or higher	Yes	8.2
Total	Yes	78.4

* Pr>F: <0.0001

C: Comparing Logistic Regression Model Between Two Surveys

- Dependent variable: Three types of phone use

a: Very few or none received on a cell phone

b: All or almost calls received on a cell phone

c: Some received on a cell phone and some on a regular home phone

$$\text{USA: } \log(\hat{\pi}_b / \hat{\pi}_a) = 0.2716 - 0.1904C_{\text{Large cities}} - 0.513E_{<HS} + 0.1462E_{HS} - 1.2429A_{\leq 29} - 0.2537A_{29 < AGE \leq 49} \\ + 0.3881A_{49 < AGE < 65} - 0.1497M_{\text{Unmarried}} - 0.1221G_{\text{Male}} - 0.1463ES_{\text{Employed}}$$

$$\text{Korea: } \log(\hat{\pi}_b / \hat{\pi}_a) = 0.6921 - 0.1962C_{\text{Large cities}} + 0.3947E_{<HS} - 0.0601E_{HS} - 1.3564A_{\leq 29} - 0.4828A_{29 < AGE \leq 49} \\ + 0.3872A_{49 < AGE < 65} - 0.5221M_{\text{Unmarried}} - 0.0643G_{\text{Male}} - 0.0953ES_{\text{Employed}}$$

C: Comparing Logistic Regression Model Between Two Surveys (Cont.)

Predictor	Category	Phone use	Odds Ratio	
			USA	Korea
Community Type	Large cities	a: very few or none received on a cell phone	1.580	1.23
		b: all or almost calls received on a cell phone	1.079	0.831
Education	Less than high school	a	1.168	0.306
		b	0.485	0.635
	High school graduate	a	0.998	0.765
		b	0.801	1.006
Age	18-29	a	34.067	11.579
		b	3.245	0.698
	30-49	a	8.774	8.694
		b	2.247	1.256
	50-64	a	3.617	3.921
		b	1.760	1.352
Marriage	Unmarried	a	1.061	1.449
		b	0.786	0.51
Sex	Male	a	1.324	0.935
		b	1.037	0.822
Empoyment Status	Employed	a	2.285	1.081
		b	1.705	0.894

Reference categories : Community type (Others), Education (College&Graduate), Age (65+), Marriage (Married), Sex (Female), Employment status (Unemployed)

C: Comparing Logistic Regression Model Between Two Surveys (Cont.)

- Dependent variable: Sending/receiving text message (Yes, No)

$$\text{USA : logit}(\hat{\pi}) = 0.251 - 0.8326C_{\text{Large cities}} + 0.1203E_{<HS} + 2.1498E_{HS} + 0.5812A_{\leq 29} - 0.6776A_{29 < AGE \leq 49} \\ + 0.02A_{49 < AGE < 65} - 0.0775M_{\text{Unmarried}} + 0.2132G_{\text{Male}} + 0.2589ES_{\text{Employed}}$$

$$\text{Korea : logit}(\hat{\pi}) = 5.3476 + 0.0289C_{\text{Large cities}} - 1.1140E_{<HS} + 0.1021E_{HS} + 2.8150A_{\leq 29} - 0.0641A_{29 < AGE \leq 49} \\ - 1.0347A_{49 < AGE < 65} - 0.6986M_{\text{Unmarried}} + 0.1879G_{\text{Male}} + 0.3046ES_{\text{Employed}}$$

Predictor	Categories	Odds Ratio	
		USA	Korea
Community Type	Large cities	1.083	1.059
Education	Less than high school	0.213	0.119
	High school graduate	0.553	0.403
Age	18-29	66.894	92.867
	30-49	13.936	5.218
	50-64	3.958	1.977
Marriage	Unmarried	1.041	0.247
Sex	Male	0.856	1.456
Empoyment Status	Employed	1.532	1.839

C: Comparing Logistic Regression Model Between Two Surveys (Cont.)

- Dependent variable: Internet access at home (Yes, No)

$$\text{USA : logit}(\hat{\pi}) = 2.2693 - 0.0106C_{\text{Large cities}} - 0.8431E_{<HS} - 0.0166E_{HS} - 0.1542A_{\leq 29} + 0.1259A_{29 < AGE \leq 49} \\ - 0.0331A_{49 < AGE < 65} - 0.0593M_{\text{Unmarried}} + 0.1326G_{\text{Male}} - 0.0508ES_{\text{Employed}}$$

$$\text{Korea : logit}(\hat{\pi}) = 2.7593 + 0.2688C_{\text{Large cities}} - 1.0031E_{<HS} + 0.2620E_{HS} + 0.9709A_{\leq 29} + 0.2169A_{29 < AGE \leq 49} \\ - 0.4958A_{49 < AGE < 65} - 0.2948M_{\text{Unmarried}} + 0.0006G_{\text{Male}} - 0.5168ES_{\text{Employed}}$$

Predictor	Categories	Odds Ratio	
		USA	Korea
Community Type	Large cities	0.979	1.712
Education	Less than high school	0.182	0.175
	High school graduate	0.416	0.619
Age	18-29	0.806	5.275
	30-49	1.067	2.482
	50-64	0.91	1.217
Marriage	Unmarried	0.888	0.555
Sex	Male	1.304	1.001
Empoyment Status	Employed	0.903	0.356

C: Comparing Logistic Regression Model Between Two Surveys (Cont.)

- Dependent variable: Internet access at work (Yes, No)

$$\text{USA : logit}(\hat{\pi}) = -0.5407 + 0.1509C_{\text{Large cities}} - 0.3795E_{<HS} - 0.4457E_{HS} + 0.4652A_{\leq 29} + 0.3684A_{29 < AGE \leq 49} \\ + 0.1722A_{49 < AGE < 65} - 0.1773M_{\text{Unmarried}} + 0.058G_{\text{Male}} + 0.9262ES_{\text{Employed}}$$

$$\text{Korea : logit}(\hat{\pi}) = -9.9919 + 0.1836C_{\text{Large cities}} - 1.7860E_{<HS} - 0.0423E_{HS} + 1.8831A_{\leq 29} - 0.1669A_{29 < AGE \leq 49} \\ - 0.4037A_{49 < AGE < 65} + 0.1081M_{\text{Unmarried}} - 0.3146G_{\text{Male}} + 11.7851ES_{\text{Employed}}$$

Predictor	Categories	Odds Ratio	
		USA	Korea
Community Type	Large cities	1.352	1.444
Education	Less than high school	0.3	0.027
	High school graduate	0.281	0.154
Age	18-29	4.354	24.426
	30-49	3.952	3.145
	50-64	3.248	2.481
Marriage	Unmarried	0.702	1.241
Sex	Male	1.123	0.533
Empoyment Status	Employed	6.376	>999.999

C: Comparing Logistic Regression Model Between Two Surveys (Cont.)

Summary

- The models have regression coefficients different between the two countries.
- Most variables have odds ratio different between the two countries.
- In addition to variables mentioned above, other variables (i.e., sending/receiving photo or video, downloading/streaming music or video, anywhere Internet access by cell phone wireless Internet) show similar results.

Conclusions

- We have examined whether the demographic correlates of technology access and use often found in the USA hold for South Korea.
- We have identified substantial differences in cell phone use and Internet access (or activities) between the two countries.
- This may imply that methodological findings on modes of data collection from the USA could not be generalized to South Korea.

Thank You.

Contact at skyangel5240@dongguk.edu