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## **Towards the global measurement of the information society: a US-China comparison of national government surveys**

A research note by Kate Williams and Hui Yan  
Submitted to *First Monday*

Note: An invited research poster explicating this study was presented at the UIUC GSLIS Research Day April 6, 2009 and is appended here.

### ***Introduction***

Our current experience of globalization is founded on the broad and transnational use of digital technologies. Scholarship regarding this use, however, is often limited to the national scale at best. As a result, we risk drawing parochial conclusions that trail behind actual social life. This paper demonstrates how to use today's "invisible college" (de Solla Price 1963, 1986, Lievrouw 1990) together with the power of the digital itself to surmount this problem and help achieve global science which can then inform global—and in turn national—policy, especially with regard to standardization.

In order to govern, allocate resources, and plan, all governments who can do so investigate their population's use of computers and the internet. The US and China are two interesting cases: each a global power, one the purported birthplace of all things digital and the other the world's largest production house and consumer market. This paper presents findings from an initial comparison of two national survey efforts, the US Current Population Survey computer and internet use supplements (10 surveys over 1984-2007) and the China Internet Network Information Center's internet development reports (22 surveys over 1997-2008).

Examining and comparing the two surveys' process and content points up agreements, differences, and gaps. Furthermore, the questions asked in China and the US suggest augmenting existing efforts towards global standardization in measuring country-level ICT access and use. Finally, we offer other researchers a guide to our English-language collection of the questions asked in the two surveys.

### ***Method***

Our first task was to collect the surveys (which already exist as digital documents), translate from Chinese, and reformat the digital files for analysis. Kate Williams guided the work and was assisted by Hui Yan, a PhD student at in the Department of Information Management at Peking University and a visiting student at the University of Illinois

Graduate School of Library and Information Science. The US surveys are available online (1990 and newer at <http://www.census.gov/apsd/techdoc/cps/cps-main.html>, pre-1990 at <http://www.census.gov/population/www/socdemo/computer.html>).

While China’s Internet Development Reports are comprehensive and freely available at their website, the questionnaires themselves are not. We used the reports to backwards-engineer the questions. These were translated. All questions concerning demographics and other non-ICT topics were eliminated. A database was then constructed from the inferred Chinese questions and the U.S. questionnaires.

### **Frequency, length, and size of surveys**

The US survey began in 1984; the Chinese survey in 1997. They vary in length, with on average 17 questions (US) and 30 questions (China). Similar patterns over time are evidenced. Each survey gets longer and more detailed as indicated by the number of questions, and then shorter. For the US, the length increases sharply in 1997 and 1998, and shrinks precipitously in 2007. Markers for this work is the 1994 Clinton Gore information superhighway/digital divide policy push, the 2000-2001 dot-com bust, and the 2001 start of the Bush presidency.

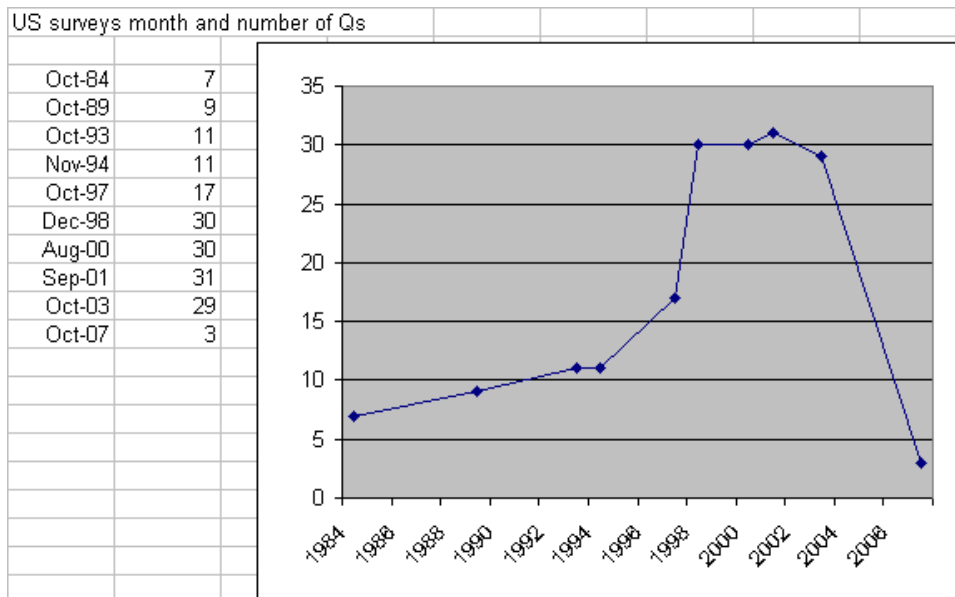


Table 2. US survey by month administered, with number of questions.

In China, the survey lengthens from 1997 to 2004, and then becomes shorter over the years 2005-2008. An additional comparison can be made in the frequency of the surveys. The US survey was conducted 10 times over 23 years. The Chinese survey quickly settled into a rhythm of every 6 months. The US survey has been carried out alongside the much smaller but far more frequent Pew Internet and American Life surveys.

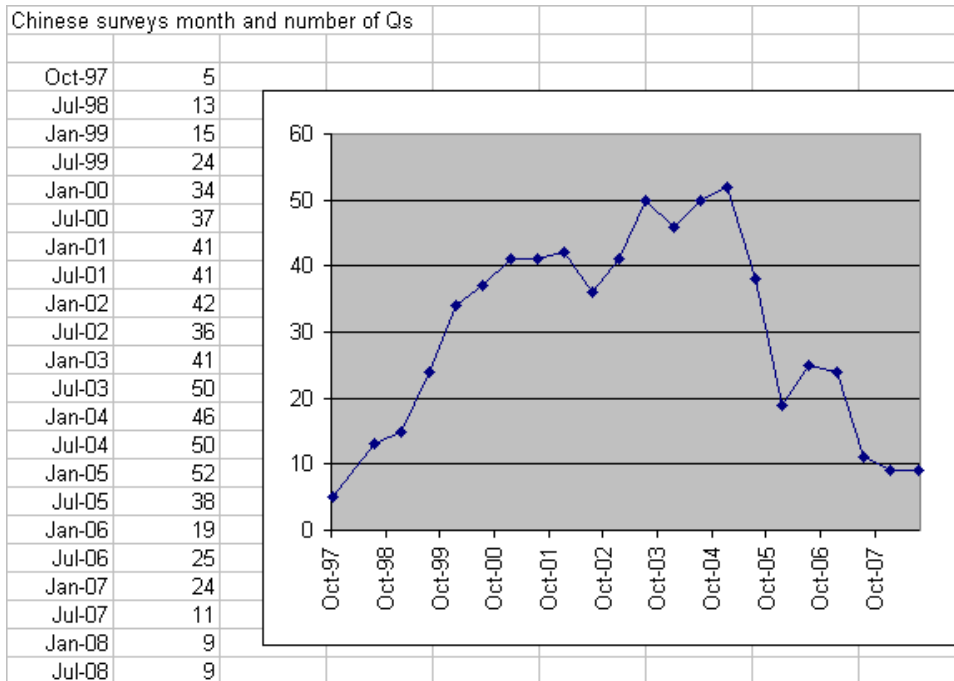


Table 2. China's surveys by month administered, with number of questions.

### ***Size and representativeness of surveys***

	Household units	Household members		Armed forces members	Total number
		Adult	Children		
<b>October, 1984</b>	59,000	169,786	51,482	0	221,268
<b>October, 1989</b>	53,600	180,123	52,667	0	232,790
<b>October, 1993</b>	57,000	110,365	32,764	517	143,646
<b>November, 1994</b>	54,000	107,506	32,110	568	140,184
<b>October, 1997</b>	48,000	95,105	27,755	389	123,249
<b>December, 1998</b>	48,000	95,061	27,490	384	122,935
<b>August, 2000</b>	48,000	94,984	26,449	312	121,745
<b>September, 2001</b>	57,000	111,778	31,098	424	143,300
<b>October, 2003</b>	57,000	109,650	29,932	476	140,058
<b>October, 2007</b>	55,000	106,349	27,169	444	133,962

Table 3. US survey response.

(Note: Household units' numbers are approximate according to US survey reports)

The US survey is carried out by telephone interviews with more than 48,000 households. Generally everyone in the household is interviewed, sometimes by proxy. While 94.6% of US households had landline telephones as of the 2007 American Community Survey (down from 97.6% in the 2000 Census), demographics which evidence lower rates of ownership of landline telephones are oversampled in order to be representative of the entire US population.

	NUMBER OF ONLINE SURVEY REPLY	NUMBER OF TELEPHONE SURVEY		TOTAL SAMPLE
		A+C1	B+C2	
<b>October, 1997</b>	1,802 (Online survey + Questionnaires on the newspaper named "Computer World")			1,802
<b>July, 1998</b>	2,494		0	2,494
<b>January, 1999</b>	> 22,000		0	> 22,000
<b>July, 1999</b>	52,549		0	52,549
<b>January, 2000</b>	202,432		0	202,432
<b>July, 2000</b>	573,902		3,679	577,581
<b>January, 2001</b>	26,667		62,620 + 6,000 (face-to-face interviewees)	95,287
<b>July, 2001</b>	78,342		52,700	131,042
<b>January, 2002</b>	64,627		52,700	117,327
<b>July, 2002</b>	14,592		4,800	19,752
<b>January, 2003</b>	29,948		49,600	79,548
<b>July, 2003</b>	19,096		4,800	23,896
<b>January, 2004</b>	16,760		49,600	66,360
<b>July, 2004</b>	17,833		7,200	25,033
<b>January, 2005</b>	23,506		49,600	73,106
<b>July, 2005</b>	18,136	5,000	4,000	27,136
<b>January, 2006</b>	24,068		32,106	56,174
<b>July, 2006</b>	16,332	7,200	4,000	27,532
<b>January, 2007</b>	20,183		32,325	52,508
<b>July, 2007</b>	21,714	7,500	5,000	34,214
<b>January, 2008</b>	69,559	31,802	4,000+10,498	115,859
<b>July, 2008</b>	--	7,000	2,000+7,000	16,000

Table 4. China survey response. A+C1 indicates residents with household telephones (including the handy phone, a reduced price cell phone); B indicates college students boarding at school; and C2 indicates residents without home phone but with cellphones.

The US survey scale began with a large scale, then dropped to 0.14 million and basically keeps the similar number from 1993 to 2007. The Chinese survey is sometimes larger, sometimes smaller and has been carried out in multiple modalities. As of end of 2008, 50% of individuals have household phones (including the handy phone, a reduced price cell phone) and 38% of individuals have cell phones (cite). The CNNIC estimates that those without any phones are not online. With this assumption and with the large online

response, it is possible that the survey is missing more than 12% of Chinese people and is not representative of the whole population.

The largest-N survey by far was in July 2000 near the peak of the dot-com boom.

### ***Diversity of questions***

US surveys	Questions	New questions	New as percent	China surveys	Questions	New questions	New as percent
Oct 1984	7	7	100%				
Oct 1989	9	2	22%				
Oct 1993	11	2	18%				
Nov 1994	10	6	60%				
Oct 1997	16	5	31%	Oct 1997	5	5	100%
				Jul 1998	13	8	62%
Dec 1998	26	19	73%	Jan 1999	15	7	47%
				Jul 1999	24	13	54%
				Jan 2000	34	19	56%
Aug 2000	26	1	4%	Jul 2000	38	14	37%
				Jan 2001	42	6	14%
Sep 2001	31	15	48%	Jul 2001	42	2	5%
				Jan 2002	43	8	19%
				Jul 2002	37	7	19%
				Jan 2003	42	6	14%
				Jul 2003	51	17	33%
Oct 2003	29	4	14%	Jan 2004	47	5	11%
				Jul 2004	51	7	14%
				Jan 2005	52	9	17%
				Jul 2005	39	20	51%
				Jan 2006	16	4	25%
				Jul 2006	24	12	50%
				Jan 2007	22	10	45%
				Jul 2007	11	3	27%
Oct 2007	3	0	0%	Jan 2008	10	2	20%
				Jul 2008	10	0	0%

Table 5. New questions introduced over time: a bird’s eye view of 25 years of surveys.

There is some churning to the questions asked each time the survey is offered. New questions are posed, old questions are dropped, and persistent questions may change in wording. Overlooking changes in wording, we can see periods of stability (in China 2001-2003, for instance) and experimentation (as in the US in December 1998).

December 1998 in the US and July 1999 in China are two surveys at almost the same moment that reflect both innovation (many new questions) AND breadth (many questions altogether), about which more below.

## **Content of surveys**

<b>Question categories</b>	<b>US</b>	<b>China</b>	<b>US as %</b>	<b>China as %</b>
uses	46	310	27%	46%
connecting	35	37	20%	6%
places	34	25	20%	4%
ownership	29	0	17%	0%
attitude	12	209	7%	31%
devices	9	15	5%	2%
frequency	7	50	4%	7%
identity	0	17	0%	3%
discourse	0	5	0%	1%
All questions asked	172	668	100%	100%

Table 6. A typology of computer/internet use questions asked by the Chinese and US surveys.

Nine categories emerged from a coding of all the survey questions. The US survey emphasizes ICT uses, details of connecting to the Internet, places people use ICT, and ownership of digital tools. The Chinese survey emphasizes ICT uses and people's attitudes towards all aspects of ICTs. Reflecting a socialist ideology, there are no questions about ownership. On the other hand, while the Chinese quite steadily maintain a question about "netizens"—with small shifts in the definition of this term—the US survey does not conceptualize or name people who use the internet. Following from this, the US does not ask people what they know about computers and the internet, while the Chinese ask people if they know certain technological terms from the current discourse.

## ***Global standardization: towards a model questionnaire***

<b>Question categories</b>	<b>US</b>	<b>China</b>	<b>ITU</b>	<b>OECD</b>
uses	✓	✓	✓	✓
connecting	✓	✓	✓	✓
places	✓	✓	✓	✓
ownership	✓		✓	
attitude	✓	✓		
devices	✓	✓	✓	✓
frequency	✓	✓		✓
identity		✓	✓	
discourse		✓		

Table 7. A comparison of the Chinese-US question typology with existing frameworks for global standardization of data collection.

International Telecommunication Union (ITU) includes questions on ICT uses, connecting, places, ownership, devices, and identity into its ICT indicators, while Organization for Economic Co-operation and Development (OECD) proposed questions on ICT uses, connecting, places, devices, and frequency for survey. Both of them don't take attitude and discourse into account. The reason might be their survey purpose of understanding the ICT access and use of households and individuals.

<b>Question categories</b>	<b>Model question</b>
frequency	How often do you use ICT?
places	Where do you use ICT?
uses	How do you use ICT?
devices	What ICT devices (hardware, software) do you use?
connecting	What mechanism do you use to connect to the Internet?
ownership	What ICT do you own?
attitude	What is your attitude towards ICT?
discourse	What ICT-related concepts do you know?
identity	Are you a netizen?

Table 8. Questions for a model survey.

These questions could be asked worldwide with control variation appropriate to the country, but yielding comparative data. The identity question expresses both practice and self-conceptualization. The discourse question addresses not skills but knowledge, part of mastery of the new tools and the new society. The questions taken together incorporate the US focus that is rooted in the digital divide origins of the US survey: who is

connected, where, what are they doing. And they incorporate the Chinese focus on their population's experience and attitude towards the digital age, conceptualized neatly and powerfully as the netizen.

## ***Guide to the collection***

The two surveys are documented in a book available from <provide address to UI repository>. the database is available from the authors.

## **Bibliography**

US surveys (supplements to the Current Population Survey) from 1990 - present are online at <http://www.census.gov/aprd/techdoc/cps/cps-main.html>. Earlier documentation is online at <http://www.census.gov/population/www/socdemo/computer.html>

China surveys (by CNNIC) from Oct. 1997 – present are online at <http://www.cnnic.net/index/0E/00/11/index.htm>

Bollen, Kenneth A., Barbara Entwisle, and Arthur S. Alderson. 1993. Macrocomparative research methods. Pp. 321-351 in *Annual Review of Sociology*, vol. Vol.19. Annual Reviews

International Telecommunication Union (ITU). nd. Definitions of World Telecommunication/ ICT indicators final version (April 2007). [www.itu.int/ITU-D/ict/material/IndDef\\_e\\_v2007.doc](http://www.itu.int/ITU-D/ict/material/IndDef_e_v2007.doc) (Accessed March 2, 2009).

International Telecommunication Union (ITU). Definitions of World Telecommunication/ ICT indicators final version (April 2007). [www.itu.int/ITU-D/ict/material/IndDef\\_e\\_v2007.doc](http://www.itu.int/ITU-D/ict/material/IndDef_e_v2007.doc)

Internet Measurement Conference (IMC). <http://www.imconf.net/> (Accessed March 2, 2009).

Internet Measurement Conference 2009. <http://www.imconf.net/imc-2009/> (Accessed March 2, 2009).

James, Jeffrey. (2009). Measuring the global digital divide at the level of individuals.” *Current Science* 96:194-197.

Lievrouw, L. A. (1990). Reconciling structure and process in the study of scholarly communication. In C. L. Borgman (Ed.), *Scholarly communication and bibliometrics* (pp. 59-69). Newbury Park, CA: Sage.



Magpantay , Esperanza. ICT Usage Indicators Data collection and Dissemination Hong Kong, China Case Study. [http://www.itu.int/ITU-D/ict/papers/2004/ITU\\_HKG\\_SP.ppt](http://www.itu.int/ITU-D/ict/papers/2004/ITU_HKG_SP.ppt) (Accessed March 2, 2009).

OECD. OECD Information Technology Outlook. <http://browse.oecdbookshop.org/oecd/pdfs/browseit/9308041E.PDF> (Accessed March 2, 2009).

OECD. OECD model survey of ICT access and use by households and individuals. <http://www.oecd.org/dataoecd/49/42/35930682.pdf> (Accessed March 2, 2009).

Price, D. J. de Solla. (1963). Little science, big science. New York: Columbia University Press.

Price, D. J. de Solla. (1986). Little science, big science ... and beyond. New York: Columbia University Press.

Wirthmann, Albrecht. nd. EUROSTAT ICT usage surveys. [http://www.itu.int/ITU-D/ict/conferences/geneva08/Session3\\_Wirthmann\\_EUROSTATsurveysv2.ppt](http://www.itu.int/ITU-D/ict/conferences/geneva08/Session3_Wirthmann_EUROSTATsurveysv2.ppt) (Accessed March 2, 2009).

Working Party on Indicators for the Information Society. ICT access and use by households and individuals: revised OECD model survey. <http://www.oecd.org/dataoecd/58/27/35937246.pdf> (Accessed March 2, 2009).

Yang, Guobin. (2003) The co-evolution of the internet and civil society in China. *Asian survey* 43: 405-422.

Zittrain, Jonathan. nd. Empirical Analysis of Internet Filtering in China.” <http://cyber.law.harvard.edu/filtering/china/> (Accessed March 2, 2009).

# Towards Global Measurement: Comparing US-China ICT Use Surveys

## 中美ICT利用状况普查“提问”的比较及全球测度建议

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### Research purpose

- To be **global, digital, inclusive**, we need to measure ICT use globally.
- The **questions** asked in China and the US suggest augmenting existing efforts towards global standardization in measuring country-level ICT access and use.
- Examining and comparing the two surveys' process and content points up agreements, differences, and silences.

### Methodology

#### Collect the surveys

US - Current Population Survey computer and internet use supplements: 10 surveys over 1984-2007.

China - Internet Development Reports: 22 surveys over 1997-2008; While China's Internet Development Reports are comprehensive and freely available at their website, the questionnaires themselves are not. We used the reports to backwards-engineer the questions.



Translate from Chinese & reformat the digital files for analysis

Organize an ICT survey questions dataset

Code questions in surveys

Analyze basic statistical data

### Many questions developed and asked

US surveys	Questions	New questions	New as percent	China surveys	Questions	New questions	New as percent
Oct 1984	7	7	100%				
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				Jul 2005	39	20	51%
				Jan 2006	16	4	25%

- New questions are posed, old questions are dropped, persistent questions may change in wording. Over-looking changes in wording, we can see periods of stability (China 2001-2003) and experimentation (US December 1998)

### 9 categories of questions

Question categories	US	China	US as %	China as %
Uses	46	310	27%	46%
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Ownership	29	0	17%	0%
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Frequency	7	50	4%	7%
Identity	0	17	0%	3%
Discourse	0	5	0%	1%
All questions asked	172	668	100%	100%

- While China maintains a question about "netizens", the US survey does not conceptualize or name people who use the internet.

- The identity question expresses both **practice and self-conceptualization**.
- The US does **not** ask people **what they know about ICT**, while China asks people if they know certain technological terms from the current discourse.
- The **discourse** question addresses not skills but the **knowledge, part of mastery of the new tools and the new society**

### Global standardization

Question categories	US	China	ITU	OECD
Uses	✓	✓	✓	✓
Connecting	✓	✓	✓	✓
Places	✓	✓	✓	✓
Ownership	✓	✓	✓	✓
Attitude	✓	✓	✓	✓
Devices	✓	✓	✓	✓
Frequency	✓	✓	✓	✓
Identity	✓	✓	✓	✓
Discourse	✓	✓	✓	✓

- ITU (International Telecommunication Union) and OECD (Organisation for Economic Co-operation and Development) are the two international organizations that carry out surveys. Their questions are not as comprehensive as US or China.

We propose all national/international surveys ask these questions

Question categories	Model question
Frequency	How often do you use ICT?
Places	Where do you use ICT?
Uses	How do you use ICT?
Devices	What ICT devices (hardware, software) do you use?
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