Cultural Patterns of Information Source Use: A Global Study of 47 Countries

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The aim of this study was to investigate the relationships between national culture and information source use (ISU) on a global level. A secondary analysis was carried out on three different data sets. They were (a) country-level data on ISU from World Values Survey (2005–2009); (b) country-specific mean scores of Hofstede's national culture dimensions (HNCD) of individualism (IDV), power distance (PDI), time orientation, uncertainty avoidance (UAI), masculinity (MAS), and indulgence (IVR); and (c) measures of wealth. The analysis showed the importance of three national culture dimensions of PDI (the way people of a nation interact with authorities), IDV (the degree of centrality of person or groups in a country), and IVR (the agreeableness of joy and happiness in a country) for explaining the cross-cultural differences of ISU. The findings were explained through HNCD, and four cultural patterns of ISU were identified. However, further research is required to better understand the complex relationships of cultural factors, ISU, and other societal variables.

Introduction

Many factors influence information seeking and use of individuals. There is a wide range of studies aiming to understand why and how people seek and use information and its sources (cf. Case & Given, 2016). For example, demographic, psychological, socio-cultural, and source-, system- and content-related aspects have been found to explain individuals' information seeking and use in a number of quantitative investigations (e.g., Al-Samarraie, Eldenfria, & Dawoud, 2017; Khosrowjerdi & Sundqvist, 2016; Niu & Hemminger, 2012; Rowley, Johnson, & Sbaffi, 2017; Zimmer & Henry, 2017). Several studies bring forth culture as an antecedent of information related activities (Catellier & Yang, 2012; Jemielniak & Wilamowski, 2017; Neumark, Lopez-Quintero, Feldman, Hirsch Allen, & Shtarkshall, 2013; Oh & Kim, 2014; Yoon & Kim, 2014). An overarching definition depicts culture as "the set of shared attitudes, values, goals, and practices that characterizes an institution … a racial, religious, or social group" (Merriam-Webster Dictionary, 2017). Culture may be seen as a "multi-level" (Pizam, 1993, p. 206) and "multi-layer" (Hofstede, Hofstede, & Minkov, 2010) construct, composed on individual, professional, institutional, and national levels (Chen, Cheung, & Law, 2012). Hofstede likened the cultural levels as the layers of an "onion", in which the "values" (or national culture) forms the core of the "onion" and influences outer layers that is "rituals" (e.g., spiritual activities), "heroes" (e.g., Batman, Napoleon, etc.), and "symbols" (e.g., customs, haircuts, etc.; Hofstede et al., 2010, p. 8).

The aim of this study is to investigate possible relationships between national culture dimensions and information source use (ISU) in cross-country level. Thus, the evidence on interactions of cultural dimensions and ISU are reviewed to point out the rationale for the study, theory choice, and the research question for this study.

Problem Statement and Research Questions

The relationships of cultural factors and information system use are widely confirmed in the literature. In an early study of culture and information technology use, Straub (1994) found that the information technology (fax and email) usage differed in Japanese and American companies. Whereas the American companies welcomed email, the Japanese were not readily positive. The finding was explained by a higher avoidance of uncertainty in the Japanese culture as well as by the complexity of Japanese language symbols. Culture has often been used to study website use. Huang and Chang (2009) investigated the website visiting patterns in 101 countries by analyzing the user data reported by Alexa. com. They found that Internet users in countries that have similar language, religious beliefs, social norms, and economic development were likely to visit similar websites. Similarly, Gevorgyan and Manucharova (2009) in a survey of American and Chinese students found that cultural dimension of individualism (IDV) influenced significantly web design preferences of users, that is, the Chinese students favored collectivistic features of websites, and the Americans students preferred the individualistic design of websites. Finally, Zhao, Shen, and Collier (2014) investigated the relationships of national culture and the e-government diffusion by correlating the country-level indexes of e-government development and e-government participation reported by United Nations with socio-cultural practices from the Global Leadership and Organizational Behavior Effectiveness (GLOBE) project. For the societies with higher Gross Domestic Product (GDP), e-government development was negatively correlated with in-group collectivism (i.e., "The degree to which individuals express pride, loyalty, and cohesiveness in their organizations or families", Dorfman, Javidan, Hanges, Dastmalchian, & House, 2012, p. 516) and positively correlated with "future orientation" (i.e., "the extent to which individuals engage in future-oriented behaviors such as delaying gratification, planning, and investing in the future"; Dorfman et al., 2012, p. 516). In addition, their analysis revealed a positive correlation of future orientation with e-participation only for richer nations.

Hofstede's National Culture Dimensions (HNCD) have also been suggested to have potential in explaining cross-cultural differences of information seeking and use (cf. Wilson, 1997, p. 561); especially the dimensions of power distance (PDI), IDV, and uncertainty avoidance (UAI) have been expected to influence individuals' information related activities (Steinwachs, 1999). There are some empirical studies that focus on relationships between national culture (or its dimensions) and information seeking and use. For example, Gaston, Dorner, and Johnstone's (2015) qualitative study revealed the influence of social and cultural environment (especially religious beliefs) on information behavior of Laotians. For example, the informants in the noted study frequently reported visiting a religious place (e.g., a "temple") or clergies (e.g., "monk" or "fortuneteller") in their information seeking processes. The researchers explained these observations with "Dervin's sense-making metaphor," that is "… the individual seeks some kind of understanding, resolution, or comfort to bridge a gap in their lives" (Gaston et al., 2015, p. 15). In an experimental setting, Hsieh (2014) found that the Australian and Taiwanese users spent less time to carry an information task on those websites tailored with their cultural preferences. Somewhat similarly, Hsu and Chang (2014) found a positive influence of inter-personal trust and a negative effect of uncertainty perceptions on knowledge sharing in a study of Chinese-speaking employees of telecommunication companies in Taiwan. Lastly, in a survey of Chinese firms, Wang, Su, and Yang (2011) found that institutional collectivism influenced knowledge production positively, while organizational PDI and UAI influenced knowledge production negatively. However, not all research supports the existence of relationships between culture and information related activities. For example, in a quantitative survey on uploading behavior of American and South Korean students, Park, Oh, and Kang (2015) found that of the investigated cultural factor (IDV vs. collectivism) and "ego involvement" (the inclusion of self-esteem in performing a task) only the "ego involvement" predicted the intention to upload contents in Wikipedia. Finally, in a qualitative interview with 58 high school students (of three schools in Indiana and New York City), Jones, Biddlecom, Hebert, and Mellor (2011) did not find verifications for the association of cultural factors (i.e., race and ethnicity) and sexual information seeking of teens.

In conclusion, the research on cultural factors and ISU has so far found, with few exceptions, a relationship between the preferences and uses of different information sources among different cultural groups. However, most research has focused on comparisons of only two culturally different groups and only few types of information sources, whereas large-scale comparative studies on several cultural aspects and several types of information sources are still missing. This lack of research is identified by both Ford, Connelly, and Meister (2003), who showed the dearth of proper applications of HNCD in investigating information systems use, and Komlodi (2005, p. 111), who calls for more inter-cultural studies within information studies. As Komlodi (2005) explains:

> Most of existing cross-cultural information behavior research reports differences in behavior, without examining the cultural variables to identify why these differences occur. A more thorough study of the impact of culture on information behavior will lead to deeper understanding of behavior and enable the designers of search systems to create interfaces that will be more usable by users from different cultural background. (Komlodi, 2005, p.112)

The current study is going to fill the long-lasting gap indicated by Ford et al. (2003) and Komlodi (2005), and to examine the, to our knowledge, unexamined hypotheses provided by Steinwachs (1999). We use previously gathered large-scale country-level data in order to investigate the relationships between culture and ISU. Based on our knowledge, this research is the first study, which directly

links HNCD with the ISU in cross-country level. The research question posed in this study is:

How does Hofstede's national culture dimensions relate to information source use in a cross-country comparison, if at all.

Theoretical Foundation

Several researchers have developed models or theories to explain the cultural values of various societies. Hofstede's national culture dimensions, abbreviated as HNCD in this study, (Hofstede, 1980, 2001), GLOBE model (House, Hanges, Javidan, Dorfman, & Gupta, 2004), and Hall's cultural dimensions (Hall, 1981) are popular in cross-cultural frameworks. Of these HNCD has been widely used and cited in different disciplines. For instance, the previous researchers have applied these dimensions in business (e.g., Chan & Cheung, 2016), marketing (e.g., Garrett, Buisson, & Yap, 2006), human-computer interaction (e.g., Krishnan & Lymm, 2016), management and leadership (e.g., Černe, Jaklič, & Škerlavaj, 2013), tourism (e.g., Matzler, Strobl, Stokburger-Sauer, Bobovnicky, & Bauer, 2016), accounting (e.g., Kitching, Mashruwala, & Pevzner, 2016), long-range planning (e.g., Garcia-Sanchez, Cuadrado-Ballesteros, & Frias-Aceituno, 2016).

Many researchers have criticized Hofstede's approach (e.g., Baskerville, 2003, 2005; Javidan, House, Dorfman, Hanges, & De Luque, 2006; McSweeney, 2002) for limitations of survey method, the reduction of culture into dimensions, the oldness of data, etc. However, a bibliometric investigation of "reviews, citations, and replications" of HNCD supports its validity over time (Søndergaard, 1994). Likewise, a relatively recent review (Taras, Rowney, & Steel, 2009) concludes the effectiveness of his cultural dimensions in predicting the investigated variables and the predominance of HNCD in cultural studies (Taras et al., 2009, p. 360). It has also been promoted within information studies (Wilson, 1997; Komlodi, 2005; Khosrowjerdi, 2016, p. 202). Due to the undoubtingly wide disciplinary applicability and previous, but little tried, interest in the area of ISU we have chosen HNCD (Hofstede, 1980; Hofstede et al., 2010) for the cultural framework of the present study.

The original HNCD (Hofstede, 1980) included four dimensions, that is PDI (small vs. large), IDV vs. collectivism, UAI (high vs. low), and masculinity (MAS) versus femininity. Later, two other dimensions were added to this cultural module: long-term versus short-term orientation (Hofstede, 2001), and IVR versus restraint (Hofstede et al., 2010). These six dimensions are described below.

PDI is the degree of acceptance and agreeableness of power inequality in society among lower classes of individuals in a society (Hofstede, 2011, p. 9). This is manifested for instance in relationships between children and parents, youths and elders, students and teachers, and sub-ordinates and superiors, etc. (Hofstede et al., 2010, p. 61). Countries with high PDI (e.g., Ghana, India, and Ukraine) are characterized by hierarchical structures, authoritarian leadership and an unequal distribution of income; while countries with low power structures (e.g., Australia, Norway, and United States) show more pluralist leadership and an equal distribution of power and income (Hofstede et al., 2010, pp. 57–61).

In the view of Hofstede (2011), *UAI* is to what degree a society is tolerant of ambiguity and unstructured situations, which is "novel, unknown, surprising, and different from usual" (Hofstede, 2011, p. 10). "Uncertainty avoiding" cultures (e.g., Argentina, France, and Russia) are controlled and ruled by strict behavioral norms aiming at uniformity. In "uncertainty accepting" societies (e.g., China, Great Britain, and Malaysia), change, ambiguity and pluralistic views and behaviors are accepted (Hofstede, 2011, p. 10; Hofstede et al., 2010, pp. 118–195).

In HNCD, IDV *vs.* collectivism is defined as the extent of group orientations among people in a society (Hofstede, 2011, p. 11). Individualistic cultures (e.g., Finland, Hungary, and United States) are characterized by loose ties between individuals, a focus on personal integrity, privacy and striving for individual fulfillment. In collectivistic cultures (e.g., China, South Korea, and Taiwan), people are integrated into and sub-ordinated to groups, often family based, which demand loyalty, and the individuals' performance are directed towards the aim of the group (Hofstede, 2011, p. 11; Hofstede et al., 2010, pp. 95–98).

Societies could also be defined by *MAS vs. femininity*, that is, the adherence to values that traditionally are regarded as masculine or feminine (Hofstede, 2011, p. 12). Societies dominated by a masculine culture (e.g., Colombia, Germany, and Japan) are assertive and competitive, and they are characterized by larger gender inequality. Societies appreciating modest and caring values (e.g., Chile, Slovenia and Sweden) are considered as feminine. Women have a stronger position in feminine societies, and societies dominated by so-called feminine values are generally more equal (Hofstede et al., 2010, pp. 140–143).

According to Hofstede (2011, p. 15), in *long-term oriented* societies (e.g., East Asian cultures), the people believe that life's imperative events will happen "in the future," and their emphasis is on persistence, efforts, and savings. As an opposite, the individuals from nations with *short-term orientation* (e.g., United States and Australia) feel that life's imperative events happened "in the past" or is occurring "now"; they do not have so much futuristic approach, and their emphasis is on results and spending (Hofstede, 2011, p. 15; Hofstede et al., 2010, p. 251).

The final dimension is *IVR vs. restraint*. Hofstede (2011, p. 15) claims that "indulgent" societies (e.g., Australia, Finland, and South Africa) are characterized by a focus on "happiness" and personal fulfillment. The latter is manifested by for example a high regard of freedom of expression and "personal life control" (Hofstede et al., 2010, p. 291). In "restraint" societies (e.g., Egypt, Italy, and Morocco), personal needs and desires are controlled and regulated by social norms, and individual achievement has limited impact on the pursuit of happiness (Hofstede et al., 2010, pp. 281–285).

Methods and Data

This study is a secondary data analysis, which means that we re-use data that is previously gathered by other researchers for other purposes, and we re-analysis it to investigate a new research problem (cf. Glass, 1976, p. 3; Polit & Beck, 2004). It is a cost effective and potentially efficient research method (McArt & McDougal, 1985). The study uses three sets of statistical data as described below. All these datasets are publicly available and entirely anonymised, so there is no specific ethical consideration that needs to be taken into consideration in the present study (cf. Tripathy, 2013). However, the included data have been cited properly in order to acknowledge the sources.

Information Source Use Data

World Values Survey (WVS) provides the data of global surveys (Waves) by Inglehart and colleagues in different periods on different aspects of culture and society. The surveys consisted mostly of face-to-face interviews. The researchers covered respondents from 97 countries, representing 90% of world's population (Inglehart, 2015, p. 345). Six waves of WVSs were carried out between 1981–2014 on a cross-sectional sample of individuals aged 18 years and older. The details of WVS methodology can be retrieved from http://www.worldvaluessurvey.org/WVSContents.jsp.

For the dependent variable as "ISU", we use the WVS Wave 1 (2005–2009) data (extracted from aggregate datafile; WVS, 1981-2014) of the statements on information use as answers to the question: *"People use different sources to learn what is going on in their country and the world. For each of the following sources, please indicate whether you used it last week or did not use it last week to obtain information (read out and code one answer for each)."* The respondents reported the usage of daily newspaper, news broadcasts on radio or TV, printed magazines, in-depth reports on radio or TV, books, internet/email, and talk with friends or colleagues as 1 = used [the source] last week, 2 = not used [the source] last week, 3 = no answer, 4 = do not know. Based on these data, we used following formulas (Table 1) to calculate the ISU of countries. In order to make these mean scores

approximately between 0–100, we used different constant numbers for each type of information source.

For example, for Argentina (N = 986), 20.59% of respondents (n = 203) answered to the question of using printed magazines as "used the source last week," and 79.41% of respondents (n = 783) replied "not used the source last week." Thus, based on the formula above:

> Printed magazine usage index for Argentina = 90 + (20.59 - 79.41) = 31.18

After this step, we calculated the mean score of ISU for each country based on the mean scores of each dimensions of ISU, for instance:

> ISU for Argentina = Mean (daily newspaper usage index, radio/TV usage index, printed magazines usage index, in-depth reports on Radio/TV usage index, books usage index, internet/email usage index, talk with friends or colleagues index) = 38.63

The calculated ISU for each country is illustrated in Table 2. It worth mentioning, the response rate to the dimensions of ISU in WVS was more than 90%.

Culture Data

The mean scores for each dimension of national culture, as independent variable in our study, were extracted from http://geerthofstede.com/research-and-vsm/dimension-data-matrix/ (Table 2). The scores of dimensions are available for 76 countries, partly based on "replications" and "extensions" of the IBM study on different international populations and by different researchers (Hofstede et al., 2010, p. 58).

Wealth Data

Researchers found the intervention of wealth of countries in the relationship of HNCD and investigated dependent variables (e.g., Deschepper et al., 2008; Hofstede, 2001). Thus, it is probable that wealth of countries has an intervention between cultural dimensions and ISU too. For this purpose, we will use gross domestic product per capita

TABLE 1. Information source use (ISU) index for each country.

Types of information source	Formula
Using daily newspapers	70 + (% respondents who used daily newspapers last week – % respondents who not used it last week)
Using news broadcasts on radio or TV	(% respondents who used news broadcasts on radio or TV last week – % respondents who not used it last week) – 15
Using printed magazines	90 + (% respondents who used printed magazines last week – % respondents who not used it the source last week)
Using in-depth reports on radio or TV	35 + (% respondents who used in-depth reports on radio or TV last week – % respondents who not used it last week)
Using books	85 + (% respondents who used books last week – % respondents who not used it last week)
Using internet / email	87 + (% respondents who used internet / email last week – % respondents who not used it last week)
Talk with friends or colleagues to gain information	10 + (% respondents who talked with friends or colleagues to gain information last week – % respondents who not used it last week)

TABLE 2.   National culture, information source use (ISU), and wealth data.

Countries	Hofstede's national culture dimensions (HNCD)						ISU	Wealth	
	PDI	IDV	MAS	UAI	LTO	IVR		GDP - PPP (2007)	GNI per capita (2007)
Argentina	49	46	56	86	20	62	38.63	16865.5	6470
Australia	36	90	61	51	21	71	96.39	36596.0	37340
Brazil	69	38	49	76	44	59	59.05	12503.6	6030
Bulgaria	70	30	40	85	69	16	55.11	12898.0	4860
Burkina Faso	70	15	50	55	27	18	22.83	1226.9	460
Canada	39	80	52	48	36	68	83.80	39442.0	41420
Chile	63	23	28	86	31	68	56.86	16862.9	8700
China	80	20	66	30	87	24	27.76	6864.0	2510
Colombia	67	13	64	80	13	83	39.81	9710.9	4070
Egypt	70	25	45	80	7	4	25.89	8327.4	1510
Ethiopia	70	20	65	55	-	-	51.18	807.4	220
Finland	33	63	26	59	38	57	99.47	37688.4	46040
France	68	71	43	86	63	48	71.90	34150.6	40250
Germany	35	67	66	65	83	40	86.27	36436.5	40700
Ghana	80	15	40	65	4	72	36.16	2520.7	800
Hungary	46	80	88	82	58	31	65.12	18933.9	11820
India	77	48	56	40	51	26	26.36	3484.9	920
Indonesia	78	14	46	48	62	38	64.10	7019.7	1600
Iran	58	41	43	59	14	40	51.98	15459.7	4140
Italy	50	76	70	75	61	30	84.61	33983.2	35820
Japan	54	46	95	92	88	42	83.27	34529.1	38740
Jordan	54	46	95	92	88	42	35.04	8944.5	2760
Malaysia	100	26	50	36	41	57	83.18	27822.9	6780
Mexico	81	30	69	82	24	97	53.23	19488.4	9190
Morocco	70	46	53	68	14	25	42.60	13877.3	2370
Netherlands	38	80	14	53	67	68	94.48	5496.6	49390
Norway	31	69	8	50	35	55	101.45	43462.0	78400
Peru	64	16	42	87	25	46	54.28	55847.1	3200
Poland	68	60	64	93	38	29	73.89	8148.9	9940
Romania	90	30	42	90	52	20	51.52	16781.4	6520
Russia	93	39	36	95	81	20	63.02	13442.6	7560
Serbia and Motenegro[a]	86	25	43	92	52	28	62.22	16648.6	4580
Slovenia	71	27	19	88	49	48	64.51	10472.1	21920
South Africa	49	65	63	49	34	63	37.47	27594.8	5940
South Korea	60	18	39	85	100	29	76.78	11289.4	22420
Spain	57	51	42	86	48	44	47.85	32584.3	29920
Sweden	31	71	5	29	53	78	104.52	40563.8	52010
Switzerland	34	68	70	58	74	66	103.41	49467.2	62680
Taiwan	58	17	45	69	93	49	46.60	–	
Thailand	64	20	34	64	32	45	51.83	11878.0	3530
Trinidad and Tobago	47	16	58	55	13	80	72.63	29252.1	14990
Turkey	66	37	45	85	49	49	40.34	14840.2	8880
Ukraine	92	25	27	95	55	18	54.95	8005.7	2570
United Kingdom	35	89	66	35	51	69	80.40	35151.3	47790
United States	40	91	62	46	26	68	77.02	48061.5	48640
Uruguay	61	36	38	99	26	53	33.98	13501.6	6370
Vietnam	70	20	40	30	57	35	47.83	3681.3	850
Zambia	60	35	40	50	30	42	38.49	2589.9	880

[a]*Note*. In June 2006 Serbia and Montenegro became separate and sovereign republics.

(GDP PPP) and gross national income per capita (GNI PPP) as measures of wealth. The GDP is the total income of a country. GDP - per capita (PPP) compares the income of a country on a purchasing power parity basis (i.e., "the ratio of prices in national currencies of the same good or service in different countries") divided by population of country for the same year (OECD data, 2017). The GNI per capita consists the total internal income of a country alongside the external income of the same country (e.g., through interests, etc.; World Bank, 2017a).

Although GDP PPP is widely used to measure the wealth of nations, some researchers highlight the limitations of this index (Costanza, Hart, Talberth, & Posner, 2009), and others used GNI PPP as an alternative to GDP PPP (e.g., Hofstede et al., 2010). In this study, both of wealth indicators are included to show the possible effects of different economic indicators in the interactions of national culture and ISU.

The included dataset of WVS in this study was for 2005–2009. In order to align WVS data with the wealth data, the middle point of WVS data (i.e. 2007) was based

TABLE 3. Descriptive statistics of included variables in this study.

		N^a	Minimum	Maximum	Mean	Std. deviation
Hofstede's national culture dimensions (HNCD)	PDI	48	31.00	100.00	61.0833	17.97023
	IDV	48	13.00	91.00	43.2083	24.13081
	MAS	48	5.00	95.00	49.1250	19.44400
	UAI	48	29.00	99.00	68.0000	20.57162
	LTO	47	4.00	100.00	46.4681	24.70597
	IVR	47	4.00	97.00	47.2340	20.82976
Information source use (ISU)		48	22.83	104.52	60.8348	22.65617
Wealth	GDP PPP	47	807.4	55847.1	20323.506	14718.5939
	GNI per capita	47	220.00	78400.00	17968.0851	20323.96921

[a]Number of countries included in this study.

for GDP PPP and GNI per capita. The included GDP PPP and GNI per capita – Atlas Method (see: World Bank, 2017b; Table 2) was obtained from World Bank via http://databank.worldbank.org (accessed 06 Nov. 2017).

Findings

Six countries from the WVS study (i.e. Andorra, Cyprus, Georgia, Mali, Moldova, and Rwanda) could not be included because of lack of data on HNCD. Hence, correlations for four of six dimensions of culture could be calculated for 48 countries. For long-term orientation (LTO), and for IVR dimension of culture and for some dimensions of ISU (i.e., using radio or TV, magazines, and in-depth reports on radio or TV) fewer correlations could be calculated because indexes on the these dimensions were not available for Ethiopia, Iran and Turkey. The descriptive features of included variables in this study are summarized in Table 3.

The Pearson correlation analysis showed significantly negative correlations of PDI with ISU. In addition, this analysis revealed significantly positive correlations of IDV and IVR with ISU (Table 4).

TABLE 4. The correlations of national culture dimensions, wealth, and information source use (ISU).

		ISU
Hofstede's national culture dimensions (HNCD)	**Individualism (IDV)**	.603[a]
	N =	48
	Power distance (PDI)	−.555[a]
	N =	48
	Indulgence (IVR)	.353[b]
	N =	47
	Masculinity (MAS)	−.149
	N =	48
	Uncertainty avoidance (UAI)	−.209
	N =	48
	Long-term orientation (LTO)	.237
	N =	47
Wealth	**GDP PPP**	.662[a]
	N =	47
	GNI per capita	.831[a]
	N =	47

[a]Correlation is significant at the 0.01 level (2-tailed).
[b]Correlation is significant at the 0.05 level (2-tailed).

Significant negative correlations were found between PDI and ISU ($r = -.555$, $p < .001$). It means that the higher the PDI in a society, the lower the ISU in the society. Significant positive correlation was observed for IDV and ISU ($r = .603$, $p < .001$). IVR was positively correlated with ISU of countries ($r = .353$, $p < .05$). It means that the higher the IDV and IVR in a country, the higher the ISU in the country. No significant correlations were found for MAS, UAI, and long-term orientation (LTO) dimensions of national culture and ISU.

Next, we controlled the effect of wealth in the relationships of cultural dimensions and ISU. After controlling the effect of wealth (through GDP per capita PPP, year 2007) via zero-order Pearson correlations, significant but weaker correlation was observed between IDV and ISU ($r = .358$, $p < .05$). In addition, the LTO dimension of culture, which had not correlation with ISU before control, became positively correlated ($r = .308$, $p < .05$). The other dimensions of culture (PDI, IVR, MAS, and UAI) had not significant correlations with ISU. After controlling the effect of wealth (through GNI per capita, Atlas Method, year 2007), no significant correlation was observed among any of the dimensions of culture and ISU.

Finally, the possible relationships of dimensions of ISU with HNCD were investigated (Table 5). As it is shown, the PDI and UAI had negative significant correlations with most of ISU dimensions; and IDV, LTO, and IVR showed positive significant correlations with ISU dimensions. Of the cultural dimensions, PDI and IDV had strongest correlations with ISU dimensions.

In addition, after controlling for wealth of countries via GDP PPP, correlations were observed for HNCD and dimensions of ISU as below. PDI had significant negative correlation with using internet or email. IDV had significant positive correlations with using printed magazines, internet or email, and talk with friends or colleagues to get information. MAS, which had not any correlation with ISU dimensions, showed a negative correlation with using printed magazines. UAI had negative correlation with using books and positive correlations with using news broadcasts on radio or TV. Finally, LTO had positive correlation with using daily newspapers and internet or email to get community information.

TABLE 5. The correlations of cultural dimensions, information sources use (ISU), and wealth of countries.

			ISU							Wealth	
			Using daily newspapers	Using news broadcasts on radio or tv	Using printed magazines	Using in-depths reports on radio or tv	Using books	Using internet or email	Talk with friends or colleagues	GDP PPP	GNI per capita
Cultural dimensions	PDI	Corr.[i]	**−.496****	**−.335***	**−.518****	−.178	**−.379****	**−.699****	**−.362***	**−.681****	**−.748****
		Sig.[ii]	.000	.021	.000	.230	.008	.000	.011	.000	.000
		N	48	47	47	47	48	48	48	48	47
	IDV	Corr.	**.501****	**.348***	**.664****	.211	**.398****	**.675****	**.463****	**.668****	**.744****
		Sig.	.000	.017	.000	.155	.005	.000	.001	.000	.000
		N	48	47	47	47	48	48	48	48	47
	MAS	Corr.	−.128	−.139	−.211	.054	−.086	−.163	−.150	−.128	−.143
		Sig.	.387	.350	.155	.717	.563	.268	.310	.385	.338
		N	48	47	47	47	48	48	48	48	47
	UAI	Corr.	−.155	.226	−.275	.022	**−.378****	−.237	−.268	−.148	−.254
		Sig.	.293	.127	.061	.883	.008	.104	.065	.314	.084
		N	48	47	47	47	48	48	48	48	47
	LTO	Corr.	**.300***	.249	.237	.136	.154	.233	−.044	**.288***	.227
		Sig.	.040	.095	.114	.366	.302	.115	.767	.050	.129
		N	47	46	46	46	47	47	47	47	46
	IVR	Corr.	**.292***	.241	.272	.229	**.377****	**.381****	.201	**.378****	**.385****
		Sig.	.047	.106	.067	.126	.009	.008	.176	.009	.008
		N	47	46	46	46	47	47	47	47	46

i: Pearson correlation.

ii: Significant (two-tailed).

* correlation is significant at the .05 level.

** correlation is significant at the .01 level.

Cultural Patterns of Information Source Use

In order to identify the general cultural patterns of ISU, we draw the scatterplots of the interactions of national culture and ISU. We followed the cultural categorizations of Hofstede in drawing the patterns. Hofstede et al. (2010) categorized the world countries into six cultural groups, based on an "empirical typology" (i.e., the clustering of countries based on their scores on national culture dimensions; cf. Hofstede, 2001, p. 28), as illustrated in Table 6.

Following Hofstede's categorization of countries, we map the scatterplots of those dimensions of culture, which had statistically significant relationships with ISU of countries. Figure 1 shows the scatterplot of the relationships of PDI and ISU. Four patterns are visible in this scatterplot. (a) Of the included countries in the figure, European North, Northwest, and Anglo countries (NUANCE) have lowest PDI and highest ISU. (b) European Central, East, and ex-Soviet countries (ECENT) have upper middle PDI and upper middle ISU. (c) South and Central American countries (SACRA) have high PDI and lower middle ISU. (d) The Muslim world, Middle Eastern countries and South Africa (MONASTIC) have high PDI and low ISU.

Of studied Asian East and Southeast countries (ASEN), Malaysia, Japan, and South Korea have similar ISU to the NUANCE. China, India, Vietnam, Thailand, and Taiwan have similar ISU patterns to MONASTIC, and interestingly, Indonesia's ISU is very similar to ECENT. Of the European South and South East countries (SAUCE), Italy has similar ISU patterns to NUANCE; France's ISU behavior is similar to ECENT; and Turkey and Spain's ISU pattern is similar to MONASTIC.

Figure 2 illustrates the relationships of IDV (IDV) level of countries and their ISU. Four patterns are visible in this scatterplot. First, NUANCE has highest IDV and highest ISU. Second, ECENT has approximately upper middle IDV (except Hungary and Poland) and upper middle ISU. Third, SACRA has low IDV and relatively low ISU. The ISU of Trinidad and Tobago is an exception and it is similar to ECENT. Fourth, MONASTIC, Turkey and Spain have low IDV and low ISU.

Of ASEN, Malaysia, Japan, and South Korea have low IDV and similar ISU to NUANCE. China, India, Vietnam, Thailand, and Taiwan have low IDV and similar ISU patterns to MONASTIC, and interestingly, Indonesia (with low IDV) has similar ISU pattern to ECENT. Of SAUCE, Italy has high IDV and similar ISU pattern to NUANCE; France's ISU is similar to ECENT, and finally, Turkey and Spain's ISU pattern is similar to MONASTIC.

Figure 3 shows the relationships of IVR level of countries and their ISU patterns. Again, four general patterns are visible in this scatterplot. First, NUANCE (except for Germany) has high IVR and highest ISU. Second, ECENT has low IVR and upper middle ISU. Third, SACRA has high IVR (except for Peru) and average ISU. Of SACRA, the ISU patterns of Trinidad and Tobago are similar to ECENT. Fourth, MONASTIC, Turkey and Spain have low IVR (except for South Africa and Ghana) and low ISU. Of ASEN, Japan, and South Korea (with low IVR) and Malaysia (with high IVR) have similar ISU pattern to NUANCE.

TABLE 6. The cultural groups of world countries[a] (Hofstede et al., 2010, pp 57–59).

Cultural group	Included countries in the group
America Central / South	Argentina, Brazil, Chile, Colombia, Mexico, Peru, Trinidad and Tobago, Uruguay
Asia East and Asia South East	China, India, Indonesia, Japan, Malaysia, South Korea, Taiwan, Thailand, Vietnam
Europe Central/East and Ex-Soviet	Bulgaria, Hungary, Poland, Romania, Russia, Serbia and Montenegro, Slovenia, Ukraine
Europe North/Northwest and Anglo World	Australia, Canada, Finland, Germany, Great Britain, Netherlands, Norway, Sweden, Switzerland, United States
Europe South/South East	France, Italy, Spain, Turkey
Muslim World, Middle East and African countries	Burkina Faso, Egypt, Ethiopia, Ghana, Iran, Jordan, Morocco, South Africa, Zambia

[a]Those countries, which are included in this study, are listed in this table.

China, India, Vietnam, Thailand, and Taiwan have low IVR and similar ISU patterns to MONASTIC, and interestingly, Indonesia (with low IVR) has similar ISU behavior to ECENT. Of SAUCE, Italy has high IVR and similar ISU pattern to NUANCE; France's ISU pattern is similar to ECENT, and finally, Turkey and Spain's ISU patterns are similar to MONASTIC.

In addition, the six cultural groups of Hofstede can be mapped into four groups of similar ISU patterns. These four groups (Table 7) and their patterns of ISU are described here.
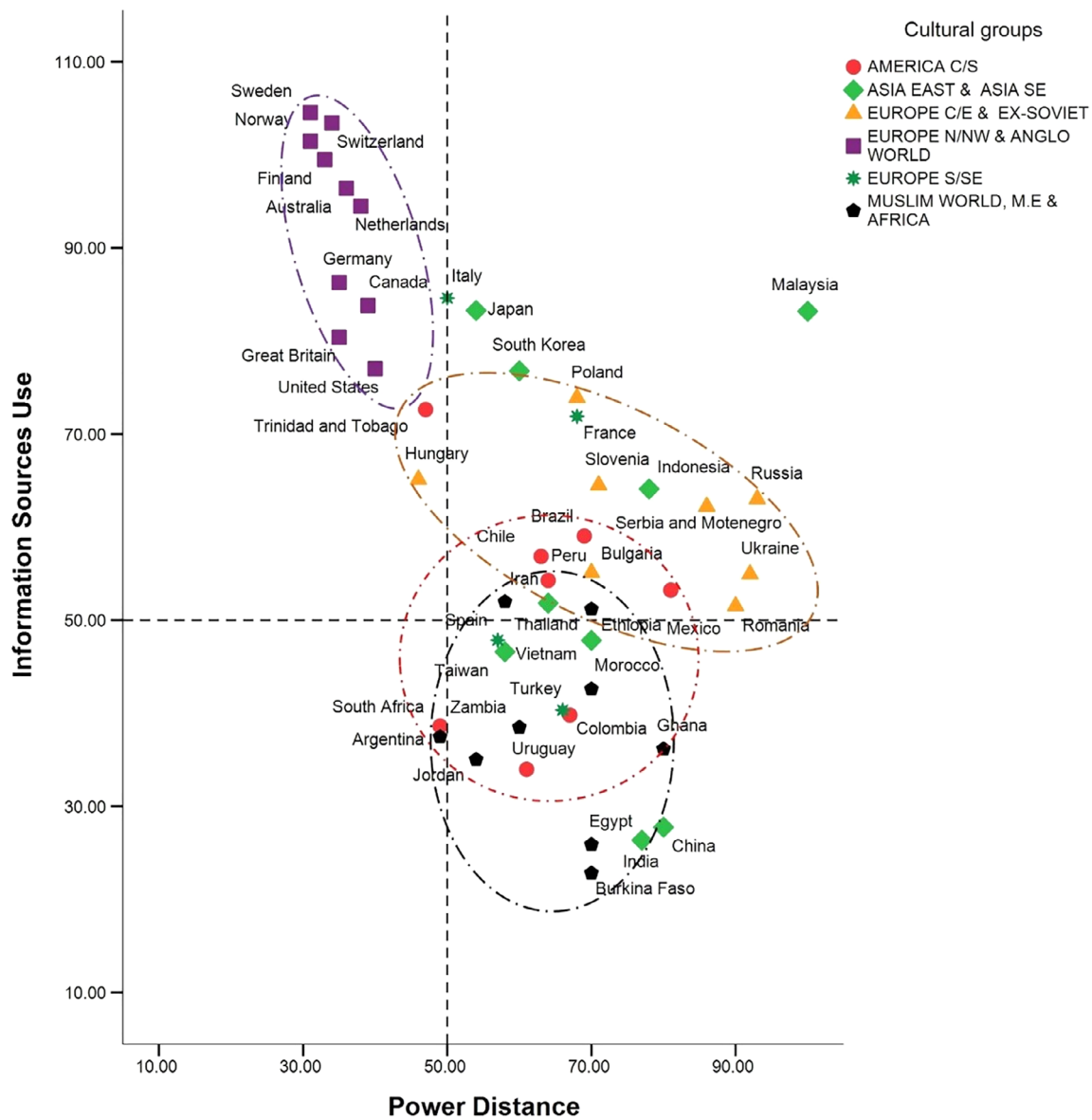

FIG. 1. Power distance (PDI) and information source use (ISU; $r = -.555$, $p < .001$). [Color figure can be viewed at wileyonlinelibrary.com]
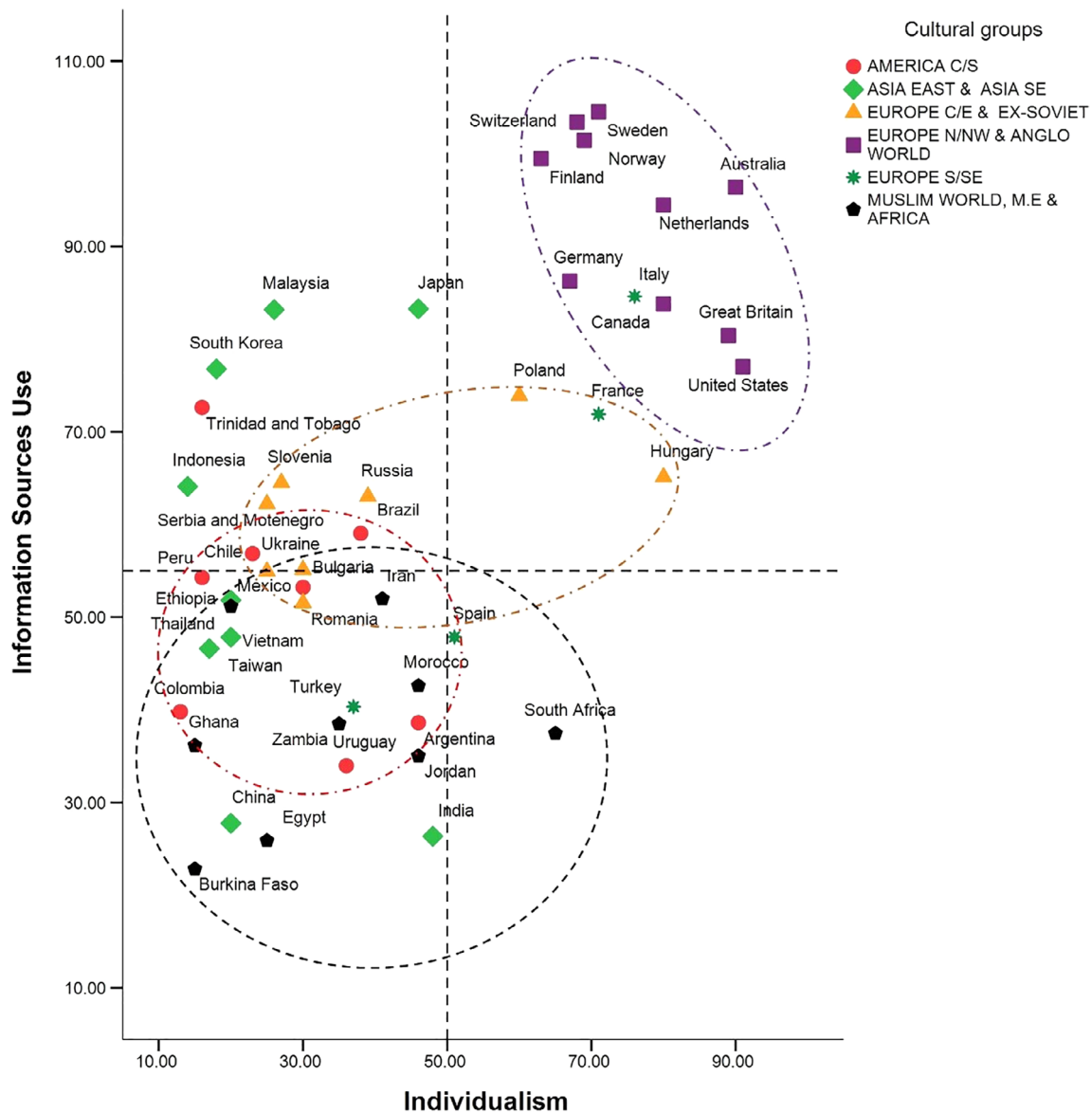
FIG. 2. Individualism (IDV) and information source use (ISU; $r = .603$, $p < .001$). [Color figure can be viewed at wileyonlinelibrary.com]

The first group including South and Central American countries (Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Uruguay) is composed of collective societies with high PDIs and high IVR. These countries have lower ISU in comparison with the other groups in this study.

The second group, i.e. European Central East, Ex-Soviet countries (Bulgaria, Hungary, Poland, Romania, Russia, Serbia and Montenegro, Slovenia, Ukraine) have similar patterns of ISU. These countries are regarded as large power distant countries with mostly low IDV and IVR, and they have low ISU too. ISU pattern of Indonesia and France is similar to this group, although they have different scores of cultural dimensions.

The third group composed of Europe N/NW and Anglo World (Australia, Canada, Finland, Germany, Great Britain, Netherlands, Norway, Sweden, Switzerland, and United

States) have generally low PDI, highest IDV, high IVR, and the highest ISU among the countries in this study. However, ISU patterns of Trinidad and Tobago, Malaysia, Japan, and South Korea which have different scores of cultural dimensions are similar to the this group.

The fourth group, formed of Muslim world, Middle East and African countries (Burkina Faso, Egypt, Ethiopia, Ghana, Iran, Jordan, Morocco, South Africa, and Zambia) has relatively high PDI, low IDV, and low IVR, and finally the lowest ISU among the studied countries. Most of Asian countries (China, India, Vietnam, Thailand, Taiwan, and Turkey) and Spain have similar ISU patterns to this group.

As it appears, the IVR has not so much effects on the ISU of the first cultural group, but for the other three groups, the IVR has a relatively positive relationship with ISU, i.e. the higher the IVR in society, the higher the ISU.
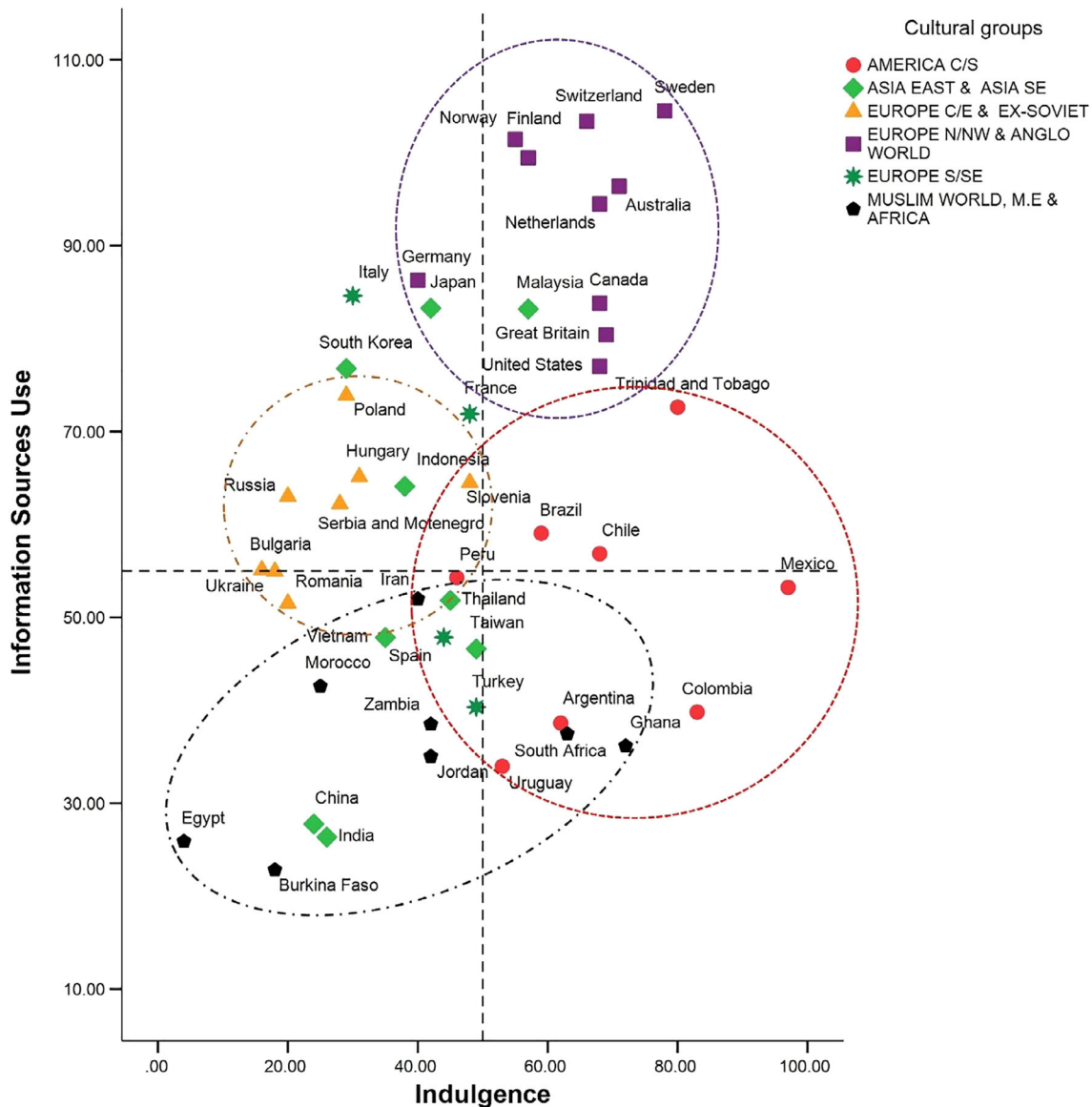
FIG. 3. Indulgence (IVR) and information source use (ISU; $r = .353$, $p < .05$). [Color figure can be viewed at wileyonlinelibrary.com]

However, the ISU patterns of all countries in this study are predictable based on two dimensions of PDI and IDV, i.e. the higher the IDV in a society, the higher the ISU in society; and the lower the PDI in a society, the higher the ISU in the society. These findings could be related to the functions of ISU in a society.

Discussions

The results of our study suggest that some dimensions of national culture are correlated with the use of information sources. The IDV dimension of culture is found to be positively correlated to ISU and its dimensions. This result

TABLE 7. Cultural patterns of information source use (ISU).

			Cultural dimensions			
			PDI	IDV	IVR	ISU
Groups	1st Group	South and Central America (SACRA)	High	Low	High	Low
	2nd Group	Europe CE and Ex-Soviet (ECENT) + France and Indonesia	High	Mostly low	Low	low
	3rd Group	Europe N/NW and Anglo World (NUANCE)	Low	High	High	High
		+ Italy, Malaysia, Japan, and South Korea + Trinidad and Tobago				
	4th Group	Muslim World, M.E., and Africa (MONASTIC)	Average-High	Low	Low-average	Low
		+ China, India, Vietnam, Thailand, Taiwan, Turkey and Spain				

is in line with findings of Zhao et al. (2014) who found a negative relationship between in-group collectivism and e-government adoption (the latter seen as a form of ISU). In individualist societies, the educational system supports the independent thinking of learners (Hofstede, 2011, p. 10; Steinwachs, 1999, p. 200). In these nations, the goal of educational system is "learning how to learn" (Hofstede, 2011, p. 10) as well as the learners are encouraged to develop their own ideas and points of view (Steinwachs, 1999, p. 200). This stems well with the more frequent and the more divergent ISU that our analysis demonstrates.

In addition, the IVR dimension of culture was positively correlated with ISU. It means that in indulgent countries people tend to use more diverse information sources than in restraint countries. This finding is in line with the assumptions of Hofstede et al. (2010); Hofstede (2011) for indulgent societies. According to Hofstede (2011, p. 15), in indulgent societies, people's intention to "have fun" is recognized by emphasizing the freedom of expression and leisure activities as inseparable parts of the social engagements; while in restraint societies, the authorities are perceived to both control and regulate such engagements through establishing and strengthening strict social norm structures. Thus, it is likely that people of indulgent societies have more opportunities for recreational activities such as reading books and newspapers, using the internet and accessing other information sources.

Furthermore, we found negative correlations of PDI dimension of culture with ISU and its dimensions. It means that in countries with high PDI, people use information sources to a lesser degree. This finding can be explained by divergent educational systems in high and low power distant societies. In societies with low PDI, the educational system is learner-oriented, and pupils are respected as adults (Hofstede, 2011, p. 9). In addition, teachers are not viewed upon as "heroes," but as accelerators of learning process (Hofstede, 2011, pp. 9–10). In such societies, the educational systems foster learners' creativity and focus on understanding (Hofstede et al., 2010, pp. 69–70) rather than "memorization of pre-selected knowledge" (Steinwachs, 1999, p. 200). In addition, in high power distant societies, a limited number of privileged persons control decision making, which may reduce the interest of the other members of these societies to find answers for society problems by accessing and using various information sources (Steinwachs, 1999, p. 200). This might explain why people in these societies tend to be more motivated to use several kinds of information sources to investigate the current issues in society than people in societies with high PDI.

However, wealth appears to moderate the cultural effects on ISU. Our finding that after controlling the effect of wealth, through GDP PPP and GNI per capita, the correlations between HNCD and ISU changed, became insignificant or new dimension (i.e., LTO) emerged in the correlations, shows that wealth is a strong mediating factor which possibly weakens the correlations of national culture and ISU. This supports a conclusion that when wealth is not a concern, the world citizens have more tendency to use information sources. This finding is not completely new. For instance, there is research where a significant correlation between MAS dimension of HNCD and the dependent variables was found only after controlling the effect of wealth (Hofstede et al., 2010, p. 145). Furthermore, connecting the cultural dimensions, wealth, and other societal variables is complex (Deschepper et al., 2008, p. 6). As researchers explain:

> … the cultural dimensions may be resultant of important factors (as we showed for the impact of GDP). However, the strength of cultural dimensions is that they are the resultant of many interacting factors and that they can put phenomena together that initially seem unconnected. (Deschepper et al., 2008, p. 7)

Limitations

This study has some limitations. First, the included data in this study is a decade old, which is a long period concerning the expansion of digital information sources. However, this does not mean that the cultural differences per se loose validity. For example, many researchers show the validity and successful replications of HNCD (Søndergaard, 1994).

Second, although we have confirmed the correlations of some dimensions of national culture with ISU, these are not enough to confirm the *causation* among them. In addition, the correlations of these variables may be "spurious" (Ferrante, 2012, p. 64), i.e. there may be a third variable (e.g., general trust, literacy, etc.) which have strong correlation with both of dependent and independent variables, resulting in accidental or spurious correlations of dependent and independent variables. One such variable could be general trust where correlation with media use has been partially confirmed (Jackob, 2010, p. 601), and it may be expected that high levels of general trust in society trigger ISU of citizens.

Third, the findings of this study are based on the aggregate (ecological) data in country-level. The findings are applicable only for cross-country comparisons and may not be used in individual level (e.g., Robinson, 2009). In other words, in this research the data are used to show a difference between the countries in general. It is not intended to measure how good or bad the countries are in relation to dimensions in question. Thus, the numbers tell nothing about individuals in any country.

Fourth, this study has the limitations of secondary data. However, both Hofstede's data for national culture dimensions and WVS's data on human preferences has been regarded as fruitful in explaining collective behaviour of nationalities (cf. Deschepper et al., 2008; Johnson & Mislin, 2012).

Conclusion

In order to answer the research question of this study – How does HNCD relate to information sources use in a cross-country comparison, if at all? – we correlated the

HNCD with country-level statistical data on ISU. The findings indicate that IDV, PDI and IVR are three cultural dimensions associated with ISUs on cross-country level.

In individualistic societies, which mostly are low power distant and indulgent nationalities, the free flow of information is a prerequisite for empowering the citizens and their involvements in vital decision-making processes. In these societies, informing citizens is a necessary part of democracy. Thus, information sharing in individualistic societies is generally more informative and balanced, where public media reflects upon different sides of what is happening in the society.

In collectivist societies, which mostly are restraint societies with large PDI, the information distribution to citizens is dependent on the legitimation by authorities. Thus, the information sources are regulated or even manipulated in order to show what the authorities approve to be shown. In these societies, the information sources have a comforting function, that is, the public media inject the positive facts and news that fortify authorities, and the "ignorant citizens" are welcomed (Porto, 2007).

There are some disparities in our portrayed patterns of ISU. First, the "multiethnic" features of Indonesia and Malaysia make the cultural scores of these countries confusing (cf. Hofstede et al., 2010, p. 158). Second, in some countries, although the central government have tried to make a unique national system (Hofstede et al., 2010, p. 17), the minorities and ethnic groups "fight for their own identities," such as Basques in Spain and France, and Kurds in Turkey (Hofstede et al., 2010, p. 21). Third, if the PDI and IDV are plotted together, most of the collectivist societies are power distant too (Hofstede et al., 2010, p. 103). Finally, these disparities may originate from the general problem of dimensional models of culture:

> The scores for each country on one dimension can be pictured points along a line. For two dimensions at a time, they become points in a plot. For three dimensions, they can be imagined as points in space. For four or five dimensions, they become difficult to imagine. (Hofstede, 2001, p. 28)

Our main aim in this study was to address the lack of direct evidence on the relationships of national culture and information-related activities of societies. We have done so by directly linking and reporting on the interactions of national culture and information sources use. Accordingly, the first major practical contribution of the present research is that it provides much-needed investigations on the information sources use of societies based on their collective information behavior. This information is important given that most of the previous information behavior studies was focused on the cognitive level of human information interaction. Recounting in depth the information related activities of groups will allow policy-makers, libraries, information system designers, and others to design initiatives, tools, and actions based on what individuals (as collective units) do in terms of their practice. For example, information providers could take note that cultural grouping seems, at least, a complementary approach to passing different information

sources to diverse groups of individuals. This will allow them to redesign their systems accordingly. Furthermore, this study responds to the call made by, among others, Menou (1983) who highlighted the importance of the cultural property of information.

A second important implication of our study derives from the uniqueness of the large-scale secondary data to directly investigating possible connections of socio-cultural variables and ISU of societies. In this sense, further, cross-national comparative research, based on different cultural theories or data (e.g., GLOBE 2004 Cultural Data that represent nine cultural dimensions of societies) and newer data of information sources (e.g., online information) alongside with other aspects of information use (such as searching, sharing, evaluation, etc.) are important to investigate in relation to cultural dimensions. Such research would deepen and specify our findings on the relationship between national culture and ISU, and to learn more about the information use of societies in the digital era. Furthermore, this would clarify whether the globalization and digital communications could contribute to a "network-state" (Castells, 1997) or the cultural territories are yet "as meaningful as" global culture (Robertson, 1992, p. 114). Finally, investigations on societal variables such as national culture, wealth, general trust and their linear or covariate interactions with ISU deserve greater attention to solve the complexity of interactions of noted factors in predicting information source patterns of societies.

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